



United States  
Department of  
Agriculture



Natural Resources  
Conservation  
Service

# Oregon Basin Outlook Report

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



**Springtime snow survey at Anthony Lakes**

*Photo courtesy of Jason Yencopal (Baker County Oregon)*

April brought warm temperatures and rapid snowmelt to Oregon's mountains. Snowpack across the state decreased significantly during April and most regions are well below normal as of May 1<sup>st</sup>. Anthony Lakes snow course (pictured above) typically continues to accumulate snow through the month of April, but this year it lost over 2.5 feet of snow depth (7 inches of snow water). As of May 1<sup>st</sup>, the course is holding onto 41 inches of dense spring snow containing 23 inches of water, which is 89% of normal. Last month, the measurement was 122% of normal. Because of this unusual April snowmelt, many reservoirs have filled significantly. However, streamflow forecasts are now predicting below normal streamflow volumes for the remaining months of the water supply season.

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# General Outlook

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

## SUMMARY

Record breaking temperatures during April took their toll on the mountain snowpack. Oregon's snowpack was near normal on April 1<sup>st</sup> and is now well below normal for most sites as of May 1<sup>st</sup>. In one month, nine SNOTEL sites experienced the most April snowmelt on record and others neared record loss. In many cases, snow monitoring sites lost up to 4 feet of snow in one month, resulting in a sharp decline in snowpack between the first of April and the first of May. Early and rapid snowmelt led to above normal streamflows and earlier than normal streamflow runoff peaks. The runoff was most beneficial to reservoirs in Oregon, where many were able to greatly improve their storage volumes and provide assurance of water supplies for users with access to reservoir water. However, water users that rely on streamflow for water supplies may likely observe below normal streamflows this spring and summer, especially in parts of southern and southeastern Oregon.

Temperatures during the month of May will be key to shaping the rest of the snowmelt season. During the last week of April, temperatures cooled off and slowed the rate of snowmelt. If this trend continues, remaining snow will be preserved longer into the season and help sustain streamflows. If warm temperatures flush the remaining snow rapidly, streams will likely recede to baseflows sooner than normal. Once the snow is gone, streams will be at the whim of temperatures and spring rainfall. Currently, NOAA's Climate Prediction Center (CPC) is calling for above normal temperatures for the next three months and above normal amounts of precipitation for southern Oregon: <http://www.cpc.ncep.noaa.gov/>. If spring brings rainfall, it could delay or lighten irrigation demand and provide a buffer to early snowmelt. The US Drought Monitor (<http://droughtmonitor.unl.edu>) still has most of eastern Oregon listed in the moderate drought category as of May 1<sup>st</sup>, so it is advised to plan conservatively for water supplies in this region. Elsewhere, water users that depend on streamflow for water supplies may also lean towards conservative water planning.

## SNOWPACK

Rapid snowmelt dominated Oregon's mountains and rivers during the month of April. However, mountain snowpack across most of the state tracked near normal for the December through March accumulation season. Most locations reached their normal seasonal peak snow accumulation amounts, which provided a great season for winter recreation and relief to water users. This year highlights not only the importance of peak snowpack quantity, but also the importance of the rate, timing and amount of snowmelt. These snowmelt characteristics are arguably as important as peak snowpack amount in shaping how streamflow is distributed throughout the spring and summer. Normally, streams receive a slower and steadier source of snowmelt distributed over more days and later in the season, but April's rapid and significant snowmelt squeezed more runoff

into a shorter window, leaving less snow to sustain streamflows later in the season. The unusual snowmelt rates have left behind a highly variable May 1<sup>st</sup> snowpack at sites throughout the state, ranging from snow-free in the John Day basin to 91% of normal in the Rogue and Umpqua basins. The following bullet points summarize the variable snow season so far:

- On April 1<sup>st</sup> state wide snowpack was near normal, but after a month of unusual snowmelt, most of the remaining snowpack is well below normal as of May 1<sup>st</sup>.
- The snowpack in most basins reached near normal seasonal peak amounts before snowmelt began. However, most sites in northwestern Oregon peaked well below normal this winter.
- Unusually warm April temperatures accelerated snowmelt to match snowmelt rates more typical of May and June.
- Over twice the normal snowmelt rates occurred during April in many locations.
- Nine long-term SNOTEL sites experienced record breaking amounts of snowmelt for April.
- Among sites that have snow on May 1<sup>st</sup>, 75% of them lost between 3 and 4 feet of snow during the month of April.
- It is normal for about half the network to be snow free on May 1<sup>st</sup>. However, this year two thirds of Oregon sites are snow-free as of May 1<sup>st</sup>.
- On average, snow-free sites melted out between 1 and 4 weeks early.
- During the last week in April, the temperatures cooled off and slowed the rate of snowmelt, which is helping to extend the life of the remaining snowpack.
- Seven snow monitoring sites have a near normal snowpack on May 1<sup>st</sup>, and 3 of those sites are in the Rogue and Umpqua basins (this region has the best snowpack in the state at 91% of normal).

## **PRECIPITATION**

April precipitation took the backseat to snowmelt and contributed below average amounts for the month. The lowest amount of precipitation fell in the Umatilla, Walla Walla and Willow basins at 39% of average and the most fell in the Owyhee and Malheur basins at 94% of average. However, since the temperatures were unusually warm, most of the precipitation fell as rain. Only the highest of elevations received some new snow during the month. Water year to date precipitation (since October 1<sup>st</sup>) has brought near average to above average amounts ranging from 96% of average in the Harney basin to 119% of average in the Rogue and Umpqua basins. As the snow season wanes, spring precipitation will become a more important factors in driving streamflows. If plentiful, it could help delay irrigation demand and increase reservoir storage, potentially offsetting or buffering the impacts of early snowmelt.

## RESERVOIRS

Many reservoirs throughout the state have benefitted from the early and rapid snowmelt. Twenty-one of Oregon's major irrigation reservoirs have increased more than 50% of normal since October 1<sup>st</sup>. Reservoirs that are in the Rogue basin had record low storage at the end of last summer and are now storing near average to above average amounts. This particular network of reservoirs has been improving all year with rainfall and recent snowmelt. As of the end of April, most of the reservoirs are now storing near average amounts. Lake Owyhee, which has greatly improved, still lags behind storing 82% of average amounts. In most cases, water users that depend on reservoir storage for water supplies will likely have adequate supplies compared to those that depend on natural streamflow, who may experience shortages.

## STREAMFLOW

Oregon's significant loss of snowpack has resulted in a drop in the statewide streamflow forecasts since last month. Most streams and rivers are now forecast for below normal volumes. The forecasts in this report include May through July and May through September total volumes. In a year such as this where the snowmelt season is shortened by unusually warm temperatures and rapid snowmelt, streams may also see a shortened high-water season. In other words, streams may have seen their highest flows earlier than usual and recede to baseflows sooner than normal. Once the snow has melted, late spring precipitation and air temperature will drive summer streamflow levels. This demonstrates how a normal snow year can still lead to below normal summer streamflows and highlights temperature effects on snow and streamflow systems.

A summary of streamflow forecasts for Oregon follows:

STREAM	Median Forecast (May through September)	
	Volume (Acre-Feet)	Percent of Average
Owyhee Reservoir Inflow	175,000	72%
Grande Ronde R at Troy	880,000	93%
Umatilla R at Pendleton	77,000	96%
Deschutes R at Benham Falls	400,000	96%
Willamette R at Salem	2,830,000	95%
Rogue R at Raygold	520,000	91%
Upper Klamath Lake Inflow	240,000	75%
Silvies R nr Burns	34,000	72%

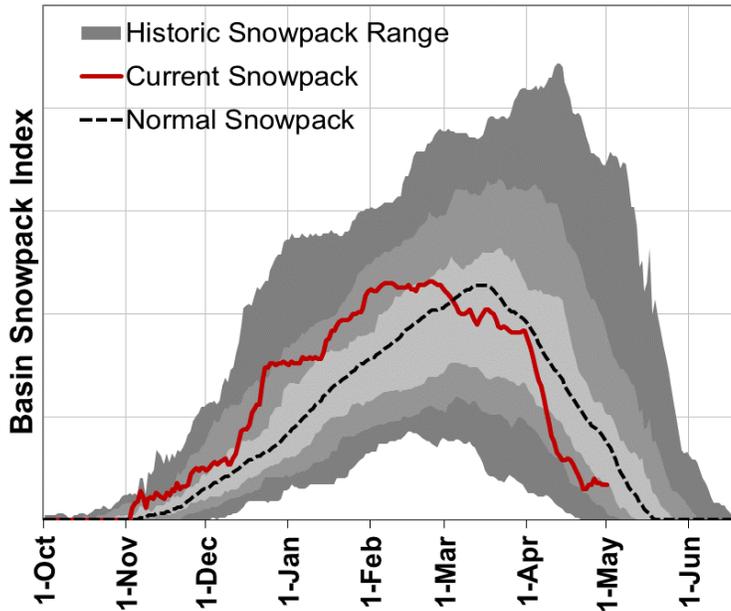
Some of these forecasts assume that normal weather conditions will occur from now to the end of the forecast period. This report contains data furnished by the Oregon Department of Water Resources, U.S. Geological Survey, NOAA National Weather Service and other cooperators. This report will be updated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



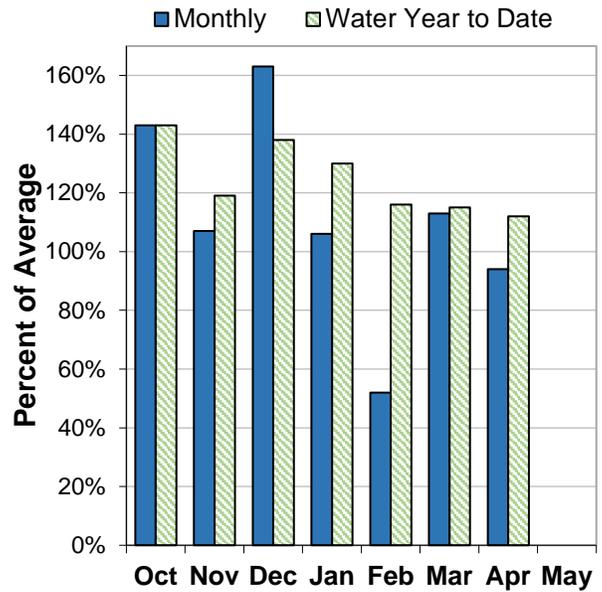
# Owyhee and Malheur Basins

May 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, many snow measurement sites in the basin were snow-free, which is normal for this time of year. However, due to a warm April, most melted out 1 to 4 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 80% to 120% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 94% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 112% of average.

### RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 82% of average at Lake Owyhee and Warm Springs to 112% of average at Beulah Reservoir. Storage has recovered significantly since the beginning of the water year, gaining between 78 and 94 percent of average.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 71% to 73% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect well below normal streamflows this summer.

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

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts May 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	MAY-JUL	29	90	131	70%	172	230	188
	MAY-SEP	43	104	146	71%	188	250	205
Owyhee R bl Owyhee Dam <sup>2</sup>	MAY-JUL	82	119	149	71%	182	235	210
	MAY-SEP	101	143	175	73%	210	270	240
Malheur R nr Drewsey	MAY-JUL	8.6	16.3	23	70%	31	44	33
	MAY-SEP	9.4	17.4	24	71%	32	46	34
NF Malheur R at Beulah	MAY-JUL	16.1	21	25	74%	29	35	34

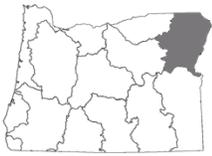
\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume  
 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

<b>Reservoir Storage</b>	<b>Useable Capacity</b>				
	<b>Current (KAF)</b>	<b>Last Year (KAF)</b>	<b>Average (KAF)</b>	<b>% of Average</b>	<b>(KAF)</b>
Beulah	54.6	37.1	49.0	112%	59.2
Bully Creek	23.0	15.5	25.3	91%	23.7
Lake Owyhee	435.0	193.2	533.1	82%	715.0
Warm Springs	104.3	45.4	126.8	82%	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	2	84%	0%
South Fork Owyhee Basin	4	66%	0%
Upper Malheur Basin	3	0%	0%
Upper Owyhee Basin	5	66%	0%

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

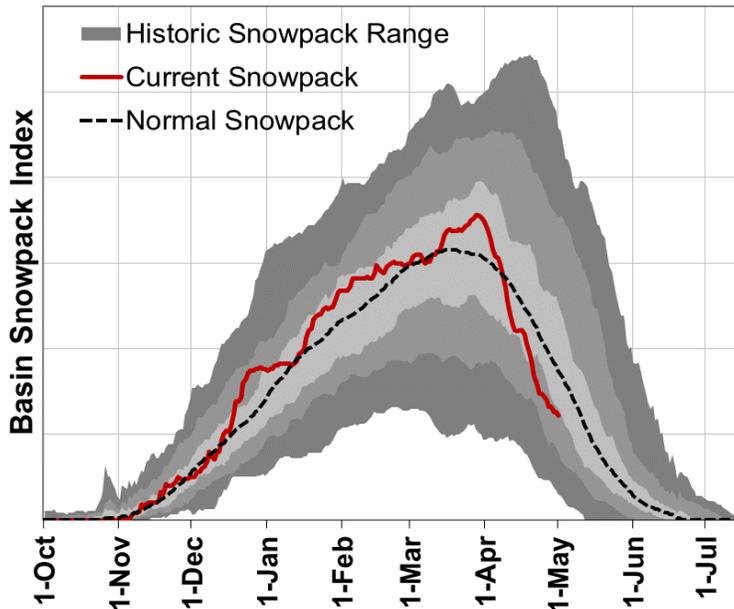
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-May	40	16.6	0.0	19.5	85%
Trout Creek AM	7890	1-May	1	0.5	0.0		
Toe Jam SNOTEL	7700	1-May	20	8.7	0.0		
Govt Corrals AM	7400	1-May	0	0.0	0.0		
Jack Creek Upper SNOTEL	7250	1-May	29	12.0	0.0	14.4	83%
Dobson Creek Snow Course	7084	2-May	53	23.8	11.6	27.1	88%
Reynolds-Dobson Divide Snow Course	7064	2-May	22	11.0	0.0	19.8	56%
Fawn Creek SNOTEL	7000	1-May	15	5.0	0.0	11.4	44%
Buckskin Lower SNOTEL	6915	1-May	0	0.0	0.0	0.2	0%
Reynolds West Fork #2 Snow Course	6798	2-May	21	10.1	0.0	18.4	55%
Big Bend SNOTEL	6700	1-May	0	0.0	0.0	0.0	
Fry Canyon SNOTEL	6700	1-May	0	0.0	0.0		
Laurel Draw SNOTEL	6697	1-May	0	0.0	0.0	0.0	
South Mtn. SNOTEL	6500	1-May	0	0.0	0.0	5.6	0%
Taylor Canyon SNOTEL	6200	1-May	0	0.0	0.0	0.0	
Blue Mountain Spring SNOTEL	5870	1-May	0	0.0	0.0	5.7	0%
Mud Flat SNOTEL	5730	1-May	0	0.0	0.0	0.0	
Democrat Creek Snow Course	5686	2-May	3	2.0	2.0	0.0	
Reynolds Creek SNOTEL	5600	1-May		0.0	0.0	0.0	
Rock Springs SNOTEL	5290	1-May	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-May	0	0.0	0.0	0.0	



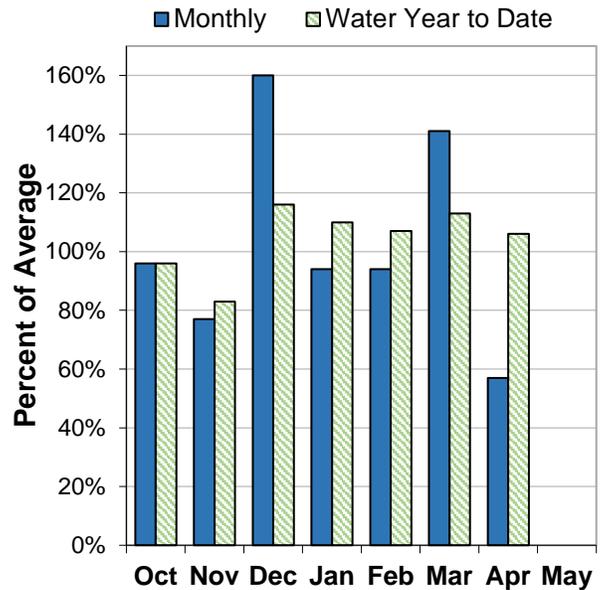
# Grande Ronde, Powder, Burnt and Imnaha Basins

May 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, roughly half the snow measurement sites in the basin were snow-free, when normally only a third are. Of the snow-free sites, some melted out 3 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 80% to 110% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 57% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 106% of average.

### RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 63% of average at Phillips Lake to 132% of average at Wallowa Lake. Storage in the Powder River basin has recovered significantly since the beginning of the water year, gaining between 50 and 100 percent of average.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 83% to 95% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect below normal to near normal streamflows this summer.

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

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts May 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	MAY-JUL	2.4	8.3	12.3	84%	16.3	22	14.7
	MAY-SEP	3.5	9.6	13.8	84%	18.0	24	16.4
Deer Ck nr Sumpter	MAY-JUL	4.2	6.4	7.8	80%	9.3	11.5	9.8
Powder R nr Sumpter	MAY-JUL	19.6	27	32	89%	36	44	36
	MAY-SEP	20	28	33	89%	38	45	37
Wolf Ck Reservoir Inflow <sup>2</sup>	MAY-JUN	3.3	5.9	7.7	85%	9.5	12.1	9.1
Pine Ck nr Oxbow	MAY-JUL	65	82	93	83%	104	121	112
	MAY-SEP	70	87	98	83%	109	126	118
Imnaha R at Imnaha	MAY-JUL	134	164	185	93%	205	235	200
	MAY-SEP	152	184	205	93%	225	260	220
Catherine Ck nr Union	MAY-JUL	33	39	43	93%	47	53	46
	MAY-SEP	37	43	47	94%	51	57	50
Lostine R nr Lostine	MAY-JUL	83	90	94	96%	98	105	98
	MAY-SEP	89	96	101	95%	106	113	106
Bear Ck nr Wallowa	MAY-SEP	42	47	51	91%	55	60	56
Grande Ronde R at Troy <sup>1</sup>	MAY-JUL	560	705	800	93%	895	1040	860
	MAY-SEP	640	780	880	93%	980	1120	945

\* 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	33.3	31.1	52.6	63%	73.5
Thief Valley	13.9	12.3	13.7	101%	13.3
Unity	24.8	24.7	24.1	103%	25.5
Wallowa Lake	26.7	31.7	20.2	132%	37.5
Wolf Creek	10.7	6.6	8.7	123%	11.1

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

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Burnt Basin	2	0%	0%
Imnaha Basin	4	92%	36%
Lower Grande Ronde Basin	4	50%	0%
Powder Basin	8	59%	18%
Upper Grande Ronde Basin	8	71%	21%
Wallowa Basin	5	73%	29%

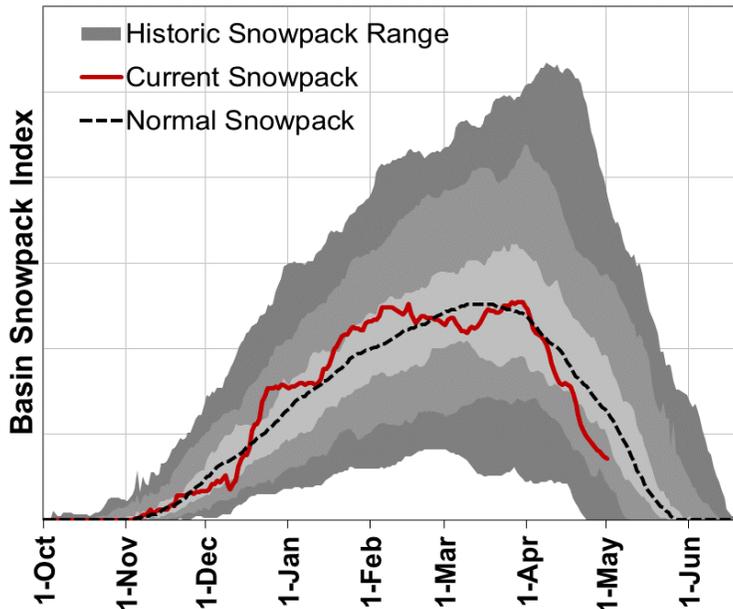
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt. Howard SNOTEL	7910	1-May	41	14.1	8.0	16.8	84%
Aneroid Lake #2 SNOTEL	7400	1-May	69	26.6	13.7	25.2	106%
Anthony Lake (Rev) Snow Course	7160	2-May	41	23.0	11.0	25.9	89%
TV Ridge AM	7050	1-May	20	8.0	0.0	19.5	41%
Big Sheep AM	6230	1-May	44	17.6	6.0	19.2	92%
Bear Saddle SNOTEL	6180	1-May	22	10.0	0.0	10.3	97%
Bourne SNOTEL	5850	1-May	0	0.0	0.0	4.7	0%
Moss Springs SNOTEL	5760	1-May	37	17.1	4.3	18.5	92%
Taylor Green SNOTEL	5740	1-May	0	0.0	0.0	10.0	0%
Spruce Springs SNOTEL	5700	1-May	0	0.0	0.0	5.1	0%
Wolf Creek SNOTEL	5630	1-May	5	1.3	0.0	6.9	19%
Milk Shakes SNOTEL	5580	1-May	70	33.2	11.2		
West Branch SNOTEL	5560	1-May	11	2.2	0.0	8.9	25%
Touchet SNOTEL	5530	1-May	28	15.0	0.0	21.8	69%
Eilertson Meadows SNOTEL	5510	1-May	0	0.0	0.0	0.0	
Gold Center SNOTEL	5410	1-May	0	0.0	0.0	0.0	
Schneider Meadows SNOTEL	5400	1-May	28	14.0	0.5	17.3	81%
Beaver Reservoir SNOTEL	5150	1-May	0	0.0	0.0	0.0	
Tipton SNOTEL	5150	1-May	0	0.0	0.0	2.0	0%
High Ridge SNOTEL	4920	1-May	20	9.8	0.0	11.0	89%
County Line SNOTEL	4830	1-May	0	0.0	0.0	0.0	
Bowman Springs SNOTEL	4530	1-May	0	0.0	0.0	0.0	
Sourdough Gulch SNOTEL	4000	1-May	0	0.0	0.0	0.0	



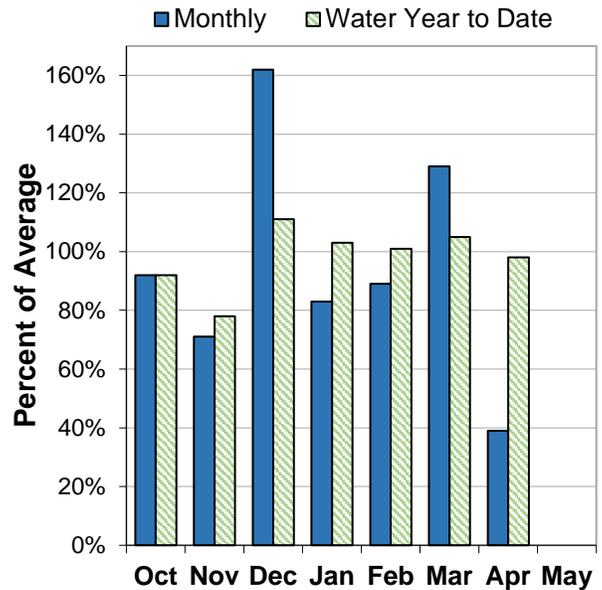
# Umatilla, Walla Walla and Willow Basins

May 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, most snow measurement sites in the basin were snow-free which is not unusual for this time of year. Of the sites that were snow-free, most melted out 2 to 5 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 80% to 110% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 39% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 98% of average.

### RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 71% of average at Cold Springs Reservoir to 108% of average at McKay Reservoir. Storage in Willow Creek Reservoir has recovered significantly since the beginning of the water year, gaining 51 percent of average.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 73% to 98% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect well below normal to near normal streamflows this summer.

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

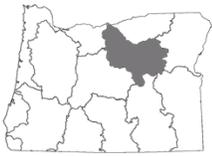
Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
SF Walla Walla R nr Milton-Freewater	MAY-JUL	27	33	36	97%	39	45	37
	MAY-SEP	38	44	48	98%	52	58	49
Umatilla R ab Meacham Ck Gibbon	MAY-JUL	17.8	30	39	93%	48	60	42
	MAY-SEP	23	35	44	92%	53	65	48
Umatilla R at Pendleton	MAY-JUL	29	55	72	97%	90	115	74
	MAY-SEP	33	59	77	96%	95	121	80
McKay Ck nr Pilot Rock	MAY-SEP	1.16	8.2	13.0	86%	17.8	25	15.2
Butter Ck nr Pine City	MAY-JUL	0.51	2.5	3.8	75%	5.1	7.1	5.1
	MAY-SEP	0.80	2.8	4.1	73%	5.4	7.4	5.6
Willow Ck ab Willow Lk nr Heppner	MAY-JUL	0.15	1.85	3.0	73%	4.2	5.8	4.1
Rhea Ck nr Heppner	MAY-JUL	0.50	1.75	3.0	73%	4.2	6.0	4.1

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

Reservoir Storage	Current	Last Year	Average	% of	Useable
	(KAF)	(KAF)	(KAF)	Average	Capacity (KAF)
Cold Springs	22.7	20.9	31.9	71%	38.6
Mckay	57.3	50.0	53.3	108%	71.5
Willow Creek	5.9	5.8	5.8	102%	9.8

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
	Umatilla Basin	5	45%
Walla Walla Basin	7	57%	0%

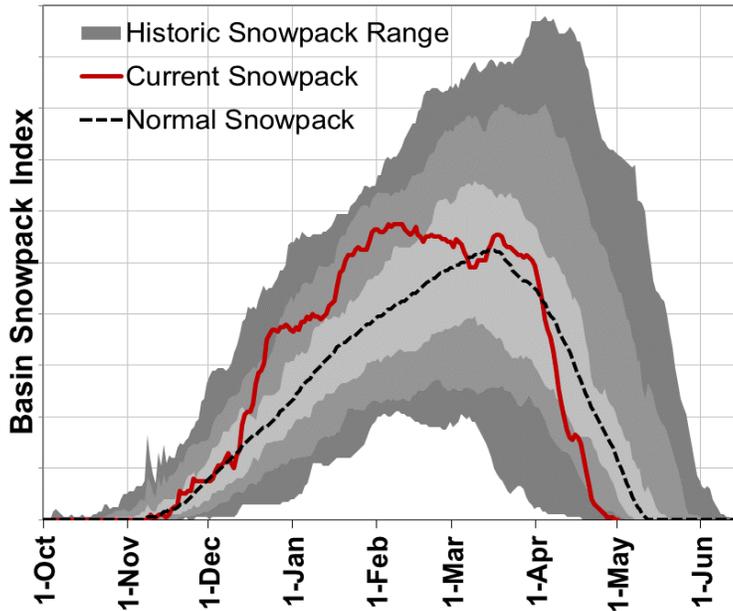
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Arbuckle Mtn SNOTEL	5770	1-May	0	0.0	0.0	11.0	0%
Spruce Springs SNOTEL	5700	1-May	0	0.0	0.0	5.1	0%
Milk Shakes SNOTEL	5580	1-May	70	33.2	11.2		
Touchet SNOTEL	5530	1-May	28	15.0	0.0	21.8	69%
Madison Butte SNOTEL	5150	1-May	0	0.0	0.0	0.0	
Lucky Strike SNOTEL	4970	1-May	0	0.0	0.0	0.0	
High Ridge SNOTEL	4920	1-May	20	9.8	0.0	11.0	89%
Bowman Springs SNOTEL	4530	1-May	0	0.0	0.0	0.0	
Emigrant Springs SNOTEL	3800	1-May	0	0.0	0.0	0.0	



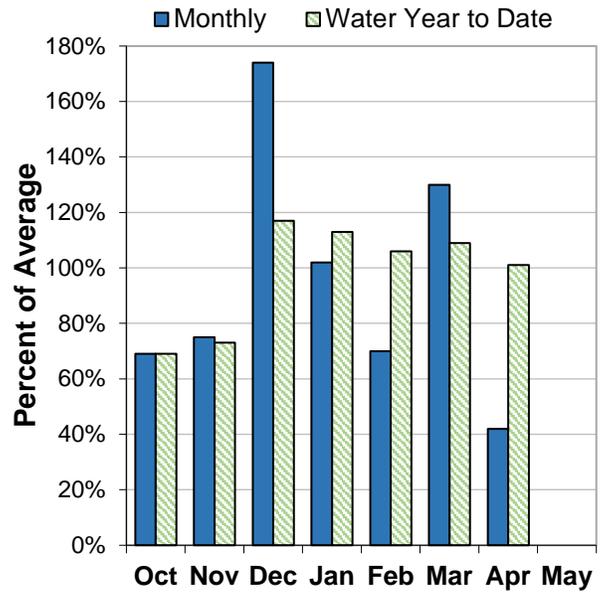
# John Day Basin

May 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, nearly all snow measurement sites in the basin were snow-free when normally only half are melted out. Most of those that melted out did so 1 to 3 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 90% to 130% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 42% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 101% of average.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 81% to 97% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect below normal to near normal streamflows this summer.

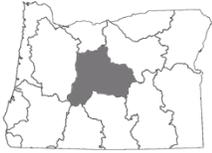
## John Day Basin Summary for May 1, 2016

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Strawberry Ck nr Prairie City	MAY-JUL	4.8	6.0	6.8	93%	7.6	8.8	7.3
	MAY-SEP	5.3	6.6	7.4	94%	8.2	9.5	7.9
Mountain Ck nr Mitchell	MAY-JUL	1.36	2.2	2.7	96%	3.2	4.0	2.8
	MAY-SEP	1.44	2.3	2.8	97%	3.3	4.2	2.9
Camas Ck nr Ukiah	MAY-JUL	4.5	10.1	13.9	82%	17.7	23	17.0
	MAY-SEP	4.8	10.4	14.3	81%	18.2	24	17.7
MF John Day R at Ritter	MAY-JUL	32	51	63	84%	75	94	75
	MAY-SEP	35	54	67	84%	80	99	80
NF John Day R at Monument	MAY-JUL	154	240	295	83%	355	440	355
	MAY-SEP	164	250	310	83%	370	455	375

\* 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
Lower John Day Basin	4	0%	0%
North Fork John Day Basin	8	53%	25%
Upper John Day Basin	5	0%	0%

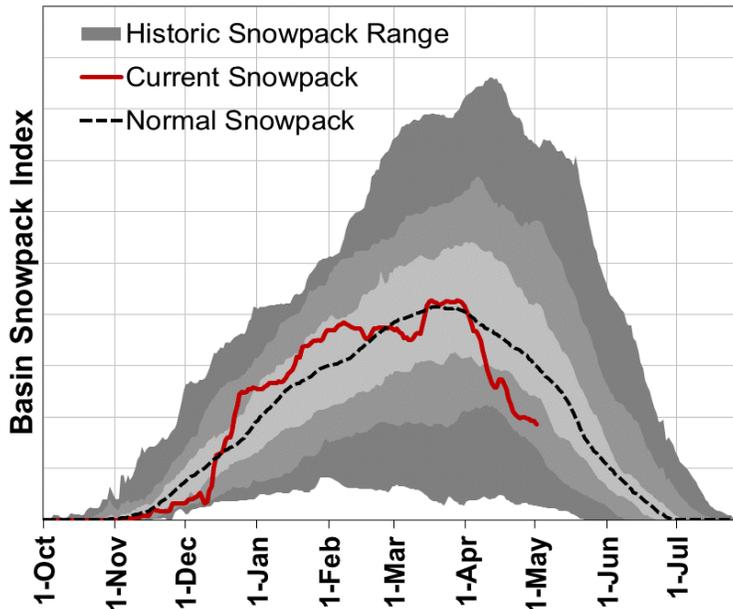
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Anthony Lake (Rev) Snow Course	7160	2-May	41	23.0	11.0	25.9	89%
Snow Mountain SNOTEL	6230	1-May	0	0.0	0.0	4.2	0%
Blue Mountain Spring SNOTEL	5870	1-May	0	0.0	0.0	5.7	0%
Bourne SNOTEL	5850	1-May	0	0.0	0.0	4.7	0%
Derr. SNOTEL	5850	1-May	0	0.0	0.0	1.5	0%
Arbuckle Mtn SNOTEL	5770	1-May	0	0.0	0.0	11.0	0%
Ochoco Meadows SNOTEL	5430	1-May	0	0.0	0.0	0.0	
Gold Center SNOTEL	5410	1-May	0	0.0	0.0	0.0	
Starr Ridge SNOTEL	5250	1-May	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-May	0	0.0	0.0	0.0	
Madison Butte SNOTEL	5150	1-May	0	0.0	0.0	0.0	
Tipton SNOTEL	5150	1-May	0	0.0	0.0	2.0	0%
Lucky Strike SNOTEL	4970	1-May	0	0.0	0.0	0.0	
County Line SNOTEL	4830	1-May	0	0.0	0.0	0.0	
Marks Creek Snow Course	4580	1-May	0	0.0	0.0	0.0	



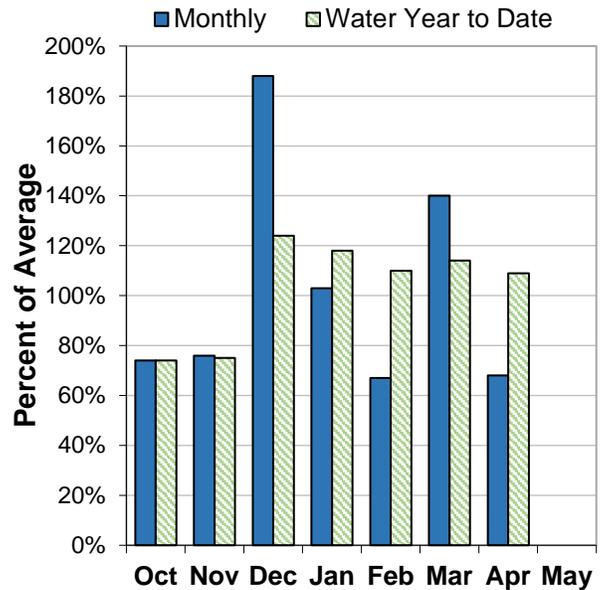
# Upper Deschutes and Crooked Basins

May 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, more than half the snow measurement sites in the basin were snow-free when normally only about a third are. Of the sites that are snow-free, some melted out 3 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 80% to 120% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 68% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 109% of average.

### RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 89% of average at Wickiup Reservoir to 123% of average at Ochoco Reservoir. Storage in Prineville and Ochoco Reservoirs has recovered significantly since the beginning of the water year, gaining 50 and 57 percent of average respectively.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 59% to 97% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect well below normal to near normal streamflows this summer.

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

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	13.7	18.6	22	92%	25	30	24
	MAY-SEP	33	40	44	94%	48	55	47
Crane Prairie Reservoir Inflow <sup>2</sup>	MAY-JUL	34	41	45	98%	49	56	46
	MAY-SEP	60	69	75	97%	81	90	77
Crescent Lake Inflow <sup>2</sup>	MAY-JUL	5.8	9.0	11.1	93%	13.2	16.4	12.0
	MAY-SEP	7.8	11.0	13.1	91%	15.2	18.4	14.4
Little Deschutes R nr La Pine	MAY-JUL	25	34	41	91%	48	57	45
	MAY-SEP	25	38	46	90%	54	67	51
Deschutes R at Benham Falls <sup>2</sup>	MAY-JUL	215	230	240	96%	250	265	250
	MAY-SEP	365	385	400	96%	410	430	415
Wychus Ck nr Sisters	MAY-JUL	22	25	26	87%	27	30	30
	MAY-SEP	32	34	36	86%	38	40	42
Prineville Reservoir Inflow <sup>2</sup>	MAY-JUL	0.60	13.5	24	62%	34	49	39
	MAY-SEP	0.10	12.6	23	59%	33	49	39
Ochoco Reservoir Inflow <sup>2</sup>	MAY-JUL	-1.60	3.2	6.5	68%	9.8	14.7	9.6
	MAY-SEP	-2.70	2.4	5.9	65%	9.4	14.5	9.1

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

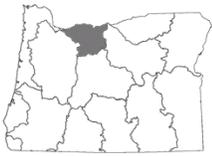
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage	Useable Capacity				
	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	(KAF)
Crane Prairie	44.4	51.1	44.1	101%	55.3
Crescent Lake	56.7	75.1	50.5	112%	86.9
Ochoco	42.3	33.2	34.5	123%	44.2
Prineville	148.3	116.5	142.9	104%	148.6
Wickiup	164.3	180.9	184.5	89%	200.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Little Deschutes Basin	4	91%	17%
Upper Crooked Basin	3	0%	0%
Upper Deschutes Basin	9	70%	11%

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

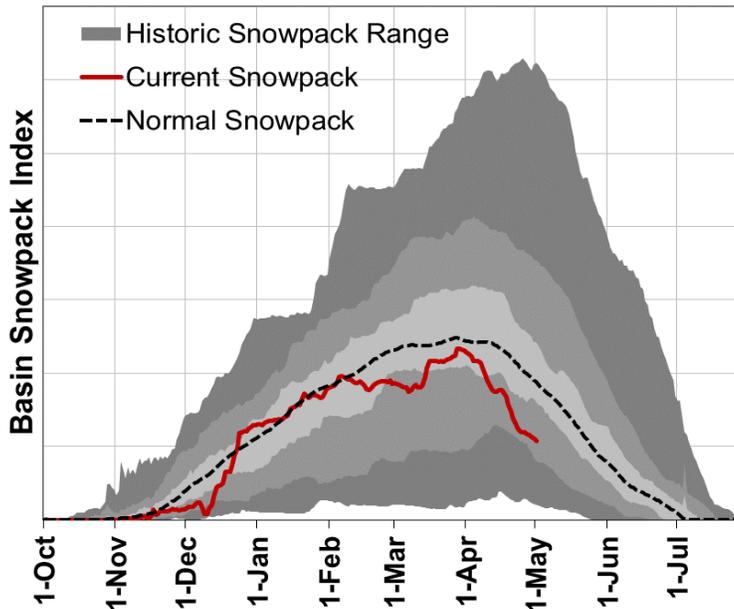
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Snow Mountain SNOTEL	6230	1-May	0	0.0	0.0	4.2	0%
Derr. SNOTEL	5850	1-May	0	0.0	0.0	1.5	0%
Three Creeks Meadow SNOTEL	5690	1-May	0	0.0	0.0	13.4	0%
Summit Lake SNOTEL	5610	1-May	90	44.1	11.4	40.8	108%
Irish Taylor SNOTEL	5540	1-May	71	33.2	8.1	39.8	83%
Ochoco Meadows SNOTEL	5430	1-May	0	0.0	0.0	0.0	
Cascade Summit SNOTEL	5100	1-May	38	15.7	0.0	24.9	63%
Roaring River SNOTEL	4950	1-May	27	14.2	0.0	20.9	68%
New Crescent Lake SNOTEL	4910	1-May	0	0.0	0.0	0.0	
Chemult Alternate SNOTEL	4850	1-May	0	0.0	0.0	0.0	
Hogg Pass SNOTEL	4790	1-May	0	0.0	0.0	19.3	0%
McKenzie SNOTEL	4770	1-May	45	19.5	0.0	35.1	56%
Marks Creek Snow Course	4580	1-May	0	0.0	0.0	0.0	
Salt Creek Falls SNOTEL	4220	1-May	7	3.5	0.0	10.1	35%
Santiam Jct. SNOTEL	3740	1-May	0	0.0	0.0	0.0	



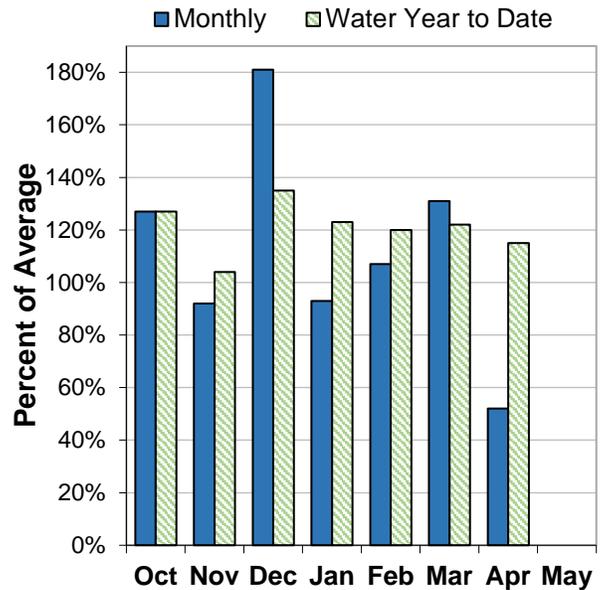
# Hood, Sandy and Lower Deschutes Basins

May 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, about half the snow measurement sites in the basin were snow-free when normally only a quarter are. Of the sites that are snow-free, most melted out 1 to 3 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 60% to 90% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 52% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 115% of average.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 89% to 95% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect below normal to near normal streamflows this summer.

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

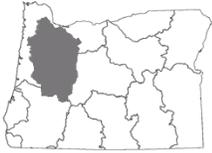
<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts May 1, 2016</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
WF Hood River nr Dee	MAY-JUL	47	63	73	94%	84	99	78
	MAY-SEP	63	80	91	95%	102	119	96
Hood R at Tucker Bridge	MAY-JUL	103	118	129	85%	139	154	151
	MAY-SEP	138	157	170	89%	183	205	190
Sandy R nr Marmot	MAY-JUL	140	168	187	89%	205	235	210
	MAY-SEP	180	210	235	92%	255	290	255

\* 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>
Clear Lake	5.1	5.2	5.4	94%	13.1

<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 Columbia - Sandy Basin	7	58%	11%
Lower Deschutes Basin	4	57%	20%
Middle Columbia - Hood Basin	6	70%	10%

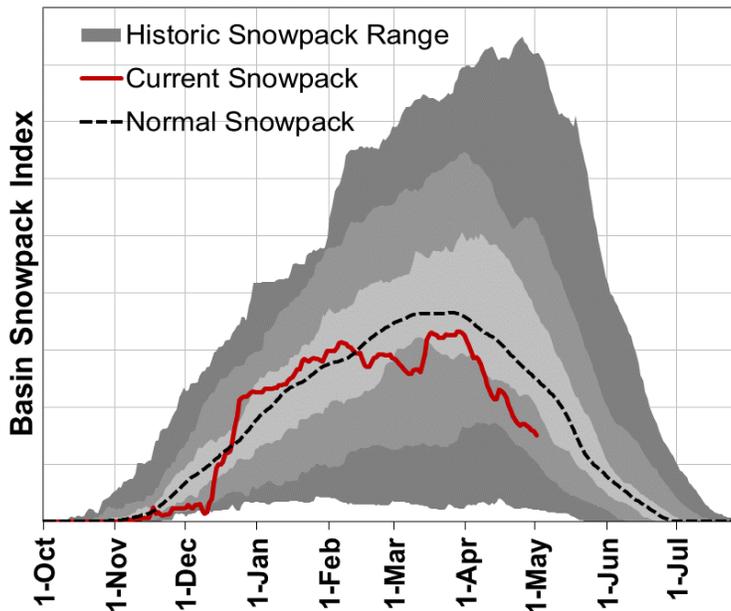
<b>Basin Snowpack Measurement Sites</b>	<b>Elevation (ft)</b>	<b>Date Measured</b>	<b>Depth (in)</b>	<b>Snow Water Equivalent (in)</b>			
				<b>Current SWE</b>	<b>Last Yr SWE</b>	<b>Median</b>	<b>% of Median</b>
Mt Hood Test Site SNOTEL	5370	1-May	88	41.8	16.4	62.0	67%
Red Hill SNOTEL	4410	1-May	56	33.9	0.0	39.8	85%
Surprise Lakes SNOTEL	4290	1-May	73	39.1	0.3	42.6	92%
Mud Ridge SNOTEL	4070	1-May	10	4.2	0.0	17.8	24%
Clear Lake SNOTEL	3810	1-May	0	0.0	0.0	1.6	0%
Blazed Alder SNOTEL	3650	1-May	13	6.4	0.0	20.4	31%
Clackamas Lake SNOTEL	3400	1-May	0	0.0	0.0	0.0	
Greenpoint SNOTEL	3310	1-May	0	0.0	0.0	1.2	0%
North Fork SNOTEL	3060	1-May	0	0.0	0.0	7.3	0%
South Fork Bull Run SNOTEL	2690	1-May	0	0.0	0.0	0.0	



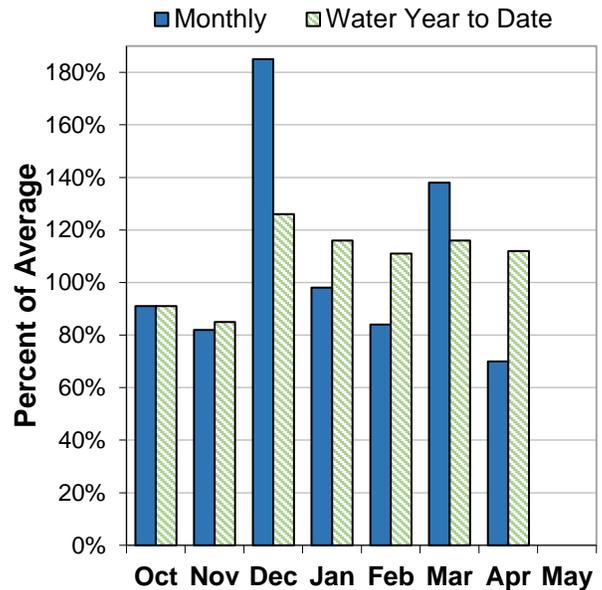
# Willamette Basin

May 1, 2016

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, roughly half the snow measurement sites in the basin were snow-free, which is not unusual for this time of year. Of the sites that are snow-free, most melted out 2 to 3 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 50% to 90% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 70% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 112% of average.

### RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 94% of average at Fall Creek Reservoir to 182% of average at Foster Reservoir.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 84% to 98% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect below normal to near normal streamflows this summer.

## Willamette Basin Summary for May 1, 2016

### Forecast Exceedance Probabilities for Risk Assessment \*

Streamflow Forecasts May 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Hills Creek Reservoir Inflow <sup>1,2</sup>	MAY-JUN	75	122	144	95%	165	210	152
	MAY-SEP	137	190	215	98%	240	290	220
MF Willamette R bl NF nr Oakridge <sup>1,2</sup>	MAY-JUN	199	310	365	95%	415	525	385
	MAY-SEP	355	480	535	97%	595	720	550
Lookout Point Reservoir Inflow <sup>1,2</sup>	MAY-JUN	195	320	375	94%	430	555	400
	MAY-SEP	360	495	555	97%	615	750	570
Fall Creek Reservoir Inflow <sup>1,2</sup>	MAY-JUN	0.40	34	49	89%	64	97	55
	MAY-SEP	8.0	44	60	94%	76	111	64
Cottage Grove Lake Inflow <sup>1,2</sup>	MAY-JUN	4.1	12.3	17.5	89%	24	40	19.6
	MAY-SEP	6.4	15.8	21	91%	28	45	23
Dorena Lake Inflow <sup>1,2</sup>	MAY-JUN	14.5	42	60	90%	80	135	67
	MAY-SEP	22	53	70	91%	91	145	77
McKenzie R bl Trail Bridge	MAY-JUN	106	118	126	92%	135	148	137
	MAY-SEP	220	240	255	94%	270	290	270
Cougar Lake Inflow <sup>1,2</sup>	MAY-JUN	54	81	96	86%	111	150	112
	MAY-SEP	92	125	142	89%	160	200	160
Blue Lake Inflow <sup>1,2</sup>	MAY-JUN	13.3	27	34	83%	43	65	41
	MAY-SEP	17.4	32	41	87%	50	74	47
McKenzie R nr Vida <sup>1</sup>	MAY-JUN	305	410	460	90%	515	645	510
	MAY-SEP	605	745	810	93%	885	1050	870
Detroit Lake Inflow <sup>1,2</sup>	MAY-JUN	156	235	270	95%	305	380	285
	MAY-SEP	280	370	410	95%	455	545	430
Little North Santiam R nr Mehama <sup>1</sup>	MAY-JUN	22	53	67	94%	81	112	71
	MAY-SEP	32	67	83	95%	99	133	87
North Santiam R at Mehama <sup>1</sup>	MAY-JUN	194	315	365	92%	420	540	395
	MAY-SEP	315	460	525	92%	595	740	570
Green Peter Lake Inflow <sup>1,2</sup>	MAY-JUN	66	108	130	90%	154	215	145
	MAY-SEP	92	139	164	93%	191	255	177
Foster Lake Inflow <sup>1,2</sup>	MAY-JUN	127	205	245	89%	290	405	275
	MAY-SEP	176	265	310	93%	365	490	335
South Santiam R at Waterloo <sup>2</sup>	MAY-JUN	156	215	260	91%	310	390	285
	MAY-SEP	210	275	325	93%	380	465	350
Willamette R at Salem <sup>1,2</sup>	MAY-JUN	1090	1710	2040	93%	2390	3270	2200
	MAY-SEP	1720	2460	2830	95%	3240	4220	2980
Scoggins Reservoir Inflow <sup>2</sup>	MAY-JUL	1.24	3.1	4.3	80%	5.6	7.4	5.4
Oak Grove Fk ab Powerplant	MAY-JUL	63	71	77	96%	83	91	80
	MAY-SEP	99	109	116	97%	124	134	120

## Willamette Basin Summary for May 1, 2016

### Forecast Exceedance Probabilities for Risk Assessment \*

Streamflow Forecasts May 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Clackamas R above Three Lynx	MAY-JUL	180	220	245	84%	270	305	290
	MAY-SEP	255	295	320	84%	350	390	380
Clackamas R at Estacada	MAY-JUL	240	300	340	84%	380	435	405
	MAY-SEP	320	385	430	84%	475	540	510

\* 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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Blue River	76.1	48.0	73.5	104%	82.3
Cottage Grove	27.5	24.6	26.7	103%	31.8
Cougar	47.7	79.6	151.9	31%	174.9
Detroit	399.2	266.6	408.5	98%	426.8
Dorena	60.8	57.4	61.5	99%	72.1
Fall Creek	101.9	66.3	108.0	94%	116.0
Fern Ridge	97.9	80.7	89.1	110%	97.3
Foster	44.9	24.3	24.6	182%	46.2
Green Peter	354.0	312.7	378.4	94%	402.8
Hills Creek	240.1	205.9	247.3	97%	279.2
Lookout Point	367.8	190.2	373.8	98%	433.2
Timothy Lake	60.9	59.2	59.0	103%	63.6
Henry Hagg Lake	53.0	53.0	52.6	101%	53.3

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Clackamas Basin	9	57%	11%
McKenzie Basin	14	68%	10%
Middle Fork Willamette Basin	7	76%	13%
North Santiam Basin	4	47%	0%
South Santiam Basin	4	47%	0%

## Willamette Basin Summary for May 1, 2016

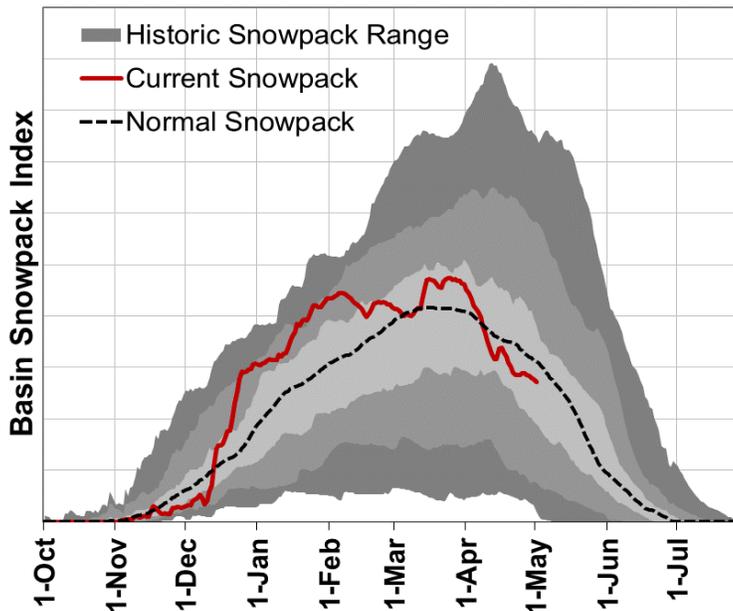
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summit Lake SNOTEL	5610	1-May	90	44.1	11.4	40.8	108%
Irish Taylor SNOTEL	5540	1-May	71	33.2	8.1	39.8	83%
Cascade Summit SNOTEL	5100	1-May	38	15.7	0.0	24.9	63%
Roaring River SNOTEL	4950	1-May	27	14.2	0.0	20.9	68%
Holland Meadows SNOTEL	4930	1-May	3	1.3	0.0	10.7	12%
McKenzie SNOTEL	4770	1-May	45	19.5	0.0	35.1	56%
Bear Grass SNOTEL	4720	1-May	59	31.2	0.0		
Salt Creek Falls SNOTEL	4220	1-May	7	3.5	0.0	10.1	35%
Mud Ridge SNOTEL	4070	1-May	10	4.2	0.0	17.8	24%
Little Meadows SNOTEL	4020	1-May	15	7.6	0.0	16.0	48%
Clear Lake SNOTEL	3810	1-May	0	0.0	0.0	1.6	0%
Santiam Jct. SNOTEL	3740	1-May	0	0.0	0.0	0.0	
Daly Lake SNOTEL	3690	1-May	0	0.0	0.0	0.3	0%
Jump Off Joe SNOTEL	3520	1-May	0	0.0	0.0	0.0	
Peavine Ridge SNOTEL	3420	1-May	0	0.0	0.0	0.0	
Clackamas Lake SNOTEL	3400	1-May	0	0.0	0.0	0.0	
Smith Ridge SNOTEL	3270	1-May	0	0.0	0.0		
Saddle Mountain SNOTEL	3110	1-May	0	0.0	0.0		
Railroad Overpass SNOTEL	2680	1-May	0	0.0	0.0	0.0	
Marion Forks SNOTEL	2590	1-May	0	0.0	0.0	0.0	
Seine Creek SNOTEL	2060	1-May	0	0.0	0.0	0.0	
Miller Woods SNOTEL	420	1-May	0	0.0	0.0		



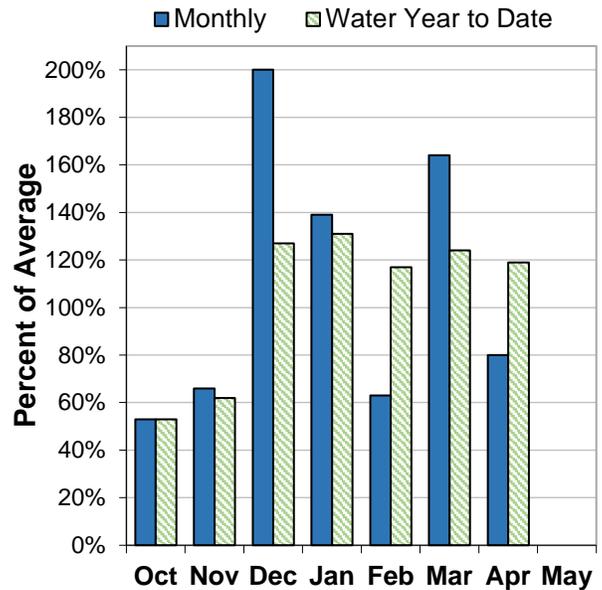
# Rogue and Umpqua Basins

May 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, roughly half the snow measurement sites in the basin were snow-free, which is not unusual for this time of year. Of the sites that are snow-free, most melted out 1 to 2 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 90% to 120% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 80% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 119% of average.

### RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 81% of average at Fourmile Lake to 107% of average at Applegate Reservoir. Storage in the Rogue basin has recovered significantly since the beginning of the water year, gaining between 55 and 81 percent of average.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 82% to 97% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect below normal to near normal streamflows this summer.

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

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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>	MAY-JUL	0.20	0.70	1.25	86%	1.90	3.0	1.46
South Umpqua R at Tiller	MAY-JUL	42	75	96	91%	118	150	106
	MAY-SEP	51	83	105	91%	127	160	115
Cow Ck nr Azalea <sup>2</sup>	MAY-JUL	1.43	4.7	6.9	91%	9.1	12.4	7.6
	MAY-SEP	1.94	5.5	7.9	90%	10.2	13.8	8.8
South Umpqua R nr Brockway	MAY-JUL	61	131	178	92%	225	295	194
	MAY-SEP	74	147	197	92%	245	320	215
North Umpqua R at Winchester	MAY-JUL	300	395	460	97%	520	615	475
	MAY-SEP	410	510	575	97%	640	735	590
Lost Creek Lk Inflow <sup>2</sup>	MAY-JUL	275	315	340	92%	370	410	370
	MAY-SEP	390	440	470	95%	500	550	495
Rogue R at Raygold <sup>2</sup>	MAY-JUL	260	345	400	91%	455	540	440
	MAY-SEP	370	460	520	91%	580	670	570
Rogue R at Grants Pass <sup>2</sup>	MAY-JUL	270	360	420	92%	480	570	455
	MAY-SEP	360	460	525	91%	590	690	580
Applegate Lake Inflow <sup>2</sup>	MAY-JUL	35	47	56	81%	65	77	69
	MAY-SEP	40	53	62	83%	71	84	75
Sucker Ck bl Ltl Grayback Ck nr Holland	MAY-JUL	16.7	23	27	82%	31	37	33
	MAY-SEP	19.5	26	30	83%	34	40	36
Illinois R nr Kerby	MAY-JUL	29	55	73	81%	91	117	90
	MAY-SEP	34	61	79	82%	97	124	96

\* 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	66.4	42.7	62.1	107%	75.2
Emigrant Lake	38.3	33.9	36.0	106%	39.0
Fish Lake	5.2	4.8	5.8	90%	7.9
Fourmile Lake	7.0	8.0	8.7	81%	15.6
Howard Prairie	42.4	25.3	46.7	91%	62.1
Hyatt Prairie	11.9	7.0	13.2	91%	16.2
Lost Creek	298.8	312.4	301.1	99%	315.0

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

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Applegate Basin	5	89%	3%
Middle Rogue Basin	7	85%	4%
North Umpqua Basin	7	101%	26%
South Umpqua Basin	10	0%	0%
Upper Rogue Basin	11	86%	14%

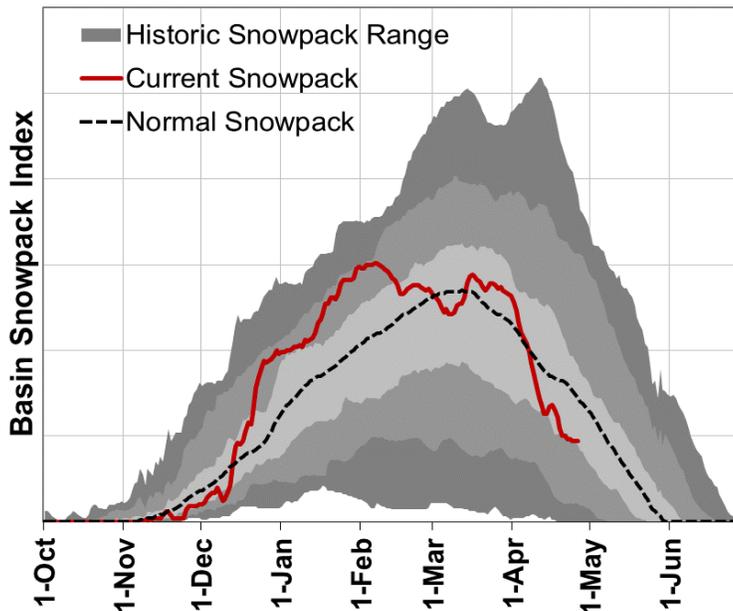
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Park H.Q. Rev Snow Course	6570	29-Apr	119	63.6	19.4	61.0	104%
Caliban (Alt.) Snow Course	6500	29-Apr	60	27.7	2.8	29.2	95%
Mt. Ashland Switchback Snow Course	6430	29-Apr	50	29.9	0.8	30.6	98%
Ski Bowl Road Snow Course	6070	29-Apr	24	11.7	0.0	21.5	54%
Big Red Mountain SNOTEL	6050	1-May	46	24.1	0.0	23.5	103%
Annie Springs SNOTEL	6010	1-May	77	39.5	6.2	43.6	91%
Fourmile Lake SNOTEL	5970	1-May	45	21.9	0.0	22.5	97%
Cold Springs Camp SNOTEL	5940	1-May	19	8.2	0.0	21.1	39%
Sevenmile Marsh SNOTEL	5700	1-May	39	17.1	0.0	24.3	70%
Summit Lake SNOTEL	5610	1-May	90	44.1	11.4	40.8	108%
Billie Creek Divide SNOTEL	5280	1-May	15	7.5	0.0	10.8	69%
Diamond Lake SNOTEL	5280	1-May	0	0.0	0.0	0.0	
Bigelow Camp SNOTEL	5130	1-May	0	0.0	0.0	0.0	
Beaver Dam Creek Snow Course	5120	2-May	0	0.0	0.0	0.0	
King Mountain 1 Snow Course	4760	29-Apr	0	0.0	0.0	0.0	
Deadwood Junction Snow Course	4660	2-May	0	0.0	0.0	0.0	
Fish Lk. SNOTEL	4660	1-May	0	0.0	0.0	0.0	
Howard Prairie SNOTEL	4580	1-May	0	0.0	0.0		
Howard Prairie Snow Course	4580	2-May	0	0.0	0.0	0.0	
Siskiyou Summit Rev. Snow Course	4560	29-Apr	0	0.0	0.0		
Red Butte 1 Snow Course	4460	29-Apr	0	0.0	0.0	2.8	0%
King Mountain SNOTEL	4340	1-May	0	0.0	0.0	0.0	
Red Butte 2 Snow Course	4050	29-Apr	0	0.0	0.0	0.0	
Silver Burn Snow Course	3680	29-Apr	0	0.0	0.0	0.0	
King Mountain 3 Snow Course	3680	29-Apr		0.0	0.0	0.0	
Red Butte 3 Snow Course	3500	29-Apr	0	0.0	0.0	0.0	
Toketee Airstrip SNOTEL	3240	1-May	0	0.0	0.0	0.0	
King Mountain 4 Snow Course	3050	29-Apr	0	0.0	0.0	0.0	
Red Butte 4 Snow Course	3000	29-Apr	0	0.0	0.0	0.0	



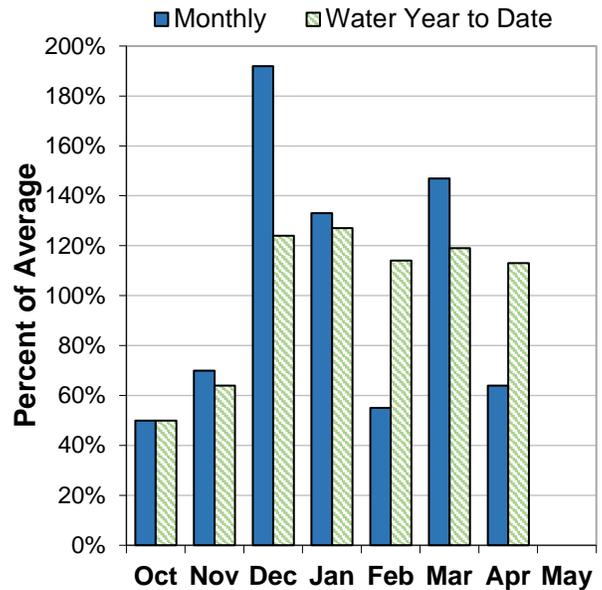
# Klamath Basin

May 1, 2016

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, roughly half the snow measurement sites in the basin were snow-free, which is not unusual for this time of year. Of the sites that are snow-free, most melted out 1 to 5 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 90% to 130% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 64% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 113% of average.

### RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 49% of average at Clear Lake to 111% of average at Upper Klamath Lake. Storage in Gerber Reservoir has recovered significantly since the beginning of the water year, gaining 68 percent of average.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 72% to 82% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect well below normal to below normal streamflows this summer.

## Klamath Basin Summary for May 1, 2016

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts May 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>	MAY-JUL	0.11	0.78	3.8	70%	6.8	11.3	5.4
	MAY-SEP	0.12	1.25	4.2	72%	7.1	11.5	5.8
Sprague R nr Chiloquin	MAY-JUL	45	70	86	73%	102	127	118
	MAY-SEP	63	89	106	75%	123	149	141
Williamson bl Sprague nr Chiloquin	MAY-JUL	94	124	144	77%	164	194	187
	MAY-SEP	148	179	200	82%	220	250	245
Upper Klamath Lake Inflow <sup>1,2</sup>	MAY-JUL	99	159	175	73%	215	275	240
	MAY-SEP	147	210	240	75%	270	335	320

\* 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	125.5	43.2	254.1	49%	513.3
Gerber	48.9	15.3	68.2	72%	94.3
Upper Klamath Lake	496.4	454.8	448.0	111%	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	3		
Sprague Basin	4	2%	0%
Upper Klamath Lake Basin	8	86%	14%
Williamson River Basin	5	99%	24%

## Klamath Basin Summary for May 1, 2016

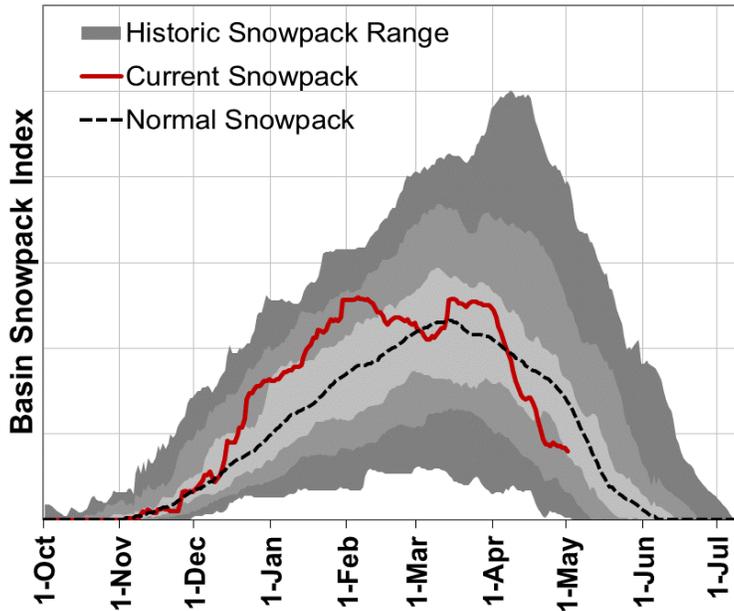
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summer Rim SNOTEL	7080	1-May	1	0.4	0.0	11.7	3%
Swan Lake Mtn SNOTEL	6830	1-May	24	12.6	0.0		
Park H.Q. Rev Snow Course	6570	29-Apr	119	63.6	19.4	61.0	104%
Crazyman Flat SNOTEL	6180	1-May	0	0.0	0.0	4.6	0%
Ski Bowl Road Snow Course	6070	29-Apr	24	11.7	0.0	21.5	54%
Annie Springs SNOTEL	6010	1-May	77	39.5	6.2	43.6	91%
Finley Corrals AM	6000	1-May	0	0.0		4.6	0%
Fourmile Lake SNOTEL	5970	1-May	45	21.9	0.0	22.5	97%
Cold Springs Camp SNOTEL	5940	1-May	19	8.2	0.0	21.1	39%
Strawberry SNOTEL	5770	1-May	0	0.0	0.0	0.0	
Cox Flat AM	5750	1-May	0	0.0			
Silver Creek SNOTEL	5740	1-May	0	0.0	0.0	0.0	
Quartz Mountain SNOTEL	5720	1-May	0	0.0	0.0	0.0	
Sevenmile Marsh SNOTEL	5700	1-May	39	17.1	0.0	24.3	70%
State Line SNOTEL	5680	1-May	0	0.0	0.0		
Sun Pass SNOTEL	5400	1-May	3	1.2	0.0		
Billie Creek Divide SNOTEL	5280	1-May	15	7.5	0.0	10.8	69%
Diamond Lake SNOTEL	5280	1-May	0	0.0	0.0	0.0	
Crowder Flat SNOTEL	5170	1-May	0	0.0	0.0	0.0	
Beaver Dam Creek Snow Course	5120	2-May	0	0.0	0.0	0.0	
Taylor Butte SNOTEL	5030	1-May	0	0.0	0.0	0.0	
Gerber Reservoir SNOTEL	4890	1-May	0	0.0	0.0	0.0	
Chemult Alternate SNOTEL	4850	1-May	0	0.0	0.0	0.0	
Deadwood Junction Snow Course	4660	2-May	0	0.0	0.0	0.0	
Fish Lk. SNOTEL	4660	1-May	0	0.0	0.0	0.0	
Howard Prairie SNOTEL	4580	1-May	0	0.0	0.0		
Howard Prairie Snow Course	4580	2-May	0	0.0	0.0	0.0	
Siskiyou Summit Rev. Snow Course	4560	29-Apr	0	0.0	0.0		



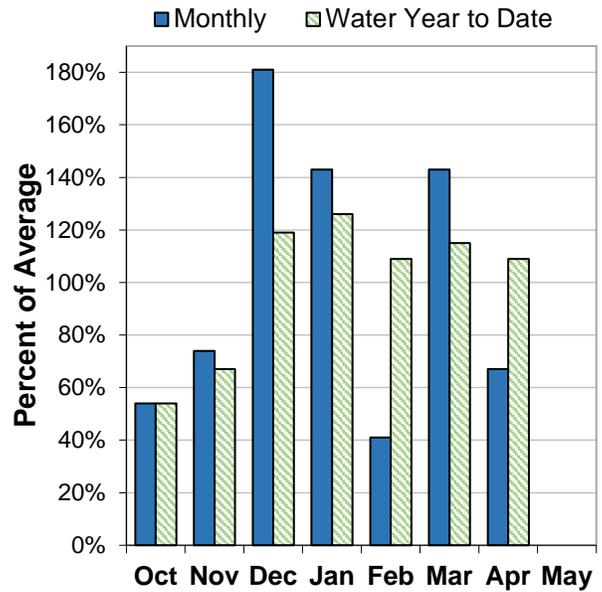
# Lake County and Goose Lake Basins

May 1, 2016

**Mountain Snowpack**



**Basin Precipitation**



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, about half the snow measurement sites in the basin were snow-free when normally only a quarter are. Of the sites that are snow-free, most melted out 2 to 5 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 90% to 120% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 67% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 109% of average.

### RESERVOIR

Reservoir storage across the basin is currently above average. As of May 1, storage at major reservoirs in the basin ranges from 104% of average at Drews Reservoir to 131% of average at Cottonwood Reservoir. Storage at Cottonwood and Drews Reservoirs has recovered significantly since the beginning of the water year, gaining 83 and 96 percent of average respectively.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 76% to 89% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect well below normal to below normal streamflows this summer.

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

### Forecast Exceedance Probabilities for Risk Assessment \*

Streamflow Forecasts May 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Twentymile Ck nr Adel	MAY-JUL	-2.50	4.7	9.6	89%	14.5	22	10.8
	MAY-SEP	-2.20	5.1	10.0	89%	14.9	22	11.2
Deep Ck ab Adel	MAY-JUL	16.6	28	35	85%	42	53	41
	MAY-SEP	17.4	28	36	84%	44	55	43
Honey Ck nr Plush	MAY-JUL	0.75	4.5	7.0	76%	9.5	13.3	9.2
	MAY-SEP	0.78	4.6	7.1	76%	9.7	13.5	9.3
Chewaucan R nr Paisley	MAY-JUL	23	34	41	82%	48	59	50
	MAY-SEP	27	38	45	83%	52	63	54

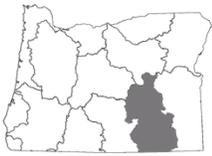
\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

Reservoir Storage					Useable Capacity
	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	(KAF)
Cottonwood	9.3	4.0	7.1	131%	9.3
Drews	47.7	12.1	45.7	104%	63.5

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Goose Lake Basin	3	78%	12%
Lake Abert Basin	1	3%	0%
Summer Lake Basin	9	48%	7%
Upper Pit Basin	3	17%	0%

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

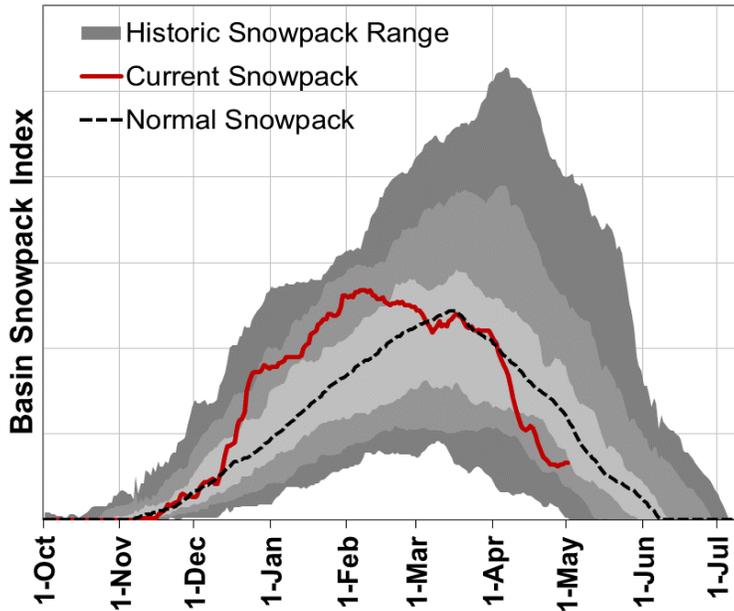
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Dismal Swamp SNOTEL	7360	1-May	69	29.1	4.6	26.0	112%
Summer Rim SNOTEL	7080	1-May	1	0.4	0.0	11.7	3%
Cedar Pass SNOTEL	7030	1-May	6	2.5	0.0	12.9	19%
Patton Meadows AM	6800	1-May	0	0.0	0.0	11.5	0%
Sherman Valley AM	6640	1-May	0	0.0	0.0		
Rogger Meadow AM	6360	1-May	0	0.0	0.0		
Adin Mtn Snow Course	6190	2-May	0	0.0	0.0	2.2	0%
Adin Mtn SNOTEL	6190	1-May	0	0.0	0.0	1.4	0%
Crazyman Flat SNOTEL	6180	1-May	0	0.0	0.0	4.6	0%
Finley Corrals AM	6000	1-May	0	0.0		4.6	0%
Sheldon SCAN	5860	1-May	0	0.0	0.0	0.0	
Strawberry SNOTEL	5770	1-May	0	0.0	0.0	0.0	
Cox Flat AM	5750	1-May	0	0.0			
Silver Creek SNOTEL	5740	1-May	0	0.0	0.0	0.0	
State Line SNOTEL	5680	1-May	0	0.0	0.0		
Crowder Flat SNOTEL	5170	1-May	0	0.0	0.0	0.0	



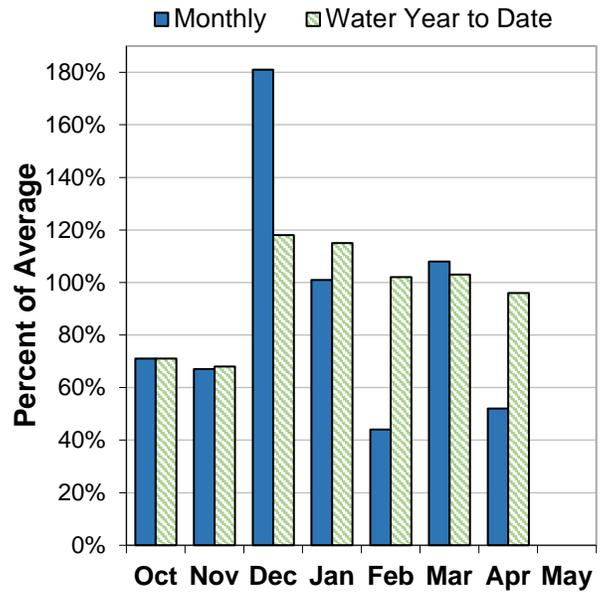
# Harney Basin

May 1, 2016

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of May 1, nearly all snow measurement sites in the basin were snow-free when normally only half are melted out. Of the sites that are snow-free, most melted out 2 to 3 weeks earlier than normal. In general, SNOTEL sites in the basin peaked around 90% to 120% of normal peak snowpack levels.

### PRECIPITATION

April precipitation was 52% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 96% of average.

### STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 67% to 72% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should expect well below normal streamflows this summer.

## Harney Basin Summary for May 1, 2016

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	3.9	21	33	73%	45	62	45
	MAY-SEP	4.2	22	34	72%	46	64	47
Donner Und Blitzen R nr Frenchglen	MAY-JUL	13.1	26	34	69%	42	55	49
	MAY-SEP	16.3	29	38	70%	47	60	54
Trout Ck nr Denio	MAY-JUL	0.89	2.6	3.7	66%	4.8	6.5	5.6
	MAY-SEP	1.20	2.9	4.0	67%	5.1	6.8	6.0

\* 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	1	98%	34%
Donner und Blitzen River Basin	2	70%	24%
Silvies River Basin	4	0%	0%
Upper Quinn Basin	3	84%	0%

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-May	40	16.6	0.0	19.5	85%
Fish Creek SNOTEL	7660	1-May	42	26.0	9.0	26.6	98%
Silvies SNOTEL	6990	1-May	0	0.0	0.0	10.3	0%
Buckskin Lower SNOTEL	6915	1-May	0	0.0	0.0	0.2	0%
Disaster Peak SNOTEL	6500	1-May	0	0.0	0.0	0.0	
Snow Mountain SNOTEL	6230	1-May	0	0.0	0.0	4.2	0%
Lamance Creek SNOTEL	6000	1-May	0	0.0	0.0	0.0	
Blue Mountain Spring SNOTEL	5870	1-May	0	0.0	0.0	5.7	0%
Sheldon SCAN	5860	1-May	0	0.0	0.0	0.0	
Rock Springs SNOTEL	5290	1-May	0	0.0	0.0	0.0	
Starr Ridge SNOTEL	5250	1-May	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-May	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	May 1	May 13	Jun 10	<b>May 18</b>
Owyhee R nr Rome	500 cfs	May 16	May 24	Jun 18	<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	25	175	360	<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 5	May 16	May 30	<b>May 25</b>
Crane Prairie Inflow	Peak Flow	255	375	495	<b>403</b>
Crane Prairie Inflow	Average Daily Flow on Oct. 1st	210	245	280	<b>269</b>
Prineville Reservoir Inflow	113 cfs	May 7	May 19	Jun 1	<b>May 30</b>
Prineville Reservoir Inflow	75 cfs	May 12	May 29	Jun 18	<b>June 7</b>
Whychus Creek nr Sisters	100 cfs	Jul 13	Aug 7	Aug 27	<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</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
South Umpqua R nr Brockway *	90 cfs	Jul 23	Aug 7	Aug 22	<b>August 8</b>
South Umpqua R at Tiller	140 cfs	Jun 21	Jul 9	Jul 28	<b>July 11</b>
South Umpqua R at Tiller	90 cfs	Jul 11	Jul 28	Aug 17	<b>August 1</b>
South Umpqua R at Tiller	60 cfs	Aug 7	Aug 31	Sep 26	<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</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Deep Ck ab Adel	100 cfs	May 18	Jun 1	Jun 19	<b>June 17</b>
Honey Ck nr Plush	100 cfs	** Observed	Mar 23	**	<b>May 16</b>
Honey Ck nr Plush	50 cfs	** Observed	May 1	**	<b>June 4</b>
Twentymile Ck nr Adel	50 cfs	** Imminent	May 8th	**	<b>May 30</b>
Twentymile Ck nr Adel	10 cfs	Jun 20	Jul 9	Jul 28	<b>July 7</b>

<b>HARNEY 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%	
Silvies R nr Burns	400 cfs	** Observed	Apr 19	**	<b>May 21</b>
Silvies R nr Burns	200 cfs	** Observed	May 1	**	<b>June 2</b>
Silvies R nr Burns	100 cfs	May 9	May 23	Jun 5	<b>June 13</b>
Silvies R nr Burns	50 cfs	May 20	Jun 12	Jul 5	<b>July 3</b>
Donner Und Blitzen R nr Frenchglen	200 cfs	** Observed	April 15	**	<b>June 20</b>
Donner Und Blitzen R nr Frenchglen	100 cfs	May 18	Jun 2	Jun 17	<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

=====

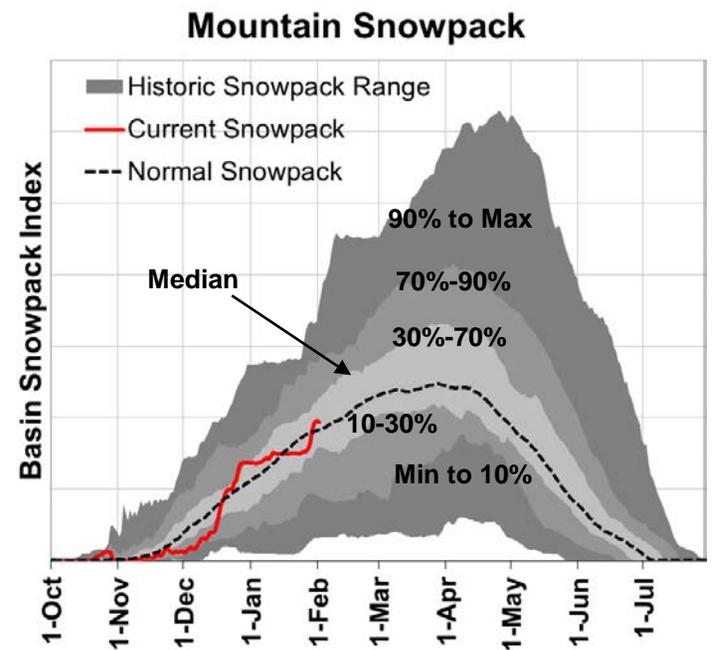
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

## 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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