



United States  
Department of  
Agriculture



Natural Resources  
Conservation  
Service

# Oregon Basin Outlook Report

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June 1, 2018



The newest addition to the NRCS real-time snowpack monitoring network: Buckskin Lake SNOLITE, installed this month by Snow Survey Hydrologists Josh Roach and Lauren Austin.

The 2018 snow season brought a well below normal snowpack to most of Oregon's mountains. Most regions barely achieved 70% of normal snowpack levels at the peak of the season. As a result, summer streamflow forecasts are calling for well below average flows and water shortages are likely in some parts of the state.

A year like 2018, with below normal snowpack and a critically low water supply season on the horizon, highlights the need for increased snowpack monitoring. Three long-term sites have been upgraded this year so far, including the Buckskin Lake SNOLITE (pictured above) near Malheur Lake in southeastern Oregon. The snow depth at this historic aerial marker has been estimated for more than 50 years by counting the bars visible above the snowpack while flying over in a fixed wing plane several times each winter. Now, with upgraded equipment, the new SNOLITE site measures snow depth and air temperature every six hours and the realtime data is available online.

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# General Outlook

June 1<sup>st</sup>, 2018

## SUMMARY

Unusually warm temperatures in the month of May led to rapid snowmelt from an already limited snowpack. Most snowpack monitoring sites across Oregon fell well short of the normal peak snowpack levels this year and precipitation throughout the winter and spring has lagged behind normal for most of the state also. The low winter snowpack and drier than normal spring conditions are strong indicators of a critically low summer water supply outlook. Significantly low streamflows and water shortages are expected across much of Oregon this summer.

Other sources are also indicating that a dry season is approaching. NOAA's Climate Prediction Center is calling for warmer and drier than normal weather conditions to prevail through August: <http://www.cpc.ncep.noaa.gov/> and the Drought Monitor has recently added a severe drought designation for parts of central and southeastern Oregon: <http://droughtmonitor.unl.edu/>. Governor Kate Brown officially declared a drought state of emergency in the following counties: Klamath, Grant, Lake and Harney. Water users are advised to plan for water shortages in these regions, especially for those without access to reservoir storage.

## SNOWPACK

The first half of winter was warm and dry, which was not conducive for building the much needed snowpack. A wetter and cooler trend followed the elusive first half of winter, but these snowy storms were not enough to overcome the substantial early season deficit. By the peak of the snow season, most of Oregon's snowpack was less than 70% of normal, which does not bode well for producing the snowmelt necessary to sustain streamflow throughout the spring and summer. Some of the lowest snowpacks were located in southern Oregon, where the peak snow levels ranged from 30 to 60% of normal.

Snowmelt dominated the snowpack story in May, where the already limited supply of snow melted off quickly. Out of the 32 SNOTEL sites that had snow on May 1<sup>st</sup>, only five continue to have measureable snow as of June 1<sup>st</sup>. Most sites have melted out slightly ahead of schedule also, with many sites melting out 1 to 2 weeks early. In addition, the snowmelt rates observed during May were significantly higher than normal because of the warm temperatures. Of note were the melt rates of several higher elevation sites that lost snowpack in May at a rate that was 150-250% of typical spring melt rates.

## PRECIPITATION

Most basins in Oregon were drier than usual during May, especially in western Oregon where monthly precipitation amounts were as low 18% of average in the region around Mt. Hood. Nineteen precipitation monitoring sites recorded the lowest May amounts on record in western Oregon. However, an unsettled weather pattern brought some significant precipitation and thunderstorms to parts of southern and eastern Oregon. Lake County and Goose Lake basins were the wettest in the state, receiving 112% of average monthly precipitation with the bulk of the precipitation falling over a few days' time.

Most of the state has been drier than usual since the water year began on October 1<sup>st</sup>. Parts of southern Oregon experienced several consecutive months with below average amounts of precipitation during the critical winter months. The Rogue, Umpqua and Harney basins all tied for the lowest seasonal amounts at 77% of average. The highest amounts of precipitation fell in the Umatilla, Walla Walla and Willow drainages, where seasonal precipitation has been 103% of average as of June 1<sup>st</sup>.

## **RESERVOIRS**

Reservoirs remain a bright spot in the water supply picture this year. Many of Oregon's major irrigation reservoirs are storing near average amounts as of the end of May, but several are beginning to dip below average since the last report. The region of the state with the overall highest reservoir storage is in the Umatilla, Walla Walla, and Willow basins where storage ranges from 95% of average to 111%. Elsewhere, reservoir storage conditions are widely variable within each basin. Most of the state's major reservoirs range from 70% to 110% of average for June 1<sup>st</sup> storage volumes.

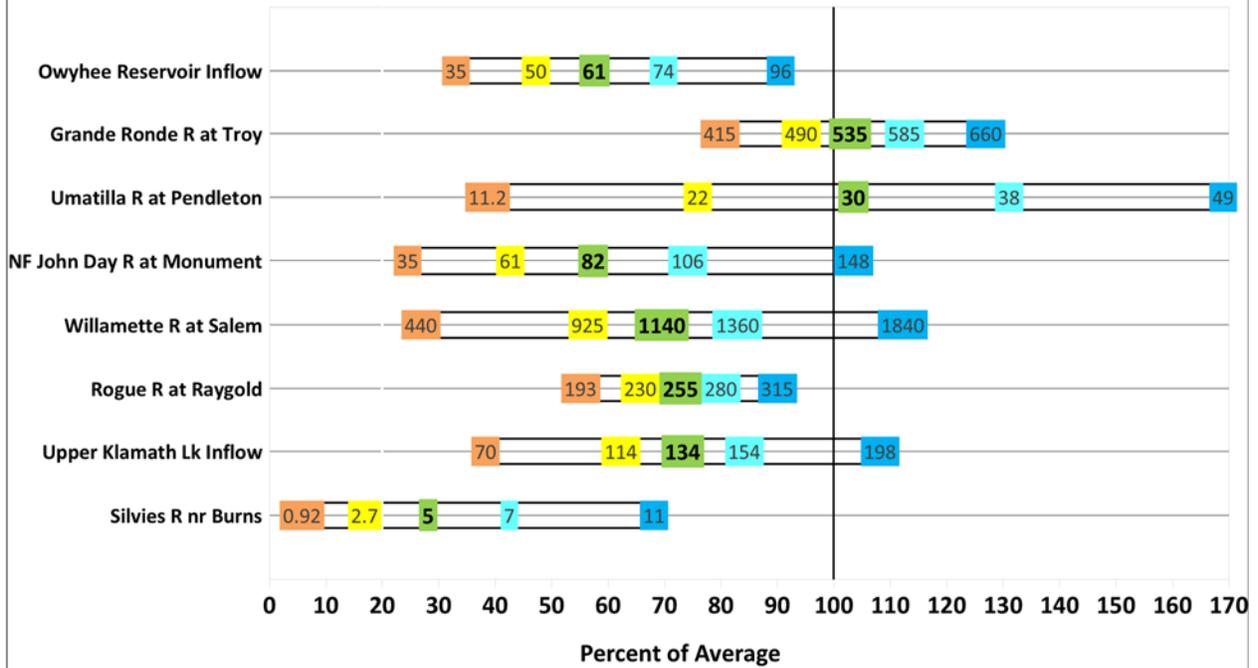
## **STREAMFLOW**

Most of Oregon experienced another dry month during May, which when coupled with the low snowpack caused most rivers in the state to record streamflow volumes for the month that were between 20 to 60% of normal. Oregon's streams and rivers continue to recede due to below normal spring snowmelt inputs and a drier than average spring. Without additional rainfall, rivers will continue their downward trend and summer streamflow forecasts are calling for well below average volumes for the summer for most regions of the state.

Water users should plan accordingly for water shortages, especially in southern and southeastern Oregon where the snowpack was the lowest this season. Lowest streamflow forecasts in the state can be found in the Harney basin, where forecasts are all less than 50% of average. Conversely, the best forecasts are calling for near average flows in the Umatilla, Walla Walla and Grande Ronde rivers, which are among the few basins in the state that received near average amounts of seasonal precipitation.

To accompany the forecast summary graphic below, here are some helpful reminders about interpreting streamflow forecasts published in this document. For each forecast point, five possible streamflow volumes are predicted. Where the observed streamflow occurs within this spectrum depends on the range of future weather conditions. If water users wish to plan conservatively, they may lean toward using the 70% chance of exceedance forecast, or the drier forecast (which may be below average depending on the region). Conversely, if a water user believes future conditions will provide more water to the system, they could choose to use the 30% chance of exceedance forecast (the wetter forecast). These arrays of forecasts are shown in this forecast graphic and explained in more detail in the "Interpreting Water Supply Forecasts" section at the end of this report.

**Summary of Streamflow Forecasts across Oregon**  
 June through September Forecast Volumes at a Selection of Streamflow Points  
 (Volumes listed in KAF)



<b>Legend:</b> ←-----Drier-----Future Conditions-----Wetter-----→				
<b>90% Exceedance Forecast (KAF)</b> There is a 90% chance that flows will exceed this volume.	<b>70% Exceedance Forecast (KAF)</b> There is a 70% chance that flows will exceed this volume.	<b>50% Exceedance Forecast (KAF)</b> There is a 50% chance that flows will exceed this volume.	<b>30% Exceedance Forecast (KAF)</b> There is a 30% chance that flows will exceed this volume.	<b>10% Exceedance Forecast (KAF)</b> There is a 10% chance that flows will exceed this volume.

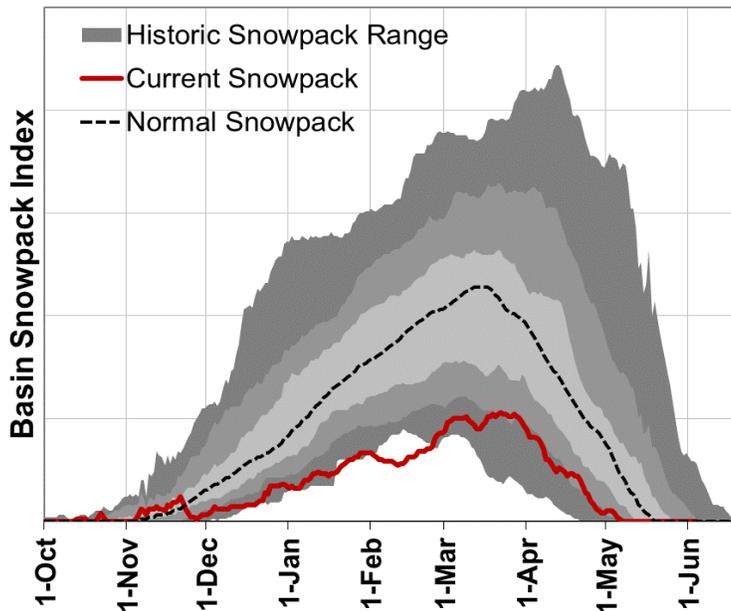
All forecasts are listed with units of 1000 acre-feet (KAF). This report contains data furnished by the Oregon Department of Water Resources, U.S. Geological Survey, NOAA National Weather Service and other cooperators. This report will be updated monthly, January through June.



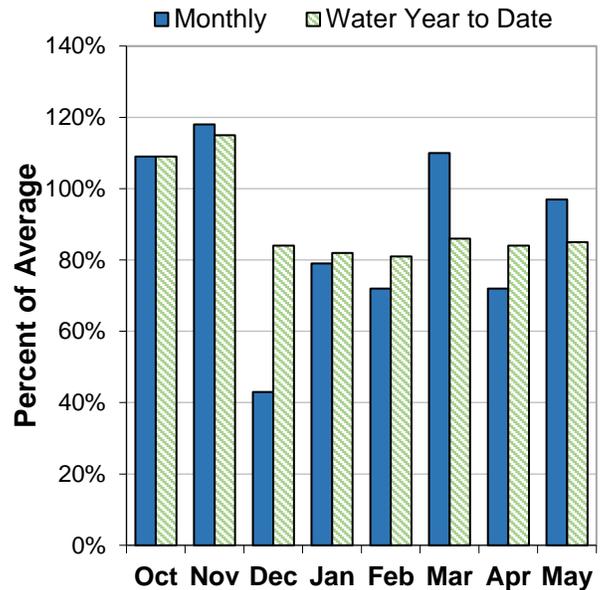
# Owyhee and Malheur Basins

June 1, 2018

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, all snow measurement sites in the basin are snow-free, which is typical for this time of year. In general, SNOTEL sites in the basin peaked around 20% to 60% of normal peak snowpack levels this winter.

### PRECIPITATION

May precipitation was 97% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 85% of average.

### RESERVOIR

As of June 1, storage at major reservoirs in the basin ranges from 60% of average at Bully Creek Reservoir to 98% of average at Lake Owyhee.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 32% to 64% of average. Water users in the basin without access to reservoir water should expect water shortages this summer and prepare accordingly.

## Owyhee And Malheur Basins Summary for June 1, 2018

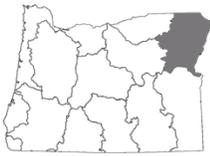
<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts June 1, 2018</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>30-Year Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
Owyhee R nr Rome	JUN-JUL	7.0	15.3	23	37%	32	48	63
	JUN-SEP	14.2	25	35	44%	45	64	80
Owyhee R bl Owyhee Dam <sup>2</sup>	JUN-JUL	15.5	27	36	47%	46	64	76
	JUN-SEP	35	50	61	58%	74	96	106
Malheur R nr Drewsey	JUN-JUL	0.62	1.99	3.4	31%	5.1	8.3	10.8
	JUN-SEP	0.89	2.5	4.0	32%	6.0	9.5	12.5
NF Malheur R at Beulah <sup>2</sup>	JUN-JUL	3.4	5.7	7.5	55%	9.7	13.3	13.7
	JUN-SEP	6.9	10.0	12.5	64%	15.2	19.8	19.5

\* 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	33.7	58.0	46.7	72%	59.2
Bully Creek	13.9	23.2	23.2	60%	23.7
Lake Owyhee	523.1	715.5	536.2	98%	715.0
Warm Springs	105.7	169.8	122.4	86%	169.6

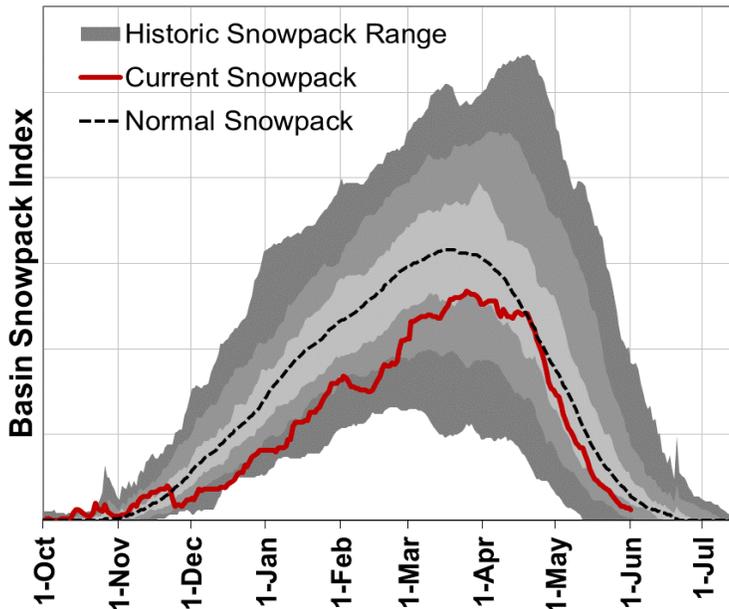
<b>Basin Snowpack Measurement Sites</b>	<b>Elevation (ft)</b>	<b>Date Measured</b>	<b>Depth (in)</b>	<b>Snow Water Equivalent (in)</b>			
				<b>Current SWE</b>	<b>Last Yr SWE</b>	<b>Median</b>	<b>% of Median</b>
Granite Peak SNOTEL	8543	1-Jun	0	0.0	11.9	1.5	0%
Trout Creek AM	7890	1-Jun	0	0.0	0.0		
Toe Jam SNOTEL	7700	1-Jun	0	0.0	0.0		
Govt Corrals AM	7400	1-Jun	0	0.0	0.0		
Jack Creek Upper SNOTEL	7250	1-Jun	0	0.0	0.0	0.0	
Fawn Creek SNOTEL	7000	1-Jun	0	0.0	0.0	0.0	
Buckskin Lower SNOTEL	6915	1-Jun	0	0.0	0.0	0.0	
Big Bend SNOTEL	6700	1-Jun	0	0.0	0.0	0.0	
Fry Canyon SNOTEL	6700	1-Jun	0	0.0	0.0		
Laurel Draw SNOTEL	6697	1-Jun	0	0.0	0.0	0.0	
South Mtn. SNOTEL	6500	1-Jun	0	0.0	0.0	0.0	
Taylor Canyon SNOTEL	6200	1-Jun	0	0.0	0.0	0.0	
Blue Mountain Spring SNOTEL	5870	1-Jun	0	0.0	0.0	0.0	
Mud Flat SNOTEL	5730	1-Jun	0	0.0	0.0	0.0	
Reynolds Creek SNOTEL	5600	1-Jun	0	0.0	0.0	0.0	
Rock Springs SNOTEL	5290	1-Jun	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-Jun	0	0.0	0.0	0.0	



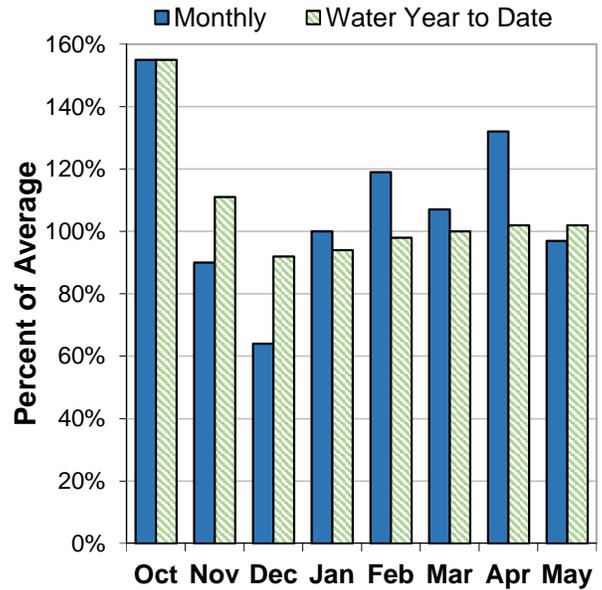
# Grande Ronde, Powder, Burnt and Imnaha Basins

June 1, 2018

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, all but two SNOTEL sites in the basin are snow-free, which is typical for this time of year. In general, SNOTEL sites in the basin peaked around 60% to 90% of normal peak snowpack levels this winter. Snowmelt timing was near normal for about half the sites in the basin, while the other half melted out up to 2 weeks early this spring.

### PRECIPITATION

May precipitation was 97% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 102% of average.

### RESERVOIR

As of June 1, storage at major reservoirs in the basin ranges from 79% of average at Phillips Lake to 104% of average at Thief Valley Reservoir.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 55% to 103% of average. Water supplies in the basin are likely to be well below normal in the Burnt, Powder, Pine and Imnaha drainages, and below normal to near normal in the Grande Ronde basin this summer.

## Grande Ronde, Powder, Burnt And Imnaha Basins Summary for June 1, 2018

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts June 1, 2018</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>30-Year 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 <sup>2</sup>	JUN-JUL	0.34	1.14	1.95	46%	3.0	4.9	4.2
	JUN-SEP	1.03	2.2	3.3	55%	4.5	6.7	6.0
Powder R nr Sumpter <sup>2</sup>	JUN-JUL	3.4	6.2	8.6	59%	11.4	16.3	14.5
	JUN-SEP	3.8	7.0	9.7	61%	12.8	18.2	15.8
Pine Ck nr Oxbow	JUN-JUL	17.9	27	33	63%	39	48	52
	JUN-SEP	21	31	37	65%	43	53	57
Imnaha R at Imnaha	JUN-JUL	72	86	96	88%	106	120	109
	JUN-SEP	89	105	115	88%	125	141	130
Catherine Ck nr Union	JUN-JUL	11.6	17.1	21	95%	25	30	22
	JUN-SEP	15.0	21	25	96%	29	34	26
Lostine R nr Lostine	JUN-JUL	51	58	63	93%	68	75	68
	JUN-SEP	57	65	70	92%	76	84	76
Bear Ck nr Wallowa	JUN-JUL	17.6	23	26	87%	30	35	30
	JUN-SEP	19.3	25	28	85%	32	37	33
Grande Ronde R at Troy	JUN-JUL	330	400	450	105%	500	570	430
	JUN-SEP	415	490	535	103%	585	660	520

\* 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>
Phillips Lake	46.3	66.2	58.7	79%	73.5
Thief Valley	14.1	14.5	13.6	104%	13.3
Unity	21.9	23.4	22.4	98%	25.5
Wallowa Lake		27.7	27.2		37.5
Wolf Creek	9.6	11.1	9.7	99%	11.1

## Grande Ronde, Powder, Burnt And Imnaha Basins Summary for June 1, 2018

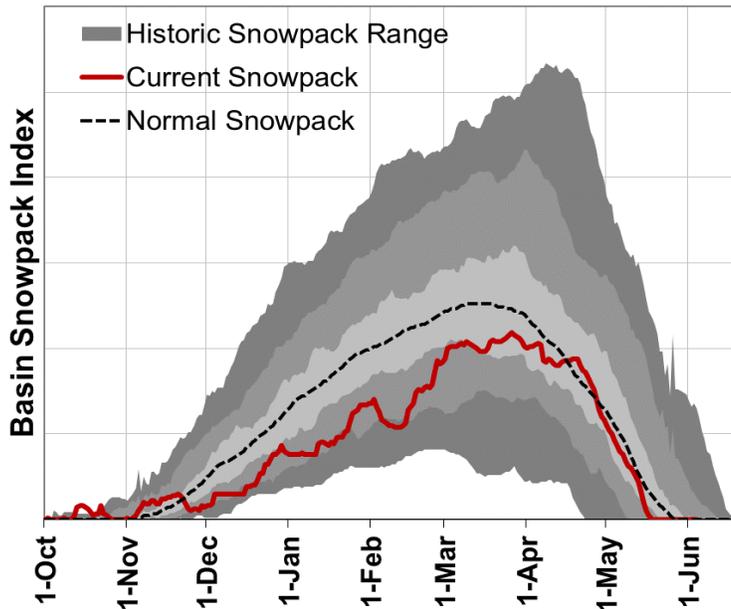
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt. Howard SNOTEL	7910	1-Jun	0	0.0	11.1	6.0	0%
Aneroid Lake #2 SNOTEL	7400	1-Jun	20	10.2	23.4	16.8	61%
TV Ridge AM	7050	1-Jun	0	0.0	0.0		
Big Sheep AM	6230	1-Jun	0	0.0	7.7		
Bear Saddle SNOTEL	6180	1-Jun	0	0.0	0.0	0.0	
Bourne SNOTEL	5850	1-Jun	0	0.0	0.0	0.0	
Moss Springs SNOTEL	5760	1-Jun	0	0.0	4.4	0.2	0%
Taylor Green SNOTEL	5740	1-Jun	0	0.0	0.0	0.0	
Spruce Springs SNOTEL	5700	1-Jun	0	0.0	0.0	0.0	
Wolf Creek SNOTEL	5630	1-Jun	0	0.0	0.0	0.0	
Milk Shakes SNOTEL	5580	1-Jun	12	7.4	23.2		
West Branch SNOTEL	5560	1-Jun	0	0.0	0.0	0.0	
Touchet SNOTEL	5530	1-Jun	0	0.0	0.0	0.0	
Eilertson Meadows SNOTEL	5510	1-Jun	0	0.0	0.0	0.0	
West Eagle Meadows AM	5500	1-Jun	0	0.0			
Gold Center SNOTEL	5410	1-Jun	0	0.0	0.0	0.0	
Schneider Meadows SNOTEL	5400	1-Jun	0	0.0	0.7	0.0	
Beaver Reservoir SNOTEL	5150	1-Jun	0	0.0	0.0	0.0	
Tipton SNOTEL	5150	1-Jun	0	0.0	0.0	0.0	
High Ridge SNOTEL	4920	1-Jun	0	0.0	0.0	0.0	
County Line SNOTEL	4830	1-Jun	0	0.0	0.0	0.0	
Bowman Springs SNOTEL	4530	1-Jun	0	0.0	0.0	0.0	
Sourdough Gulch SNOTEL	4000	1-Jun	0	0.0	0.0	0.0	



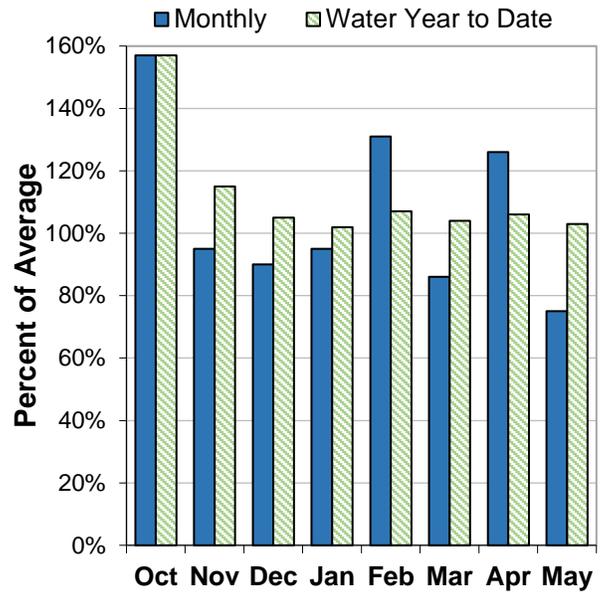
# Umatilla, Walla Walla and Willow Basins

June 1, 2018

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, Milk Shakes SNOTEL is the only site in the basin that still has snow, which is typical for this time of year. In general, SNOTEL sites in the basin peaked around 60% to 100% of normal peak snowpack levels this winter. Snowmelt timing was about a week earlier than normal this spring for most sites.

### PRECIPITATION

May precipitation was 75% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 103% of average.

### RESERVOIR

As of June 1, storage at major reservoirs in the basin ranges from 95% of average at Cold Springs Reservoir to 111% of average at Mckay Reservoir.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 58% to 103% of average. Water supplies in the basin are likely to be well below normal in the Willow and Butter Creek drainages, and between slightly below to near normal in the Umatilla and Walla Walla basins this summer.

## Umatilla, Walla Walla And Willow Basins Summary for June 1, 2018

### Forecast Exceedance Probabilities for Risk Assessment \*

Streamflow Forecasts June 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
SF Walla Walla R nr Milton-Freewater	JUN-JUL	14.4	17.0	18.8	103%	21	23	18.2
	JUN-SEP	26	29	31	100%	34	37	31
Umatilla R ab Meacham nr Gibbon	JUN-JUL	6.7	11.5	14.8	104%	18.1	23	14.2
	JUN-SEP	11.9	16.8	20	102%	23	28	19.6
Umatilla R at Pendleton	JUN-JUL	6.2	17.4	25	104%	33	44	24
	JUN-SEP	11.2	22	30	103%	38	49	29
McKay Ck nr Pilot Rock	JUN-JUL	0.24	1.42	2.8	74%	4.6	8.1	3.8
	JUN-SEP	0.33	1.59	3.0	75%	4.8	8.3	4.0
Butter Ck nr Pine City	JUN-JUL	0.28	0.73	1.16	62%	1.68	2.6	1.88
	JUN-SEP	0.45	0.98	1.46	63%	2.0	3.1	2.3
Willow Ck ab Willow Lk nr Heppner	JUN-JUL	0.11	0.49	0.90	57%	1.44	2.5	1.57
	JUN-SEP	0.15	0.57	1.00	58%	1.55	2.6	1.72
Rhea Ck nr Heppner	JUN-JUL	0.22	0.60	0.96	57%	1.41	2.2	1.69
	JUN-SEP	0.39	0.84	1.24	59%	1.72	2.6	2.1

\* 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	26.7	25.2	28.2	95%	38.6
Mckay	63.2	65.6	57.0	111%	71.5
Willow Creek	6.0	5.9	5.9	102%	9.8

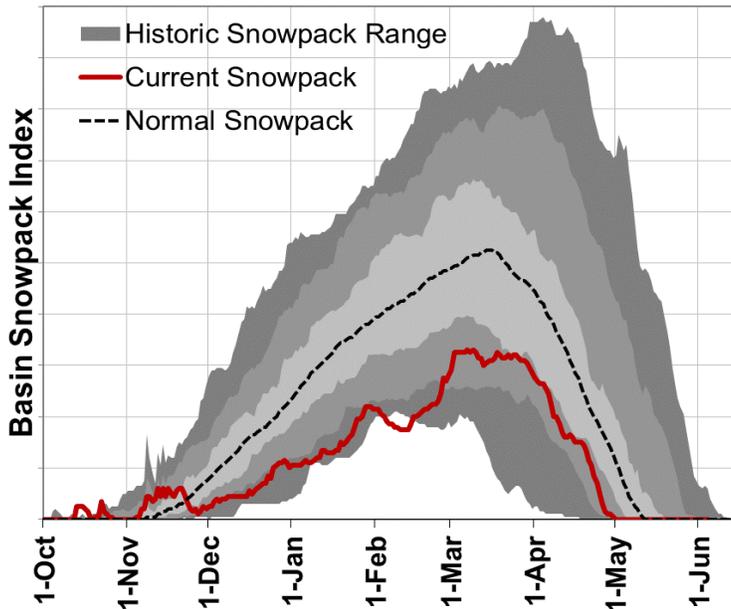
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Arbuckle Mtn SNOTEL	5770	1-Jun	0	0.0	0.0	0.0	
Spruce Springs SNOTEL	5700	1-Jun	0	0.0	0.0	0.0	
Milk Shakes SNOTEL	5580	1-Jun	12	7.4	23.2		
Touchet SNOTEL	5530	1-Jun	0	0.0	0.0	0.0	
Madison Butte SNOTEL	5150	1-Jun	0	0.0	0.0	0.0	
Lucky Strike SNOTEL	4970	1-Jun	0	0.0	0.0	0.0	
High Ridge SNOTEL	4920	1-Jun	0	0.0	0.0	0.0	
Bowman Springs SNOTEL	4530	1-Jun	0	0.0	0.0	0.0	
Emigrant Springs SNOTEL	3800	1-Jun	0	0.0	0.0	0.0	



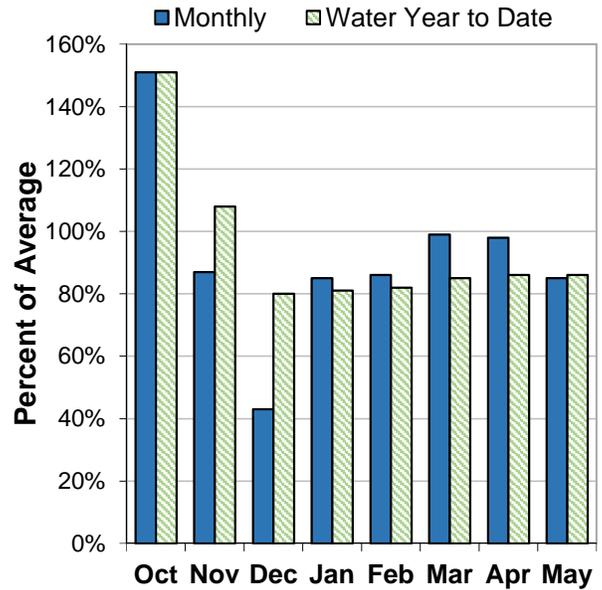
# John Day Basin

June 1, 2018

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, all snow measurement sites in the basin are snow-free, which is typical for this time of year. In general, SNOTEL sites in the basin peaked around 50% to 70% of normal peak snowpack levels this winter. Snowmelt timing was 1-2 weeks earlier than normal this spring for most sites.

### PRECIPITATION

May precipitation was 85% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 86% of average.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 26% to 82% of average. Water users in the basin should expect water shortages this summer and prepare accordingly.

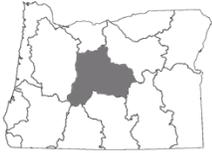
## John Day Basin Summary for June 1, 2018

### Forecast Exceedance Probabilities for Risk Assessment \*

Streamflow Forecasts June 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Strawberry Ck nr Prairie City	JUN-JUL	1.33	2.4	3.2	70%	3.9	5.0	4.6
	JUN-SEP	1.60	2.8	3.6	69%	4.3	5.5	5.2
Mountain Ck nr Mitchell	JUN-JUL	0.03	0.12	0.23	26%	0.36	0.61	0.90
	JUN-SEP	0.04	0.15	0.26	26%	0.40	0.67	1.01
Camas Ck nr Ukiah	JUN-JUL	1.27	2.7	4.1	80%	5.6	8.4	5.1
	JUN-SEP	1.75	3.3	4.7	82%	6.3	9.1	5.7
MF John Day R at Ritter	JUN-JUL	4.9	9.6	13.8	49%	18.7	27	28
	JUN-SEP	7.2	12.6	17.1	53%	22	31	32
NF John Day R at Monument	JUN-JUL	27	50	70	56%	93	134	126
	JUN-SEP	35	61	82	57%	106	148	143

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

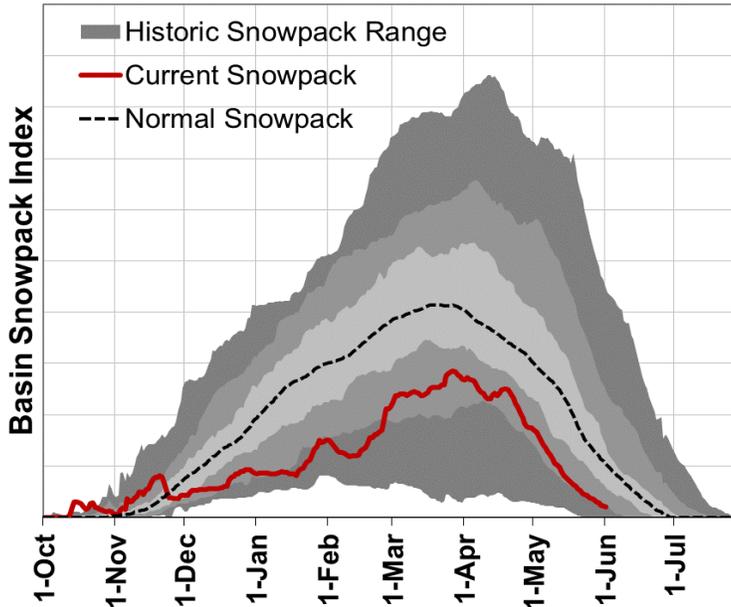
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Snow Mountain SNOTEL	6230	1-Jun	0	0.0	0.0	0.0	
Blue Mountain Spring SNOTEL	5870	1-Jun	0	0.0	0.0	0.0	
Bourne SNOTEL	5850	1-Jun	0	0.0	0.0	0.0	
Derr. SNOTEL	5850	1-Jun	0	0.0	0.0	0.0	
Arbuckle Mtn SNOTEL	5770	1-Jun	0	0.0	0.0	0.0	
Ochoco Meadows SNOTEL	5430	1-Jun	0	0.0	0.0	0.0	
Gold Center SNOTEL	5410	1-Jun	0	0.0	0.0	0.0	
Starr Ridge SNOTEL	5250	1-Jun	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-Jun	0	0.0	0.0	0.0	
Madison Butte SNOTEL	5150	1-Jun	0	0.0	0.0	0.0	
Tipton SNOTEL	5150	1-Jun	0	0.0	0.0	0.0	
Lucky Strike SNOTEL	4970	1-Jun	0	0.0	0.0	0.0	
County Line SNOTEL	4830	1-Jun	0	0.0	0.0	0.0	



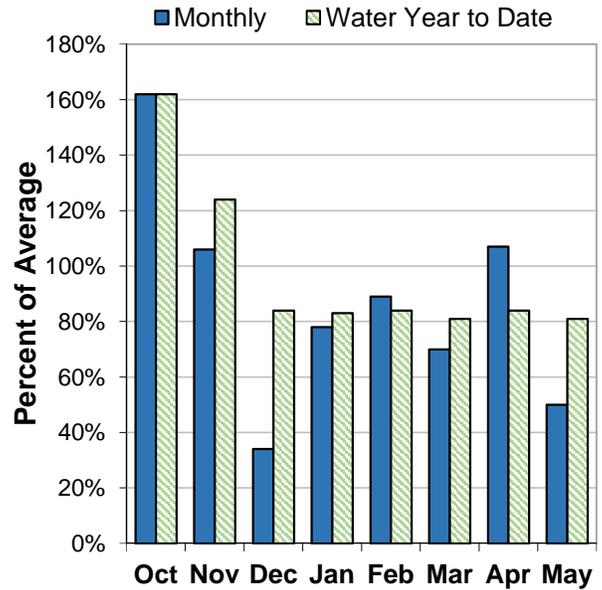
# Upper Deschutes and Crooked Basins

June 1, 2018

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, the two high elevation SNOTEL sites in the basin that are still recording snow have less than 40% of typical amounts for this time of year. In general, SNOTEL sites in the basin peaked around 40% to 80% of normal peak snowpack levels this winter. Snowmelt timing was 1-2 weeks earlier than normal this spring for most sites.

### PRECIPITATION

May precipitation was 50% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 81% of average.

### RESERVOIR

As of June 1, storage at major reservoirs in the basin ranges from 73% of average at Ochoco Reservoir to 150% of average at Crescent Lake.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from -50% to 85% of average. Water managers in the Crooked and Little Deschutes basins without access to reservoir water should expect water shortages this summer and prepare accordingly. Streamflow forecasts in the Upper Deschutes basin are slightly higher, but still well below normal to below normal.

## Upper Deschutes And Crooked Basins Summary for June 1, 2018

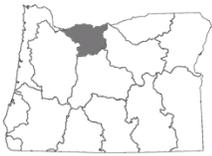
### Forecast Exceedance Probabilities for Risk Assessment \*

Streamflow Forecasts June 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Deschutes R bl Snow Ck	JUN-JUL	7.0	9.5	11.2	65%	12.9	15.4	17.2
	JUN-SEP	16.7	22	25	63%	28	33	40
Crane Prairie Reservoir Inflow <sup>2</sup>	JUN-JUL	13.6	17.5	20	67%	23	27	30
	JUN-SEP	29	36	42	68%	47	54	62
Crescent Lake Inflow <sup>2</sup>	JUN-JUL	0.25	0.83	1.42	23%	2.2	3.6	6.1
	JUN-SEP	0.09	0.72	1.49	18%	2.5	4.6	8.4
Little Deschutes R nr La Pine <sup>2</sup>	JUN-JUL	1.43	3.5	5.5	25%	7.9	12.1	22
	JUN-SEP	1.49	3.9	6.2	23%	9.0	14.0	27
Deschutes R at Benham Falls <sup>2</sup>	JUN-JUL	113	126	135	83%	143	156	163
	JUN-SEP	245	265	280	85%	295	315	330
Wychus Ck nr Sisters	JUN-JUL	12.8	15.6	17.5	80%	19.4	22	22
	JUN-SEP	21	24	27	79%	29	33	34
Prineville Reservoir Inflow <sup>2</sup>	JUN-JUL	-3.20	-2.00	-0.50	-6%	1.50	5.6	8.3
	JUN-SEP	-6.30	-4.00	-1.80	-22%	0.90	6.1	8.1
Ochoco Reservoir Inflow <sup>2</sup>	JUN-JUL	-2.20	-1.00	0.00	0%	1.10	3.2	2.7
	JUN-SEP	-4.30	-2.50	-1.10	-50%	0.40	3.1	2.2

\* 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	48.5	48.2	42.8	113%	55.3
Crescent Lake	81.7	71.0	54.4	150%	86.9
Ochoco	25.4	41.3	34.6	73%	44.2
Prineville	111.3	148.5	140.5	79%	148.6
Wickiup	138.6	155.5	159.7	87%	200.0

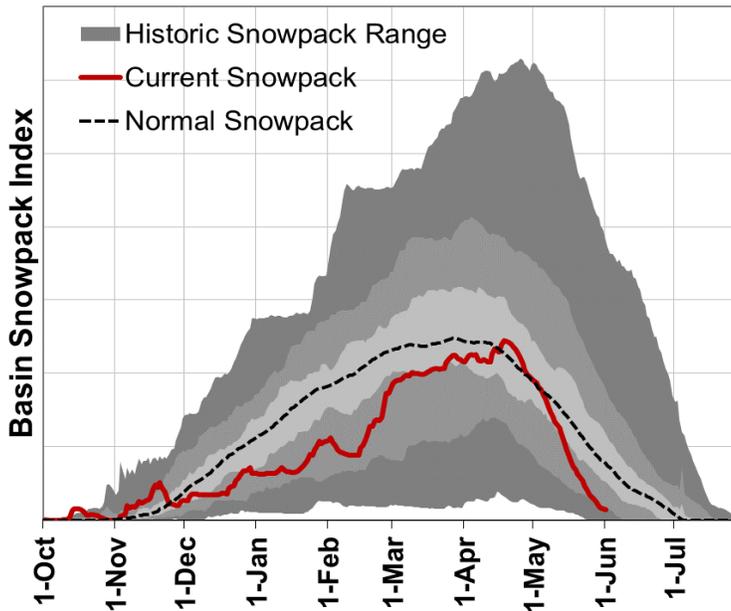
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Snow Mountain SNOTEL	6230	1-Jun	0	0.0	0.0	0.0	
Derr. SNOTEL	5850	1-Jun	0	0.0	0.0	0.0	
Three Creeks Meadow SNOTEL	5690	1-Jun	0	0.0	0.0	0.0	
Summit Lake SNOTEL	5610	1-Jun	22	12.0	40.3	30.5	39%
Irish Taylor SNOTEL	5540	1-Jun	7	2.2	26.4	26.7	8%
Ochoco Meadows SNOTEL	5430	1-Jun	0	0.0	0.0	0.0	
Cascade Summit SNOTEL	5100	1-Jun	0	0.0	3.8	0.2	0%
Roaring River SNOTEL	4950	1-Jun	0	0.0	1.7	0.0	
New Crescent Lake SNOTEL	4910	1-Jun	0	0.0	0.0	0.0	
Chemult Alternate SNOTEL	4850	1-Jun	0	0.0	0.0	0.0	
Hogg Pass SNOTEL	4790	1-Jun	0	0.0	0.0	0.0	
McKenzie SNOTEL	4770	1-Jun	0	0.0	15.5	15.2	0%
Salt Creek Falls SNOTEL	4220	1-Jun	0	0.0	0.0	0.0	
Santiam Jct. SNOTEL	3740	1-Jun	0	0.0	0.0	0.0	



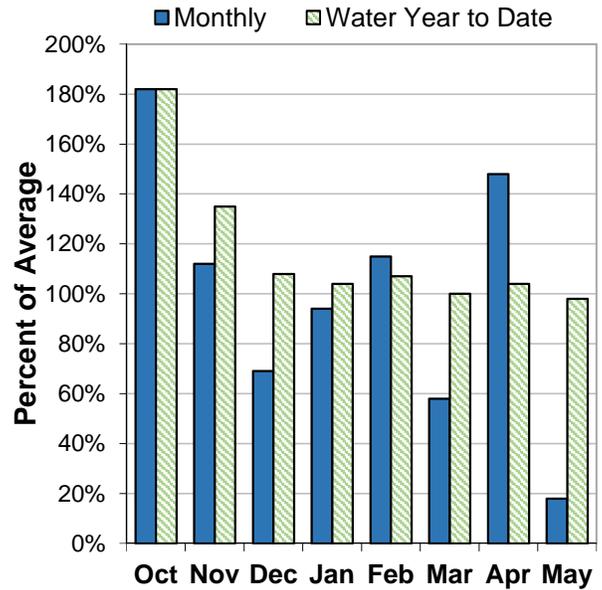
# Hood, Sandy and Lower Deschutes Basins

June 1, 2018

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, Mt Hood SNOTEL is the only site in the basin that still has snow and it is recording less than 25% of normal snowpack. Due to the unusually warm May temperatures, Mt Hood SNOTEL set a record for snowmelt during the month - losing over 36 inches of snow water, which is more than double the normal snowmelt rate for May. In general, SNOTEL sites in the basin peaked around 60% to 120% of normal peak snowpack levels this winter. Snowmelt timing was near normal this spring for most sites.

### PRECIPITATION

May precipitation was 18% of average. Six long-term monitoring stations in the basin set new record lows for May precipitation, including Bonneville Dam which recorded only 0.5" of precipitation (14% of average). This site has been measured continuously since 1938. Precipitation since the beginning of the water year (October 1 - June 1) has been 98% of average.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 69% to 80% of average. Water managers in the basin should expect well below normal to below normal streamflows this summer.

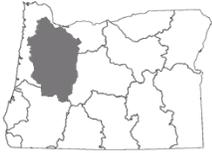
## Hood, Sandy And Lower Deschutes Basins Summary for June 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts June 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
WF Hood R nr Dee	JUN-JUL	16.7	22	25	63%	28	33	40
	JUN-SEP	30	36	40	69%	44	50	58
Hood R at Tucker Bridge	JUN-JUL	38	46	51	64%	56	64	80
	JUN-SEP	64	75	83	69%	91	102	120
Sandy R nr Marmot	JUN-JUL	50	69	83	75%	96	116	110
	JUN-SEP	85	110	126	80%	143	167	157

\* 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	4.6	6.7	6.5	71%	13.1

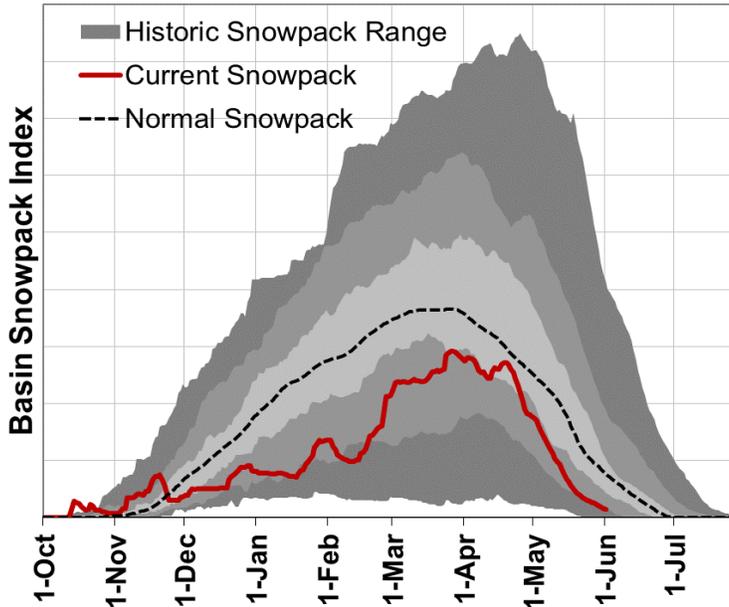
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt Hood Test Site SNOTEL	5370	1-Jun	27	11.5	39.1	48.1	24%
Red Hill SNOTEL	4410	1-Jun	0	0.0	36.3	13.5	0%
Mud Ridge SNOTEL	4070	1-Jun	0	0.0	7.0	0.0	
Clear Lake SNOTEL	3810	1-Jun	0	0.0	0.0	0.0	
Blazed Alder SNOTEL	3650	1-Jun	0	0.0	9.8	0.0	
Clackamas Lake SNOTEL	3400	1-Jun	0	0.0	0.0	0.0	
Greenpoint SNOTEL	3310	1-Jun	0	0.0	0.0	0.0	
North Fork SNOTEL	3060	1-Jun	0	0.0	0.0	0.0	
South Fork Bull Run SNOTEL	2690	1-Jun	0	0.0	0.0	0.0	



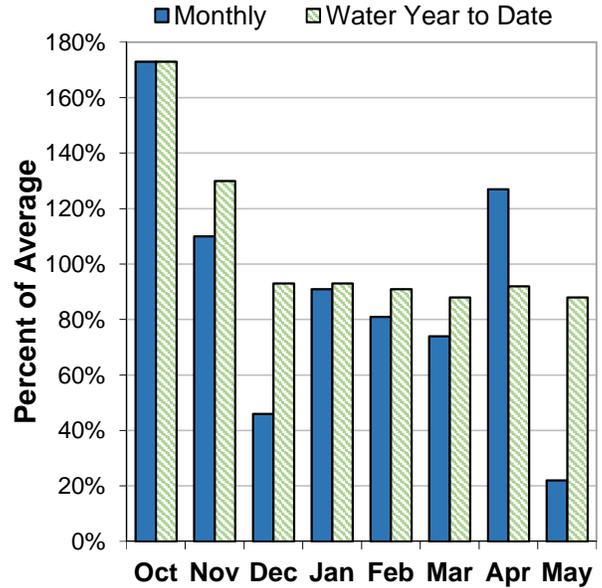
# Willamette Basin

June 1, 2018

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, the two high elevation SNOTEL sites in the basin that are still recording snow have less than 40% of typical amounts for this time of year. In general, SNOTEL sites in the basin peaked around 50% to 80% of normal peak snowpack levels this winter. Snowmelt timing was near normal for most sites in the basin, but a few melted out up to 2 weeks early this spring.

### PRECIPITATION

May precipitation was 22% of average. Eleven long-term monitoring stations in the basin set new record lows for May precipitation, including three stations that have each been measured continuously for more than 70 years: Cottage Grove Dam, Leaburg, and Detroit Dam. Precipitation since the beginning of the water year (October 1 - June 1) has been 88% of average.

### RESERVOIR

As of June 1, storage at major reservoirs in the basin ranges from 70% of average at Cougar Reservoir to 105% of average at Fern Ridge Reservoir.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 48% to 87% of average. Water managers in the basin should expect well below normal to below normal streamflows this summer.

## Willamette Basin Summary for June 1, 2018

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts June 1, 2018</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>30-Year 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>	JUN-SEP	56	83	96	74%	108	135	129
Lookout Point Reservoir Inflow <sup>1,2</sup>	JUN-SEP	152	220	245	74%	275	340	330
McKenzie R bl Trail Bridge	JUN-SEP	122	147	158	81%	170	194	195
Cougar Lake Inflow <sup>1,2</sup>	JUN-SEP	38	57	66	73%	75	94	90
Blue Lake Inflow <sup>1,2</sup>	JUN-SEP	1.21	6.2	9.7	49%	14.0	26	19.8
McKenzie R nr Vida <sup>1,2</sup>	JUN-SEP	340	420	455	80%	490	570	570
Detroit Lake Inflow <sup>1,2</sup>	JUN-SEP	136	187	210	81%	235	285	260
North Santiam R at Mehama <sup>1,2</sup>	JUN-SEP	136	225	260	78%	300	390	335
Green Peter Lake Inflow <sup>1,2</sup>	JUN-SEP	9.3	29	41	48%	56	97	85
Foster Lake Inflow <sup>1,2</sup>	JUN-SEP	23	61	84	51%	110	182	164
South Santiam R at Waterloo <sup>2</sup>	JUN-SEP	25	64	88	51%	116	190	171
Willamette R at Salem <sup>1,2</sup>	JUN-SEP	440	925	1140	70%	1360	1840	1640
Oak Grove Fk ab Powerplant	JUN-JUL	28	34	39	85%	43	49	46
	JUN-SEP	57	67	74	87%	81	91	85
Clackamas R ab Three Lynx	JUN-JUL	63	94	115	78%	136	166	148
	JUN-SEP	137	171	193	82%	215	250	235
Clackamas R at Estacada	JUN-JUL	74	123	157	77%	191	240	205
	JUN-SEP	161	215	255	81%	290	345	315

\* 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

## Willamette Basin Summary for June 1, 2018

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Blue River	71.0	82.1	78.6	90%	82.3
Cottage Grove	27.2	31.7	30.3	90%	31.8
Cougar	115.8	174.8	165.0	70%	174.9
Detroit	421.8	425.3	423.4	100%	426.8
Dorena	56.3	71.0	70.4	80%	72.1
Fall Creek	106.0	115.1	115.5	92%	116.0
Fern Ridge	96.3	96.3	91.5	105%	97.3
Foster	44.1	44.1	46.3	95%	46.2
Green Peter	357.2	399.3	381.2	94%	402.8
Hills Creek	218.0	274.3	268.3	81%	279.2
Lookout Point	296.2	423.7	396.8	75%	433.2
Timothy Lake	63.0	63.2	62.3	101%	63.6
Henry Hagg Lake	52.6	53.3	52.5	100%	53.3

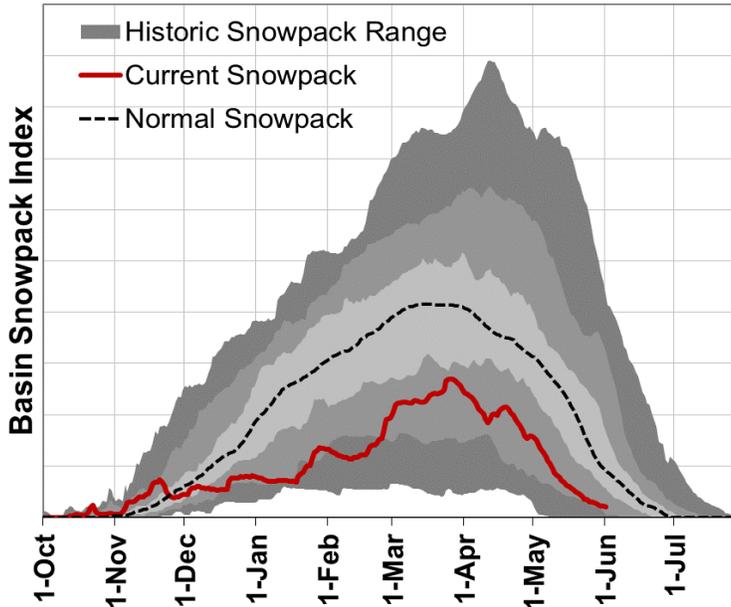
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summit Lake SNOTEL	5610	1-Jun	22	12.0	40.3	30.5	39%
Irish Taylor SNOTEL	5540	1-Jun	7	2.2	26.4	26.7	8%
Cascade Summit SNOTEL	5100	1-Jun	0	0.0	3.8	0.2	0%
Roaring River SNOTEL	4950	1-Jun	0	0.0	1.7	0.0	
Holland Meadows SNOTEL	4930	1-Jun	0	0.0	0.0	0.0	
McKenzie SNOTEL	4770	1-Jun	0	0.0	15.5	15.2	0%
Bear Grass SNOTEL	4720	1-Jun	0	0.0	38.9		
Salt Creek Falls SNOTEL	4220	1-Jun	0	0.0	0.0	0.0	
Mud Ridge SNOTEL	4070	1-Jun	0	0.0	7.0	0.0	
Little Meadows SNOTEL	4020	1-Jun	0	0.0	8.0	0.0	
Clear Lake SNOTEL	3810	1-Jun	0	0.0	0.0	0.0	
Santiam Jct. SNOTEL	3740	1-Jun	0	0.0	0.0	0.0	
Daly Lake SNOTEL	3690	1-Jun	0	0.0	0.0	0.0	
Jump Off Joe SNOTEL	3520	1-Jun	0	0.0	0.0	0.0	
Peavine Ridge SNOTEL	3420	1-Jun	0	0.0	0.0	0.0	
Clackamas Lake SNOTEL	3400	1-Jun	0	0.0	0.0	0.0	
Smith Ridge SNOTEL	3270	1-Jun	0	0.0	0.0		
Saddle Mountain SNOTEL	3110	1-Jun	0	0.0	0.0		
Railroad Overpass SNOTEL	2680	1-Jun	0	0.0	0.0	0.0	
Marion Forks SNOTEL	2590	1-Jun	0	0.0	0.0	0.0	
Seine Creek SNOTEL	2060	1-Jun	0	0.0	0.0	0.0	
Miller Woods SNOTEL	420	1-Jun	0	0.0	0.0		



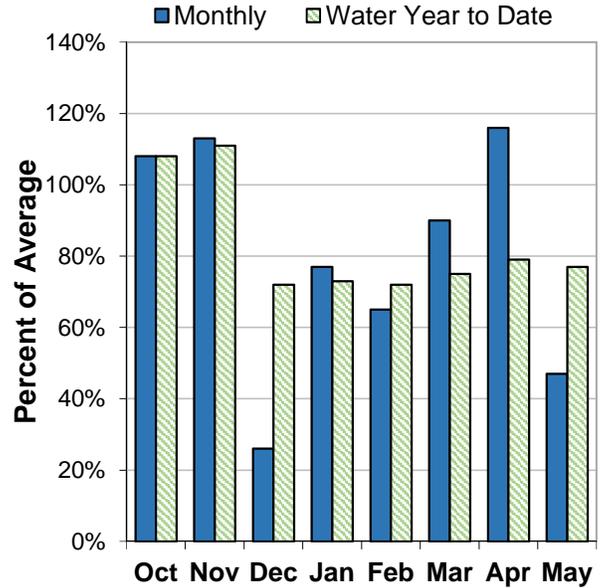
# Rogue and Umpqua Basins

June 1, 2018

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, all snow monitoring sites in the basin are snow-free except Summit Lake SNOTEL (5610 ft elev). Normally, four high elevation sites would still have snowpack remaining at this time of year. In general, SNOTEL sites in the basin peaked around 40% to 80% of normal peak snowpack levels this winter. Snowmelt timing was 1-2 weeks earlier than normal this spring for most sites.

### PRECIPITATION

May precipitation was 47% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 77% of average.

### RESERVOIR

As of June 1, storage at major reservoirs in the basin ranges from 48% of average at Hyatt Prairie Reservoir to 106% of average at Fish Lake.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 47% to 81% of average. Water managers in the Applegate River basin without access to reservoir water should expect water shortages this summer and prepare accordingly. Streamflow forecasts in the rest of the Rogue and Umpqua basins are slightly higher, but still well below normal to below normal.

## Rogue And Umpqua Basins Summary for June 1, 2018

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts June 1, 2018</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>30-Year 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>	
South Umpqua R at Tiller	JUN-JUL	8.0	15.4	22	55%	29	43	40
	JUN-SEP	13.2	22	29	59%	38	52	49
Cow Ck ab Galesville Reservoir	JUN-JUL	1.27	1.88	2.4	80%	2.9	3.8	3.0
	JUN-SEP	2.1	2.8	3.4	81%	4.1	5.2	4.2
South Umpqua R nr Brockway	JUN-JUL	19.1	34	46	64%	60	84	72
	JUN-SEP	28	46	60	67%	76	104	90
North Umpqua R at Winchester	JUN-JUL	79	119	146	62%	173	215	235
	JUN-SEP	172	215	245	70%	275	320	350
Lost Creek Lk Inflow <sup>2</sup>	JUN-JUL	121	141	154	75%	167	187	205
	JUN-SEP	220	245	265	80%	280	305	330
Rogue R at Raygold <sup>2</sup>	JUN-JUL	97	128	149	68%	169	200	220
	JUN-SEP	193	230	255	73%	280	315	350
Rogue R at Grants Pass <sup>2</sup>	JUN-JUL	88	123	146	66%	170	205	220
	JUN-SEP	172	215	245	72%	275	315	340
Applegate Lake Inflow <sup>2</sup>	JUN-JUL	1.74	7.4	11.2	40%	15.1	21	28
	JUN-SEP	5.6	11.9	16.1	47%	20	27	34
Sucker Ck bl Ltl Grayback nr Holland	JUN-JUL	2.7	6.0	8.3	61%	10.6	14.0	13.6
	JUN-SEP	5.2	9.0	11.6	66%	14.1	17.9	17.6
Illinois R nr Kerby	JUN-JUL	6.7	12.7	17.9	56%	24	34	32
	JUN-SEP	9.6	16.8	23	61%	30	42	38

\* 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>
Applegate	67.5	68.2	64.9	104%	75.2
Emigrant Lake	28.9	38.1	35.5	81%	39.0
Fish Lake	6.6	6.3	6.2	106%	7.9
Fourmile Lake	7.9	10.7	10.7	74%	15.6
Howard Prairie	36.9	60.2	48.3	76%	62.1
Hyatt Prairie	6.4	9.9	13.2	48%	16.2
Lost Creek	282.3	298.1	302.6	93%	315.0

## Rogue And Umpqua Basins Summary for June 1, 2018

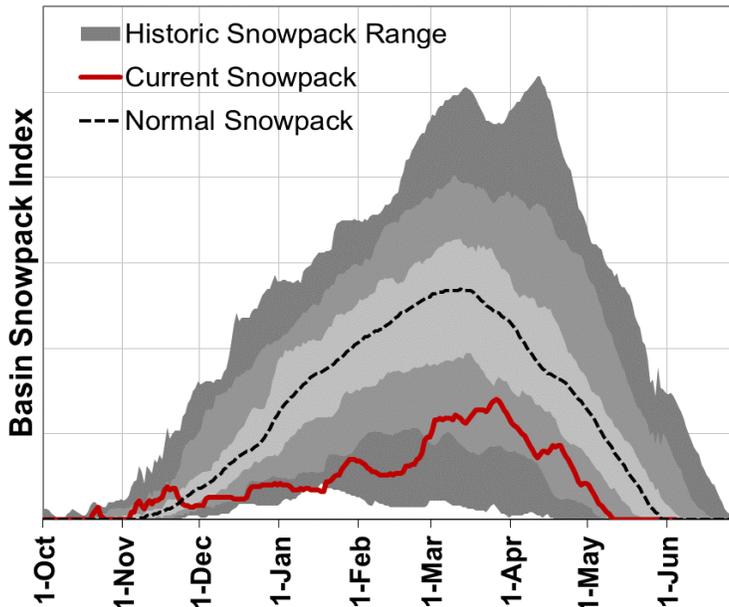
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Big Red Mountain SNOTEL	6050	1-Jun	0	0.0	12.8	0.2	0%
Annie Springs SNOTEL	6010	1-Jun	0	0.0	34.0	24.0	0%
Fourmile Lake SNOTEL	5970	1-Jun	0	0.0	0.4	0.0	
Cold Springs Camp SNOTEL	5940	1-Jun	0	0.0	0.0	0.0	
Sevenmile Marsh SNOTEL	5700	1-Jun	0	0.0	9.9	0.0	
Summit Lake SNOTEL	5610	1-Jun	22	12.0	40.3	30.5	39%
Billie Creek Divide SNOTEL	5280	1-Jun	0	0.0	0.0	0.0	
Diamond Lake SNOTEL	5280	1-Jun	0	0.0	0.0	0.0	
Bigelow Camp SNOTEL	5130	1-Jun	0	0.0	0.0	0.0	
Fish Lk. SNOTEL	4660	1-Jun	0	0.0	0.0	0.0	
Howard Prairie SNOTEL	4580	1-Jun	0	0.0	0.0		
King Mountain SNOTEL	4340	1-Jun	0	0.0	0.0	0.0	
Tokenetee Airstrip SNOTEL	3240	1-Jun	0	0.0	0.0	0.0	



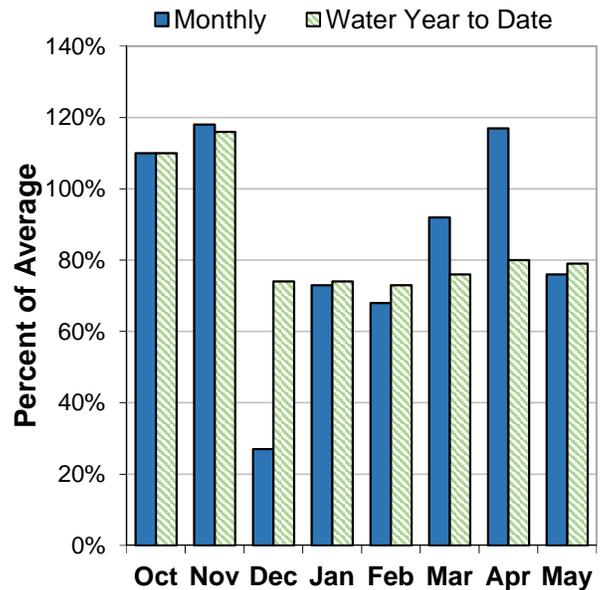
# Klamath Basin

June 1, 2018

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, all SNOTEL sites in the basin are snow-free, when normally Annie Springs SNOTEL (6010 ft elev) still has around 3 feet of snowpack remaining on this date. In general, SNOTEL sites in the basin peaked around 30% to 60% of normal peak snowpack levels this winter. Snowmelt timing was 1-2 weeks earlier than normal this spring for most sites.

### PRECIPITATION

May precipitation was 76% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 79% of average.

### RESERVOIR

As of June 1, storage at major reservoirs in the basin ranges from 88% of average at Clear Lake to 123% of average at Gerber Reservoir.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 26% to 82% of average. Water users in the basin without access to reservoir water should expect water shortages this summer and prepare accordingly.

## Klamath Basin Summary for June 1, 2018

### Forecast Exceedance Probabilities for Risk Assessment \*

Streamflow Forecasts June 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Gerber Reservoir Inflow <sup>2</sup>	JUN-JUL	0.00	0.06	0.33	23%	0.85	2.0	1.43
	JUN-SEP	0.00	0.08	0.47	26%	1.16	2.7	1.78
Sprague R nr Chiloquin	JUN-JUL	22	29	34	68%	40	49	50
	JUN-SEP	37	47	54	74%	62	74	73
Williamson R bl Sprague nr Chiloquin	JUN-JUL	47	59	67	74%	75	87	90
	JUN-SEP	95	111	122	82%	133	149	149
Upper Klamath Lake Inflow <sup>1,2</sup>	JUN-JUL	27	55	68	65%	80	108	104
	JUN-SEP	70	114	134	73%	154	198	183

\* 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)
Clear Lake	218.3	283.4	247.4	88%	513.3
Gerber	79.7	90.2	65.0	123%	94.3
Upper Klamath Lake	427.4	434.9	445.2	96%	523.7

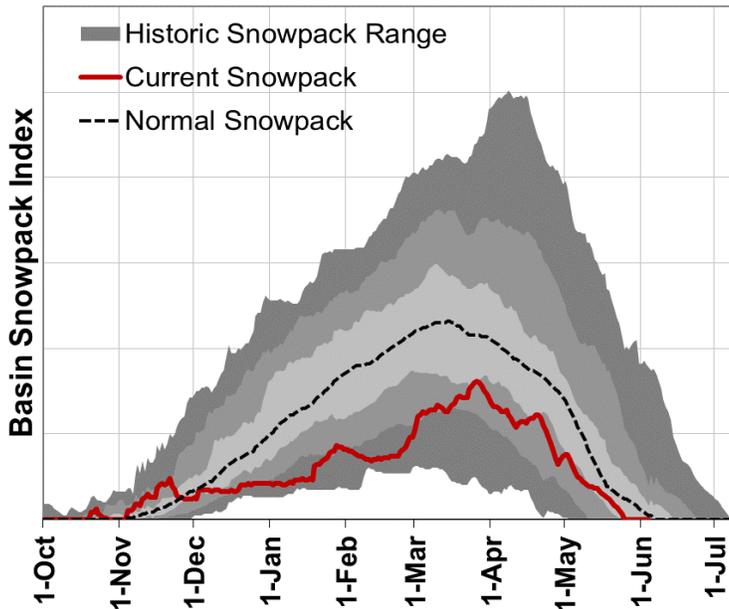
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	% of Median	Median
Summer Rim SNOTEL	7080	1-Jun	0	0.0	0.0	0.0	
Swan Lake Mtn SNOTEL	6830	1-Jun	0	0.0	0.0		
Crazyman Flat SNOTEL	6180	1-Jun	0	0.0	0.0	0.0	
Annie Springs SNOTEL	6010	1-Jun	0	0.0	34.0	24.0	0%
Finley Corrals AM	6000	1-Jun	0	0.0	0.0		
Fourmile Lake SNOTEL	5970	1-Jun	0	0.0	0.4	0.0	
Cold Springs Camp SNOTEL	5940	1-Jun	0	0.0	0.0	0.0	
Strawberry SNOTEL	5770	1-Jun	0	0.0	0.0	0.0	
Cox Flat AM	5750	1-Jun	0	0.0	0.0		
Silver Creek SNOTEL	5740	1-Jun	0	0.0	0.0	0.0	
Quartz Mountain SNOTEL	5720	1-Jun	0	0.0	0.0	0.0	
Sevenmile Marsh SNOTEL	5700	1-Jun	0	0.0	9.9	0.0	
State Line SNOTEL	5680	1-Jun	0	0.0	0.0		
Sun Pass SNOTEL	5400	1-Jun	0	0.0	0.0		
Billie Creek Divide SNOTEL	5280	1-Jun	0	0.0	0.0	0.0	
Diamond Lake SNOTEL	5280	1-Jun	0	0.0	0.0	0.0	
Crowder Flat SNOTEL	5170	1-Jun	0	0.0	0.0	0.0	
Taylor Butte SNOTEL	5030	1-Jun	0	0.0	0.0	0.0	
Gerber Reservoir SNOTEL	4890	1-Jun	0	0.0	0.0	0.0	
Chemult Alternate SNOTEL	4850	1-Jun	0	0.0	0.0	0.0	
Fish Lk. SNOTEL	4660	1-Jun	0	0.0	0.0	0.0	
Howard Prairie SNOTEL	4580	1-Jun	0	0.0	0.0		



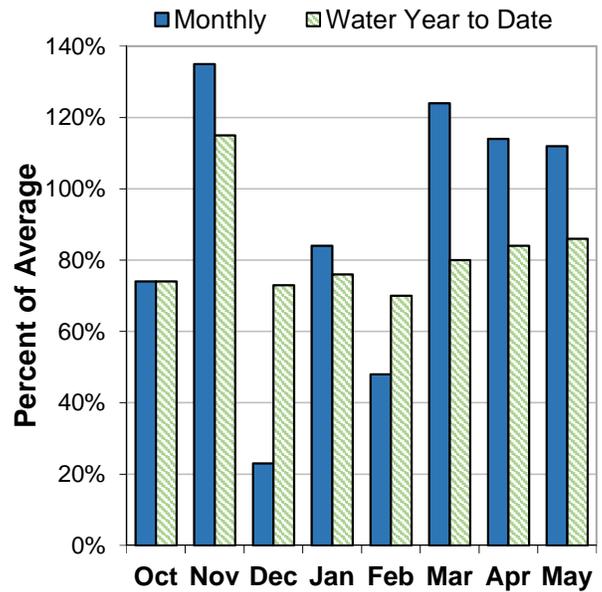
# Lake County and Goose Lake Basins

June 1, 2018

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, all snow measurement sites in the basin are snow-free, which is typical for this time of year. In general, SNOTEL sites in the basin peaked around 30% to 70% of normal peak snowpack levels this winter. Snowmelt timing was 1-2 weeks earlier than normal this spring for most sites.

### PRECIPITATION

May precipitation was 112% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 86% of average.

### RESERVOIR

As of June 1, storage at major reservoirs in the basin ranges from 80% of average at Cottonwood Reservoir to 111% of average at Drews Reservoir.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 38% to 58% of average. Water users in the basin without access to reservoir water should expect water shortages this summer and prepare accordingly.

## Lake County And Goose Lake Basins Summary for June 1, 2018

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts June 1, 2018</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>30-Year 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	JUN-JUL	0.54	0.99	1.36	36%	1.80	2.6	3.8
	JUN-SEP	0.79	1.30	1.72	40%	2.2	3.0	4.3
Deep Ck ab Adel	JUN-JUL	1.84	3.4	4.6	33%	6.1	8.7	13.9
	JUN-SEP	2.8	4.5	6.0	38%	7.6	10.4	15.8
Honey Ck nr Plush	JUN-JUL	0.30	0.66	0.97	37%	1.35	2.0	2.6
	JUN-SEP	0.36	0.73	1.07	40%	1.47	2.2	2.7
Chewaucan R nr Paisley	JUN-JUL	5.5	8.1	10.2	54%	12.4	16.2	19.0
	JUN-SEP	8.1	11.1	13.4	58%	15.9	19.9	23

\* 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	5.6	9.3	7.0	80%	9.3
Drews	50.6	62.7	45.5	111%	63.5

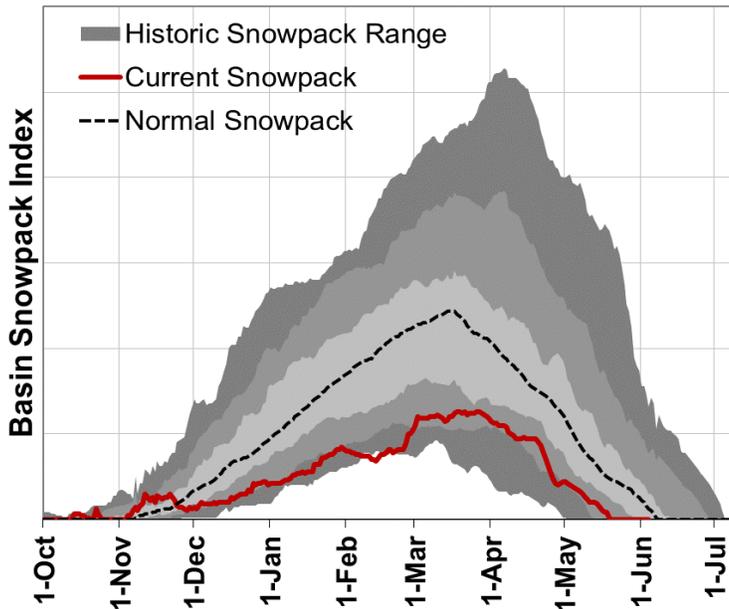
<b>Basin Snowpack Measurement Sites</b>	<b>Elevation (ft)</b>	<b>Date Measured</b>	<b>Depth (in)</b>	<b>Snow Water Equivalent (in)</b>			
				<b>Current SWE</b>	<b>Last Yr SWE</b>	<b>Median</b>	<b>% of Median</b>
Dismal Swamp SNOTEL	7360	1-Jun	0	0.0	19.2	4.2	0%
Summer Rim SNOTEL	7080	1-Jun	0	0.0	0.0	0.0	
Cedar Pass SNOTEL	7030	1-Jun	0	0.0	0.0	0.0	
Patton Meadows AM	6800	1-Jun	0	0.0	0.0		
Sherman Valley AM	6640	1-Jun	0	0.0	0.0		
Hart Mountain AM	6430	1-Jun	0	0.0	0.0		
Rogger Meadow AM	6360	1-Jun	0	0.0	0.0		
Adin Mtn SNOTEL	6190	1-Jun	0	0.0	0.0	0.0	
Crazyman Flat SNOTEL	6180	1-Jun	0	0.0	0.0	0.0	
Finley Corrals AM	6000	1-Jun	0	0.0	0.0		
Sheldon SCAN	5860	1-Jun	0	0.0	0.0	0.0	
Strawberry SNOTEL	5770	1-Jun	0	0.0	0.0	0.0	
Cox Flat AM	5750	1-Jun	0	0.0	0.0		
Silver Creek SNOTEL	5740	1-Jun	0	0.0	0.0	0.0	
State Line SNOTEL	5680	1-Jun	0	0.0	0.0		
Crowder Flat SNOTEL	5170	1-Jun	0	0.0	0.0	0.0	



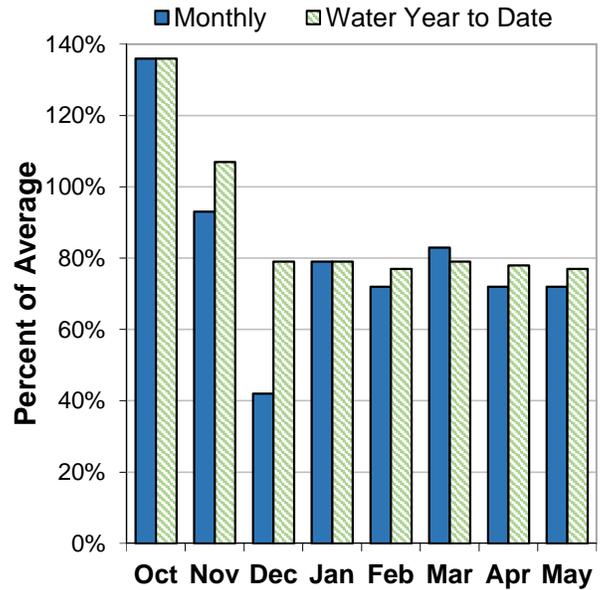
# Harney Basin

June 1, 2018

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of June 1, all snow measurement sites in the basin are snow-free, which is typical for this time of year. In general, SNOTEL sites in the basin peaked around 40% to 60% of normal peak snowpack levels this winter. Snowmelt timing was 2-3 weeks earlier than normal this spring for most sites.

### PRECIPITATION

May precipitation was 72% of average. Precipitation since the beginning of the water year (October 1 - June 1) has been 77% of average.

### STREAMFLOW FORECAST

The June through September streamflow forecasts in the basin range from 28% to 46% of average. Water users in the basin should expect water shortages this summer and prepare accordingly.

## Harney Basin Summary for June 1, 2018

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts June 1, 2018</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>30-Year 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>	
Silvies R nr Burns	JUN-JUL	0.53	2.0	3.6	27%	5.7	9.5	13.5
	JUN-SEP	0.92	2.7	4.5	28%	6.8	10.9	16.0
Donner Und Blitzen R nr Frenchglen	JUN-JUL	5.2	7.8	9.9	41%	12.3	16.2	24
	JUN-SEP	8.1	11.3	13.7	46%	16.3	21	30
Trout Ck nr Denio	JUN-JUL	0.24	0.47	0.66	30%	0.90	1.30	2.2
	JUN-SEP	0.36	0.65	0.90	33%	1.18	1.68	2.7

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

<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>
Granite Peak SNOTEL	8543	1-Jun	0	0.0	11.9	1.5	0%
Trout Creek AM	7890	1-Jun	0	0.0	0.0		
Fish Creek SNOTEL	7660	1-Jun	0	0.0	19.9	9.1	0%
Govt Corrals AM	7400	1-Jun	0	0.0	0.0		
Silvies SNOTEL	6990	1-Jun	0	0.0	0.0	0.0	
Buckskin Lower SNOTEL	6915	1-Jun	0	0.0	0.0	0.0	
V Lake AM	6600	1-Jun	0	0.0	0.0		
Disaster Peak SNOTEL	6500	1-Jun	0	0.0	0.0	0.0	
Hart Mountain AM	6430	1-Jun	0	0.0	0.0		
Snow Mountain SNOTEL	6230	1-Jun	0	0.0	0.0	0.0	
Lamance Creek SNOTEL	6000	1-Jun	0	0.0	0.0	0.0	
Blue Mountain Spring SNOTEL	5870	1-Jun	0	0.0	0.0	0.0	
Sheldon SCAN	5860	1-Jun	0	0.0	0.0	0.0	
Rock Springs SNOTEL	5290	1-Jun	0	0.0	0.0	0.0	
Starr Ridge SNOTEL	5250	1-Jun	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-Jun	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

OWYHEE AND MALHEUR BASINS					
FORECAST POINT	FORECAST THRESHOLD	FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----			LONG-TERM AVERAGE VALUE
		90%	50%	10%	
Owyhee R nr Rome	2000 cfs	** Observed	Mar 25		<b>May 6</b>
Owyhee R nr Rome	1000 cfs	** Observed	Mar 28		<b>May 18</b>
Owyhee R nr Rome	500 cfs	** Observed	May 6		<b>Jun 2</b>

UPPER JOHN DAY BASIN					
FORECAST POINT	FORECAST THRESHOLD	FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----			LONG-TERM AVERAGE VALUE
		90%	50%	10%	
John Day R at Service Creek	Average Daily Flow on Aug. 1st	15	95	135	<b>271</b>

UPPER DESCHUTES AND CROOKED BASINS					
FORECAST POINT	FORECAST THRESHOLD	FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----			LONG-TERM AVERAGE VALUE
		90%	50%	10%	
Crane Prairie Inflow *	Date of Peak	** Observed	Apr 13		<b>May 25</b>
Crane Prairie Inflow	Peak Flow	** Observed	205 cfs		<b>403</b>
Crane Prairie Inflow	Average Daily Flow on Oct. 1st	140	170	200	<b>269</b>
Prineville Reservoir Inflow	150 cfs	** Observed	May 4		<b>May 30</b>
Prineville Reservoir Inflow	80 cfs	** Observed	May 12		<b>June 7</b>
Whychus Creek nr Sisters	100 cfs	Jul 3	Jul 23	Aug 17	<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	Jul 12	Jul 28	Aug 7	<b>August 8</b>
South Umpqua R at Tiller	140 cfs	Jun 13	Jun 26	Jul 9	<b>July 11</b>
South Umpqua R at Tiller	90 cfs	Jul 1	Jul 17	Aug 2	<b>August 1</b>
South Umpqua R at Tiller	60 cfs	Jul 23	Aug 17	Sep 6	<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	** Observed	Jun 3		<b>June 17</b>
Honey Ck nr Plush	100 cfs	** Flow did not exceed this level **			<b>May 16</b>
Honey Ck nr Plush	50 cfs	** Observed	Apr 19		<b>June 4</b>
Twentymile Ck nr Adel	50 cfs	** Observed	May 29		<b>May 30</b>
Twentymile Ck nr Adel	10 cfs	Jun 9	Jun 16	Jun 23	<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	** Flow did not exceed this level **			<b>May 21</b>
Silvies R nr Burns	200 cfs	** Observed	Apr 21		<b>June 2</b>
Silvies R nr Burns	100 cfs	** Observed	May 5		<b>June 13</b>
Silvies R nr Burns	50 cfs	** Observed	Jun 3		<b>July 3</b>
Donner Und Blitzen R nr Frenchglen	200 cfs	** Observed	May 27		<b>June 20</b>
Donner Und Blitzen R nr Frenchglen	100 cfs	Jun 10	Jun 18	Jun 26	<b>July 9</b>

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

# 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. Streamflow forecasts help users make risk-based decisions. Water 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. 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. AF stands for acre-feet. Forecasted volumes of water are typically in thousands of acre-feet.

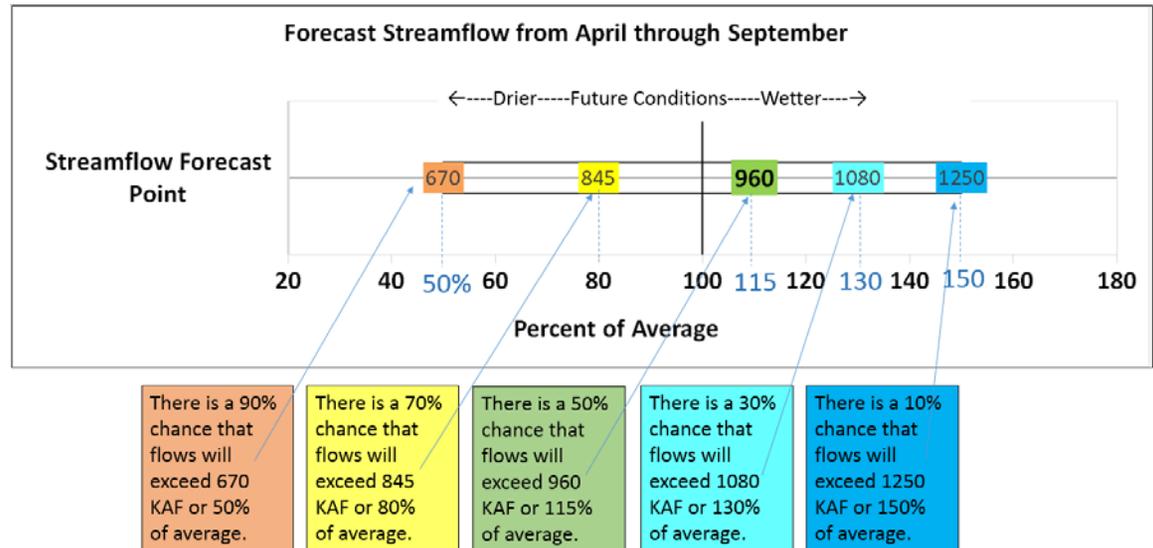
**30-Year Average.** The 30-year average streamflow for each forecast period is provided for comparison. The average is based on data from 1981-2010. The % AVG. column compares the 50% chance of exceedance forecast to the 30-year average streamflow; values above 100% denote when the 50% chance of exceedance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

**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.

## Graphical Representation of Streamflow Forecast Range:

*This type of graphic is used in the state-wide streamflow forecast summary*



## Using the Forecasts - an Example

### Using the 50 Percent Exceedance Forecast.

Using the example forecasts shown here, 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.

JOHN DAY BASIN									
Streamflow Forecasts - February 1, 2013									
Forecast Point	Forecast Period	<<===== Drier =====>>			Future Conditions		===== Wetter =====>>		
		90% (1000AF)	70% (1000AF)	50% (1000AF)	Chance Of Exceeding * (% AVG.)		30% (1000AF)	10% (1000AF)	30-Yr Avg. (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.

**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.

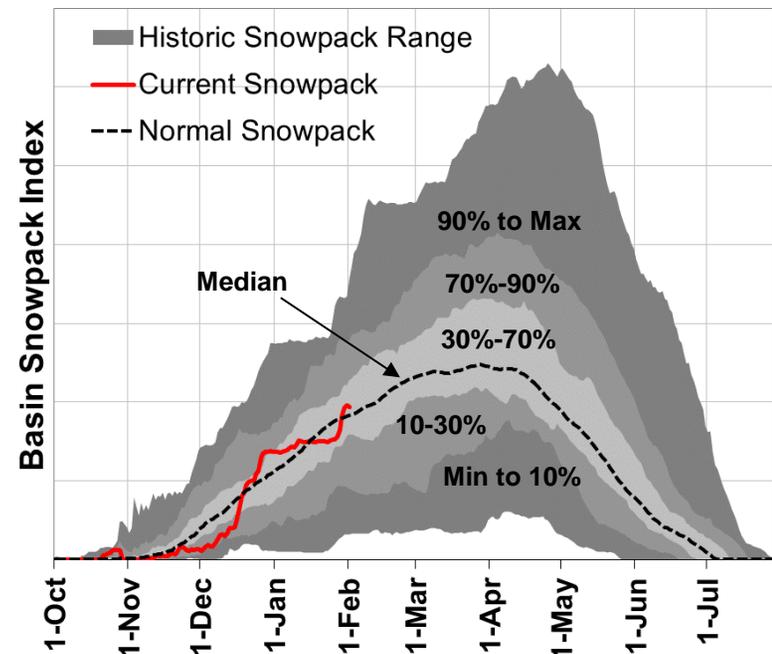
## Interpreting Snowpack Plots

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 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).

## Mountain Snowpack



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Official Business



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