



United States  
Department of  
Agriculture



Natural Resources  
Conservation  
Service

# Oregon Basin Outlook Report

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February 1, 2019



**Barney Creek SNOLITE on Jan 31, 2019**

*Photo courtesy of Wes Morgan (Snow Surveyor, Burnt River Irrigation District)*

In 2013, the Barney Creek snow course (in the Burnt River basin, east of John Day) was enhanced to include an automated SNOLITE site. Over the past seven years, the Oregon Snow Survey team has automated 20 snow courses and aerial markers to provide better data coverage across the state. Automated SNOLITE sites send real-time snow depth and air temperature data every six hours, which provides much greater resolution than data collected manually on a monthly basis. SNOLITE sites are groundtruthed monthly via snow course surveys or aerial marker flights. Here is a link to the SNOLITE network in Oregon: [Map of Oregon SNOLITE network](#)

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# General Outlook

February 1<sup>st</sup>, 2019

## SUMMARY

As of February 1<sup>st</sup>, a wide array of snow conditions exists throughout the state. In general, most of eastern Oregon has snowpack conditions in the 80-100% of normal range, while the snow in western and central Oregon ranges from about 50-70% of normal. Precipitation has been below average since the water year began on October 1<sup>st</sup> for most basins. Western Oregon has been the driest so far this winter, which when combined with generally warmer mountain temperatures has resulted in snowpack accumulation well below normal amounts leading into February.

Based on the current conditions, streamflow forecasts are calling for below average flows for the spring and summer water supply season across much of Oregon. However, there are several pockets of near normal streamflow forecasts in the northeastern and southern parts of the state. As winter continues, significant storm systems would be necessary for snowpack conditions to reach normal peak levels by spring. As of Feb 1<sup>st</sup>, most of Oregon's major reservoirs are storing below average amounts for this time of year, underscoring the need for additional snow-laden storms. NOAA's Climate Prediction Center's long-range weather forecast shows that the odds are not in favor of that. Their 3-month long-range forecast is calling for warmer than normal temperatures and below normal precipitation: <http://www.cpc.ncep.noaa.gov/>. Based on current conditions and the long-range weather forecasts, water supplies may be limited this summer across Oregon. Water users should be aware that nearly 75% of the state is currently listed in a severe or extreme drought status by the National Drought Monitor: <https://droughtmonitor.unl.edu/>. While a few more months of winter means there is still time for snowpack conditions to improve, a full snowpack recovery throughout the entire state is not likely.

## SNOWPACK

Warmer temperatures and variable precipitation patterns have resulted in complex snowpack conditions across the state. Western Oregon's winter weather has been elusive. Rain fell at times when it should have been snowing, and the season has been unusually dry. Snowpack in western Oregon ranges from 51% of normal in the Willamette basin to 60% of normal in the Rogue and Umpqua. While the snowpack is quite low, other years have been lower. Last year at this time, all snow measuring sites were below normal, and most of southern Oregon had snowpack levels below 50% of normal.

Moving from west to east, the snowpack conditions improve throughout the state. Most basins in eastern Oregon are hanging onto slightly below normal to near normal snowpack as of February 1<sup>st</sup>. The highest snowpack in the state is in Umatilla, Walla Walla, and Willow basins at 102% of normal. In these regions, the mountains were able to stay cold enough to preserve the early season snow as well as continue to accumulate snowpack during storms.

## PRECIPITATION

January's storm track favored southern Oregon, bringing this region near normal amounts of precipitation (90-100% of average) thanks to a significant mid-month "atmospheric river" storm system. Conversely, northern and central Oregon had an exceptionally dry month. The Hood,

Sandy and Lower Deschutes Basins were the driest in the state, at 53% of average, followed by the Willamette at 59% of average. Elsewhere, January precipitation landed in the 70-80% range.

Although January precipitation was near normal in southern Oregon, all basins in the state are below average in terms of seasonal precipitation (Oct – Jan). Most of the state has seen between 75-85% amounts since the water year began on October 1<sup>st</sup>. Northeastern Oregon has had the most consistent seasonal precipitation and the highest in the state is at 95% of average in the Umatilla, Walla Walla and Willow basins for the current water year.

## **RESERVOIRS**

Most of Oregon's major irrigation reservoirs are storing below average amounts as of the end of January. Lowest storage amounts are in the Grande Ronde, Powder, Burnt and Imnaha basins at 63% of average. The Willamette basin reservoirs have the highest amounts of storage in the state, where storage is 93% of average, collectively.

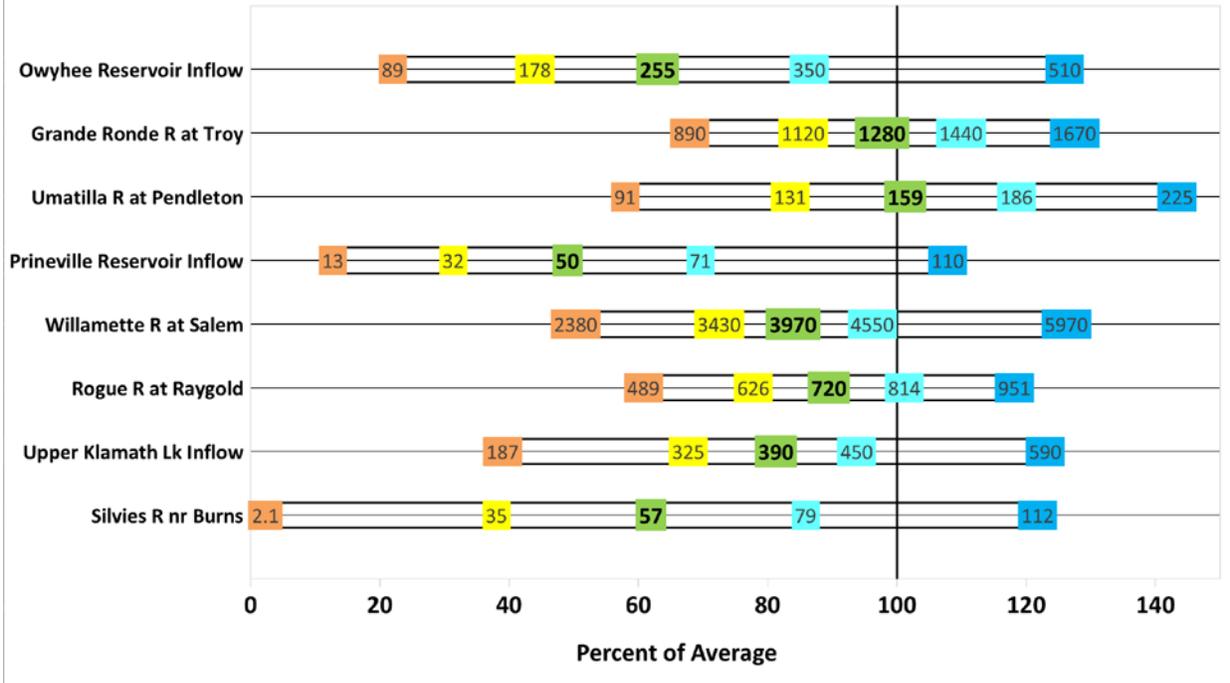
## **STREAMFLOW**

January streamflow volumes were below average for most of the state. A moisture-laden storm system temporarily drove rivers up during the middle of the month but quickly receded as the last week of the month was dry. A select few rivers in northeastern and southwestern Oregon were able to achieve normal monthly streamflow.

Forecasts are quite variable through the state, mirroring the variable conditions in snowpack and seasonal precipitation. Western and central Oregon's summer streamflow forecasts are expected to be below normal, ranging from 70% to 90% of average. These forecasts are not as low as current snow conditions might suggest because streamflows in this region are often bolstered by rainfall; western Oregon's rivers are less snowmelt-driven and more rain-driven than those in eastern Oregon. On the other side of the spectrum, parts of eastern Oregon with near normal snowpack levels currently have streamflow forecasts for below normal summer volumes ranging from 60% to 100% of normal. In other words, history has shown that even with a basin-wide near normal Feb 1<sup>st</sup> snowpack, the summer streamflow forecasts can end up below normal. This is especially true when variability in regional snowpack exists and when precipitation has been below normal for the season. If the long-range warm and dry weather forecasts hold true for the rest of this season and the mountain snowpacks peak at less than typical levels, below normal summer streamflows at many locations across the state are likely.

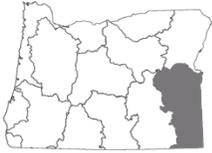
To accompany the forecast summary graphic on the following page, here are some helpful reminders about interpreting streamflow forecasts published in this document. For each forecast point, five possible streamflow volumes are predicted. Where the observed streamflow occurs within this spectrum depends 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 the chart on the following page and explained in more detail at the end of this report.

**Summary of Streamflow Forecasts across Oregon**  
**April 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.

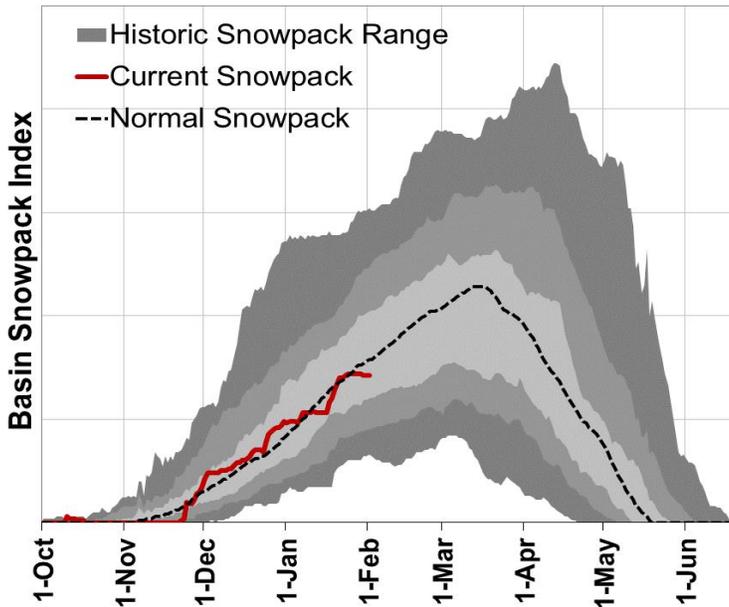
All forecasts are listed with units of 1000 acre-feet (KAF). This report contains data furnished by the Oregon Department of Water Resources, U.S. Geological Survey, NOAA National Weather Service and other cooperators. This report will be updated monthly, January through June.



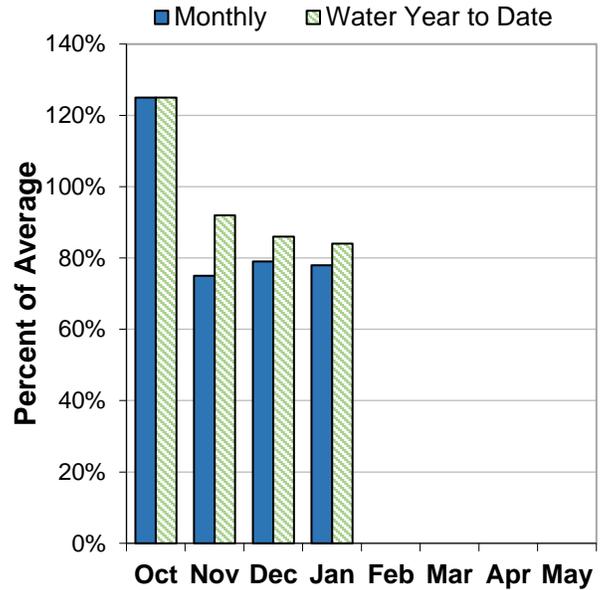
# Owyhee and Malheur Basins

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 95% of normal. This is lower than last month when the snowpack was 116% of normal.

### PRECIPITATION

January precipitation was 78% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 84% of average.

### RESERVOIR

Reservoir storage across the basin is currently well below average. As of February 1, storage at major reservoirs in the basin ranges from 21% of average at Warm Springs Reservoir to 79% of average at Lake Owyhee.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 59% to 89% of average. Overall, forecasts increased slightly from last month's report. If conditions remain similar, water supplies in the basin are likely to be well below normal to below normal this summer.

## Owyhee And Malheur Basins Summary for February 1, 2019

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts February 1, 2019</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	FEB-JUL	133	255	355	61%	480	690	580
	FEB-SEP	142	265	370	62%	495	710	595
	APR-JUL	48	126	199	58%	290	450	345
	APR-SEP	57	139	215	59%	305	470	365
Owyhee R bl Owyhee Dam <sup>2</sup>	FEB-JUL	162	290	400	63%	530	745	635
	FEB-SEP	184	320	430	65%	560	780	665
	APR-JUL	68	151	225	60%	315	475	375
	APR-SEP	89	178	255	63%	350	510	405
Malheur R nr Drewsey	FEB-JUL	29	69	96	83%	123	163	116
	APR-SEP	11.4	39	58	83%	77	104	70
NF Malheur R at Beulah <sup>2</sup>	FEB-JUL	33	57	73	86%	89	114	85
	APR-SEP	24	43	55	89%	68	86	62

\* 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	14.1	24.7	26.0	54%	59.2
Bully Creek	5.1	10.8	12.5	41%	23.7
Lake Owyhee	273.8	490.6	345.3	79%	715.0
Warm Springs	14.4	102.9	68.5	21%	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	95%	53%
South Fork Owyhee Basin	5	90%	37%
Upper Malheur Basin	4	95%	43%
Upper Owyhee Basin	5	92%	44%

## Owyhee And Malheur Basins Summary for February 1, 2019

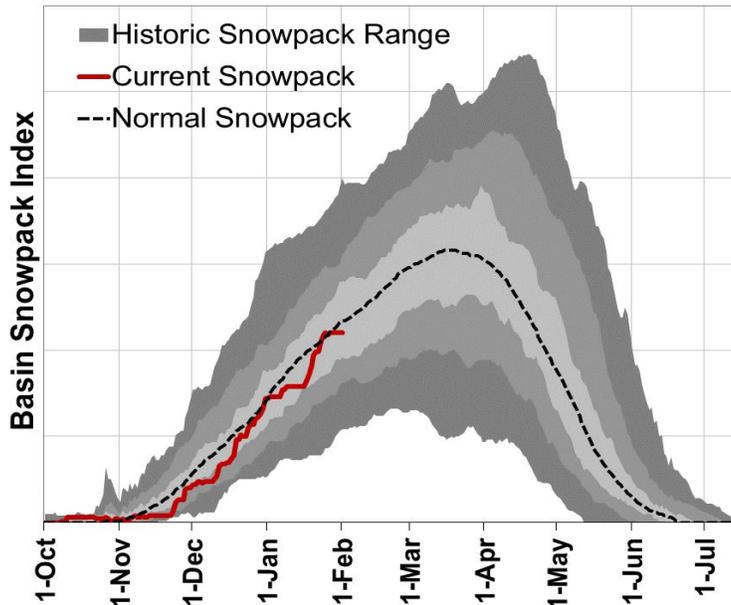
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-Feb	36	10.9	6.3	12.1	90%
Trout Creek AM	7890	1-Feb	26	7.5	3.2	8.2	91%
Toe Jam SNOTEL	7700	1-Feb	38	11.3	7.2		
Govt Corrals AM	7400	1-Feb	28	7.6	4.3	7.5	101%
Jack Creek Upper SNOTEL	7250	1-Feb	32	8.7	4.9	9.4	93%
Dobson Creek Snow Course	7084	1-Feb	40	12.0	8.8	17.0	71%
Reynolds-Dobson Divide Snow Course	7064	1-Feb	41	12.3	8.5	15.0	82%
Fawn Creek SNOTEL	7000	1-Feb	35	9.1	4.4	10.2	89%
Merritt Mountain AM	7000	29-Jan	19	3.8	1.7	4.7	81%
Buckskin Lower SNOTEL	6915	1-Feb	28	6.7	3.5	6.5	103%
Reynolds West Fork #2 Snow Course	6798	1-Feb	39	11.2	7.4	15.2	74%
Gold Creek Snow Course	6707	29-Jan	16	3.2	0.7	4.2	76%
Big Bend SNOTEL	6700	1-Feb	21	5.5	2.9	5.5	100%
Fry Canyon SNOTEL	6700	1-Feb	12	3.0	1.7		
Fry Canyon Snow Course	6700	29-Jan	21	5.8	2.7	6.2	94%
Laurel Draw SNOTEL	6697	1-Feb	25	7.2	3.5	7.7	94%
Columbia Basin AM	6650	29-Jan	24	4.8	1.3	7.8	62%
Red Canyon AM	6600	1-Feb	21	5.8		6.3	92%
Louse Canyon AM	6530	30-Jan	20	5.0		4.2	119%
South Mtn. SNOTEL	6500	1-Feb	26	8.0	4.0	11.5	70%
Quinn Ridge AM	6270	31-Jan	3	0.8		2.0	40%
Taylor Canyon SNOTEL	6200	1-Feb	17	5.2	0.2	4.0	130%
Blue Mountain Spring SNOTEL	5870	1-Feb		10.8	6.1	11.2	96%
Vaught Ranch AM	5850	1-Feb	16	4.0		4.0	100%
Barney Creek (New) Snow Course	5830	31-Jan	27	7.0	2.8		
Buck Pasture AM	5740	30-Jan	10	3.0		2.3	130%
Lookout Butte AM	5740	31-Jan	1	0.2		0.2	100%
Mud Flat SNOTEL	5730	1-Feb	18	4.5	0.8	5.1	88%
Battle Creek AM	5710	1-Feb	12	3.0		3.2	94%
Boulder Creek AM	5710	30-Jan	12	3.0		2.9	103%
Democrat Creek Snow Course	5686	1-Feb	21	6.6	0.0	7.8	85%
Reynolds Creek SNOTEL	5600	1-Feb	13	3.9	1.3	2.8	139%
Bull Basin AM	5460	1-Feb	5	1.3		2.1	62%
Dooley Mountain Snow Course	5440	31-Jan	26	7.6	2.6	6.6	115%
Call Meadows AM	5380	1-Feb	14	4.5		3.6	125%
Bully Creek AM	5300	30-Jan	8	2.5		2.9	86%
Rock Springs SNOTEL	5290	1-Feb	14	4.5	1.5	4.7	96%
Lake Creek R.S. SNOTEL	5240	1-Feb	28	7.8	4.5	9.4	83%
Flag Prairie AM	4720	30-Jan	9	2.8		4.8	58%
Eldorado Pass Snow Course	4630	31-Jan	15	3.7	0.0	2.8	132%



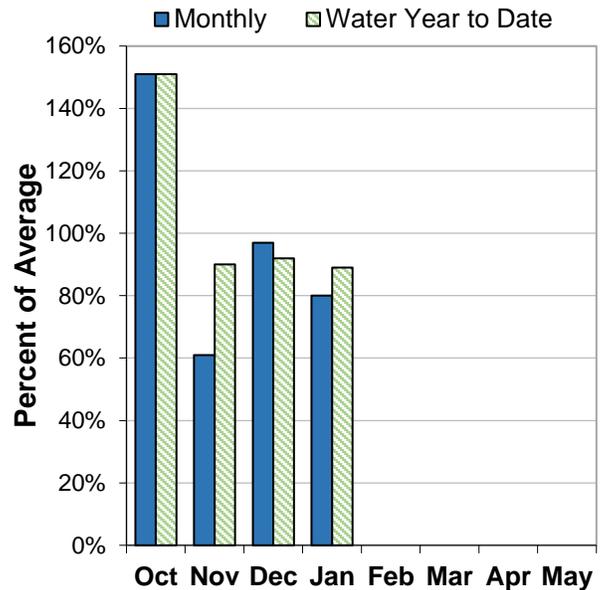
# Grande Ronde, Powder, Burnt and Imnaha Basins

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 91% of normal. This is slightly lower than last month when the snowpack was 100% of normal.

### PRECIPITATION

January precipitation was 80% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 89% of average.

### RESERVOIR

As of February 1, storage at major reservoirs in the basin ranges from 20% of average at Phillips Lake to 128% of average at Wallowa Lake.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 77% to 98% of average. If conditions remain similar, water supplies in the basin are likely to be below normal in the Burnt, Powder, Pine and Imnaha drainages, and near normal in the Grande Ronde basin this summer.

## Grande Ronde, Powder, Burnt And Imnaha Basins Summary for February 1, 2019

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts February 1, 2019</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>	FEB-JUL	18.0	32	41	80%	50	64	51
	APR-SEP	6.3	18.5	27	77%	35	47	35
Powder R nr Sumpter <sup>2</sup>	FEB-JUL	33	45	53	79%	63	79	67
	APR-SEP	24	34	42	78%	51	65	54
Pine Ck nr Oxbow	FEB-JUL	116	156	184	84%	210	250	220
	APR-SEP	72	107	130	80%	153	188	163
Imnaha R at Imnaha	APR-JUL	149	197	230	90%	265	310	255
	APR-SEP	163	215	250	89%	285	335	280
Catherine Ck nr Union	APR-JUL	38	49	56	93%	64	75	60
	APR-SEP	41	52	60	94%	68	79	64
Lostine R nr Lostine	APR-JUL	85	96	103	97%	110	120	106
	APR-SEP	91	102	110	96%	118	130	115
Bear Ck nr Wallowa	APR-JUL	45	55	61	97%	68	78	63
	APR-SEP	47	57	63	97%	70	80	65
Grande Ronde R at Troy	MAR-JUL	1070	1320	1490	99%	1650	1900	1510
	APR-SEP	890	1120	1280	98%	1440	1670	1310

\* 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	6.4	34.9	32.0	20%	73.5
Thief Valley	10.6	14.1	12.4	85%	13.3
Unity	8.0	11.3	11.7	68%	25.5
Wallowa Lake	19.3	26.5	15.1	128%	37.5
Wolf Creek	2.3	2.5	2.8	81%	11.1

<b>Snowpack Summary by Basin</b>	<b>Basin Snowpack % of Median</b>		
	<b># of Sites</b>	<b>Current Yr</b>	<b>Last Yr</b>
Burnt Basin	4	107%	58%
Imnaha Basin	5	79%	63%
Lower Grande Ronde Basin	4	86%	72%
Powder Basin	12	93%	63%
Upper Grande Ronde Basin	9	94%	69%
Wallowa Basin	6	81%	66%

## Grande Ronde, Powder, Burnt And Innaha Basins Summary for February 1, 2019

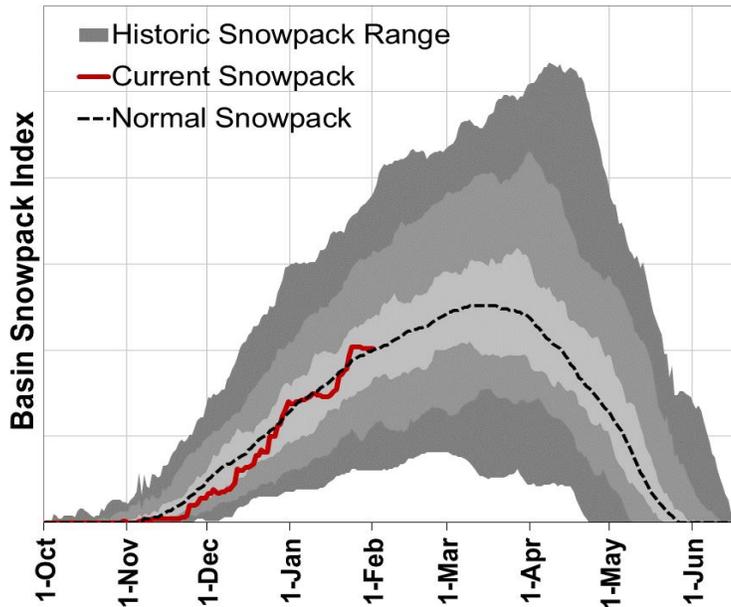
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt. Howard SNOTEL	7910	1-Feb	22	7.5	6.6	10.2	74%
Aneroid Lake #2 SNOTEL	7400	1-Feb	37	9.7	8.7	14.4	67%
Standley AM	7360	30-Jan	55	16.5		19.8	83%
Anthony Lake (Rev) Snow Course	7160	31-Jan	46	12.5	12.0	15.8	79%
TV Ridge AM	7050	1-Feb	24	7.2	7.0	9.9	73%
Little Alps Snow Course	6360	31-Jan	28	6.4	5.0	7.8	82%
Big Sheep AM	6230	1-Feb	36	10.1	9.3	17.2	59%
Bear Saddle SNOTEL	6180	1-Feb	48	14.5	8.8	15.2	95%
Bourne SNOTEL	5850	1-Feb	35	10.6	6.4	11.1	96%
Barney Creek (New) Snow Course	5830	31-Jan	27	7.0	2.8		
Moss Springs SNOTEL	5760	1-Feb	52	15.0	14.3	16.2	93%
Taylor Green SNOTEL	5740	1-Feb	42	14.0	8.5	14.5	97%
Boulder Creek AM	5710	30-Jan	12	3.0		2.9	103%
Spruce Springs SNOTEL	5700	1-Feb	28	8.4	7.0	11.9	71%
Wolf Creek SNOTEL	5630	1-Feb	37	10.3	6.9	11.6	89%
Milk Shakes SNOTEL	5580	1-Feb	71	23.7	24.1		
West Branch SNOTEL	5560	1-Feb	43	13.6	9.6	14.1	96%
Touchet SNOTEL	5530	1-Feb	60	20.9	17.0	20.4	102%
Eilertson Meadows SNOTEL	5510	1-Feb	30	8.6	4.5	7.9	109%
Dooley Mountain Snow Course	5440	31-Jan	26	7.6	2.6	6.6	115%
Gold Center SNOTEL	5410	1-Feb	31	8.2	4.9	7.3	112%
Schneider Meadows SNOTEL	5400	1-Feb	60	18.1	14.3	19.6	92%
Beaver Reservoir SNOTEL	5150	1-Feb	28	7.2	4.9	6.6	109%
Tipton SNOTEL	5150	1-Feb	30	7.4	7.0	8.5	87%
High Ridge SNOTEL	4920	1-Feb	51	18.8	13.1	16.1	117%
County Line SNOTEL	4830	1-Feb	10	3.1	1.3	3.9	79%
Eldorado Pass Snow Course	4630	31-Jan	15	3.7	0.0	2.8	132%
Little Antone (Alt.) Snow Course	4560	31-Jan	27	6.4	4.0	6.8	94%
Bowman Springs SNOTEL	4530	1-Feb	25	7.4	4.7	6.2	119%
East Eagle Snow Course	4400	27-Jan	49	14.4	9.0	14.6	99%
Sourdough Gulch SNOTEL	4000	1-Feb	2	0.7	0.2	0.9	78%



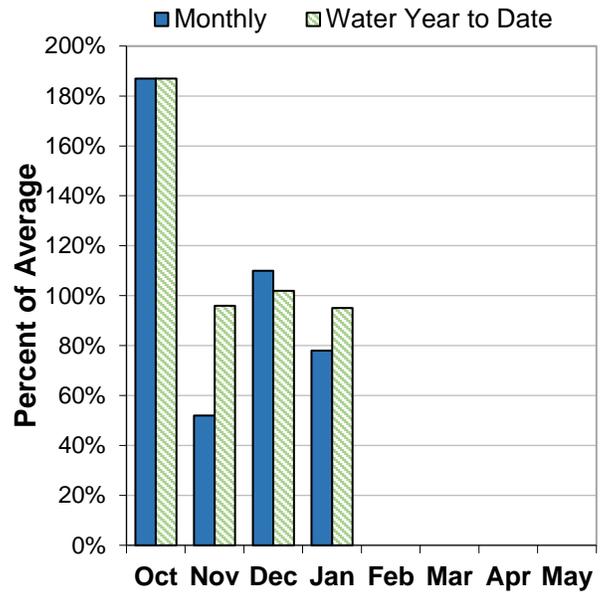
# Umatilla, Walla Walla and Willow Basins

February 1, 2019

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 102% of normal -- the highest in the state. This is slightly lower than last month when the snowpack was 106% of normal.

### PRECIPITATION

January precipitation was 78% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 95% of average.

### RESERVOIR

Reservoir storage across the basin is currently below average. As of February 1, storage at major reservoirs in the basin ranges from 90% of average at McKay Reservoir to 92% of average at Cold Springs and Willow Creek Reservoir.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 95% to 103% of average. If conditions remain similar, water supplies in the basin are likely to be near normal this summer.

## Umatilla, Walla Walla And Willow Basins Summary for February 1, 2019

### Forecast Exceedance Probabilities for Risk Assessment \*

Streamflow Forecasts February 1, 2019	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	MAR-JUL	53	62	68	100%	74	84	68
	APR-SEP	51	60	66	100%	72	81	66
Umatilla R ab Meacham nr Gibbon	MAR-JUL	70	90	103	102%	116	136	101
	APR-SEP	51	69	81	101%	93	111	80
Umatilla R at Pendleton	MAR-JUL	151	196	225	100%	255	300	225
	APR-SEP	91	131	159	101%	186	225	157
McKay Ck nr Pilot Rock	MAR-JUL	28	41	52	102%	63	83	51
	APR-SEP	12.0	22	30	103%	40	56	29
Butter Ck nr Pine City	MAR-JUL	8.3	11.8	14.5	97%	17.5	22	14.9
	APR-SEP	5.0	7.5	9.5	97%	11.8	15.5	9.8
Willow Ck ab Willow Lk nr Heppner	MAR-JUL	5.3	7.9	10.0	99%	12.4	16.3	10.1
	APR-SEP	3.1	5.3	7.1	100%	9.1	12.7	7.1
Rhea Ck nr Heppner	MAR-JUL	5.4	8.3	10.6	95%	13.3	17.7	11.1
	APR-SEP	3.0	5.2	7.1	95%	9.3	13.0	7.5

\* 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	12.1	16.4	13.1	92%	38.6
Mckay	26.8	34.5	29.8	90%	71.5
Willow Creek	3.9	3.5	4.2	92%	9.8

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Umatilla Basin	5	101%	65%
Walla Walla Basin	7	102%	68%

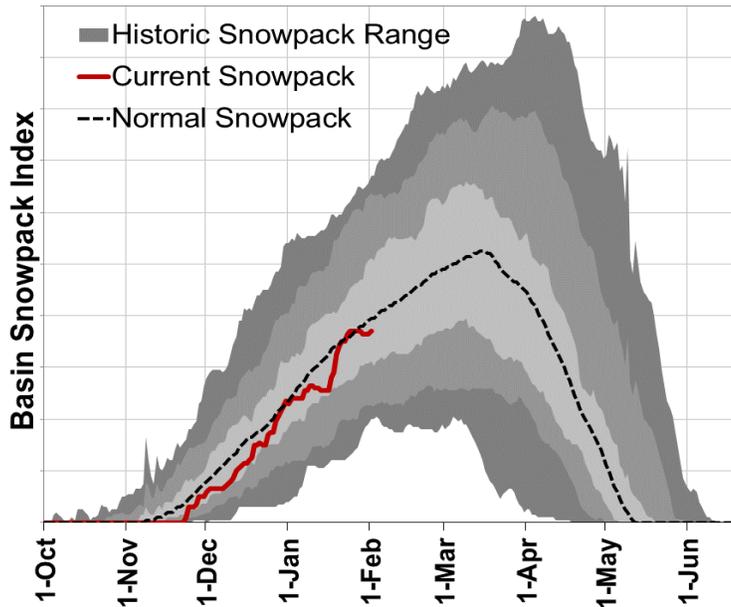
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Arbuckle Mtn SNOTEL	5770	1-Feb	33	10.5	7.1	12.2	86%
Spruce Springs SNOTEL	5700	1-Feb	28	8.4	7.0	11.9	71%
Milk Shakes SNOTEL	5580	1-Feb	71	23.7	24.1		
Touchet SNOTEL	5530	1-Feb	60	20.9	17.0	20.4	102%
Madison Butte SNOTEL	5150	1-Feb	15	4.5	0.6	3.8	118%
Lucky Strike SNOTEL	4970	1-Feb		7.0	3.4	5.9	119%
High Ridge SNOTEL	4920	1-Feb	51	18.8	13.1	16.1	117%
Bowman Springs SNOTEL	4530	1-Feb	25	7.4	4.7	6.2	119%
Emigrant Springs SNOTEL	3800	1-Feb	9	2.6	1.4	5.4	48%



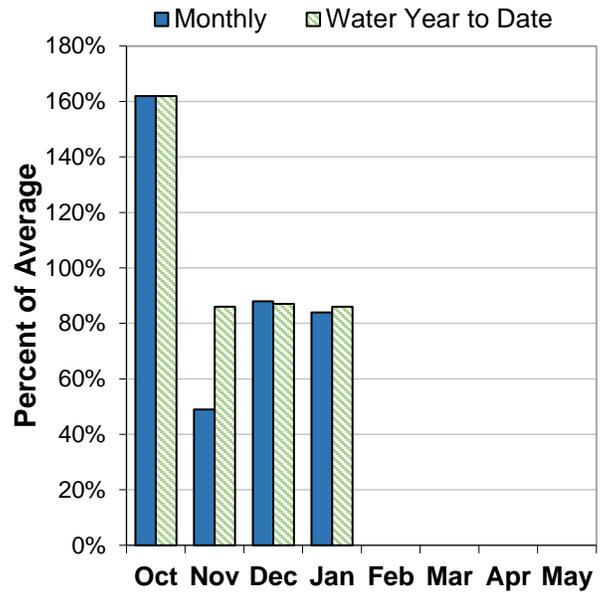
# John Day Basin

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 92% of normal. This is slightly lower than last month when the snowpack was 96% of normal.

### PRECIPITATION

January precipitation was 84% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 86% of average.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 71% to 103% of average. If conditions remain similar, water supplies in the basin are likely to be below normal to near normal this summer.

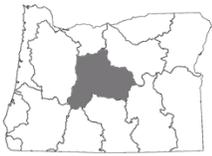
## John Day Basin Summary for February 1, 2019

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts February 1, 2019	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	MAR-JUL	4.7	6.5	7.7	91%	9.0	10.8	8.5
	APR-SEP	4.8	6.6	7.9	90%	9.1	10.9	8.8
Mountain Ck nr Mitchell	MAR-JUL	1.73	3.5	4.7	75%	5.9	7.7	6.3
	APR-SEP	0.91	2.5	3.5	71%	4.5	6.1	4.9
Camas Ck nr Ukiah	MAR-JUL	32	42	49	102%	56	67	48
	APR-SEP	18.3	29	36	103%	43	54	35
MF John Day R at Ritter	MAR-JUL	75	113	139	89%	165	205	156
	APR-SEP	55	89	112	89%	136	170	126
NF John Day R at Monument	MAR-JUL	480	640	750	98%	860	1020	765
	APR-SEP	340	490	585	98%	685	835	600

\* 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	6	95%	43%
North Fork John Day Basin	8	93%	62%
Upper John Day Basin	6	93%	50%

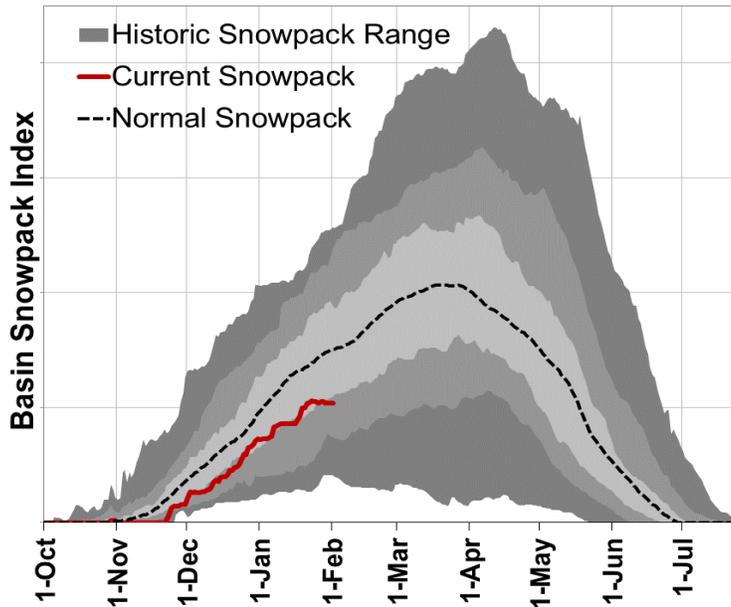
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Anthony Lake (Rev) Snow Course	7160	31-Jan	46	12.5	12.0	15.8	79%
Little Alps Snow Course	6360	31-Jan	28	6.4	5.0	7.8	82%
Snow Mountain SNOTEL	6230	1-Feb	20	6.2	4.1	6.3	98%
Blue Mountain Spring SNOTEL	5870	1-Feb		10.8	6.1	11.2	96%
Derr Snow Course	5860	30-Jan	22	8.4	3.5	7.9	106%
Bourne SNOTEL	5850	1-Feb	35	10.6	6.4	11.1	96%
Derr. SNOTEL	5850	1-Feb	29	8.2	4.4	9.8	84%
Barney Creek (New) Snow Course	5830	31-Jan	27	7.0	2.8		
Arbuckle Mtn SNOTEL	5770	1-Feb	33	10.5	7.1	12.2	86%
Ochoco Meadows SNOTEL	5430	1-Feb	24	7.8	3.4	7.4	105%
Gold Center SNOTEL	5410	1-Feb	31	8.2	4.9	7.3	112%
Starr Ridge SNOTEL	5250	1-Feb	18	4.8	2.4	5.3	91%
Lake Creek R.S. SNOTEL	5240	1-Feb	28	7.8	4.5	9.4	83%
Ochoco Meadows Snow Course	5190	30-Jan	23	8.9	4.8	8.5	105%
Madison Butte SNOTEL	5150	1-Feb	15	4.5	0.6	3.8	118%
Tipton SNOTEL	5150	1-Feb	30	7.4	7.0	8.5	87%
Lucky Strike SNOTEL	4970	1-Feb		7.0	3.4	5.9	119%
County Line SNOTEL	4830	1-Feb	10	3.1	1.3	3.9	79%
Marks Creek Snow Course	4580	30-Jan	5	0.8	0.7	3.4	24%
Little Antone (Alt.) Snow Course	4560	31-Jan	27	6.4	4.0	6.8	94%



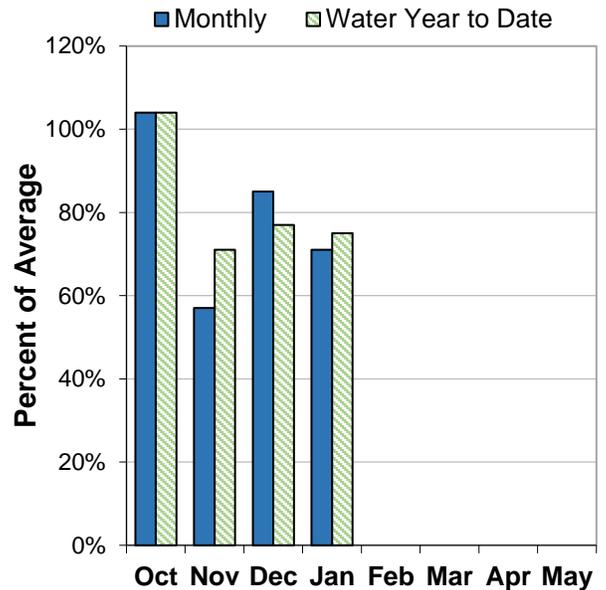
# Upper Deschutes and Crooked Basins

February 1, 2019

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 66% of normal. This is slightly lower than last month when the snowpack was 72% of normal.

### PRECIPITATION

January precipitation was 71% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 75% of average.

### RESERVOIR

As of February 1, storage at major reservoirs in the basin ranges from 28% of average at Ochoco Reservoir to 128% of average at Crescent Lake.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 47% to 84% of average. If conditions remain similar, water supplies in the basin are likely to be well below normal this summer.

## Upper Deschutes And Crooked Basins Summary for February 1, 2019

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts February 1, 2019</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>	
Deschutes R bl Snow Ck	FEB-JUL	17.7	25	30	73%	34	42	41
	FEB-SEP	25	37	44	70%	52	64	63
	APR-JUL	11.4	17.1	21	70%	25	30	30
	APR-SEP	18.1	29	36	69%	43	54	52
Crane Prairie Reservoir Inflow <sup>2</sup>	FEB-JUL	37	49	57	75%	65	77	76
	FEB-SEP	48	67	80	75%	93	111	107
	APR-JUL	24	34	41	73%	48	58	56
	APR-SEP	35	52	64	73%	75	92	88
Crescent Lake Inflow <sup>2</sup>	FEB-JUL	4.9	8.6	11.6	59%	15.2	21	19.6
	FEB-SEP	3.4	11.0	11.5	52%	15.3	23	22
	APR-JUL	3.4	5.9	8.0	53%	10.3	14.4	15.0
	APR-SEP	2.0	4.8	8.1	47%	10.5	16.0	17.4
Little Deschutes R nr La Pine <sup>2</sup>	FEB-JUL	12.1	38	55	62%	72	98	89
	FEB-SEP	7.8	36	56	60%	75	104	94
	APR-JUL	5.7	24	37	59%	49	68	63
	APR-SEP	1.30	23	38	55%	52	74	69
Deschutes R at Benham Falls <sup>2</sup>	FEB-JUL	295	340	370	80%	400	450	460
	FEB-SEP	420	475	515	82%	555	615	625
	APR-JUL	210	240	260	81%	280	310	320
	APR-SEP	335	375	405	84%	435	475	485
Wychus Ck nr Sisters	FEB-JUL	27	33	38	88%	42	48	43
	FEB-SEP	35	42	47	85%	52	60	55
	APR-JUL	23	27	30	86%	32	36	35
	APR-SEP	30	36	39	83%	43	49	47
Prineville Reservoir Inflow <sup>2</sup>	FEB-JUL	52	88	117	57%	151	210	205
	FEB-SEP	50	86	116	57%	151	210	205
	APR-JUL	14.2	33	51	50%	72	110	102
	APR-SEP	13.0	32	50	49%	71	110	102
Ochoco Reservoir Inflow <sup>2</sup>	FEB-JUL	11.0	18.4	24	60%	31	43	40
	FEB-SEP	10.1	17.5	24	60%	31	43	40
	APR-JUL	4.3	8.6	12.4	59%	16.9	25	21
	APR-SEP	3.6	7.8	11.5	58%	16.0	24	20

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

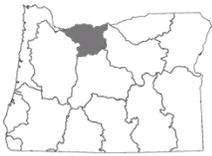
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

## Upper Deschutes And Crooked Basins Summary for February 1, 2019

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Crane Prairie	38.7	42.5	37.7	103%	55.3
Crescent Lake	58.8	77.5	46.1	128%	86.9
Ochoco	5.3	20.5	18.8	28%	44.2
Prineville	54.4	83.5	86.8	63%	148.6
Wickiup	103.9	174.7	161.7	64%	200.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Little Deschutes Basin	4	71%	57%
Upper Crooked Basin	5	92%	45%
Upper Deschutes Basin	14	66%	46%

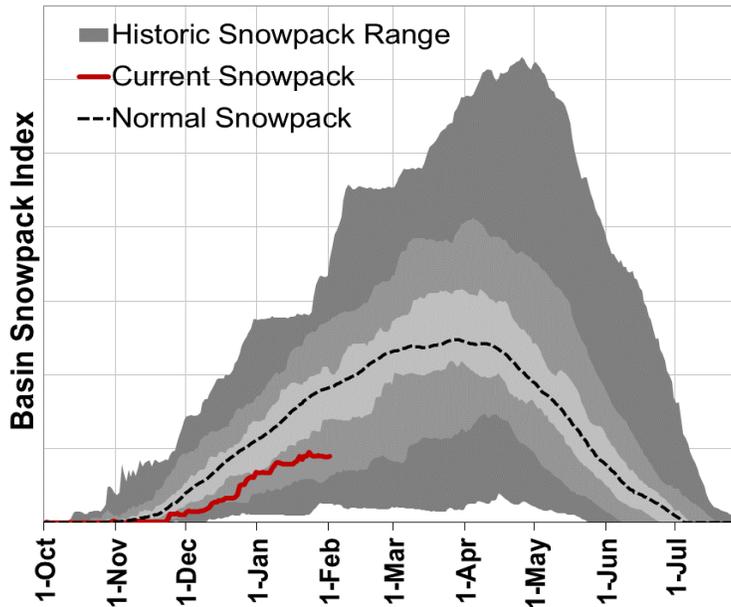
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
New Dutchman #3 Snow Course	6320	1-Feb	61	20.6	19.8	31.9	65%
Snow Mountain SNOTEL	6230	1-Feb	20	6.2	4.1	6.3	98%
Derr Snow Course	5860	30-Jan	22	8.4	3.5	7.9	106%
Derr. SNOTEL	5850	1-Feb	29	8.2	4.4	9.8	84%
Three Creeks Meadow SNOTEL	5690	1-Feb	26	8.7	3.8	12.4	70%
Summit Lake SNOTEL	5610	1-Feb	48	16.8	18.5	23.7	71%
Bald Peter Snow Course	5600	6-Feb	46	17.4	5.4	19.7	88%
Irish Taylor SNOTEL	5540	1-Feb	49	16.0	13.7	22.7	70%
Tangent Snow Course	5470	1-Feb	33	9.8	3.8	14.5	68%
Ochoco Meadows SNOTEL	5430	1-Feb	24	7.8	3.4	7.4	105%
Ochoco Meadows Snow Course	5190	30-Jan	23	8.9	4.8	8.5	105%
Racing Creek Snow Course	5160	6-Feb	23	6.8	1.2	10.5	65%
Cascade Summit SNOTEL	5100	1-Feb	47	15.8	13.5	20.4	77%
Roaring River SNOTEL	4950	1-Feb	31	12.5	8.4	18.6	67%
New Crescent Lake SNOTEL	4910	1-Feb	21	6.5	2.4	10.7	61%
Chemult Alternate SNOTEL	4850	1-Feb	17	5.2	1.3	7.6	68%
Hogg Pass SNOTEL	4790	1-Feb	35	12.6	9.3	13.9	91%
McKenzie SNOTEL	4770	1-Feb	40	16.6	14.3	29.8	56%
Marks Creek Snow Course	4580	30-Jan	5	0.8	0.7	3.4	24%
Hungry Flat Snow Course	4400	1-Feb	2	0.4	0.0	2.3	17%
Salt Creek Falls SNOTEL	4220	1-Feb	21	8.6	2.8	13.9	62%
Santiam Jct. SNOTEL	3740	1-Feb	8	3.9	4.2	13.5	29%



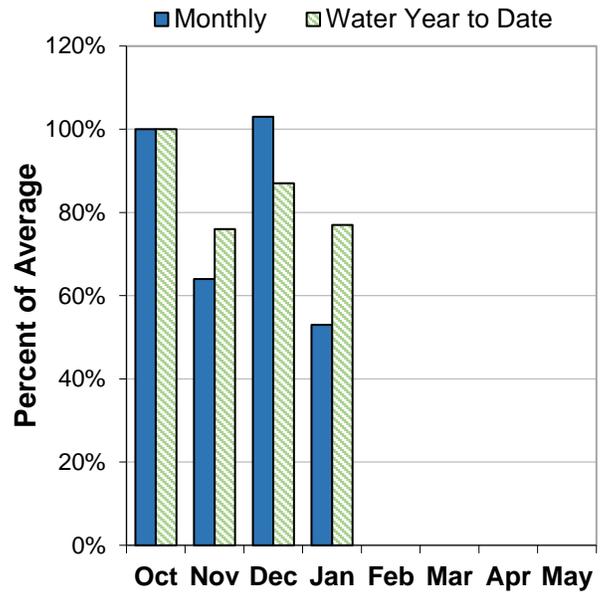
# Hood, Sandy and Lower Deschutes Basins

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 54% of normal. This is slightly lower than last month when the snowpack was 63% of normal.

### PRECIPITATION

January precipitation was 53% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 77% of average.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 76% to 82% of average. If conditions remain similar, water supplies in the basin are likely to be well below normal to below normal this summer.

## Hood, Sandy And Lower Deschutes Basins Summary for February 1, 2019

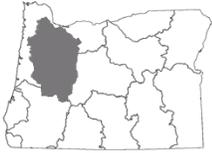
<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts February 1, 2019</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>30-Year Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
WF Hood R nr Dee	APR-JUL	61	83	98	82%	113	136	120
	APR-SEP	74	98	114	82%	130	154	139
Hood R at Tucker Bridge	APR-JUL	111	152	180	80%	210	250	225
	APR-SEP	137	182	215	81%	245	290	265
Sandy R nr Marmot	APR-JUL	168	210	240	77%	270	310	310
	APR-SEP	200	245	275	76%	305	350	360

\* 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	1.2	3.0	3.0	40%	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	50%	62%
Lower Deschutes Basin	9	61%	42%
Middle Columbia - Hood Basin	8	58%	66%

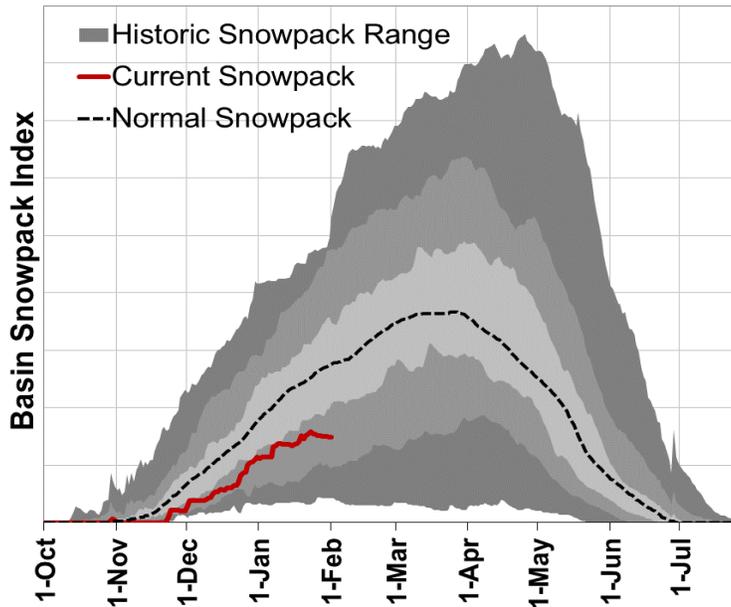
<b>Basin Snowpack Measurement Sites</b>	<b>Elevation (ft)</b>	<b>Date Measured</b>	<b>Depth (in)</b>	<b>Snow Water Equivalent (in)</b>			
				<b>Current SWE</b>	<b>Last Yr SWE</b>	<b>Median</b>	<b>% of Median</b>
High Prairie Snow Course	6080	30-Jan	61	21.3	15.0	29.7	72%
Bald Peter Snow Course	5600	6-Feb	46	17.4	5.4	19.7	88%
Mt Hood Test Site SNOTEL	5370	1-Feb	64	22.9	23.4	38.4	60%
Racing Creek Snow Course	5160	6-Feb	23	6.8	1.2	10.5	65%
Red Hill SNOTEL	4410	1-Feb	42	18.3	21.3	30.9	59%
Mill Creek Meadow Snow Course	4400	30-Jan	28	8.1	3.0	8.2	99%
Surprise Lakes SNOTEL	4290	1-Feb	58	21.4	32.2	33.3	64%
Beaver Creek #2 Snow Course	4220	31-Jan	11	3.0	0.0	8.0	38%
Beaver Creek #1 Snow Course	4210	31-Jan	18	4.6	1.4	10.0	46%
Mud Ridge SNOTEL	4070	1-Feb	33	9.2	11.7	18.5	50%
Clear Lake SNOTEL	3810	1-Feb	15	4.1	2.2	9.7	42%
Blazed Alder SNOTEL	3650	1-Feb	24	9.5	16.3	21.4	44%
Clackamas Lake SNOTEL	3400	1-Feb	13	4.1	4.6	9.2	45%
Greenpoint SNOTEL	3310	1-Feb	14	5.1	4.0	13.2	39%
North Fork SNOTEL	3060	1-Feb	6	2.8	8.4	13.2	21%
South Fork Bull Run SNOTEL	2690	1-Feb	0	0.0	0.0	1.3	0%



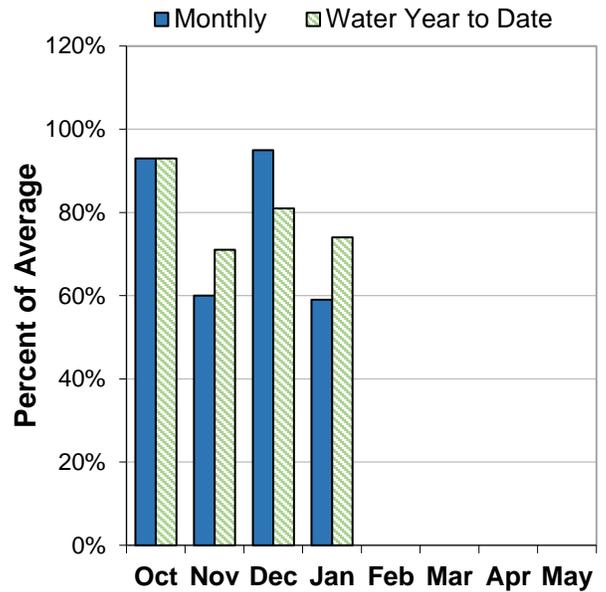
# Willamette Basin

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 51% of normal -- the lowest in the state. This is slightly lower than last month when the snowpack was 61% of normal.

### PRECIPITATION

January precipitation was 59% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 74% of average.

### RESERVOIR

As of February 1, storage at major reservoirs in the basin ranges from 54% of average at Fern Ridge Reservoir to 143% of average at Cottage Grove and Dorena Reservoir.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 77% to 90% of average. Overall, forecasts decreased slightly from last month's report. If conditions remain similar, water supplies in the basin are likely to be well below normal to below normal this summer.

## Willamette Basin Summary for February 1, 2019

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts February 1, 2019	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Hills Creek Reservoir Inflow <sup>1,2</sup>	APR-JUN	97	175	210	86%	245	325	245
	APR-SEP	148	240	280	89%	320	410	315
Lookout Point Reservoir Inflow <sup>1,2</sup>	APR-JUN	360	500	565	87%	625	765	650
	APR-SEP	490	655	725	88%	800	960	825
McKenzie R bl Trail Bridge	APR-JUN	134	167	183	87%	199	240	210
	APR-SEP	235	285	310	90%	335	390	345
Cougar Lake Inflow <sup>1,2</sup>	APR-JUN	94	138	160	86%	185	245	185
	APR-SEP	128	178	205	87%	230	295	235
Blue Lake Inflow <sup>1,2</sup>	APR-JUN	40	58	68	85%	78	104	80
	APR-SEP	36	61	74	86%	89	125	86
McKenzie R nr Vida <sup>1,2</sup>	APR-JUN	480	645	730	88%	820	1030	830
	APR-SEP	740	950	1050	88%	1160	1410	1190
Detroit Lake Inflow <sup>1,2</sup>	APR-JUN	160	305	370	79%	435	580	470
	APR-SEP	280	415	475	78%	535	665	610
North Santiam R at Mehama <sup>1,2</sup>	APR-JUN	310	460	530	80%	600	750	665
	APR-SEP	415	575	650	77%	720	880	840
Green Peter Lake Inflow <sup>1,2</sup>	APR-JUN	105	179	220	83%	265	375	265
	APR-SEP	144	210	250	85%	285	380	295
Foster Lake Inflow <sup>1,2</sup>	APR-JUN	225	345	410	82%	480	645	500
	APR-SEP	275	410	480	85%	550	735	565
South Santiam R at Waterloo <sup>2</sup>	APR-JUN	240	365	430	82%	500	670	525
	APR-SEP	290	430	500	85%	575	765	590
Willamette R at Salem <sup>1,2</sup>	APR-JUN	1830	2760	3240	82%	3760	5040	3950
	APR-SEP	2380	3430	3970	84%	4550	5970	4730
Oak Grove Fk ab Powerplant	APR-JUL	71	87	98	85%	108	124	115
	APR-SEP	95	115	128	83%	141	161	155
Clackamas R ab Three Lynx	APR-JUL	275	330	370	82%	405	460	450
	APR-SEP	345	405	445	83%	485	540	535
Clackamas R at Estacada	APR-JUL	375	455	510	82%	565	650	625
	APR-SEP	460	545	605	83%	665	750	730

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

1) 90% and 10% exceedance probabilities are actually 95% and 5%

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

## Willamette Basin Summary for February 1, 2019

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Blue River	11.3	13.2	9.5	119%	82.3
Cottage Grove	7.0	6.1	4.9	143%	31.8
Cougar	42.4	46.5	55.3	77%	174.9
Detroit	170.3	205.6	180.5	94%	426.8
Dorena	16.7	13.0	11.7	143%	72.1
Fall Creek	3.7	8.1	16.5		116.0
Fern Ridge	8.7	6.3	16.0	54%	97.3
Foster	25.9	26.9	22.8	114%	46.2
Green Peter	175.4	213.6	182.9	96%	402.8
Hills Creek	107.5	90.8	105.8	102%	279.2
Lookout Point	125.2	137.1	143.9	87%	433.2
Timothy Lake	55.9	61.7	51.0	110%	63.6
Henry Hagg Lake	32.7	40.1	38.0	86%	53.3

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Clackamas Basin	11	54%	57%
McKenzie Basin	17	66%	48%
Middle Fork Willamette Basin	7	67%	53%
North Santiam Basin	4	26%	44%
South Santiam Basin	4	20%	43%

## Willamette Basin Summary for February 1, 2019

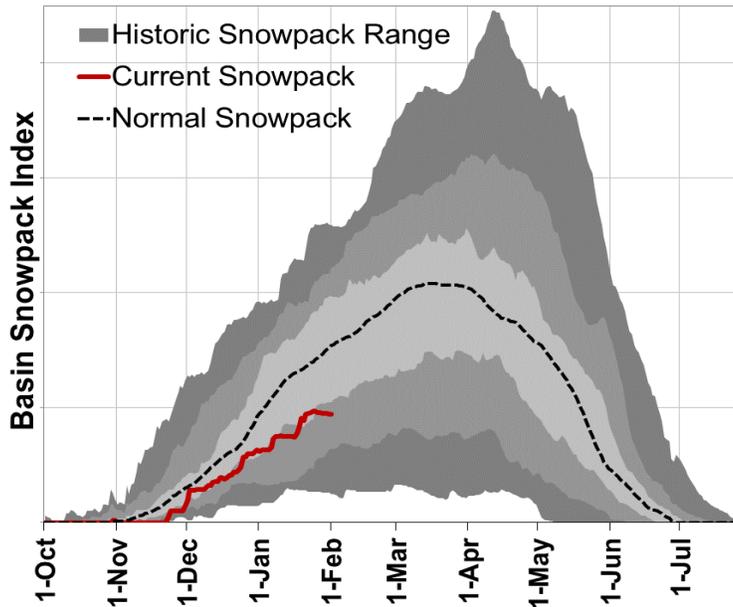
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summit Lake SNOTEL	5610	1-Feb	48	16.8	18.5	23.7	71%
Irish Taylor SNOTEL	5540	1-Feb	49	16.0	13.7	22.7	70%
Cascade Summit SNOTEL	5100	1-Feb	47	15.8	13.5	20.4	77%
Roaring River SNOTEL	4950	1-Feb	31	12.5	8.4	18.6	67%
Holland Meadows SNOTEL	4930	1-Feb	17	7.4	3.9	16.0	46%
McKenzie SNOTEL	4770	1-Feb	40	16.6	14.3	29.8	56%
Bear Grass SNOTEL	4720	1-Feb	48	21.1	22.8		
Beaver Creek #2 Snow Course	4220	31-Jan	11	3.0	0.0	8.0	38%
Salt Creek Falls SNOTEL	4220	1-Feb	21	8.6	2.8	13.9	62%
Beaver Creek #1 Snow Course	4210	31-Jan	18	4.6	1.4	10.0	46%
Mud Ridge SNOTEL	4070	1-Feb	33	9.2	11.7	18.5	50%
Little Meadows SNOTEL	4020	1-Feb	19	8.1	11.1	16.6	49%
Clear Lake SNOTEL	3810	1-Feb	15	4.1	2.2	9.7	42%
Santiam Jct. SNOTEL	3740	1-Feb	8	3.9	4.2	13.5	29%
Daly Lake SNOTEL	3690	1-Feb	0	0.0	2.9	10.0	0%
Marys Peak (Rev.) Snow Course	3580	30-Jan	0	0.0	0.6		
Jump Off Joe SNOTEL	3520	1-Feb	1	0.2	1.9	9.1	2%
Peavine Ridge SNOTEL	3420	1-Feb	10	4.3	3.5	10.3	42%
Clackamas Lake SNOTEL	3400	1-Feb	13	4.1	4.6	9.2	45%
Smith Ridge SNOTEL	3270	1-Feb	0	0.0	1.1		
Saddle Mountain SNOTEL	3110	1-Feb	0	0.0	2.4		
Railroad Overpass SNOTEL	2680	1-Feb	0	0.0	0.0	0.0	
Marion Forks SNOTEL	2590	1-Feb	0	0.0	2.3	6.3	0%
Seine Creek SNOTEL	2060	1-Feb	0	0.0	0.0	0.2	0%
Miller Woods SNOTEL	420	1-Feb	0	0.0	0.0		



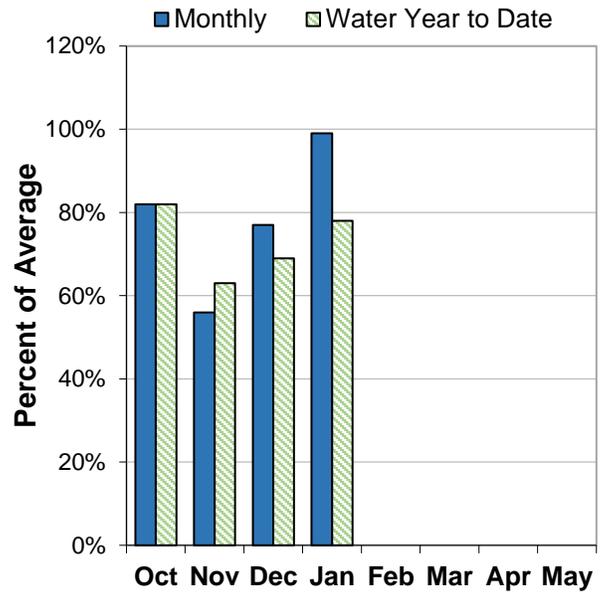
# Rogue and Umpqua Basins

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 60% of normal. This is slightly lower than last month when the snowpack was 67% of normal.

### PRECIPITATION

January precipitation was 99% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 78% of average.

### RESERVOIR

As of February 1, storage at major reservoirs in the basin ranges from 17% of average at Hyatt Prairie Reservoir to 155% of average at Applegate Reservoir.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 70% to 90% of average. Overall, forecasts increased slightly from last month's report. If conditions remain similar, water supplies in the basin are likely to be well below normal to below normal this summer.

## Rogue And Umpqua Basins Summary for February 1, 2019

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts February 1, 2019</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	APR-JUL	78	129	164	85%	198	250	193
	APR-SEP	85	137	172	86%	210	260	200
Cow Ck ab Galesville Reservoir	FEB-JUL	11.5	23	30	91%	37	48	33
	APR-JUL	2.8	8.5	12.4	89%	16.3	22	13.9
	APR-SEP	3.2	9.0	13.0	87%	17.0	23	15.0
South Umpqua R nr Brockway	APR-JUL	116	255	345	88%	440	580	390
	APR-SEP	136	275	370	90%	465	600	410
North Umpqua R at Winchester	APR-JUL	415	560	660	85%	755	900	775
	APR-SEP	480	630	730	82%	830	980	890
Lost Creek Lk Inflow <sup>2</sup>	FEB-JUL	550	650	715	90%	785	885	795
	FEB-SEP	655	765	835	91%	910	1020	920
	APR-JUL	310	380	430	83%	475	545	520
	APR-SEP	410	490	545	84%	600	680	645
Rogue R at Raygold <sup>2</sup>	APR-JUL	380	500	585	87%	670	795	675
	APR-SEP	490	625	720	89%	815	950	805
Rogue R at Grants Pass <sup>2</sup>	APR-JUL	360	505	600	83%	695	840	725
	APR-SEP	475	630	730	86%	845	1000	845
Applegate Lake Inflow <sup>2</sup>	FEB-JUL	59	106	138	71%	170	215	195
	FEB-SEP	63	111	143	72%	175	225	200
	APR-JUL	29	57	75	69%	94	121	109
	APR-SEP	34	62	81	70%	100	128	115
Sucker Ck bl Ltl Grayback nr Holland	APR-JUL	17.0	30	39	71%	48	61	55
	APR-SEP	20	34	43	73%	52	65	59
Illinois R nr Kerby	APR-JUL	55	100	132	70%	163	210	188
	APR-SEP	61	107	139	72%	170	215	193

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

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

## Rogue And Umpqua Basins Summary for February 1, 2019

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Applegate	16.7	9.9	10.8	155%	75.2
Emigrant Lake	11.9	16.4	21.6	55%	39.0
Fish Lake	3.5	5.6	4.8	72%	7.9
Fourmile Lake	3.1	6.3	6.9	45%	15.6
Howard Prairie	17.7	40.1	36.1	49%	62.1
Hyatt Prairie	1.8	7.4	10.2	17%	16.2
Lost Creek	164.9	160.7	161.8	102%	315.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Applegate Basin	5	52%	20%
Middle Rogue Basin	8	49%	18%
North Umpqua Basin	7	54%	49%
South Umpqua Basin	10	31%	31%
Upper Rogue Basin	11	67%	44%

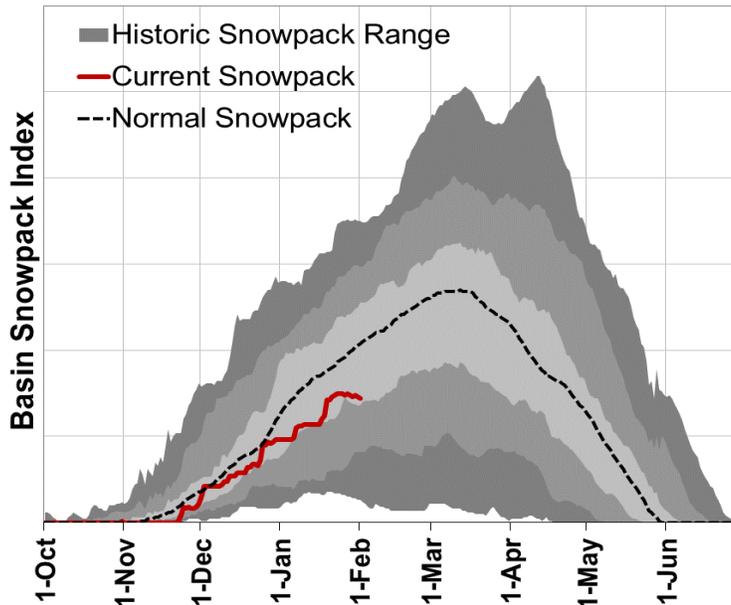
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Park H.Q. Rev Snow Course	6570	30-Jan	76	29.6	28.8	36.9	80%
Caliban (Alt.) Snow Course	6500	1-Feb	35	12.8	3.8	20.2	63%
Mt. Ashland Switchback Snow Course	6430	1-Feb	28	10.0	2.3	21.2	47%
Ski Bowl Road Snow Course	6070	1-Feb	19	6.8	2.0	15.0	45%
Big Red Mountain SNOTEL	6050	1-Feb	31	10.5	3.6	17.6	60%
Annie Springs SNOTEL	6010	1-Feb	56	18.4	16.9	26.8	69%
Fourmile Lake SNOTEL	5970	1-Feb	39	13.3	6.0	21.2	63%
Cold Springs Camp SNOTEL	5940	1-Feb	30	11.5	6.8	22.5	51%
Sevenmile Marsh SNOTEL	5700	1-Feb	38	14.1	10.1	20.0	71%
Summit Lake SNOTEL	5610	1-Feb	48	16.8	18.5	23.7	71%
Billie Creek Divide SNOTEL	5280	1-Feb	33	11.4	6.0	16.7	68%
Diamond Lake SNOTEL	5280	1-Feb	15	7.5	3.4	12.2	61%
Bigelow Camp SNOTEL	5130	1-Feb	7	3.2	4.5	8.9	36%
Beaver Dam Creek Snow Course	5120	1-Feb	14	5.0	1.0	10.2	49%
King Mountain 1 Snow Course	4760	30-Jan	3	1.2	2.2	3.8	32%
Deadwood Junction Snow Course	4660	1-Feb	14	7.1	1.2	6.2	115%
Fish Lk. SNOTEL	4660	1-Feb	16	5.4	1.9	9.1	59%
Howard Prairie SNOTEL	4580	1-Feb	7	2.9	0.5		
Howard Prairie Snow Course	4580	1-Feb	5	1.7	0.4	5.9	29%
Siskiyou Summit Rev. 2 Snow Course	4560	1-Feb	7	2.6	0.6	5.5	47%
Red Butte 1 Snow Course	4460	30-Jan	8	2.5	2.5	7.4	34%
King Mountain SNOTEL	4340	1-Feb	0	0.0	1.6	2.5	0%
Red Butte 2 Snow Course	4050	30-Jan	0	0.0	0.0	2.3	0%
Silver Burn Snow Course	3680	30-Jan	12	5.0	2.4	8.2	61%
King Mountain 3 Snow Course	3680	30-Jan	0	0.0	0.0	0.0	
Red Butte 3 Snow Course	3500	30-Jan	0	0.0	0.0	0.4	0%
Toketee Airstrip SNOTEL	3240	1-Feb	0	0.0	0.0	3.4	0%
King Mountain 4 Snow Course	3050	30-Jan	0	0.0	0.0	0.0	
Red Butte 4 Snow Course	3000	30-Jan	0	0.0	0.0	0.0	



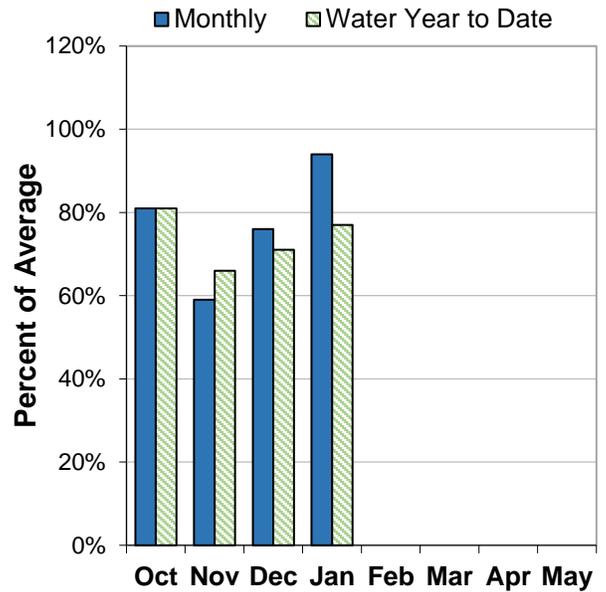
# Klamath Basin

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 69% of normal. This is slightly lower than last month when the snowpack was 74% of normal.

### PRECIPITATION

January precipitation was 94% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 77% of average.

### RESERVOIR

As of February 1, storage at major reservoirs in the basin ranges from 80% of average at Clear Lake to 129% of average at Gerber Reservoir.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 60% to 83% of average. If conditions remain similar, water supplies in the basin are likely to be well below normal to below normal this summer.

## Klamath Basin Summary for February 1, 2019

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts February 1, 2019</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>	
Gerber Reservoir Inflow <sup>2</sup>	FEB-JUL	11.7	23	30	73%	43	62	41
	APR-SEP	0.63	4.5	8.6	60%	15.5	28	14.4
Sprague R nr Chiloquin	FEB-JUL	124	196	245	83%	295	370	295
	FEB-SEP	139	215	265	83%	320	395	320
	APR-JUL	76	123	151	80%	187	235	188
	APR-SEP	92	142	172	82%	210	260	210
Williamson R bl Sprague nr Chiloquin	FEB-JUL	225	320	380	80%	445	540	475
	FEB-SEP	275	370	435	82%	505	600	530
	APR-JUL	135	197	240	81%	285	345	295
	APR-SEP	183	250	295	83%	345	410	355
Upper Klamath Lake Inflow <sup>1,2</sup>	FEB-JUL	290	490	580	81%	670	870	720
	FEB-SEP	330	550	650	81%	745	965	800
	APR-JUL	143	265	320	80%	375	495	400
	APR-SEP	187	325	390	81%	450	590	480

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

1) 90% and 10% exceedance probabilities are actually 95% and 5%

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

<b>Reservoir Storage</b>	<b>Current (KAF)</b>	<b>Last Year (KAF)</b>	<b>Average (KAF)</b>	<b>% of Average</b>	<b>Useable Capacity (KAF)</b>
Clear Lake	159.2	202.6	199.0	80%	513.3
Gerber	55.9	61.4	43.5	129%	94.3
Upper Klamath Lake	301.0	330.2	319.0	94%	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	66%	16%
Sprague Basin	6	92%	39%
Upper Klamath Lake Basin	8	67%	47%
Williamson River Basin	5	72%	57%

## Klamath Basin Summary for February 1, 2019

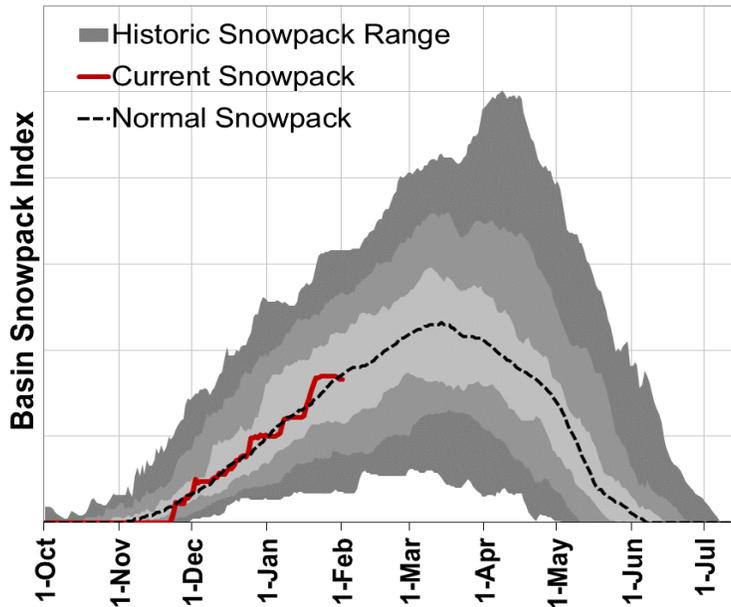
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summer Rim SNOTEL	7080	1-Feb	29	10.4	5.8	11.1	94%
Swan Lake Mtn SNOTEL	6830	1-Feb	42	14.5	5.4		
Park H.Q. Rev Snow Course	6570	30-Jan	76	29.6	28.8	36.9	80%
Colvin Creek AM	6520	30-Jan	9	2.9		2.5	116%
Crazyman Flat SNOTEL	6180	1-Feb	31	11.4	5.0	10.9	105%
Ski Bowl Road Snow Course	6070	1-Feb	19	6.8	2.0	15.0	45%
Annie Springs SNOTEL	6010	1-Feb	56	18.4	16.9	26.8	69%
Finley Corrals AM	6000	1-Feb	36	11.8	5.0	9.8	120%
Fourmile Lake SNOTEL	5970	1-Feb	39	13.3	6.0	21.2	63%
Cold Springs Camp SNOTEL	5940	1-Feb	30	11.5	6.8	22.5	51%
Strawberry SNOTEL	5770	1-Feb	8	3.6	0.9	4.4	82%
Cox Flat AM	5750	1-Feb	10	3.3	1.1	5.4	61%
Silver Creek SNOTEL	5740	1-Feb	20	6.5	2.1	8.1	80%
Quartz Mountain SNOTEL	5720	1-Feb	6	2.0	0.2	1.5	133%
Sevenmile Marsh SNOTEL	5700	1-Feb	38	14.1	10.1	20.0	71%
State Line SNOTEL	5680	1-Feb	14	5.5	1.2		
Sycan Flat AM	5580	30-Jan	10	3.5		4.0	88%
Sun Pass SNOTEL	5400	1-Feb		10.8	2.8		
Billie Creek Divide SNOTEL	5280	1-Feb	33	11.4	6.0	16.7	68%
Diamond Lake SNOTEL	5280	1-Feb	15	7.5	3.4	12.2	61%
Crowder Flat SNOTEL	5170	1-Feb	5	2.4	0.1	3.7	65%
Beaver Dam Creek Snow Course	5120	1-Feb	14	5.0	1.0	10.2	49%
Taylor Butte SNOTEL	5030	1-Feb	8	3.2	0.6	5.5	58%
Dog Hollow AM	4920	30-Jan	0	0.0		1.0	0%
Gerber Reservoir SNOTEL	4890	1-Feb	1	0.3	0.5	1.5	20%
Chemult Alternate SNOTEL	4850	1-Feb	17	5.2	1.3	7.6	68%
Deadwood Junction Snow Course	4660	1-Feb	14	7.1	1.2	6.2	115%
Fish Lk. SNOTEL	4660	1-Feb	16	5.4	1.9	9.1	59%
Howard Prairie SNOTEL	4580	1-Feb	7	2.9	0.5		
Howard Prairie Snow Course	4580	1-Feb	5	1.7	0.4	5.9	29%
Siskiyou Summit Rev. 2 Snow Course	4560	1-Feb	7	2.6	0.6	5.5	47%



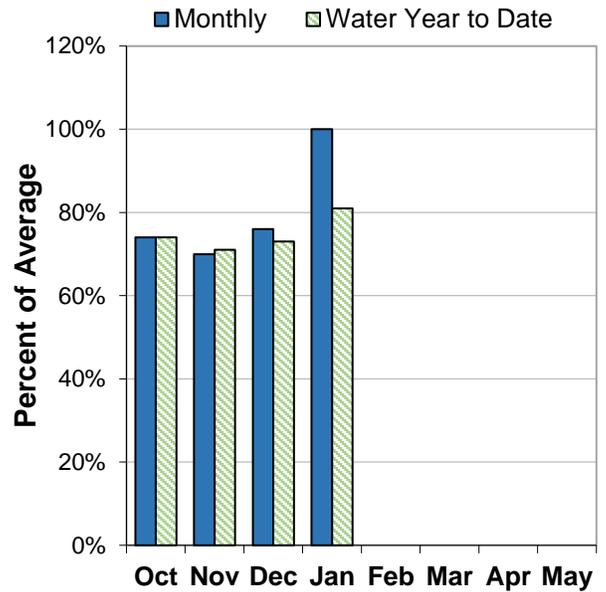
# Lake County and Goose Lake Basins

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 100% of normal. This is similar to last month when the snowpack was 99% of normal.

### PRECIPITATION

January precipitation was 100% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 81% of average.

### RESERVOIR

As of February 1, storage at major reservoirs in the basin ranges from 21% of average at Cottonwood Reservoir to 84% of average at Drews Reservoir.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 88% to 103% of average. If conditions remain similar, water supplies in the basin are likely to be below normal to near normal this summer.

## Lake County And Goose Lake Basins Summary for February 1, 2019

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts February 1, 2019</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	MAR-JUL	6.2	19.8	29	107%	38	52	27
	APR-SEP	1.28	11.2	18.0	103%	25	35	17.4
Deep Ck ab Adel	MAR-JUL	49	68	81	103%	94	114	79
	APR-SEP	39	55	66	102%	77	92	65
Honey Ck nr Plush	MAR-JUL	4.8	12.0	16.8	98%	22	29	17.1
	APR-SEP	3.4	9.5	13.7	97%	17.9	24	14.1
Chewaucan R nr Paisley	MAR-JUL	43	63	76	90%	90	109	84
	APR-SEP	39	55	66	88%	76	92	75

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

<b>Reservoir Storage</b>	<b>Current (KAF)</b>	<b>Last Year (KAF)</b>	<b>Average (KAF)</b>	<b>% of Average</b>	<b>Useable Capacity (KAF)</b>
Cottonwood	0.8	2.0	3.9	21%	9.3
Drews	23.9	35.4	28.4	84%	63.5

<b>Snowpack Summary by Basin</b>	<b>Basin Snowpack % of Median</b>		
	<b># of Sites</b>	<b>Current Yr</b>	<b>Last Yr</b>
Goose Lake Basin	6	102%	43%
Lake Abert Basin	5	96%	40%
Summer Lake Basin	13	100%	42%
Upper Pit Basin	3	103%	37%

## Lake County And Goose Lake Basins Summary for February 1, 2019

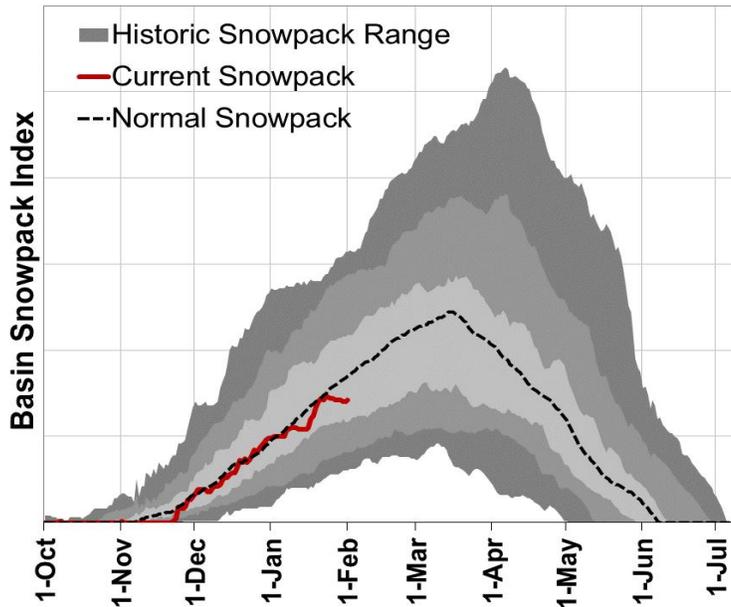
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Dismal Swamp SNOTEL	7360	1-Feb	53	19.0	12.9	18.0	106%
Summer Rim SNOTEL	7080	1-Feb	29	10.4	5.8	11.1	94%
Cedar Pass Snow Course	7050	30-Jan	37	11.3	4.8	10.2	111%
Cedar Pass SNOTEL	7030	1-Feb	34	11.0	5.8	11.3	97%
Barley Camp AM	6890	30-Jan	43	13.7		10.0	137%
Blue Lake Ranch Snow Course	6830	1-Feb	27	7.7	1.0	6.3	122%
Patton Meadows AM	6800	1-Feb	36	11.8	2.9	10.2	116%
Sherman Valley AM	6640	1-Feb	22	7.2	2.5	8.0	90%
Bear Flat Meadow AM	6580	1-Feb	27	8.9		7.4	120%
Colvin Creek AM	6520	30-Jan	9	2.9		2.5	116%
Hart Mountain AM	6430	1-Feb	7	2.3	0.0	1.4	164%
Rogger Meadow AM	6360	1-Feb	29	9.5	2.5	7.7	123%
Adin Mtn Snow Course	6190	1-Feb	36	11.0	3.2	8.8	125%
Adin Mtn SNOTEL	6190	1-Feb	34	10.8	2.8	8.6	126%
Crazyman Flat SNOTEL	6180	1-Feb	31	11.4	5.0	10.9	105%
Finley Corrals AM	6000	1-Feb	36	11.8	5.0	9.8	120%
Camas Creek #3 Snow Course	5860	30-Jan	30	8.6	3.0	8.8	98%
Sheldon SCAN	5860	1-Feb	0	0.0	0.0	0.4	0%
Strawberry SNOTEL	5770	1-Feb	8	3.6	0.9	4.4	82%
Cox Flat AM	5750	1-Feb	10	3.3	1.1	5.4	61%
Silver Creek SNOTEL	5740	1-Feb	20	6.5	2.1	8.1	80%
State Line SNOTEL	5680	1-Feb	14	5.5	1.2		
Sycan Flat AM	5580	30-Jan	10	3.5		4.0	88%
Crowder Flat SNOTEL	5170	1-Feb	5	2.4	0.1	3.7	65%



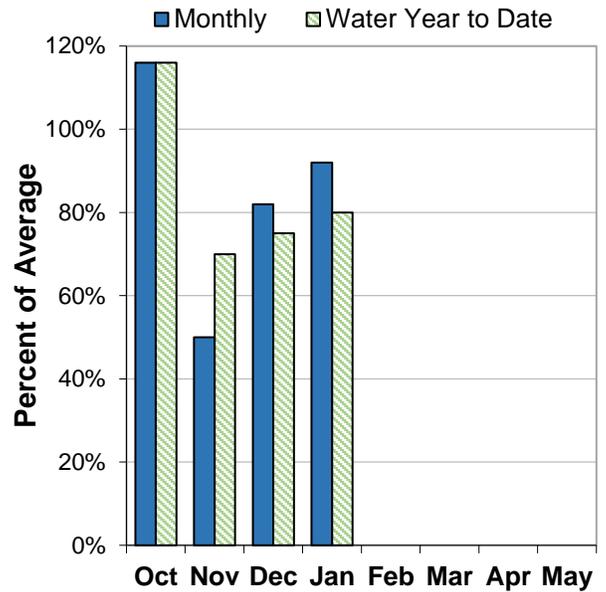
# Harney Basin

February 1, 2019

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of February 1, the basin snowpack was 86% of normal. This is lower than last month when the snowpack was 100% of normal.

### PRECIPITATION

January precipitation was 92% of average. Precipitation since the beginning of the water year (October 1 - February 1) has been 80% of average.

### STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 62% to 93% of average. If conditions remain similar, water supplies in the basin are likely to be well below normal to below normal this summer.

## Harney Basin Summary for February 1, 2019

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts February 1, 2019	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Silvies R nr Burns	MAR-JUL	6.4	51	81	66%	111	156	123
	APR-SEP	2.1	35	57	62%	79	112	92
Donner Und Blitzen R nr Frenchglen	MAR-JUL	30	49	61	85%	73	92	72
	APR-SEP	26	45	57	84%	69	88	68
Trout Ck nr Denio	MAR-JUL	3.0	6.2	8.4	97%	10.6	13.8	8.7
	APR-SEP	1.87	5.2	7.4	93%	9.6	12.9	8.0

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

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Alvord Lake Basin	4	83%	49%
Donner und Blitzen River Basin	3	72%	47%
Silvies River Basin	4	91%	49%
Upper Quinn Basin	5	92%	43%

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-Feb	36	10.9	6.3	12.1	90%
Trout Creek AM	7890	1-Feb	26	7.5	3.2	8.2	91%
Fish Creek SNOTEL	7660	1-Feb	41	11.7	9.6	15.8	74%
Govt Corrals AM	7400	1-Feb	28	7.6	4.3	7.5	101%
Oregon Canyon AM	7050	30-Jan	9	2.3		4.0	58%
Silvies SNOTEL	6990	1-Feb	24	6.7	4.1	9.6	70%
Pueblo Summit AM	6970	30-Jan	7	1.9		1.8	106%
Buckskin Lower SNOTEL	6915	1-Feb	28	6.7	3.5	6.5	103%
V Lake AM	6600	1-Feb	13	3.5	0.7	5.2	67%
Louse Canyon AM	6530	30-Jan	20	5.0		4.2	119%
Disaster Peak SNOTEL	6500	1-Feb	21	5.5	0.0	5.6	98%
Hart Mountain AM	6430	1-Feb	7	2.3	0.0	1.4	164%
Quinn Ridge AM	6270	31-Jan	3	0.8		2.0	40%
Snow Mountain SNOTEL	6230	1-Feb	20	6.2	4.1	6.3	98%
Lamance Creek SNOTEL	6000	1-Feb	22	6.2	1.1	8.0	78%
Blue Mountain Spring SNOTEL	5870	1-Feb		10.8	6.1	11.2	96%
Sheldon SCAN	5860	1-Feb	0	0.0	0.0	0.4	0%
Buck Pasture AM	5740	30-Jan	10	3.0		2.3	130%
Call Meadows AM	5380	1-Feb	14	4.5		3.6	125%
Rock Springs SNOTEL	5290	1-Feb	14	4.5	1.5	4.7	96%
Starr Ridge SNOTEL	5250	1-Feb	18	4.8	2.4	5.3	91%
Lake Creek R.S. SNOTEL	5240	1-Feb	28	7.8	4.5	9.4	83%
Buckskin Lake AM	5190	1-Feb	0	0.0		0.1	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	Mar 9	Apr 19	May 30	<b>May 5</b>
Owyhee R nr Rome	1000 cfs	Mar 12	Apr 24	Jun 6	<b>May 18</b>
Owyhee R nr Rome	500 cfs	Mar 30	May 10	Jun 20	<b>June 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	3.2	230	455	<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				<b>May 25</b>
Crane Prairie Inflow	Peak Flow	184	355	485	<b>403</b>
Crane Prairie Inflow	Average Daily Flow on Oct. 1st	105	177	250	<b>269</b>
Prineville Reservoir Inflow	150 cfs	May 3	May 28	Jun 22	<b>May 30</b>
Prineville Reservoir Inflow	80 cfs	May 8	Jun 2	Jun 27	<b>June 7</b>
Whychus Creek nr Sisters	100 cfs	Jun 30	Jul 28	Aug 22	<b>August 16</b>

\*No prediction possible until April 1. Historic values are shown for reference prior to the April 1 report.

<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>
		90%	50%	10%	
South Umpqua R nr Brockway *	90 cfs	Jul 12	Jul 28	Aug 17	<b>August 8</b>
South Umpqua R at Tiller	140 cfs	Jun 12	Jul 4	Jul 28	<b>July 11</b>
South Umpqua R at Tiller	90 cfs	Jul 2	Jul 23	Aug 17	<b>August 1</b>
South Umpqua R at Tiller	60 cfs	Jul 23	Aug 22	Sep 21	<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>
		90%	50%	10%	
Deep Ck ab Adel	100 cfs	May 25	Jun 14	Jul 4	<b>June 17</b>
Honey Ck nr Plush	100 cfs	Mar 30	May 4	Jun 8	<b>May 16</b>
Honey Ck nr Plush	50 cfs	Apr 16	May 18	Jun 19	<b>June 4</b>
Twentymile Ck nr Adel	50 cfs	Apr 21	May 21	Jun 20	<b>May 30</b>
Twentymile Ck nr Adel	10 cfs	Jun 11	Jul 4	Jul 28	<b>July 7</b>

<b>HARNEY BASIN</b>					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----</i>			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Silvies R nr Burns	400 cfs	Apr 12	May 9	Jun 5	<b>May 21</b>
Silvies R nr Burns	200 cfs	Apr 20	May 18	Jun 15	<b>June 2</b>
Silvies R nr Burns	100 cfs	May 2	May 31	Jun 29	<b>June 13</b>
Silvies R nr Burns	50 cfs	May 20	Jun 24	Jul 28	<b>July 3</b>
Donner Und Blitzen R nr Frenchglen	200 cfs	May 15	Jun 6	Jun 28	<b>June 20</b>
Donner Und Blitzen R nr Frenchglen	100 cfs	June 6	Jun 26	Jul 16	<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. 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.

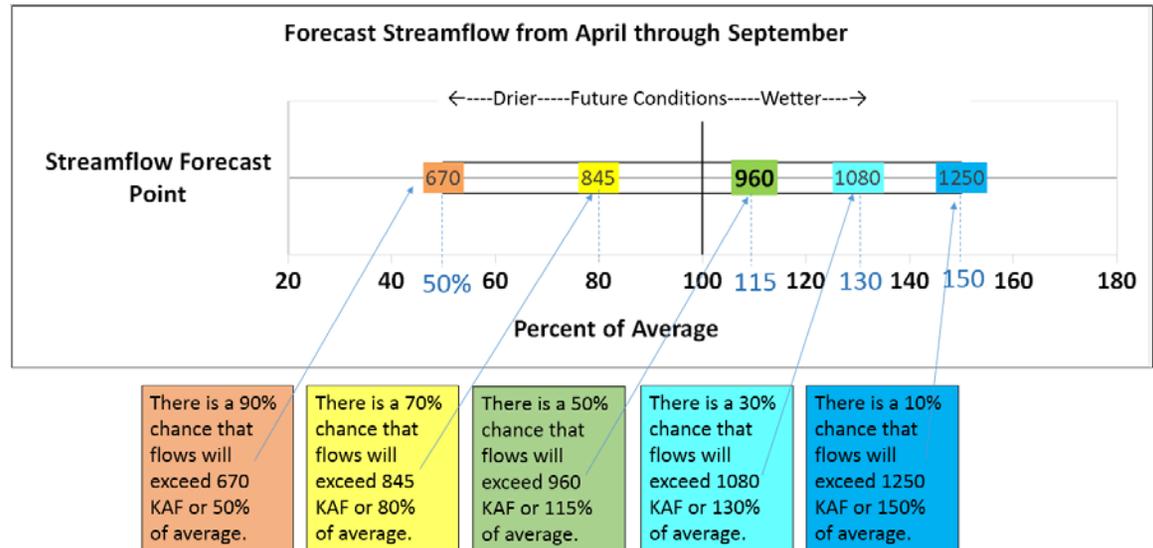
**30-Year Average.** The 30-year average streamflow for each forecast period is provided for comparison. The average is based on data from 1981-2010. The % AVG. column compares the 50% chance of exceedance forecast to the 30-year average streamflow; values above 100% denote when the 50% chance of exceedance 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			30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (1000AF)	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.

**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.

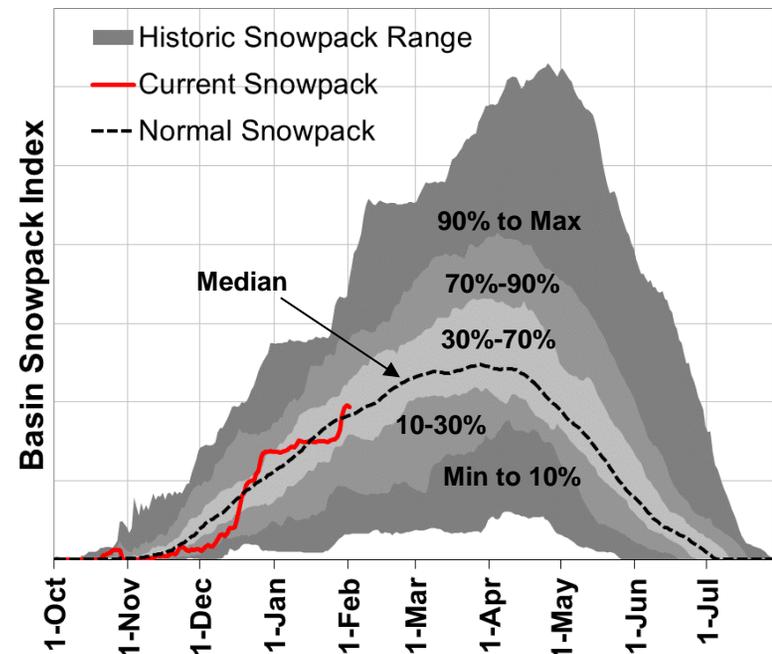
## Interpreting Snowpack Plots

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



USDA Natural Resources Conservation Service  
1201 NE Lloyd Suite 900  
Portland, OR 97232-1274

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Official Business



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

*Issued by*  
**Matthew Lohr, Chief**  
Natural Resources Conservation Service  
U.S. Department of Agriculture

*Released by*  
**Ron Alvarado, State Conservationist**  
Natural Resources Conservation Service  
Portland, Oregon

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