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Department of
Agriculture



Natural Resources
Conservation
Service

Oregon Basin Outlook Report

April 1, 2018



Anthony Lake snow course (Powder River Basin) has been measured since 1936, and is one of Oregon's oldest snow courses. Snowpack here is 81% of normal as of April 1st.

Photo courtesy of Jason Yencopal (Baker County Emergency Management)

Storm systems that hit the Pacific Northwest this winter deposited the majority of their snow to the north of the Columbia River, leaving Oregon with a state-wide snowpack of only 72% of normal as of April 1st. Snow accumulation was least abundant in southeastern Oregon where snowpack levels hover near half of normal. Many reservoirs in the state are holding near average amounts of water for this time of year, and may provide a much needed buffer for farms and fish in a year when summer streamflows are forecast to be well below normal for many of Oregon's streams and rivers.

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General Outlook

April 1st, 2018

SUMMARY

The Columbia River served as a sharp dividing line for snowpack accumulation this season in the Pacific Northwest, bringing near normal snowpack north of the river and below normal to the south. Northern Oregon had the best snowpack in the state, benefiting from the fringes of storms that brought ample snow to the northern latitudes. However, all regions in the state are reporting below normal snowpack as of April 1st. In general, the snowpack conditions deteriorate from north to south across the state. While March did bring near to above average precipitation to parts of southern Oregon and offered at least some improvement in snowpack conditions, it wasn't enough to change the water supply outlook.

Oregon's streamflow forecasts closely follow the seasonal trend: only the rivers closest to the Columbia River are expected to see near normal spring and summer streamflows. Elsewhere in the state, streamflow is projected to be well below normal due to the lack of normal snowpack levels this season. Reservoir storage may serve as a buffer for water users that have access to it. Reservoir storage in most of Oregon's major irrigation reservoirs are storing near average amounts for this time of year. Water users that are not able to take advantage of reservoir storage will likely experience significantly reduced water supplies this summer, especially in the southern and southeastern basins of Oregon. The Governor declared a drought emergency in Klamath County in March and more counties may follow.

Spring weather conditions will have some influence on the final water supply outcome but it is not likely to vastly improve the situation. NOAA's Climate Prediction Center is calling for below average precipitation for the next three months: <http://www.cpc.ncep.noaa.gov/>. If temperatures were to stay cooler this spring, it would help to preserve the limited snowpack later in the season in the event that the next few months remain drier than usual. While cooler temperatures would be the best scenario, there is no guarantee. Currently, the drought monitor has most of Oregon in either an abnormally dry status or moderate drought category: <http://droughtmonitor.unl.edu/>.

SNOWPACK

April marks the time of year when the snowpack typically reaches the peak accumulation and transitions into the snowmelt season. As of April 1st, all basins in Oregon have a below normal snowpack. Of the lower and mid-elevation snow sites that are beginning to experience snowmelt, most only achieved 40 to 70% of normal peak levels. Warmer temperatures and lack of winter storms early this season are ultimately the reasons for below normal snowpack throughout the state. March brought cooler temperatures and new snow to the mountains, sustaining the already low snowpack and boosting it up in other locations. The late season snow improved the snowpack and allowed many sites to reach their peak at the normal time, but not nearly enough snow was received to bring the snowpack to typical peak levels. The last week in March brought warmer temperatures and revved up the snowmelt engine as spring began to spread across much of Oregon.

The best snow in the state remained confined to the northern parts of Oregon, and as of April 1st, the snowpack ranges from 80% of normal in the Wallowa Mountains to 85% in both the Umatilla Basin and the area around Mt. Hood. Snowpack in southern Oregon falls the most behind normal levels ranging from 50% of normal in the Owyhee and Malheur basins to 59% in Harney County; these are also the regions that reached only half of the normal seasonal peak amounts of snow.

PRECIPITATION

Most of Oregon has been drier than usual since the water year began on October 1st. Only northern Oregon has received near average amounts for the season. The highest precipitation relative to normal amounts has fallen in the Umatilla, Walla Walla and Willow basins at 104% of average. Central and southern Oregon have been much drier. The Rogue, Umpqua and Klamath basins have received the lowest amounts in the state at 75% of average.

March brought on a turn of precipitation events, where some areas in southern Oregon received average to above average amounts for the first time since November. The most noticeable amounts of precipitation fell in Lake County and Goose Lake basins at 124% of average. Northern Oregon has managed to receive a few months of above average precipitation, but March was drier than usual in this region. The Hood, Sandy, and lower Deschutes basin received 58% of average monthly amounts even though it has been one of the wetter regions in the state all year.

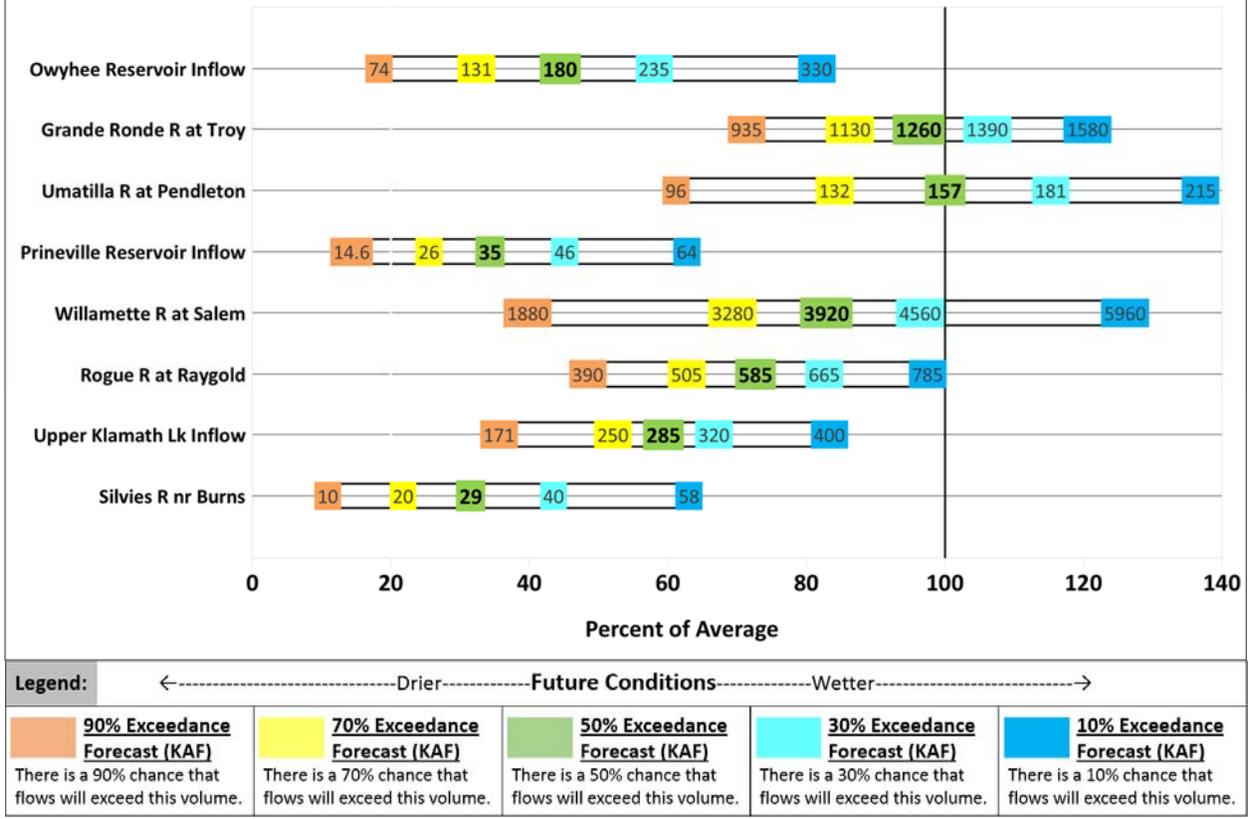
RESERVOIRS

Most of the major irrigation reservoirs east of the Cascades are storing near average amounts as of the end of March. The Umatilla, Walla Walla and Willow basins have the highest reservoir storage at 123% collectively. This is also the region holding onto the best snowpack and water year precipitation in the state. Western Oregon reservoirs are storing mostly below normal amounts for this time of year. The lowest overall reservoir storage in Oregon can be found in the Rogue and Umpqua basins at 88% of average, where it has been drier than normal this water year.

STREAMFLOW

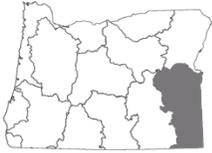
Based on the low seasonal snowpack and drier than usual conditions, spring and summer streamflows across almost all of Oregon are forecast to be below normal. While most forecasts in the western and northern basins of the state are calling for around 60 to 90% of normal streamflows in the coming summer, most forecasts for southern and southeastern Oregon are lower. Summer streamflow forecasts range from 30% to 60% of normal in the Klamath, Harney, Crooked, Owyhee, Malheur, Lake and Goose Lake basins. Some water users in these regions will likely experience water shortages as a result.

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



To accompany the above forecast summary graphic, 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.

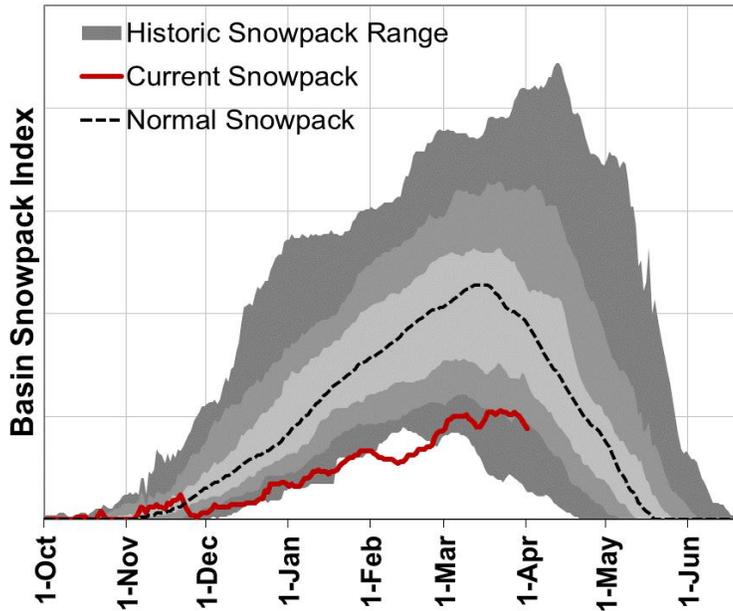
All forecasts are listed with units of 1000 acre-feet (KAF). This report contains data furnished by the Oregon Department of Water Resources, U.S. Geological Survey, NOAA National Weather Service and other cooperators. This report will be updated monthly, January through June.



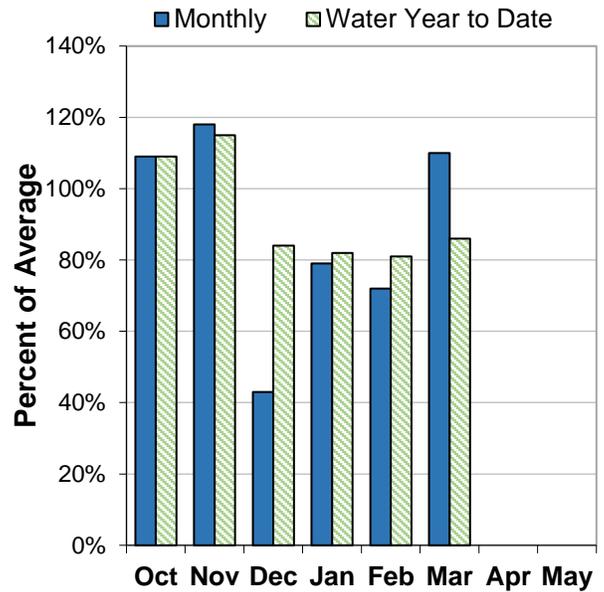
Owyhee and Malheur Basins

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 49% of normal. This is slightly higher than last month when the snowpack was 40% of normal. In general, SNOTEL sites in the basin have reached around 20% to 60% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 110% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 86% of average.

RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 70% of average at Bully Creek Reservoir to 115% of average at Lake Owyhee.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 34% to 52% of average. Overall, forecasts increased slightly from last month's report. 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 April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Owyhee R nr Rome	APR-JUL	38	84	126	37%	177	265	345
	APR-SEP	46	95	139	38%	191	280	365
Owyhee R bl Owyhee Dam ²	APR-JUL	55	107	153	41%	205	300	375
	APR-SEP	74	131	180	44%	235	330	405
Malheur R nr Drewsey	APR-JUL	9.7	17.0	23	34%	30	42	68
	APR-SEP	10.1	17.5	24	34%	31	43	70
NF Malheur R at Beulah ²	APR-JUL	16.4	22	27	48%	32	40	56
	APR-SEP	21	27	32	52%	37	46	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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Beulah	35.4	51.3	43.5	81%	59.2
Bully Creek	16.5	19.8	23.8	70%	23.7
Lake Owyhee	569.8	675.4	495.8	115%	715.0
Warm Springs	120.3	146.8	113.8	106%	169.6

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
East Little Owyhee Basin	7	51%	163%
South Fork Owyhee Basin	7	49%	105%
Upper Malheur Basin	8	41%	103%
Upper Owyhee Basin	5	54%	104%

Owyhee And Malheur Basins Summary for April 1, 2018

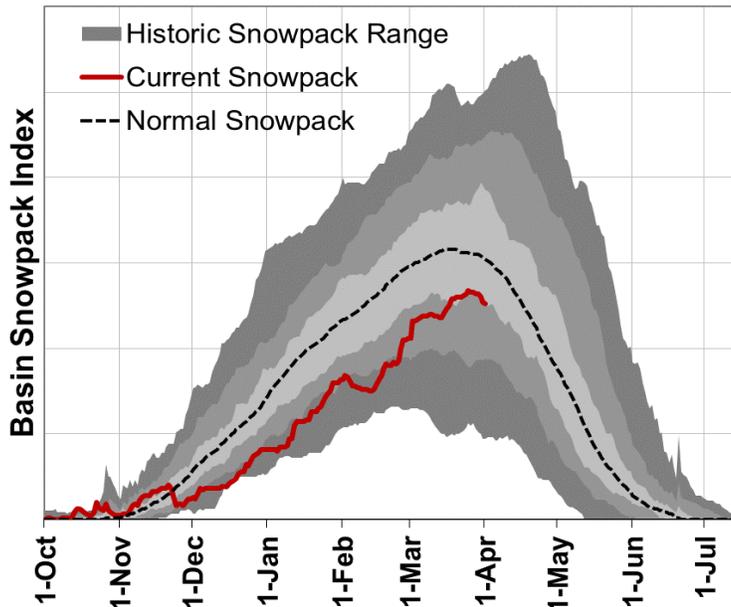
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-Apr	45	14.6	35.0	21.2	69%
Trout Creek AM	7890	1-Apr	27	10.0	12.2	12.7	79%
Toe Jam SNOTEL	7700	1-Apr	36	13.4	30.8		
Govt Corrals AM	7400	1-Apr	28	10.4	22.7	15.0	69%
Jack Creek Upper SNOTEL	7250	1-Apr	34	10.4	17.3	16.7	62%
Fawn Creek SNOTEL	7000	1-Apr	34	9.8	18.6	15.8	62%
Merritt Mountain AM	7000	1-Apr	4	1.2	2.4	5.5	22%
Buckskin Lower SNOTEL	6915	1-Apr	16	4.3	10.4	8.5	51%
Jack Creek Lower Snow Course	6800	29-Mar	0	0.0	0.0	0.8	0%
Gold Creek Snow Course	6707	29-Mar	0	0.0	3.8	2.0	0%
Big Bend SNOTEL	6700	1-Apr	5	2.7	10.1	7.7	35%
Fry Canyon SNOTEL	6700	1-Apr	2	0.6	0.0		
Fry Canyon Snow Course	6700	29-Mar	6	1.8	2.9	4.8	38%
Laurel Draw SNOTEL	6697	1-Apr	12	4.6	7.5	8.6	53%
Columbia Basin AM	6650	1-Apr	0	0.0	5.7	7.6	0%
Red Canyon AM	6600	3-Apr	0	0.0	8.4	4.1	0%
Louse Canyon AM	6530	3-Apr	0	0.0	1.6	3.2	0%
South Mtn. SNOTEL	6500	1-Apr	13	5.4	12.8	17.3	31%
Succor Creek AM	6310	3-Apr	1	0.4	0.4	8.0	5%
Quinn Ridge AM	6270	3-Apr	0	0.0	2.0	0.0	
Taylor Canyon SNOTEL	6200	1-Apr	0	0.0	2.9	1.3	0%
Blue Mountain Spring SNOTEL	5870	1-Apr	24	8.9	16.0	15.9	56%
Vaught Ranch AM	5850	3-Apr	0	0.0	0.8	0.0	
Barney Creek (New) Snow Course	5830	2-Apr	14	3.5			
Buck Pasture AM	5740	30-Mar	0	0.0	0.4	0.0	
Lookout Butte AM	5740	3-Apr	0	0.0	1.2	0.0	
Mud Flat SNOTEL	5730	1-Apr	0	0.0	0.0	2.5	0%
Battle Creek AM	5710	3-Apr	0	0.0	0.4	0.0	
Boulder Creek AM	5710	30-Mar	0	0.0	0.4	0.5	0%
Reynolds Creek SNOTEL	5600	1-Apr	1	0.1	0.8	0.1	100%
Bull Basin AM	5460	3-Apr	0	0.0	1.6	0.0	
Dooley Mountain Snow Course	5440	2-Apr	0	0.0	0.0	8.0	0%
Call Meadows AM	5380	30-Mar	0	0.0	0.9	1.2	0%
Bully Creek AM	5300	30-Mar	0	0.0	0.0	0.0	
Rock Springs SNOTEL	5290	1-Apr	0	0.0	0.0	0.9	0%
Lake Creek R.S. SNOTEL	5240	1-Apr	5	1.9	8.3	8.6	22%
Flag Prairie AM	4720	30-Mar	0	0.0	1.7	0.0	
Eldorado Pass Snow Course	4630	2-Apr	0	0.0	0.0	0.0	



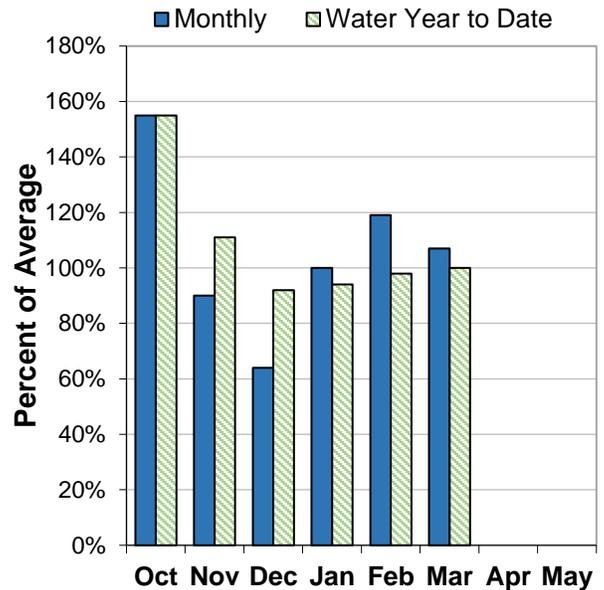
Grande Ronde, Powder, Burnt and Imnaha Basins

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 80% of normal. This is higher than last month when the snowpack was 69% of normal. In general, SNOTEL sites in the basin have reached around 60% to 80% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 107% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 100% of average.

RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 79% of average at Wolf Creek Reservoir to 138% of average at Wallowa Lake.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 46% to 97% of average. Overall, forecasts increased slightly from last month's report. 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 April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Burnt R nr Hereford ²	APR-JUL	7.2	11.4	14.8	45%	18.6	25	33
	APR-SEP	8.1	12.5	16.0	46%	20	27	35
Powder R nr Sumpter ²	APR-JUL	24	30	34	64%	39	46	53
	APR-SEP	24	30	35	65%	40	48	54
Pine Ck nr Oxbow	APR-JUL	63	93	113	72%	134	164	157
	APR-SEP	67	97	117	72%	138	167	163
Imnaha R at Imnaha	APR-JUL	149	188	215	84%	240	280	255
	APR-SEP	164	205	230	82%	260	300	280
Catherine Ck nr Union	APR-JUL	36	45	52	87%	58	67	60
	APR-SEP	39	49	55	86%	62	71	64
Lostine R nr Lostine	APR-JUL	88	96	102	96%	107	116	106
	APR-SEP	93	103	109	95%	115	124	115
Bear Ck nr Wallowa	APR-JUL	49	56	61	97%	66	73	63
	APR-SEP	51	58	63	97%	68	75	65
Grande Ronde R at Troy	APR-JUL	860	1050	1170	96%	1300	1490	1220
	APR-SEP	935	1130	1260	96%	1390	1580	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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Phillips Lake	41.2	30.2	42.0	98%	73.5
Thief Valley	14.1	14.4	13.9	101%	13.3
Unity	21.6	22.7	20.6	105%	25.5
Wallowa Lake	23.4	23.6	17.0	138%	37.5
Wolf Creek	4.2	3.7	5.3	79%	11.1

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Burnt Basin	5	55%	117%
Imnaha Basin	4	80%	122%
Lower Grande Ronde Basin	5	89%	108%
Powder Basin	11	70%	106%
Upper Grande Ronde Basin	10	85%	105%
Wallowa Basin	8	86%	106%

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

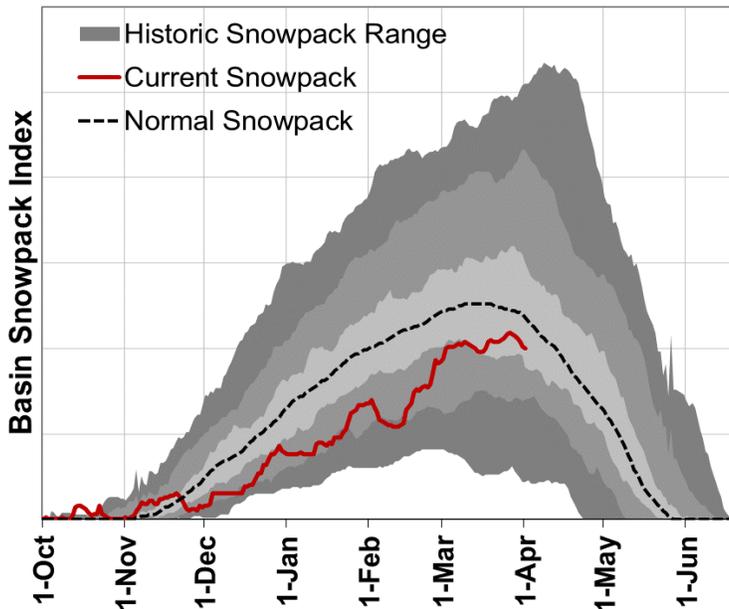
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt. Howard SNOTEL	7910	1-Apr	41	14.3	19.9	15.5	92%
Aneroid Lake #2 SNOTEL	7400	1-Apr	54	17.7	27.1	24.1	73%
Standley AM	7360	30-Mar	93	31.6	37.3	32.4	98%
Anthony Lake (Rev) Snow Course	7160	30-Mar	59	21.1	30.1	26.0	81%
TV Ridge AM	7050	30-Mar	39	15.6	14.8	17.8	88%
Bald Mtn AM	6600	30-Mar	68	25.9	32.4	25.8	100%
Little Alps Snow Course	6360	30-Mar	33	9.7	13.9	13.6	71%
Big Sheep AM	6230	1-Apr	49	18.6	30.2	24.2	77%
Bear Saddle SNOTEL	6180	1-Apr	43	15.8	23.9	22.3	71%
Placer Creek Snow Course	5860	29-Mar	45	16.1	21.8	16.4	98%
Bourne SNOTEL	5850	1-Apr	22	8.5	16.4	14.7	58%
Barney Creek (New) Snow Course	5830	2-Apr	14	3.5			
Moss Springs SNOTEL	5760	1-Apr	61	25.1	23.6	25.1	100%
Taylor Green SNOTEL	5740	1-Apr	35	14.9	17.6	19.6	76%
Boulder Creek AM	5710	30-Mar	0	0.0	0.4	0.5	0%
Spruce Springs SNOTEL	5700	1-Apr	30	11.5	13.1	13.8	83%
Wolf Creek SNOTEL	5630	1-Apr	33	10.9	15.4	16.8	65%
Milk Shakes SNOTEL	5580	1-Apr	97	34.9	41.7		
West Branch SNOTEL	5560	1-Apr	44	15.5	22.3	21.0	74%
Touchet SNOTEL	5530	1-Apr	65	24.6	36.1	30.1	82%
Eilertson Meadows SNOTEL	5510	1-Apr	9	4.2	10.2	6.7	63%
West Eagle Meadows AM	5500	1-Apr	44	18.9	28.1	30.0	63%
Dooley Mountain Snow Course	5440	2-Apr	0	0.0	0.0	8.0	0%
Gold Center SNOTEL	5410	1-Apr	10	4.4	12.6	3.9	113%
Schneider Meadows SNOTEL	5400	1-Apr	55	21.7	33.2	26.5	82%
Beaver Reservoir SNOTEL	5150	1-Apr	19	7.3	7.2	8.6	85%
Tipton SNOTEL	5150	1-Apr	21	8.8	15.1	11.6	76%
Thorson Cabin #2 Snow Course	5100	29-Mar	12	4.6	12.6		
High Ridge SNOTEL	4920	1-Apr	55	24.3	29.5	20.7	117%
County Line SNOTEL	4830	1-Apr	1	0.3	0.0	0.5	60%
Eldorado Pass Snow Course	4630	2-Apr	0	0.0	0.0	0.0	
Little Antone (Alt.) Snow Course	4560	30-Mar	18	6.4	4.7	6.8	94%
Bowman Springs SNOTEL	4530	1-Apr	7	3.3	3.4	5.5	60%
East Eagle Snow Course	4400	31-Mar	39	15.6		20.9	75%
Sourdough Gulch SNOTEL	4000	1-Apr	0	0.0	0.0	0.0	



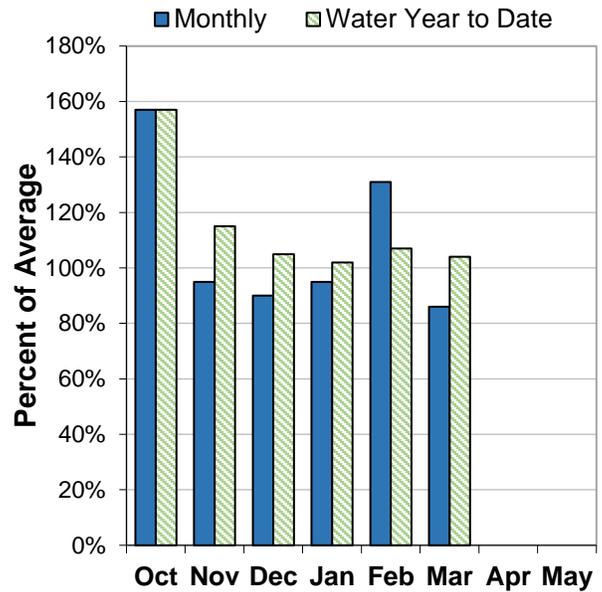
Umatilla, Walla Walla and Willow Basins

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 85% of normal. This is slightly higher than last month when the snowpack was 77% of normal. In general, SNOTEL sites in the basin have reached around 50% to 90% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 86% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 104% of average.

RESERVOIR

Reservoir storage across the basin is currently well above average. As of April 1, storage at major reservoirs in the basin ranges from 109% of average at Willow Creek Reservoir to 127% of average at McKay Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 71% to 106% of average. Overall, forecasts remain similar to last month's report. 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 April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 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	APR-JUL	46	53	57	106%	62	69	54
	APR-SEP	58	65	70	106%	75	83	66
Umatilla R ab Meacham nr Gibbon	APR-JUL	47	63	74	100%	86	102	74
	APR-SEP	52	69	80	100%	91	107	80
Umatilla R at Pendleton	APR-JUL	89	125	150	99%	174	210	151
	APR-SEP	96	132	157	100%	181	215	157
McKay Ck nr Pilot Rock	APR-JUL	9.0	17.6	25	86%	34	49	29
	APR-SEP	9.1	17.8	25	86%	34	50	29
Butter Ck nr Pine City	APR-JUL	3.6	5.5	7.1	76%	8.9	11.8	9.4
	APR-SEP	3.8	5.8	7.4	76%	9.2	12.1	9.8
Willow Ck ab Willow Lk nr Heppner	APR-JUL	2.0	3.7	5.2	74%	6.9	9.8	7.0
	APR-SEP	2.1	3.8	5.3	75%	7.0	9.9	7.1
Rhea Ck nr Heppner	APR-JUL	1.97	3.6	5.1	72%	6.7	9.6	7.1
	APR-SEP	2.1	3.9	5.3	71%	7.0	10.0	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	34.9	21.5	29.4	119%	38.6
Mckay	64.3	61.6	50.8	127%	71.5
Willow Creek	5.9	5.7	5.4	109%	9.8

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Umatilla Basin	5	86%	113%
Walla Walla Basin	7	85%	114%

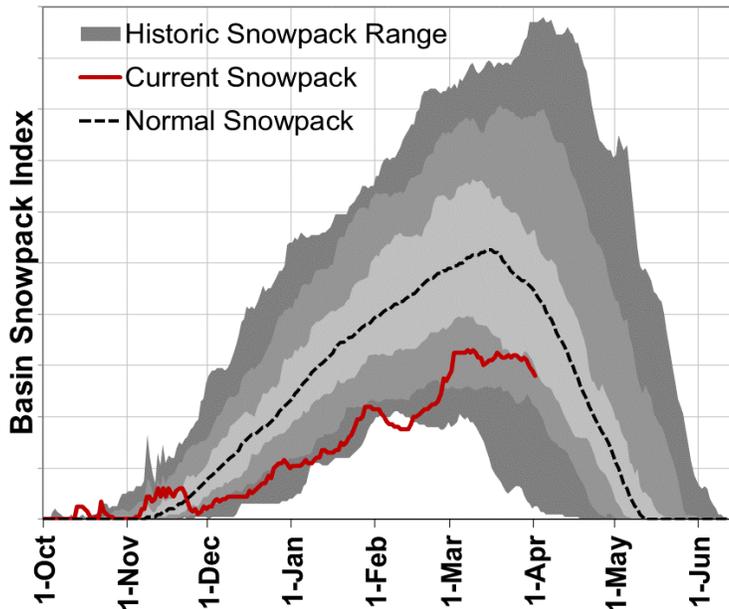
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Arbuckle Mtn SNOTEL	5770	1-Apr	30	12.1	19.9	18.8	64%
Spruce Springs SNOTEL	5700	1-Apr	30	11.5	13.1	13.8	83%
Milk Shakes SNOTEL	5580	1-Apr	97	34.9	41.7		
Touchet SNOTEL	5530	1-Apr	65	24.6	36.1	30.1	82%
Madison Butte SNOTEL	5150	1-Apr	3	1.4	0.0	1.2	117%
Lucky Strike SNOTEL	4970	1-Apr	9	4.2	5.1	6.2	68%
High Ridge SNOTEL	4920	1-Apr	55	24.3	29.5	20.7	117%
Indian Ridge Snow Course	4908	29-Mar	58	21.0			
Bowman Springs SNOTEL	4530	1-Apr	7	3.3	3.4	5.5	60%
Emigrant Springs SNOTEL	3800	1-Apr	0	0.0	0.0	0.0	



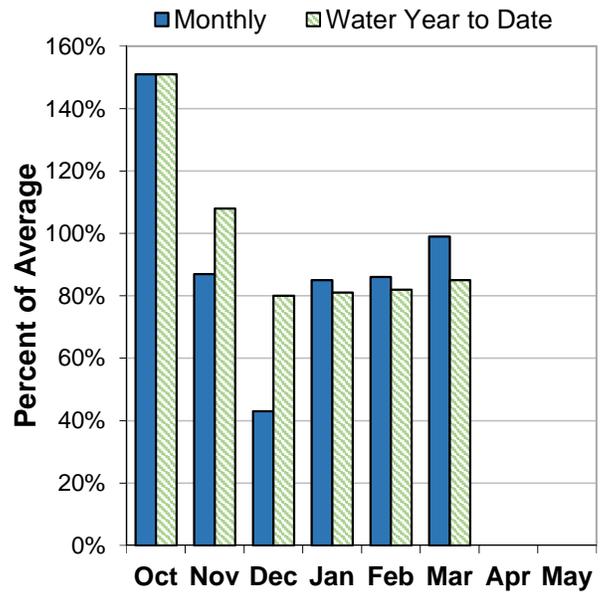
John Day Basin

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 64% of normal. This is slightly higher than last month when the snowpack was 59% of normal. In general, SNOTEL sites in the basin have reached around 40% to 70% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 99% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 85% of average.

STREAMFLOW FORECAST

Most April through September streamflow forecasts in the basin range from 49% to 81% of average. Overall, forecasts remain similar to last month's report. Water managers in the basin should expect well below normal to below normal streamflows this summer.

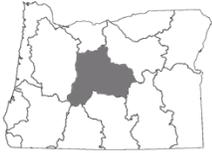
John Day Basin Summary for April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 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	APR-JUL	4.0	5.6	6.7	83%	7.8	9.4	8.1
	APR-SEP	4.3	6.0	7.1	81%	8.2	9.8	8.8
Mountain Ck nr Mitchell	APR-JUL	1.20	1.84	2.3	48%	2.9	3.9	4.8
	APR-SEP	1.23	1.87	2.4	49%	3.0	3.9	4.9
Camas Ck nr Ukiah	APR-JUL	17.2	26	32	94%	38	47	34
	APR-SEP	17.8	27	33	94%	39	48	35
MF John Day R at Ritter	APR-JUL	38	64	82	68%	99	125	121
	APR-SEP	41	67	85	67%	103	129	126
NF John Day R at Monument	APR-JUL	245	345	415	72%	485	585	580
	APR-SEP	255	355	425	71%	495	600	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	74%	118%
North Fork John Day Basin	8	73%	120%
Upper John Day Basin	6	59%	115%

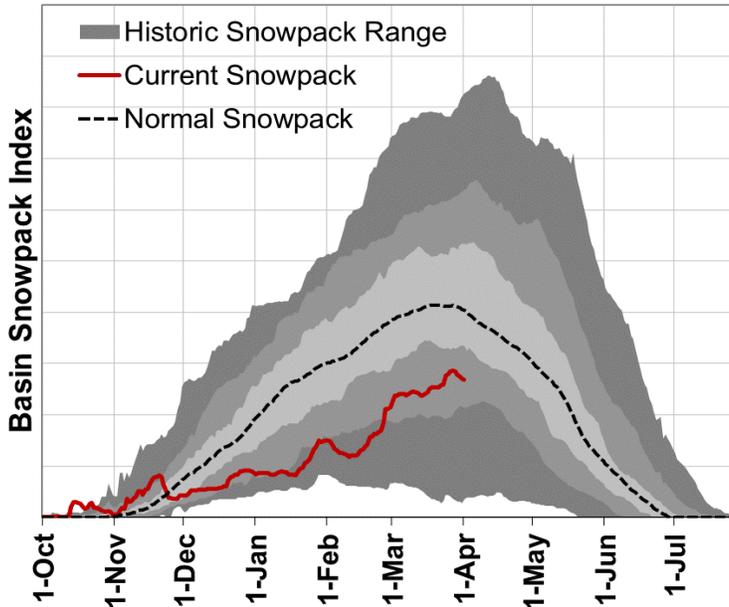
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Anthony Lake (Rev) Snow Course	7160	30-Mar	59	21.1	30.1	26.0	81%
Little Alps Snow Course	6360	30-Mar	33	9.7	13.9	13.6	71%
Snow Mountain SNOTEL	6230	1-Apr	18	7.8	12.9	12.2	64%
Blue Mountain Spring SNOTEL	5870	1-Apr	24	8.9	16.0	15.9	56%
Derr Snow Course	5860	29-Mar	14	5.9	7.6	7.6	78%
Bourne SNOTEL	5850	1-Apr	22	8.5	16.4	14.7	58%
Derr. SNOTEL	5850	1-Apr	22	8.8	19.9	12.0	73%
Barney Creek (New) Snow Course	5830	2-Apr	14	3.5			
Arbuckle Mtn SNOTEL	5770	1-Apr	30	12.1	19.9	18.8	64%
Ochoco Meadows SNOTEL	5430	1-Apr	12	5.1	9.5	9.5	54%
Gold Center SNOTEL	5410	1-Apr	10	4.4	12.6	3.9	113%
Starr Ridge SNOTEL	5250	1-Apr	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-Apr	5	1.9	8.3	8.6	22%
Ochoco Meadows Snow Course	5190	29-Mar	19	7.6	9.3	8.8	86%
Madison Butte SNOTEL	5150	1-Apr	3	1.4	0.0	1.2	117%
Tipton SNOTEL	5150	1-Apr	21	8.8	15.1	11.6	76%
Lucky Strike SNOTEL	4970	1-Apr	9	4.2	5.1	6.2	68%
County Line SNOTEL	4830	1-Apr	1	0.3	0.0	0.5	60%
Marks Creek Snow Course	4580	29-Mar	0	0.0	0.0	0.0	
Little Antone (Alt.) Snow Course	4560	30-Mar	18	6.4	4.7	6.8	94%



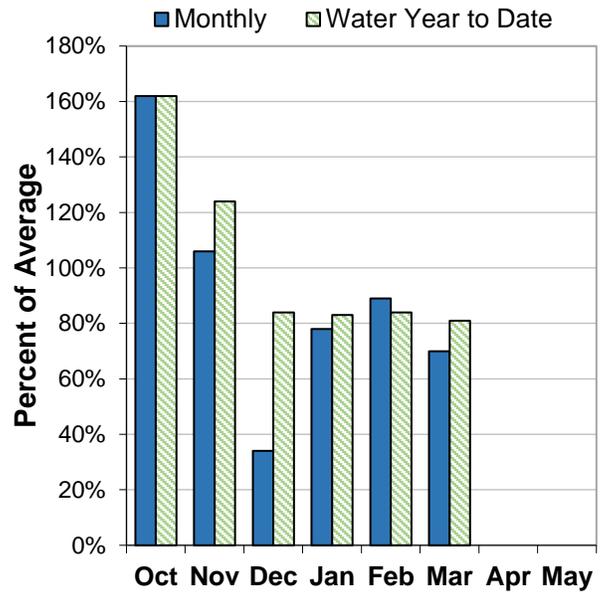
Upper Deschutes and Crooked Basins

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 66% of normal. This is slightly higher than last month when the snowpack was 58% of normal. In general, SNOTEL sites in the basin have reached around 40% to 80% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 70% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 81% of average.

RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 83% of average at Prineville Reservoir to 162% of average at Crescent Lake.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 34% to 86% of average. Overall, forecasts decreased slightly from last month's report. 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 April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 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	APR-JUL	15.0	19.3	22	73%	25	29	30
	APR-SEP	26	32	37	71%	41	48	52
Crane Prairie Reservoir Inflow ²	APR-JUL	31	38	42	75%	47	54	56
	APR-SEP	47	58	65	74%	72	83	88
Crescent Lake Inflow ²	APR-JUL	4.4	7.0	8.7	58%	10.5	13.1	15.0
	APR-SEP	4.0	7.0	9.1	52%	11.1	14.1	17.4
Little Deschutes R nr La Pine ²	APR-JUL	20	29	35	56%	40	49	63
	APR-SEP	19.8	29	35	51%	42	51	69
Deschutes R at Benham Falls ²	APR-JUL	240	255	270	84%	280	295	320
	APR-SEP	380	400	415	86%	425	445	485
Wychus Ck nr Sisters	APR-JUL	24	26	28	80%	29	32	35
	APR-SEP	32	35	37	79%	39	41	47
Prineville Reservoir Inflow ²	APR-JUL	15.6	27	36	35%	47	65	102
	APR-SEP	14.6	26	35	34%	46	64	102
Ochoco Reservoir Inflow ²	APR-JUL	4.1	7.1	9.6	46%	12.5	17.3	21
	APR-SEP	3.6	6.3	8.7	44%	11.4	16.0	20

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

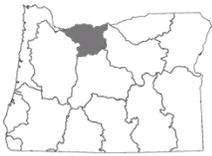
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Crane Prairie	47.0	46.3	42.1	112%	55.3
Crescent Lake	78.2	61.1	48.4	162%	86.9
Ochoco	25.8	40.3	30.2	85%	44.2
Prineville	108.3	135.5	130.4	83%	148.6
Wickiup	199.5	173.9	189.2	105%	200.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Little Deschutes Basin	4	74%	146%
Upper Crooked Basin	5	72%	122%
Upper Deschutes Basin	12	67%	123%

Upper Deschutes And Crooked Basins Summary for April 1, 2018

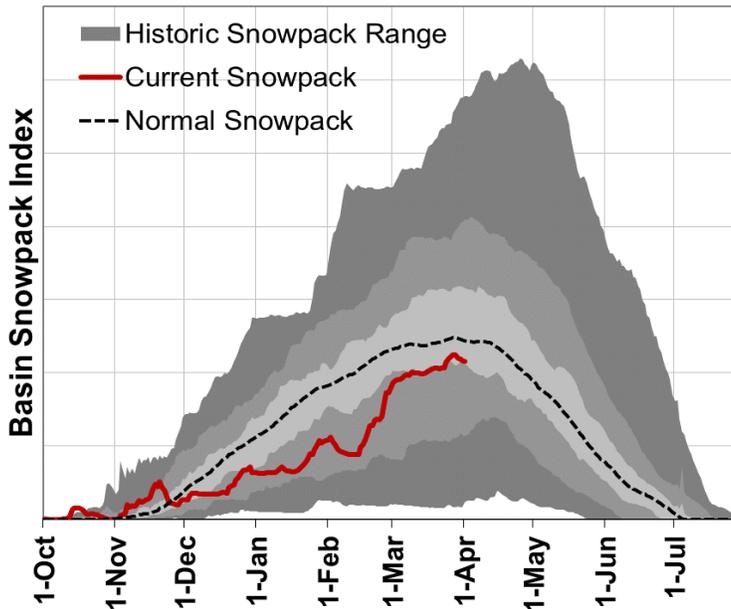
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
New Dutchman #3 Snow Course	6320	29-Mar	87	32.5	53.0	44.8	73%
Snow Mountain SNOTEL	6230	1-Apr	18	7.8	12.9	12.2	64%
Derr Snow Course	5860	29-Mar	14	5.9	7.6	7.6	78%
Derr. SNOTEL	5850	1-Apr	22	8.8	19.9	12.0	73%
Three Creeks Meadow SNOTEL	5690	1-Apr	14	6.6	17.8	18.4	36%
Summit Lake SNOTEL	5610	1-Apr	77	31.3	50.0	37.1	84%
Irish Taylor SNOTEL	5540	1-Apr	66	21.8	38.7	37.2	59%
Tangent Snow Course	5470	29-Mar	12	4.6	20.4	18.1	25%
Ochoco Meadows SNOTEL	5430	1-Apr	12	5.1	9.5	9.5	54%
Ochoco Meadows Snow Course	5190	29-Mar	19	7.6	9.3	8.8	86%
Cascade Summit SNOTEL	5100	1-Apr	60	23.9	36.8	31.0	77%
Roaring River SNOTEL	4950	1-Apr	42	20.3	33.8	26.0	78%
New Crescent Lake SNOTEL	4910	1-Apr	3	1.4	14.9	5.4	26%
Chemult Alternate SNOTEL	4850	1-Apr	0	0.0	9.3	2.5	0%
Hogg Pass SNOTEL	4790	1-Apr	36	13.5	25.4	26.0	52%
McKenzie SNOTEL	4770	1-Apr	64	27.8	40.1	37.4	74%
Marks Creek Snow Course	4580	29-Mar	0	0.0	0.0	0.0	
Hungry Flat Snow Course	4400	29-Mar	0	0.0	0.0	0.0	
Salt Creek Falls SNOTEL	4220	1-Apr	24	11.2	25.9	17.5	64%
Santiam Jct. SNOTEL	3740	1-Apr	17	7.4	15.8	9.8	76%



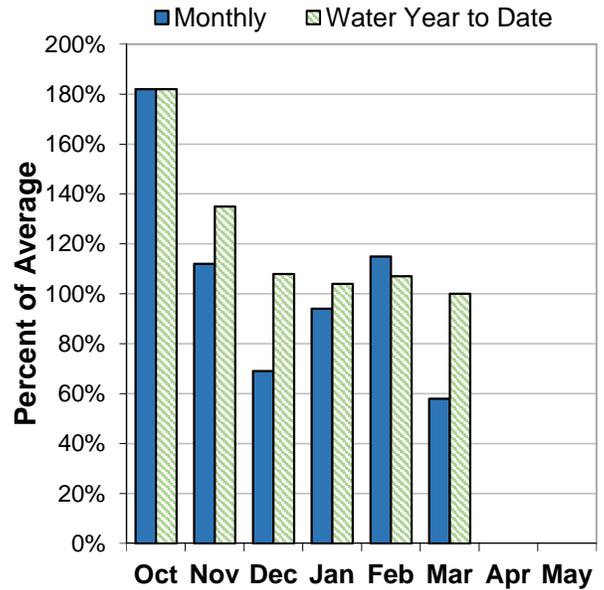
Hood, Sandy and Lower Deschutes Basins

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 84% of normal. This is slightly higher than last month when the snowpack was 79% of normal. In general, SNOTEL sites in the basin have reached around 50% to 110% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 58% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 100% of average. South Fork SNOTEL (in the Bull Run River basin) set a new record low for March precipitation (7", 53% of average) since measurements begun in 1997. In addition, two other long-term monitoring stations in the region (North Fork and Red Hill SNOTEL sites) measured the 2nd lowest March precipitation on record - the lowest since 1992.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 85% to 93% of average. Overall, forecasts decreased slightly from last month's report. Water managers in the basin should expect below normal streamflows this summer.

Hood, Sandy And Lower Deschutes Basins Summary for April 1, 2018

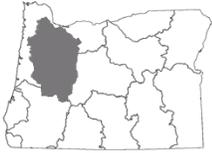
Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
WF Hood R nr Dee	APR-JUL	72	92	105	88%	119	138	120
	APR-SEP	87	108	122	88%	136	157	139
Hood R at Tucker Bridge	APR-JUL	137	169	191	85%	215	245	225
	APR-SEP	166	200	225	85%	250	285	265
Sandy R nr Marmot	APR-JUL	205	255	290	94%	325	375	310
	APR-SEP	245	300	335	93%	370	425	360

* 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	4.1	3.1	4.4	94%	13.1

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lower Columbia - Sandy Basin	7	92%	129%
Lower Deschutes Basin	5	74%	109%
Middle Columbia - Hood Basin	8	85%	123%

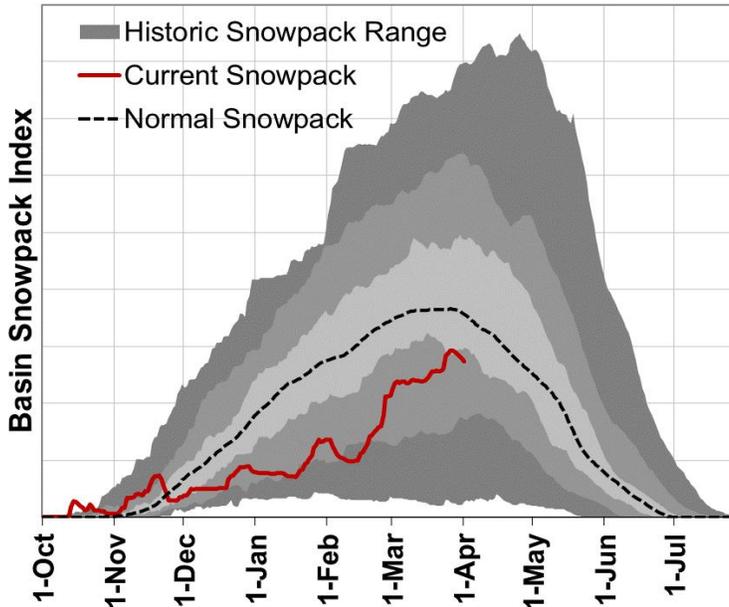
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
High Prairie Snow Course	6080	29-Mar	79	27.8	45.6	42.2	66%
Mt Hood Test Site SNOTEL	5370	1-Apr	111	42.8	53.9	60.2	71%
Red Hill SNOTEL	4410	1-Apr	81	37.2	59.6	45.7	81%
Mill Creek Meadow Snow Course	4400	29-Mar	22	7.3	11.4	10.8	68%
Surprise Lakes SNOTEL	4290	1-Apr	101	47.2	61.9	45.5	104%
Mud Ridge SNOTEL	4070	1-Apr	53	23.1	31.3	23.4	99%
Clear Lake SNOTEL	3810	1-Apr	16	5.6	14.7	10.4	54%
Blazed Alder SNOTEL	3650	1-Apr	75	30.2	41.6	25.6	118%
Clackamas Lake SNOTEL	3400	1-Apr	20	7.6	12.8	8.6	88%
Greenpoint SNOTEL	3310	1-Apr	20	8.0	19.9	15.6	51%
North Fork SNOTEL	3060	1-Apr	50	19.7	26.3	14.4	137%
South Fork Bull Run SNOTEL	2690	1-Apr	14	6.3	4.5	0.0	



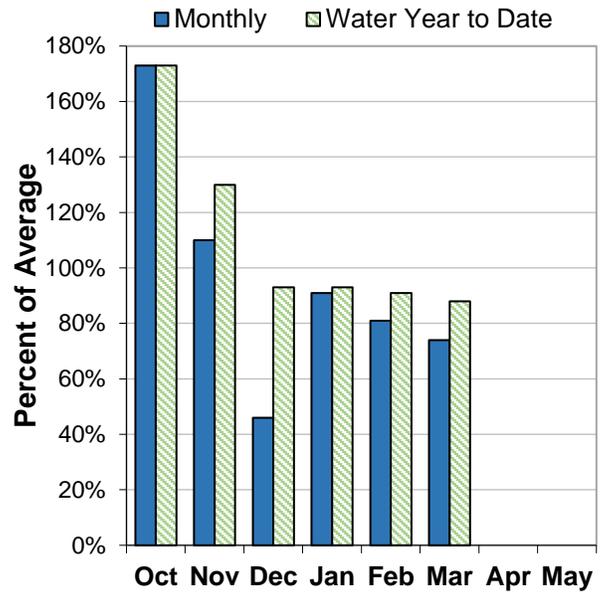
Willamette Basin

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 79% of normal. This is higher than last month when the snowpack was 65% of normal. In general, SNOTEL sites in the basin have reached around 50% to 80% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 74% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 88% of average.

RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 73% of average at Lookout Point Reservoir to 142% of average at Cottage Grove Reservoir.

STREAMFLOW FORECAST

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

Willamette Basin Summary for April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2018	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 ^{1,2}	APR-JUN	91	155	185	76%	215	280	245
	APR-SEP	137	210	240	76%	275	345	315
Lookout Point Reservoir Inflow ^{1,2}	APR-JUN	245	415	495	76%	570	740	650
	APR-SEP	365	550	630	76%	715	900	825
McKenzie R bl Trail Bridge	APR-JUN	139	168	181	86%	194	225	210
	APR-SEP	240	280	300	87%	315	355	345
Cougar Lake Inflow ^{1,2}	APR-JUN	74	123	146	79%	168	220	185
	APR-SEP	107	162	188	80%	215	270	235
Blue Lake Inflow ^{1,2}	APR-JUN	22	51	65	81%	78	107	80
	APR-SEP	26	56	70	81%	83	114	86
McKenzie R nr Vida ^{1,2}	APR-JUN	445	620	700	84%	780	950	830
	APR-SEP	730	935	1020	86%	1120	1320	1190
Detroit Lake Inflow ^{1,2}	APR-JUN	225	340	390	83%	440	555	470
	APR-SEP	335	460	515	84%	575	700	610
North Santiam R at Mehama ^{1,2}	APR-JUN	290	475	560	84%	640	825	665
	APR-SEP	410	610	705	84%	795	1000	840
Green Peter Lake Inflow ^{1,2}	APR-JUN	90	186	230	87%	275	370	265
	APR-SEP	115	215	260	88%	305	405	295
Foster Lake Inflow ^{1,2}	APR-JUN	172	355	435	87%	520	700	500
	APR-SEP	220	410	495	88%	580	770	565
South Santiam R at Waterloo ²	APR-JUN	185	375	465	89%	550	740	525
	APR-SEP	235	435	525	89%	615	810	590
Willamette R at Salem ^{1,2}	APR-JUN	1370	2670	3260	83%	3850	5160	3950
	APR-SEP	1880	3280	3920	83%	4560	5960	4730
Oak Grove Fk ab Powerplant	APR-JUL	76	90	100	87%	110	124	115
	APR-SEP	106	124	136	88%	149	167	155
Clackamas R ab Three Lynx	APR-JUL	275	335	380	84%	420	485	450
	APR-SEP	350	415	460	86%	505	570	535
Clackamas R at Estacada	APR-JUL	355	460	530	85%	600	705	625
	APR-SEP	445	555	630	86%	700	810	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 April 1, 2018

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Blue River	59.5	59.5	56.4	105%	82.3
Cottage Grove	27.4	21.3	19.3	142%	31.8
Cougar	93.1	147.1	118.6	79%	174.9
Detroit	301.3	363.1	335.5	90%	426.8
Dorena	45.5	53.5	44.4	102%	72.1
Fall Creek	62.4	97.5	81.6	76%	116.0
Fern Ridge	85.2	83.4	73.1	117%	97.3
Foster	23.4	24.4	30.9	76%	46.2
Green Peter	363.2	347.2	332.6	109%	402.8
Hills Creek	157.3	241.9	205.6	77%	279.2
Lookout Point	217.6	340.5	296.7	73%	433.2
Timothy Lake	63.0	53.3	52.7	120%	63.6
Henry Hagg Lake	51.2	51.2	50.0	102%	53.3

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Clackamas Basin	11	84%	125%
McKenzie Basin	17	66%	125%
Middle Fork Willamette Basin	7	71%	125%
North Santiam Basin	4	106%	197%
South Santiam Basin	4	112%	196%

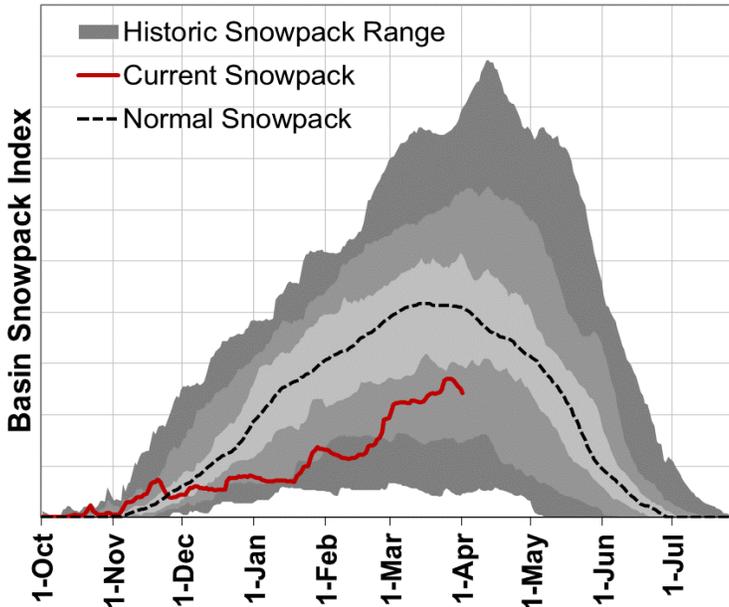
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summit Lake SNOTEL	5610	1-Apr	77	31.3	50.0	37.1	84%
Irish Taylor SNOTEL	5540	1-Apr	66	21.8	38.7	37.2	59%
Cascade Summit SNOTEL	5100	1-Apr	60	23.9	36.8	31.0	77%
Roaring River SNOTEL	4950	1-Apr	42	20.3	33.8	26.0	78%
Holland Meadows SNOTEL	4930	1-Apr	28	11.3	26.5	21.1	54%
McKenzie SNOTEL	4770	1-Apr	64	27.8	40.1	37.4	74%
Bear Grass SNOTEL	4720	1-Apr	89	42.8	64.2		
Salt Creek Falls SNOTEL	4220	1-Apr	24	11.2	25.9	17.5	64%
Mud Ridge SNOTEL	4070	1-Apr	53	23.1	31.3	23.4	99%
Little Meadows SNOTEL	4020	1-Apr	63	26.5	43.2	23.3	114%
Clear Lake SNOTEL	3810	1-Apr	16	5.6	14.7	10.4	54%
Santiam Jct. SNOTEL	3740	1-Apr	17	7.4	15.8	9.8	76%
Daly Lake SNOTEL	3690	1-Apr	16	8.0	16.7	7.7	104%
Jump Off Joe SNOTEL	3520	1-Apr	20	7.6	11.8	7.8	97%
Peavine Ridge SNOTEL	3420	1-Apr	14	6.6	16.6	8.9	74%
Clackamas Lake SNOTEL	3400	1-Apr	20	7.6	12.8	8.6	88%
Smith Ridge SNOTEL	3270	1-Apr	3	1.5	1.1		
Saddle Mountain SNOTEL	3110	1-Apr	5	3.7	0.0		
Railroad Overpass SNOTEL	2680	1-Apr	0	0.0	0.0	0.0	
Marion Forks SNOTEL	2590	1-Apr	18	7.3	15.1	5.4	135%
Seine Creek SNOTEL	2060	1-Apr	0	0.0	0.0	0.0	
Miller Woods SNOTEL	420	1-Apr	0	0.0	0.0		



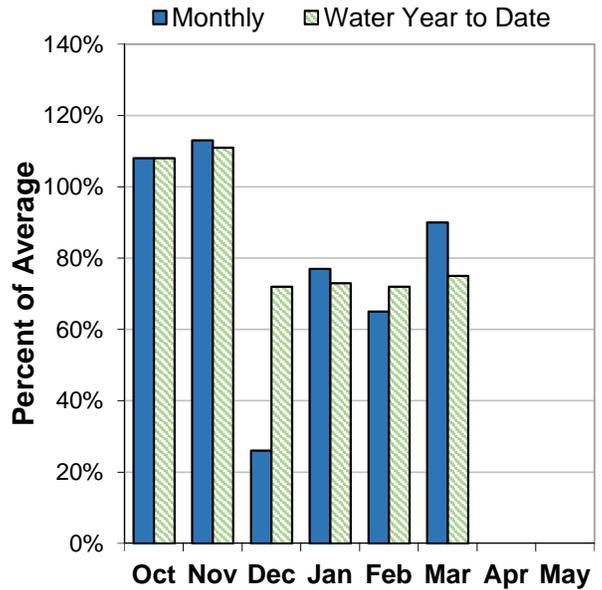
Rogue and Umpqua Basins

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 61% of normal. This is slightly higher than last month when the snowpack was 52% of normal. In general, SNOTEL sites in the basin have reached around 40% to 70% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 90% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 75% of average.

RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 52% of average at Hyatt Prairie Reservoir to 114% of average at Fish Lake.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 46% to 90% of average. Overall, forecasts remain similar to last month's report. 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 April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
South Umpqua R at Tiller	APR-JUL	80	134	172	89%	210	265	193
	APR-SEP	88	143	180	90%	215	270	200
Cow Ck ab Galesville Reservoir	APR-JUL	2.9	7.6	10.7	77%	13.8	18.5	13.9
	APR-SEP	3.8	8.5	11.7	78%	14.9	19.6	15.0
South Umpqua R nr Brockway	APR-JUL	98	230	315	81%	405	535	390
	APR-SEP	111	245	335	82%	425	555	410
North Umpqua R at Winchester	APR-JUL	420	570	670	86%	775	925	775
	APR-SEP	520	675	780	88%	880	1030	890
Lost Creek Lk Inflow ²	APR-JUL	310	370	410	79%	450	510	520
	APR-SEP	410	475	520	81%	565	630	645
Rogue R at Raygold ²	APR-JUL	295	410	485	72%	560	670	675
	APR-SEP	390	505	585	73%	665	785	805
Rogue R at Grants Pass ²	APR-JUL	275	410	505	70%	595	735	725
	APR-SEP	350	495	595	70%	690	835	845
Applegate Lake Inflow ²	APR-JUL	13.8	35	49	45%	63	84	109
	APR-SEP	17.2	38	53	46%	67	89	115
Sucker Ck bl Ltl Grayback nr Holland	APR-JUL	8.8	24	35	64%	46	61	55
	APR-SEP	11.4	27	38	64%	49	65	59
Illinois R nr Kerby	APR-JUL	28	92	136	72%	180	245	188
	APR-SEP	32	96	140	73%	184	250	193

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

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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Applegate	31.8	46.2	44.0	72%	75.2
Emigrant Lake	25.4	37.0	33.6	76%	39.0
Fish Lake	5.9	4.7	5.2	114%	7.9
Fourmile Lake	7.3	5.7	7.5	98%	15.6
Howard Prairie	37.1	54.4	41.9	89%	62.1
Hyatt Prairie	6.3	10.0	12.1	52%	16.2
Lost Creek	248.5	277.2	266.7	93%	315.0

Rogue And Umpqua Basins Summary for April 1, 2018

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Applegate Basin	5	41%	137%
Middle Rogue Basin	8	53%	147%
North Umpqua Basin	9	84%	175%
South Umpqua Basin	10	178%	261%
Upper Rogue Basin	11	57%	122%

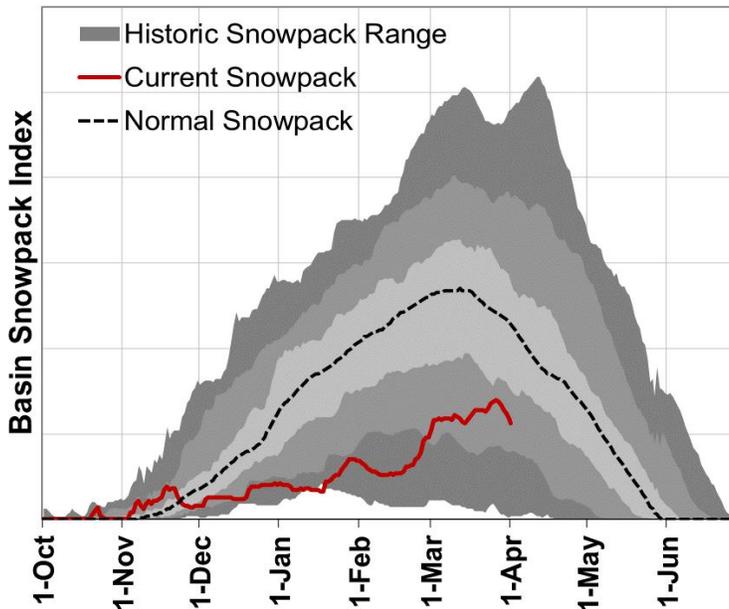
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Park H.Q. Rev Snow Course	6570	2-Apr	101	44.0	79.6	59.6	74%
Caliban (Alt.) Snow Course	6500	28-Mar	45	13.8	43.6	30.6	45%
Mt. Ashland Switchback Snow Course	6430	28-Mar	36	10.0	42.2	32.4	31%
Ski Bowl Road Snow Course	6070	28-Mar	28	7.7	27.8	23.6	33%
Big Red Mountain SNOTEL	6050	1-Apr	37	11.3	37.4	27.8	41%
Annie Springs SNOTEL	6010	1-Apr	72	25.7	57.0	41.0	63%
Fourmile Lake SNOTEL	5970	1-Apr	39	13.3	26.4	28.9	46%
Cold Springs Camp SNOTEL	5940	1-Apr	29	11.6	30.2	28.8	40%
Sevenmile Marsh SNOTEL	5700	1-Apr	45	17.8	38.3	31.8	56%
Summit Lake SNOTEL	5610	1-Apr	77	31.3	50.0	37.1	84%
Billie Creek Divide SNOTEL	5280	1-Apr	25	10.5	23.1	21.2	50%
Diamond Lake SNOTEL	5280	1-Apr	10	5.1	20.1	10.2	50%
Bigelow Camp SNOTEL	5130	1-Apr	16	8.2	20.3	10.8	76%
Beaver Dam Creek Snow Course	5120	2-Apr	6	2.9	11.1	8.0	36%
King Mountain 1 Snow Course	4760	29-Mar	28	8.7	13.3	3.2	272%
Deadwood Junction Snow Course	4660	2-Apr	2	0.6	2.7	3.0	20%
Fish Lk. SNOTEL	4660	1-Apr	12	4.9	8.4	6.8	72%
Howard Prairie SNOTEL	4580	1-Apr	5	2.1	2.6		
Howard Prairie Snow Course	4580	2-Apr	2	0.6	2.7	4.2	14%
Siskiyou Summit Rev. 2 Snow Course	4560	28-Mar	9	3.2	8.0	3.4	94%
Red Butte 1 Snow Course	4460	28-Mar	32	10.0	20.3	7.2	139%
King Mountain SNOTEL	4340	1-Apr	12	5.6	3.2	0.5	1120%
North Umpqua Snow Course	4200	2-Apr	3	1.0	10.3	5.4	19%
Red Butte 2 Snow Course	4050	28-Mar	12	3.3	0.0	1.0	330%
Trap Creek Snow Course	3830	2-Apr	9	3.2	13.8	4.5	71%
Silver Burn Snow Course	3680	2-Apr	13	5.6	13.8	7.5	75%
King Mountain 3 Snow Course	3680	29-Mar	2	0.5	0.0	0.0	
Red Butte 3 Snow Course	3500	28-Mar	4	0.8	0.0	0.0	
Toketee Airstrip SNOTEL	3240	1-Apr	0	0.0	0.0	0.0	
King Mountain 4 Snow Course	3050	29-Mar	0	0.0	0.0	0.0	
Red Butte 4 Snow Course	3000	28-Mar	0	0.0	0.0	0.0	



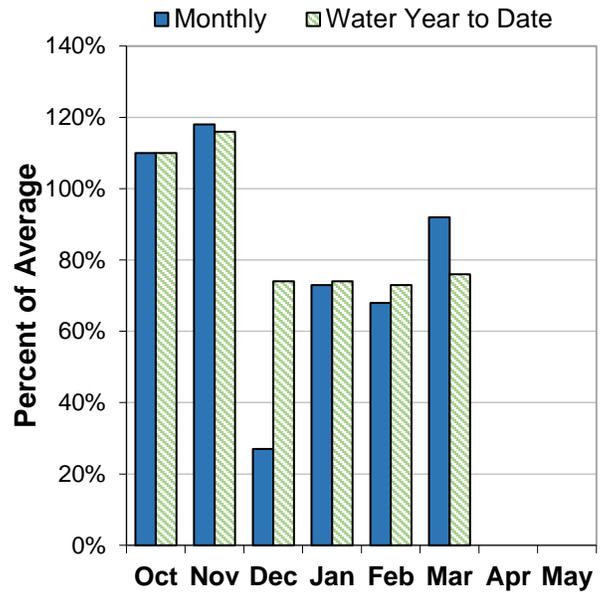
Klamath Basin

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 55% of normal. This is slightly higher than last month when the snowpack was 46% of normal. In general, SNOTEL sites in the basin have reached around 20% to 60% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 92% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 76% of average.

RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 89% of average at Clear Lake to 128% of average at Gerber Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 28% to 63% of average. Overall, forecasts increased slightly from last month's report. Water users in the basin without access to reservoir water should expect water shortages this summer and prepare accordingly.

Klamath Basin Summary for April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 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 ²	APR-JUL	0.02	1.54	3.9	28%	7.5	14.7	14.0
	APR-SEP	0.03	1.64	4.1	28%	7.7	15.0	14.4
Sprague R nr Chiloquin	APR-JUL	65	84	98	52%	113	138	188
	APR-SEP	81	101	116	55%	132	157	210
Williamson R bl Sprague nr Chiloquin	APR-JUL	115	148	171	58%	194	225	295
	APR-SEP	163	199	225	63%	245	285	355
Upper Klamath Lake Inflow ^{1,2}	APR-JUL	119	191	225	56%	255	330	400
	APR-SEP	171	250	285	59%	320	400	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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Clear Lake	218.5	250.3	245.0	89%	513.3
Gerber	80.1	82.5	62.5	128%	94.3
Upper Klamath Lake	454.0	464.8	424.5	107%	523.7

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lost Basin	4	0%	0%
Sprague Basin	8	53%	113%
Upper Klamath Lake Basin	8	58%	121%
Williamson River Basin	5	64%	145%

Klamath Basin Summary for April 1, 2018

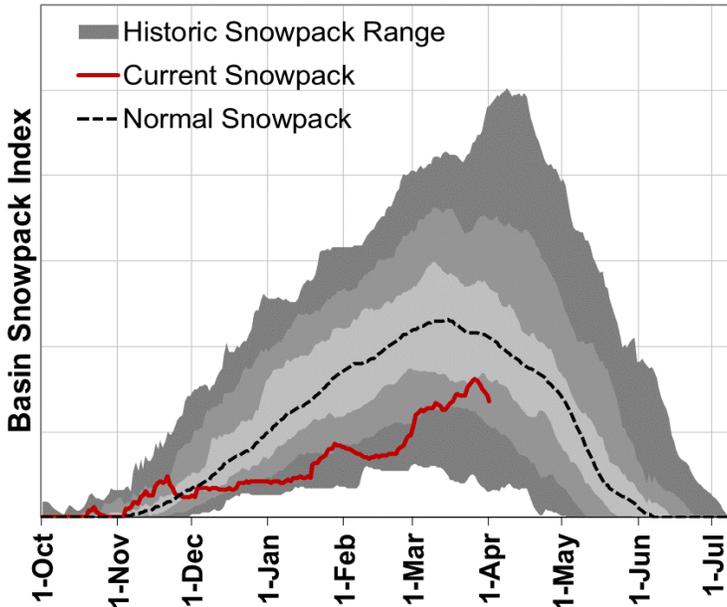
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summer Rim SNOTEL	7080	1-Apr	30	11.9	15.5	16.4	73%
Swan Lake Mtn SNOTEL	6830	1-Apr	27	11.1	31.8		
Park H.Q. Rev Snow Course	6570	2-Apr	101	44.0	79.6	59.6	74%
Colvin Creek AM	6520	30-Mar	0	0.0	0.8	0.0	
Crazyman Flat SNOTEL	6180	1-Apr	16	7.7	17.7	13.1	59%
Ski Bowl Road Snow Course	6070	28-Mar	28	7.7	27.8	23.6	33%
Annie Springs SNOTEL	6010	1-Apr	72	25.7	57.0	41.0	63%
Finley Corral AM	6000	1-Apr	16	7.2	12.7	13.0	55%
Fourmile Lake SNOTEL	5970	1-Apr	39	13.3	26.4	28.9	46%
Cold Springs Camp SNOTEL	5940	1-Apr	29	11.6	30.2	28.8	40%
Strawberry SNOTEL	5770	1-Apr	0	0.0	0.0	1.2	0%
Cox Flat AM	5750	1-Apr	0	0.0	0.0	0.2	0%
Silver Creek SNOTEL	5740	1-Apr	3	1.2	10.4	7.2	17%
Quartz Mountain SNOTEL	5720	1-Apr	0	0.0	0.0	0.0	
Sevenmile Marsh SNOTEL	5700	1-Apr	45	17.8	38.3	31.8	56%
State Line AM	5690	1-Apr	0	0.0	0.0	0.7	0%
State Line SNOTEL	5680	1-Apr	0	0.0	0.4		
Sycan Flat AM	5580	30-Mar	0	0.0	0.0	0.4	0%
Sun Pass SNOTEL	5400	1-Apr	9	4.1	23.9		
Billie Creek Divide SNOTEL	5280	1-Apr	25	10.5	23.1	21.2	50%
Diamond Lake SNOTEL	5280	1-Apr	10	5.1	20.1	10.2	50%
Crowder Flat SNOTEL	5170	1-Apr	0	0.0	0.0	0.0	
Beaver Dam Creek Snow Course	5120	2-Apr	6	2.9	11.1	8.0	36%
Taylor Butte SNOTEL	5030	1-Apr	0	0.0	3.1	3.0	0%
Dog Hollow AM	4920	30-Mar	0	0.0	0.0	0.0	
Gerber Reservoir SNOTEL	4890	1-Apr	0	0.0	0.0	0.0	
Chemult Alternate SNOTEL	4850	1-Apr	0	0.0	9.3	2.5	0%
Deadwood Junction Snow Course	4660	2-Apr	2	0.6	2.7	3.0	20%
Fish Lk. SNOTEL	4660	1-Apr	12	4.9	8.4	6.8	72%
Howard Prairie SNOTEL	4580	1-Apr	5	2.1	2.6		
Howard Prairie Snow Course	4580	2-Apr	2	0.6	2.7	4.2	14%
Siskiyou Summit Rev. 2 Snow Course	4560	28-Mar	9	3.2	8.0	3.4	94%



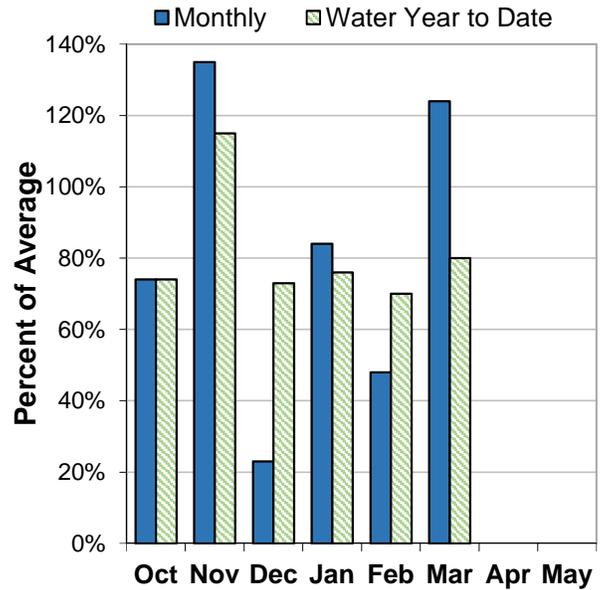
Lake County and Goose Lake Basins

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 60% of normal. This is higher than last month when the snowpack was 44% of normal. In general, SNOTEL sites in the basin have reached around 30% to 70% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 124% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 80% of average.

RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 53% of average at Cottonwood Reservoir to 113% of average at Drews Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 41% to 56% of average. Overall, forecasts increased slightly from last month's report. 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 April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Twentymile Ck nr Adel	APR-JUL	2.4	4.8	6.9	41%	9.3	13.7	17.0
	APR-SEP	2.6	5.0	7.2	41%	9.7	14.1	17.4
Deep Ck ab Adel	APR-JUL	18.5	26	32	51%	39	50	63
	APR-SEP	19.4	27	33	51%	40	51	65
Honey Ck nr Plush	APR-JUL	2.7	4.4	5.8	41%	7.3	9.9	14.0
	APR-SEP	2.8	4.5	5.9	42%	7.4	10.0	14.1
Chewaucan R nr Paisley	APR-JUL	24	33	39	55%	45	56	71
	APR-SEP	27	35	42	56%	48	59	75

* 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)
Cottonwood	3.3	9.7	6.3	53%	9.3
Drews	47.3	67.6	42.0	113%	63.5

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Goose Lake Basin	6	62%	130%
Lake Abert Basin	7	55%	102%
Summer Lake Basin	12	60%	125%
Upper Pit Basin	3	58%	138%

Lake County And Goose Lake Basins Summary for April 1, 2018

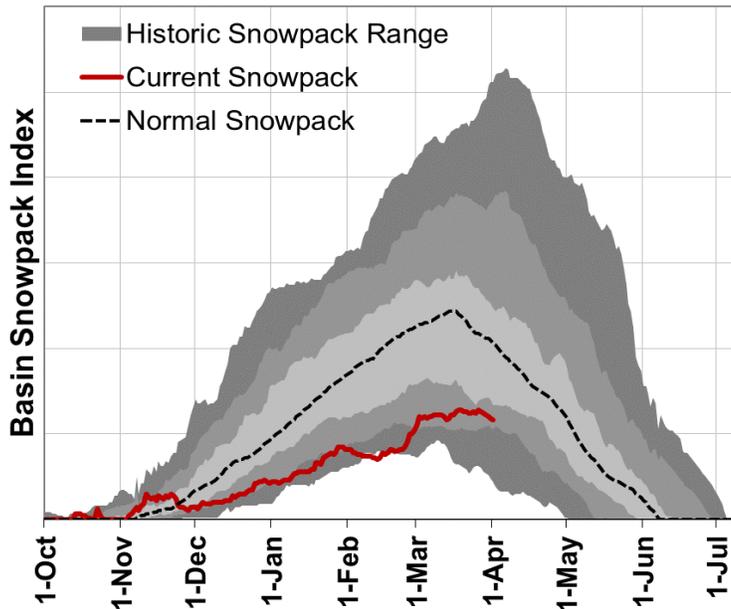
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Dismal Swamp SNOTEL	7360	1-Apr	56	22.6	45.8	28.4	80%
Summer Rim SNOTEL	7080	1-Apr	30	11.9	15.5	16.4	73%
Cedar Pass Snow Course	7050	28-Mar	33	11.0	20.2	14.8	74%
Cedar Pass SNOTEL	7030	1-Apr	29	11.2	21.4	17.9	63%
Barley Camp AM	6890	3-Apr	30	12.0		16.1	75%
Blue Lake Ranch Snow Course	6830	29-Mar	14	4.9	9.9	8.7	56%
Patton Meadows AM	6800	1-Apr	19	7.6	16.4	16.0	48%
Sherman Valley AM	6640	1-Apr	12	4.8	10.7	13.0	37%
Bear Flat Meadow AM	6580	30-Mar	13	5.2	9.6	11.8	44%
Colvin Creek AM	6520	30-Mar	0	0.0	0.8	0.0	
Hart Mountain AM	6430	1-Apr	0	0.0	0.0	0.0	
Rogger Meadow AM	6360	1-Apr	11	4.4	14.8	8.8	50%
Adin Mtn Snow Course	6190	30-Mar	20	7.2	16.8	12.2	59%
Adin Mtn SNOTEL	6190	1-Apr	13	5.8	19.0	11.3	51%
Crazyman Flat SNOTEL	6180	1-Apr	16	7.7	17.7	13.1	59%
Finley Corrals AM	6000	1-Apr	16	7.2	12.7	13.0	55%
Camas Creek #3 Snow Course	5860	28-Mar	22	7.1	17.1	11.0	65%
Sheldon SCAN	5860	1-Apr	0	0.0	0.0	0.0	
Strawberry SNOTEL	5770	1-Apr	0	0.0	0.0	1.2	0%
Cox Flat AM	5750	1-Apr	0	0.0	0.0	0.2	0%
Silver Creek SNOTEL	5740	1-Apr	3	1.2	10.4	7.2	17%
State Line AM	5690	1-Apr	0	0.0	0.0	0.7	0%
State Line SNOTEL	5680	1-Apr	0	0.0	0.4		
Sycan Flat AM	5580	30-Mar	0	0.0	0.0	0.4	0%
Crowder Flat SNOTEL	5170	1-Apr	0	0.0	0.0	0.0	



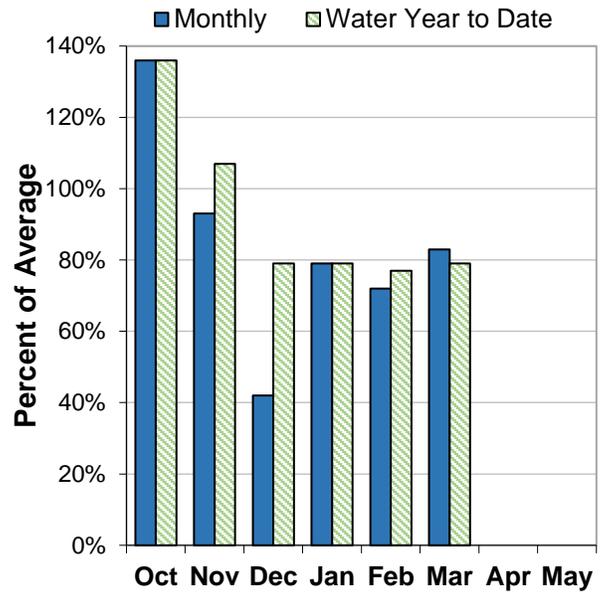
Harney Basin

April 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of April 1, the basin snowpack was 59% of normal. This is higher than last month when the snowpack was 47% of normal. In general, SNOTEL sites in the basin have reached around 40% to 60% of normal peak snowpack levels this winter.

PRECIPITATION

March precipitation was 83% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 79% of average.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 32% to 62% of average. Overall, forecasts increased slightly from last month's report. Water users in the basin should expect water shortages this summer and prepare accordingly.

Harney Basin Summary for April 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2018	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	APR-JUL	9.4	19.3	28	31%	39	57	89
	APR-SEP	10.0	20	29	32%	40	58	92
Donner Und Blitzen R nr Frenchglen	APR-JUL	23	31	38	61%	46	58	62
	APR-SEP	26	35	42	62%	50	63	68
Trout Ck nr Denio	APR-JUL	0.55	1.48	2.4	32%	3.5	5.4	7.6
	APR-SEP	0.64	1.62	2.6	33%	3.7	5.7	8.0

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

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Alvord Lake Basin	7	63%	118%
Donner und Blitzen River Basin	5	57%	110%
Silvies River Basin	4	45%	98%
Upper Quinn Basin	6	59%	122%

Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-Apr	45	14.6	35.0	21.2	69%
Trout Creek AM	7890	1-Apr	27	10.0	12.2	12.7	79%
Fish Creek SNOTEL	7660	1-Apr	51	18.9	37.5	27.4	69%
Govt Corrals AM	7400	1-Apr	28	10.4	22.7	15.0	69%
Oregon Canyon AM	7050	3-Apr	1	0.4	1.2	3.0	13%
Silvies SNOTEL	6990	1-Apr	23	8.4	14.8	15.6	54%
Pueblo Summit AM	6970	3-Apr	0	0.0	0.4	0.0	
Buckskin Lower SNOTEL	6915	1-Apr	16	4.3	10.4	8.5	51%
V Lake AM	6600	1-Apr	0	0.0	0.0	4.9	0%
Louse Canyon AM	6530	3-Apr	0	0.0	1.6	3.2	0%
Disaster Peak SNOTEL	6500	1-Apr	0	0.0	0.0	1.9	0%
Hart Mountain AM	6430	1-Apr	0	0.0	0.0	0.0	
Quinn Ridge AM	6270	3-Apr	0	0.0	2.0	0.0	
Snow Mountain SNOTEL	6230	1-Apr	18	7.8	12.9	12.2	64%
Lamance Creek SNOTEL	6000	1-Apr	0	0.0	0.3	6.6	0%
Blue Mountain Spring SNOTEL	5870	1-Apr	24	8.9	16.0	15.9	56%
Sheldon SCAN	5860	1-Apr	0	0.0	0.0	0.0	
Buck Pasture AM	5740	30-Mar	0	0.0	0.4	0.0	
Call Meadows AM	5380	30-Mar	0	0.0	0.9	1.2	0%
Rock Springs SNOTEL	5290	1-Apr	0	0.0	0.0	0.9	0%
Starr Ridge SNOTEL	5250	1-Apr	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-Apr	5	1.9	8.3	8.6	22%
Buckskin Lake AM	5190	30-Mar	0	0.0	0.0	0.0	

Recession Forecasts for Oregon

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

The types of forecasts in the table below are:

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

OWYHEE AND MALHEUR BASINS					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Owyhee R nr Rome	2000 cfs	** Observed			May 6
Owyhee R nr Rome	1000 cfs	** Observed			May 18
Owyhee R nr Rome	500 cfs	Apr 14	Apr 20	Apr 28	Jun 2

UPPER JOHN DAY BASIN					
<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	20	137	345	271

UPPER DESCHUTES AND CROOKED BASINS					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Crane Prairie Inflow *	Date of Peak	May 1	May 17	Jun 2	May 25
Crane Prairie Inflow	Peak Flow	170	300	430	403
Crane Prairie Inflow	Average Daily Flow on Oct. 1st	140	175	210	269
Prineville Reservoir Inflow	150 cfs	Apr 28	May 19	Jun 9	May 30
Prineville Reservoir Inflow	80 cfs	May 4	May 25	Jun 15	June 7
Whychus Creek nr Sisters	100 cfs	Jul 4	Jul 28	Aug 17	August 16

ROGUE AND UMPQUA BASINS					
<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 16	Aug 2	Aug 17	August 8
South Umpqua R at Tiller	140 cfs	Jun 16	Jul 6	Jul 28	July 11
South Umpqua R at Tiller	90 cfs	Jul 5	Jul 28	Aug 17	August 1
South Umpqua R at Tiller	60 cfs	Jul 28	Aug 22	Sep 16	August 28

*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.

LAKE COUNTY AND GOOSE LAKE BASINS					
<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 18	Jun 4	Jun 21	June 17
Honey Ck nr Plush	100 cfs	Mar 24	Apr 24	May 25	May 16
Honey Ck nr Plush	50 cfs	Apr 8	May 5	Jun 1	June 4
Twentymile Ck nr Adel	50 cfs	Apr 6	May 4	Jun 1	May 30
Twentymile Ck nr Adel	10 cfs	Jun 2	Jun 22	Jul 12	July 7

HARNEY BASIN					
<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 6	Apr 27	May 18	May 21
Silvies R nr Burns	200 cfs	Apr 15	May 8	May 31	June 2
Silvies R nr Burns	100 cfs	Apr 26	May 20	Jun 13	June 13
Silvies R nr Burns	50 cfs	May 16	Jun 11	Jul 7	July 3
Donner Und Blitzen R nr Frenchglen	200 cfs	May 14	Jun 2	Jun 21	June 20
Donner Und Blitzen R nr Frenchglen	100 cfs	Jun 5	Jun 21	Jul 7	July 9

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.

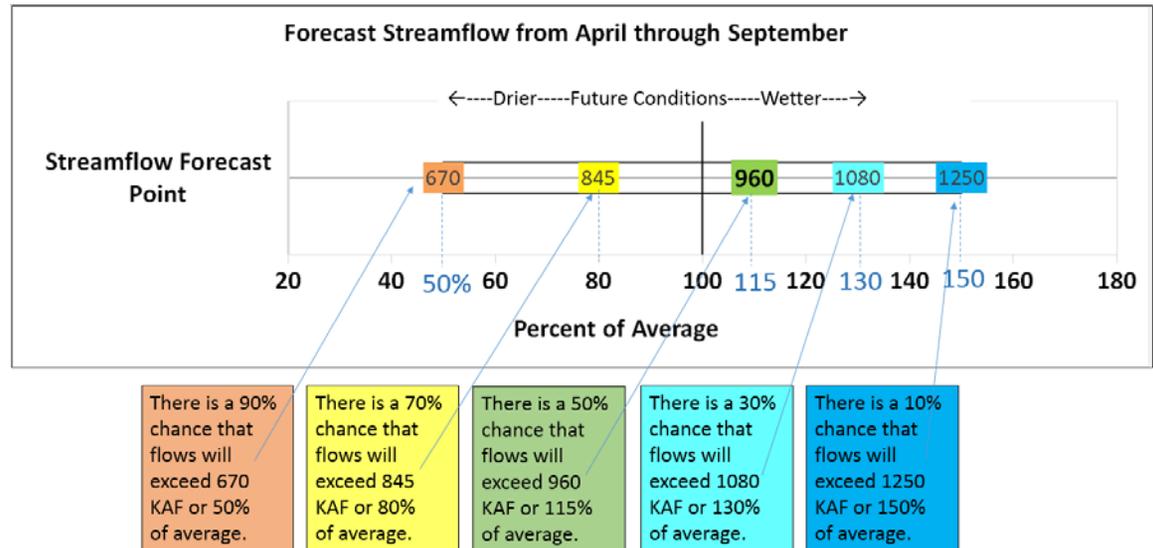
30-Year Average. The 30-year average streamflow for each forecast period is provided for comparison. The average is based on data from 1981-2010. The % AVG. column compares the 50% chance of exceedance forecast to the 30-year average streamflow; values above 100% denote when the 50% chance of exceedance 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) (% AVG.)	30% (1000AF)	10% (1000AF)		
Strawberry Ck nr Prairie City	MAR-JUL	5.0	6.6	7.6	89	8.6	10.2	8.5
	APR-SEP	5.2	6.8	7.9	90	9.0	10.6	8.8
Mountain Ck nr Mitchell	FEB-JUL	3.2	5.4	6.9	99	8.4	10.6	7.0
	APR-SEP	1.7	3.3	4.4	90	5.5	7.1	4.9

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

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.

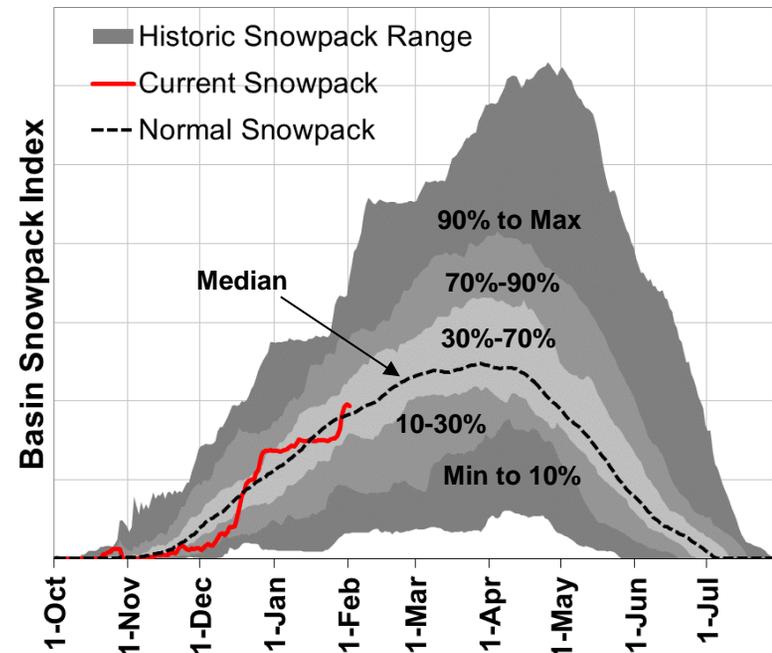
Interpreting Snowpack Plots

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 10th percentile and the 90th percentile to maximum). The medium grey shading indicates the range from the 10th to 30th percentiles and the 70th to 90th percentiles. The light grey shading indicates the range between the 30th to 70th percentiles, while the median is the 50th percentile. A percentile is the value of the snowpack index below which the given percent of historical years fall. For instance, the 90th 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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<http://www.or.nrcs.usda.gov/snow>

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