



United States
Department of
Agriculture



Natural Resources
Conservation
Service

Oregon Basin Outlook Report

May 1, 2018



Abundant sunshine, warm temperatures, and a lower than normal snowpack meant that Silvies SNOTEL on Steens Mountain melted out several weeks early this year.

Photo courtesy of Bill Overman (NRCS Snow Surveys)

Most of Oregon experienced lower than normal snowpack this winter. Statewide snowpack on May 1st is just 66% of normal and more snow measurement sites than usual are snow-free. Summer streamflows are forecast to be well below normal for many of Oregon's streams and rivers, and water users across most of the state should be prepared for reduced water supplies this summer. Most reservoirs statewide are storing close to normal water supplies, which may help offset shortages from low streamflows this summer.

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General Outlook

May 1st, 2018

SUMMARY

Oregon is bracing for a low water supply season with shortages likely, especially in parts of southern and eastern Oregon. As of May 1st, Governor Kate Brown has officially declared a drought state of emergency for Klamath and Grant counties with more counties likely to follow. Streamflow is expected to be well below average throughout most of the state due to a drier than normal winter and a well below normal seasonal snowpack. The drought monitor has included 40% of Oregon in a moderate drought status (<http://droughtmonitor.unl.edu/>) and the long range forecast from NOAA's Climate Prediction Center is calling for a warmer and drier than normal weather pattern for the next 3 months: <http://www.cpc.ncep.noaa.gov/>.

Water users are advised to plan for lower than usual water supplies, especially those that depend on streamflow as the main source. Many reservoirs that assist irrigation are storing near average amounts of water for this time of year which may provide a much needed buffer with those that have access to it. Northern Oregon continues to be the exception. Streamflow will be closer to normal in the northern most river reaches of the state, where near average amounts of precipitation fell this season. However, many rivers in this region may still not achieve normal streamflow levels through the summer, as northern Oregon's snowpack is mostly below normal as of May 1st.

SNOWPACK

Snowpack levels across the state fell well short of normal peak levels this winter. Over half of the snow monitoring sites in Oregon achieved less than 70% of the normal peak snowpack levels. Only 8 SNOTEL sites were able to reach above normal peak snowpack this season - all of them located on the west side of the Cascades and most located on the slopes around Mt. Hood. The lack of snowfall and mild temperatures during the first half of winter was a major setback for building the snowpack. However, the return of winter beginning in mid-February meant that most sites had near normal timing for the peak snowpack this winter, and many sites actually peaked slightly later than normal.

Temperatures in April stayed on the cooler and more seasonable side, which helped to keep winter around a little longer. The first part of April brought new snow to the higher elevations throughout most of the state. Mid-April snowmelt occurred at mostly normal rates until another cooling trend capped off the end of the month, stunting the melting process and momentarily preserving the limited snowpack.

As of May 1st, the Hood, Sandy and Lower Deschutes is the only region with a normal snowpack for this time of year. Statewide, about 60% of the snow monitoring sites are snow-free when normally only about 45% of the network is snow-free. The John Day basin stands out at as having the most sites that melted out early - 12 have melted out, when normally only 7 are snow-free on May 1st. Even though this year turned out to be a very low snow year for much of Oregon, 2015 still holds the sweeping record for the lowest snowpack across the state. The late winter snowfall rescued the state's snowpack from record low territory this year but it was not enough to improve the water supply outlook.

PRECIPITATION

The month of April was wetter than normal for most of the state – statewide precipitation was 124% of average for the month. All basins received near normal to well above normal precipitation for April with the exceptions of the Owyhee, Malheur, and Harney Basins, which received 72% of normal April precipitation. On the high end, the Hood, Sandy, and Lower Deschutes Basins received 148% of normal April precipitation.

Despite above average April precipitation, most of the state has received below average amounts of precipitation since the water year began. Only a few basins in northern Oregon have received the normal amount for the season. Statewide water year precipitation (Oct – Apr) is 93% as of May 1st. Basins in the northern part of the state have received the most precipitation, with several slightly above average. Southern Oregon basins received the least water year precipitation, with Harney Basin receiving 78%, Rogue and Umpqua Basins at 79%, and Klamath Basin at 80%. Warmer temperatures throughout the winter meant that much of this precipitation fell as rain and did not contribute to the snowpack.

RESERVOIRS

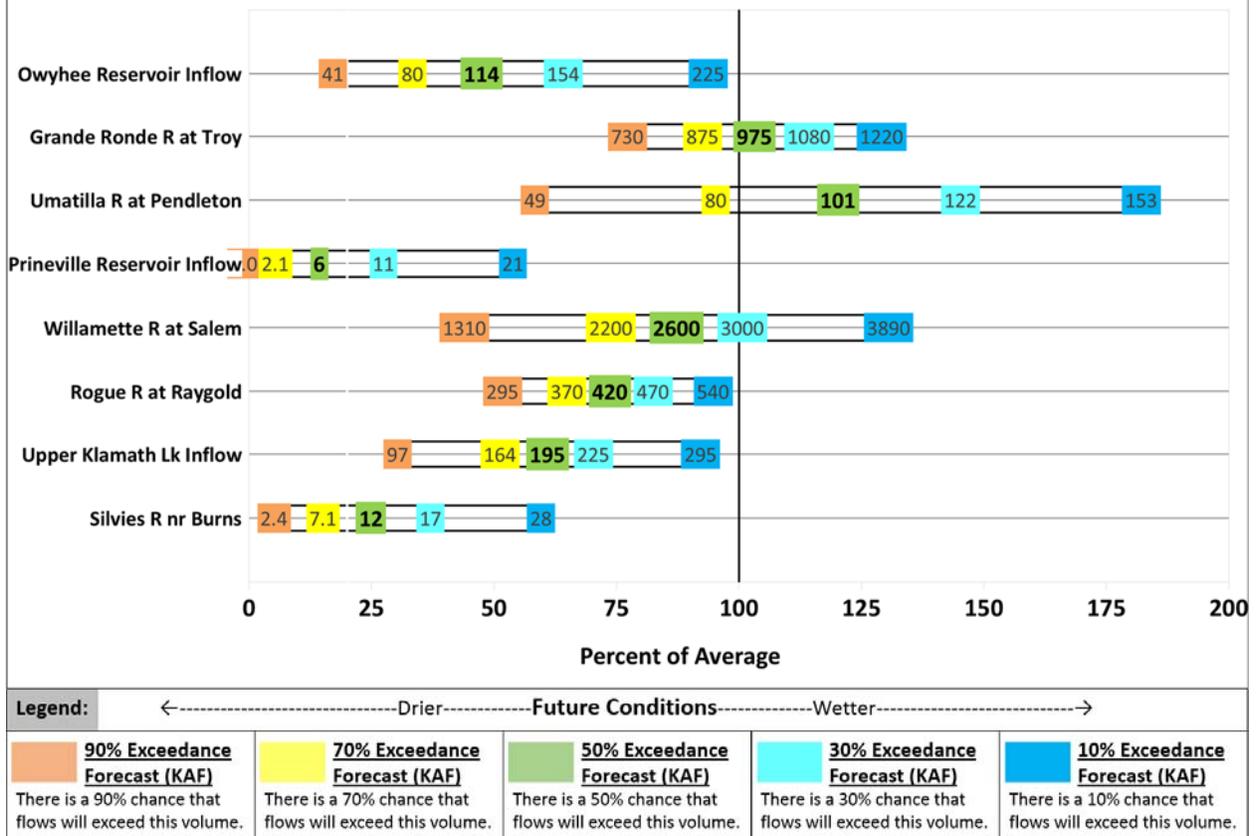
Reservoir storage across the state ranges widely, but most reservoirs statewide are storing near normal amounts of water for May 1st, which will help offset water shortages in parts of the state with below normal snowpack. The lowest storage in the state is 96% of average in the Rogue and Umpqua Basins. All other basins in the state are hovering near 100% of average, with a handful of reservoirs such as Lake Owyhee, Wallowa Lake, McKay Reservoir, Fern Ridge Reservoir, Fish Lake, and Drews Reservoir storing more water than normal as of May 1st. Water supplies will still need to be carefully managed, but healthy reservoir storage across the state will likely provide some buffer for the low streamflows that are anticipated this summer.

STREAMFLOW

April streamflows were running well above normal for much of northern and northwestern Oregon, where the month also brought above average precipitation. Conversely, both the April precipitation and streamflow in central and southern Oregon was well below normal and is a window into what to expect this summer.

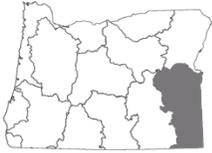
Overall, the highest summer streamflow forecasts in the state are found where both the precipitation has been near average and the snowpack has been the highest this season. Most streamflow forecasts in the Hood, Sandy, Lower Deschutes basins and the Umatilla and Walla Walla drainages range from slightly below average to near average during the spring and summer period. As a result of the drier weather and well below normal seasonal snowpack, the lowest forecasts in the state are calling for 55% or less than normal streamflow in the Owyhee, Malheur, Harney, Lake County and Goose Lake basins. Water users that depend on streamflow for water supplies will need to plan accordingly for possible shortages.

Summary of Streamflow Forecasts across Oregon
May 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.

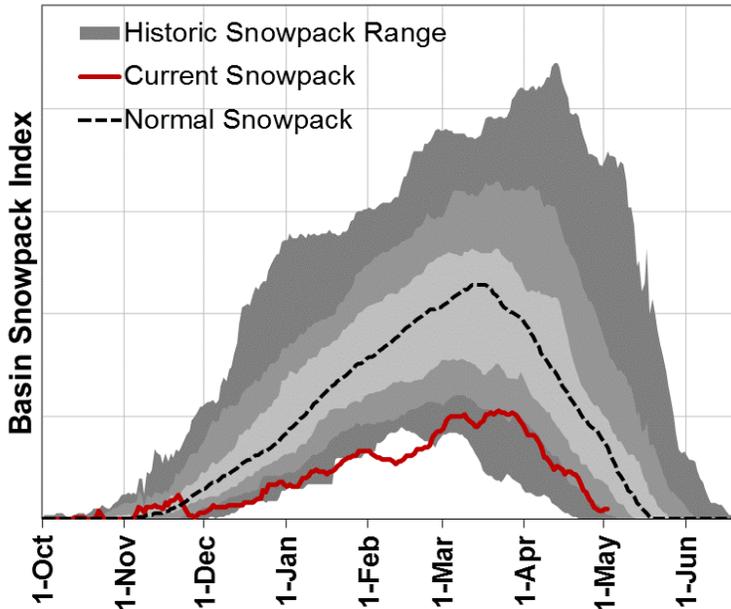
All forecasts are listed with units of 1000 acre-feet (KAF). This report contains data furnished by the Oregon Department of Water Resources, U.S. Geological Survey, NOAA National Weather Service and other cooperators. This report will be updated monthly, January through June.



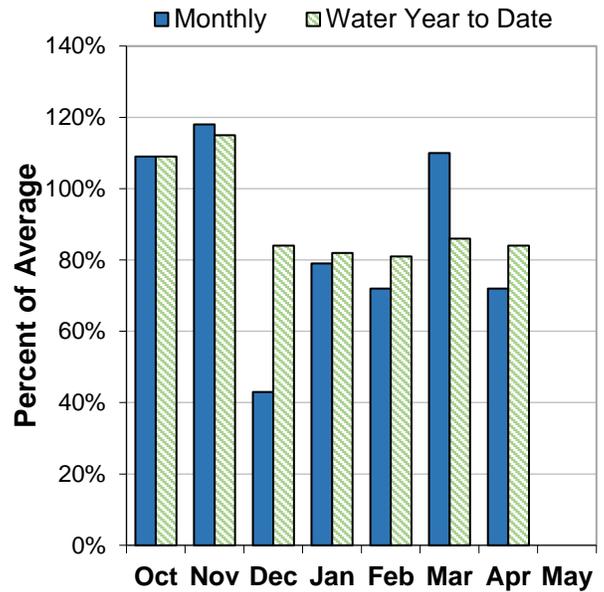
Owyhee and Malheur Basins

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

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

PRECIPITATION

April precipitation was 72% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 84% of average.

RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 70% of average at Bully Creek Reservoir to 108% of average at Lake Owyhee.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 30% to 55% of average. Water users in the basin without access to reservoir water should expect water shortages this summer and prepare accordingly.

Owyhee And Malheur Basins Summary for May 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	12.8	40	66	35%	100	162	188
	MAY-SEP	19.7	50	79	39%	115	179	205
Owyhee R bl Owyhee Dam ²	MAY-JUL	24	57	87	41%	124	191	210
	MAY-SEP	41	80	114	48%	154	225	240
Malheur R nr Drewsey	MAY-JUL	1.97	5.8	9.4	28%	14.1	22	33
	MAY-SEP	2.3	6.3	10.1	30%	14.8	23	34
NF Malheur R at Beulah ²	MAY-JUL	9.2	13.3	16.6	49%	20	26	34
	MAY-SEP	13.1	17.9	22	55%	25	32	40

* 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	40.2	59.1	49.0	82%	59.2
Bully Creek	17.8	23.6	25.3	70%	23.7
Lake Owyhee	574.1	713.5	533.1	108%	715.0
Warm Springs	122.4	160.9	126.8	97%	169.6

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
East Little Owyhee Basin	2	45%	192%
South Fork Owyhee Basin	4	18%	129%
Upper Malheur Basin	3	0%	163%
Upper Owyhee Basin	5	18%	129%

Owyhee And Malheur Basins Summary for May 1, 2018

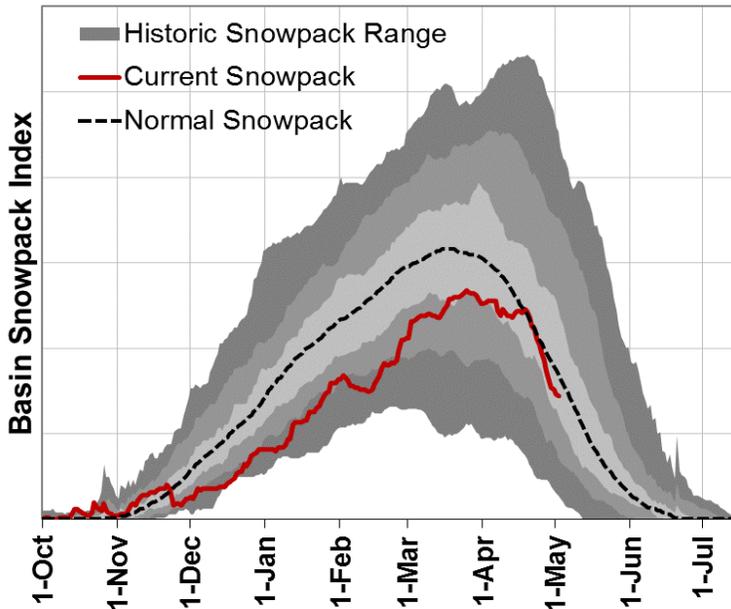
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-May	23	8.8	36.3	19.5	45%
Trout Creek AM	7890	1-May	5	2.4	13.8		
Toe Jam SNOTEL	7700	1-May	0	0.0	30.1		
Govt Corrals AM	7400	1-May	0	0.0	20.7		
Jack Creek Upper SNOTEL	7250	1-May	15	4.7	16.8	14.4	33%
Fawn Creek SNOTEL	7000	1-May	0	0.0	16.4	11.4	0%
Buckskin Lower SNOTEL	6915	1-May	0	0.0	1.6	0.2	0%
Big Bend SNOTEL	6700	1-May	0	0.0	0.0	0.0	
Fry Canyon SNOTEL	6700	1-May	0	0.0	0.0		
Laurel Draw SNOTEL	6697	1-May	0	0.0	0.0	0.0	
South Mtn. SNOTEL	6500	1-May	0	0.0	4.1	5.6	0%
Taylor Canyon SNOTEL	6200	1-May	0	0.0	0.0	0.0	
Blue Mountain Spring SNOTEL	5870	1-May	0	0.0	9.3	5.7	0%
Mud Flat SNOTEL	5730	1-May	0	0.0	0.0	0.0	
Reynolds Creek SNOTEL	5600	1-May	0	0.0	0.0	0.0	
Rock Springs SNOTEL	5290	1-May	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-May	0	0.0	0.0	0.0	



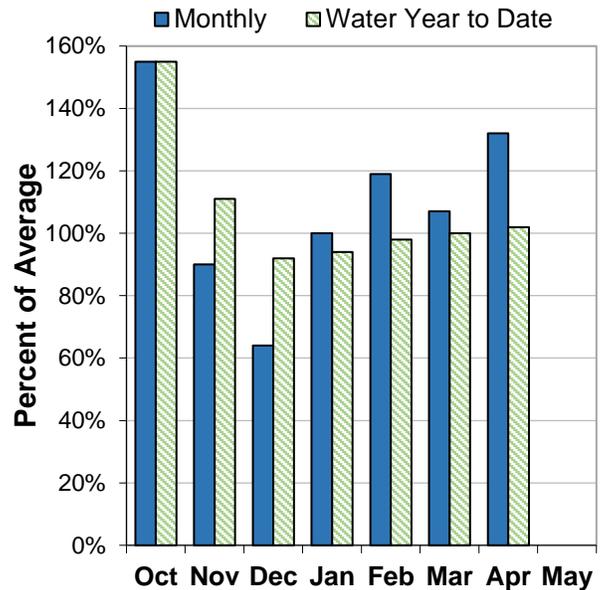
Grande Ronde, Powder, Burnt and Imnaha Basins

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, about half of snow measurement sites in the basin are snow-free, which is typical for this time of year. However, the remaining snowpack at the higher elevation sites (above ~5500 ft) is currently 81% of normal. In general, SNOTEL sites in the basin peaked around 60% to 90% of normal peak snowpack levels this winter. While the timing of the snowpack peak was near normal for most sites, several peaked up to 2 weeks later than normal.

PRECIPITATION

April precipitation was 132% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 102% of average.

RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 90% of average at Phillips Lake to 126% of average at Wallowa Lake.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 41% to 103% of average. Water supplies in the basin are likely to be well below normal in the Burnt, Powder, Pine and Imnaha drainages, and below normal to near normal in the Grande Ronde basin this summer.

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

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	1.31	3.5	5.5	38%	8.1	12.7	14.6
	MAY-SEP	2.0	4.5	6.7	41%	9.4	14.2	16.3
Powder R nr Sumpter ²	MAY-JUL	13.7	18.6	22	61%	27	33	36
	MAY-SEP	14.4	19.4	23	62%	28	34	37
Pine Ck nr Oxbow	MAY-JUL	46	67	81	72%	96	117	112
	MAY-SEP	50	71	85	72%	100	121	118
Imnaha R at Imnaha	MAY-JUL	117	147	168	84%	188	220	200
	MAY-SEP	133	164	185	84%	205	240	220
Catherine Ck nr Union	MAY-JUL	26	34	40	87%	45	53	46
	MAY-SEP	29	38	43	86%	49	57	50
Lostine R nr Lostine	MAY-JUL	84	91	96	98%	100	107	98
	MAY-SEP	91	98	103	97%	108	116	106
Bear Ck nr Wallowa	MAY-JUL	44	49	53	100%	56	62	53
	MAY-SEP	46	51	55	98%	59	64	56
Grande Ronde R at Troy	MAY-JUL	645	790	890	103%	985	1130	860
	MAY-SEP	730	875	975	103%	1080	1220	945

* 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	47.1	50.2	52.6	90%	73.5
Thief Valley	14.0	14.2	13.7	103%	13.3
Unity	25.0	23.2	24.1	104%	25.5
Wallowa Lake	25.5	26.3	20.2	126%	37.5
Wolf Creek	9.3	11.1	8.7	107%	11.1

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Burnt Basin	2	0%	445%
Imnaha Basin	4	77%	146%
Lower Grande Ronde Basin	4	75%	119%
Powder Basin	8	63%	150%
Upper Grande Ronde Basin	8	96%	150%
Wallowa Basin	5	84%	127%

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

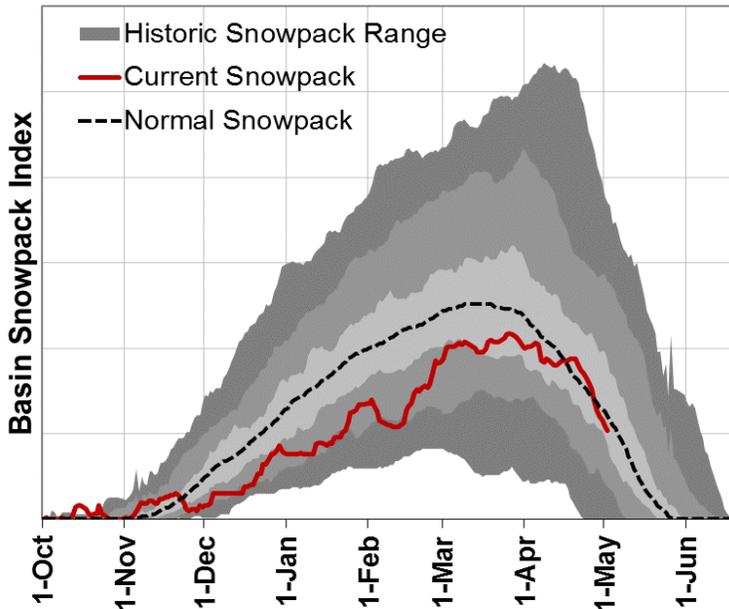
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt. Howard SNOTEL	7910	1-May	35	14.8	26.2	16.8	88%
Aneroid Lake #2 SNOTEL	7400	1-May	55	21.7	32.5	25.2	86%
Anthony Lake (Rev) Snow Course	7160	30-Apr	50	22.8	34.0	26.9	85%
TV Ridge AM	7050	1-May	31	12.4	17.2	19.5	64%
Big Sheep AM	6230	1-May	34	13.6	28.8	19.2	71%
Bear Saddle SNOTEL	6180	1-May	16	6.4	20.4	10.3	62%
Bourne SNOTEL	5850	1-May	0	0.0	12.1	4.7	0%
Moss Springs SNOTEL	5760	1-May	52	22.5	25.9	18.5	122%
Taylor Green SNOTEL	5740	1-May	9	4.2	12.9	10.0	42%
Spruce Springs SNOTEL	5700	1-May	5	2.2	5.9	5.1	43%
Wolf Creek SNOTEL	5630	1-May	10	3.5	11.0	6.9	51%
Milk Shakes SNOTEL	5580	1-May	90	38.3	42.9		
West Branch SNOTEL	5560	1-May	13	3.2	15.1	8.9	36%
Touchet SNOTEL	5530	1-May	49	20.4	32.3	21.8	94%
Eilertson Meadows SNOTEL	5510	1-May	0	0.0	0.0	0.0	
West Eagle Meadows AM	5500	1-May	21	10.5		18.8	56%
Gold Center SNOTEL	5410	1-May	0	0.0	1.4	0.0	
Schneider Meadows SNOTEL	5400	1-May	24	10.7	27.0	17.3	62%
Beaver Reservoir SNOTEL	5150	1-May	0	0.0	0.0	0.0	
Tipton SNOTEL	5150	1-May	0	0.0	7.5	2.0	0%
High Ridge SNOTEL	4920	1-May	36	17.5	25.9	11.0	159%
County Line SNOTEL	4830	1-May	0	0.0	0.0	0.0	
Bowman Springs SNOTEL	4530	1-May	0	0.0	0.0	0.0	
Sourdough Gulch SNOTEL	4000	1-May	0	0.0	0.0	0.0	



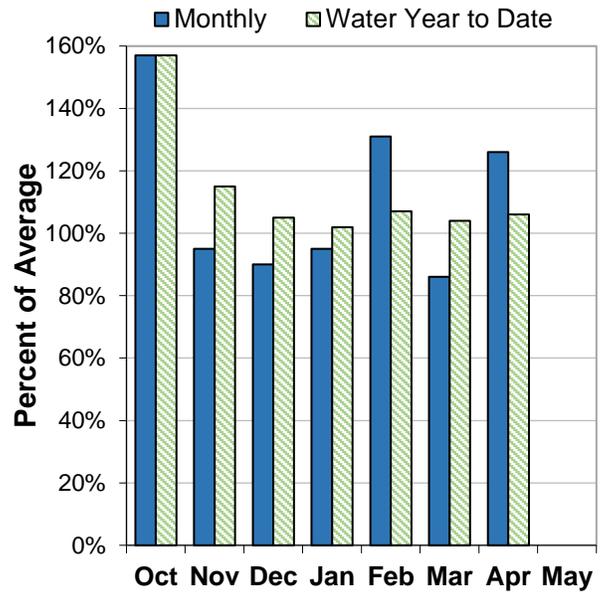
Umatilla, Walla Walla and Willow Basins

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, many snow measurement sites in the basin are snow-free, which is typical for this time of year. In general, SNOTEL sites in the basin peaked around 60% to 100% of normal peak snowpack levels this winter. While the timing of the snowpack peak was near normal for most sites, several peaked up to 3 weeks later than normal.

PRECIPITATION

April precipitation was 126% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 106% of average.

RESERVOIR

Reservoir storage across the basin is currently above average. As of May 1, storage at major reservoirs in the basin ranges from 101% of average at Cold Springs Reservoir to 123% of average at McKay Reservoir.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 68% to 120% of average. Water supplies in the basin are likely to be well below normal in the Willow and Butter Creek drainages, and between slightly below to above normal in the Umatilla and Walla Walla basins this summer.

Umatilla, Walla Walla And Willow Basins Summary for May 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	32	38	42	114%	45	51	37
	MAY-SEP	45	51	55	112%	59	64	49
Umatilla R ab Meacham nr Gibbon	MAY-JUL	27	41	51	121%	60	74	42
	MAY-SEP	33	47	56	117%	66	79	48
Umatilla R at Pendleton	MAY-JUL	44	75	96	122%	117	147	79
	MAY-SEP	49	80	101	120%	122	153	84
McKay Ck nr Pilot Rock	MAY-JUL	2.8	8.1	13.2	94%	19.5	31	14.1
	MAY-SEP	3.0	8.3	13.4	94%	19.8	31	14.3
Butter Ck nr Pine City	MAY-JUL	1.16	2.4	3.5	69%	4.9	7.2	5.1
	MAY-SEP	1.38	2.7	3.8	68%	5.2	7.5	5.6
Willow Ck ab Willow Lk nr Heppner	MAY-JUL	0.67	1.80	2.9	71%	4.2	6.6	4.1
	MAY-SEP	0.73	1.89	3.0	70%	4.3	6.8	4.3
Rhea Ck nr Heppner	MAY-JUL	0.81	1.88	2.9	71%	4.0	6.2	4.1
	MAY-SEP	1.01	2.1	3.2	71%	4.4	6.5	4.5

* 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	32.3	28.7	31.9	101%	38.6
Mckay	65.5	65.5	53.3	123%	71.5
Willow Creek	6.0	6.1	5.8	104%	9.8

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Umatilla Basin	5	80%	195%
Walla Walla Basin	7	87%	172%

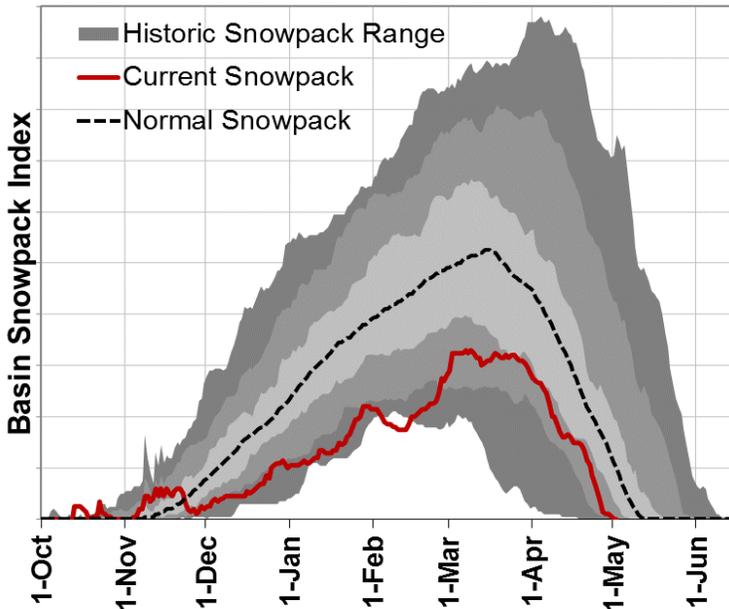
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Arbuckle Mtn SNOTEL	5770	1-May	0	0.0	17.1	11.0	0%
Spruce Springs SNOTEL	5700	1-May	5	2.2	5.9	5.1	43%
Milk Shakes SNOTEL	5580	1-May	90	38.3	42.9		
Touchet SNOTEL	5530	1-May	49	20.4	32.3	21.8	94%
Madison Butte SNOTEL	5150	1-May	0	0.0	0.0	0.0	
Lucky Strike SNOTEL	4970	1-May	0	0.0	0.0	0.0	
High Ridge SNOTEL	4920	1-May	36	17.5	25.9	11.0	159%
Bowman Springs SNOTEL	4530	1-May	0	0.0	0.0	0.0	
Emigrant Springs SNOTEL	3800	1-May	0	0.0	0.0	0.0	



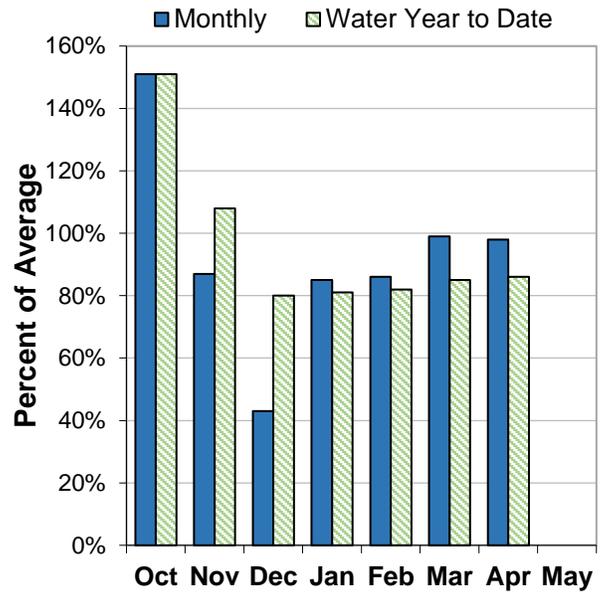
John Day Basin

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, Anthony Lake snow course (7160ft) and Snow Mountain SNOTEL (6230 ft) were the only snow measurement sites in the basin still recording snowpack. Normally 7 of the 14 sites in the basin still have snow on May 1. In general, SNOTEL sites in the basin peaked around 50% to 70% of normal peak snowpack levels this winter and melted out about 1-2 weeks earlier than normal.

PRECIPITATION

April precipitation was 98% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 86% of average.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 38% to 84% of average. Water managers in the basin should prepare for significantly reduced water supplies in the coming summer.

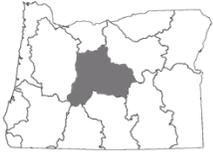
John Day Basin Summary for May 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	3.4	4.7	5.7	78%	6.6	7.9	7.3
	MAY-SEP	3.7	5.1	6.1	77%	7.0	8.4	7.9
Mountain Ck nr Mitchell	MAY-JUL	0.31	0.70	1.06	38%	1.50	2.3	2.8
	MAY-SEP	0.33	0.74	1.10	38%	1.54	2.3	2.9
Camas Ck nr Ukiah	MAY-JUL	1.76	9.4	14.6	83%	19.9	28	17.5
	MAY-SEP	2.3	10.0	15.2	84%	20	28	18.2
MF John Day R at Ritter	MAY-JUL	9.5	28	40	53%	52	70	75
	MAY-SEP	12.0	30	43	54%	55	74	80
NF John Day R at Monument	MAY-JUL	71	154	210	59%	265	350	355
	MAY-SEP	80	164	220	59%	275	360	375

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

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lower John Day Basin	3	0%	707%
North Fork John Day Basin	8	51%	162%
Upper John Day Basin	5	2%	243%

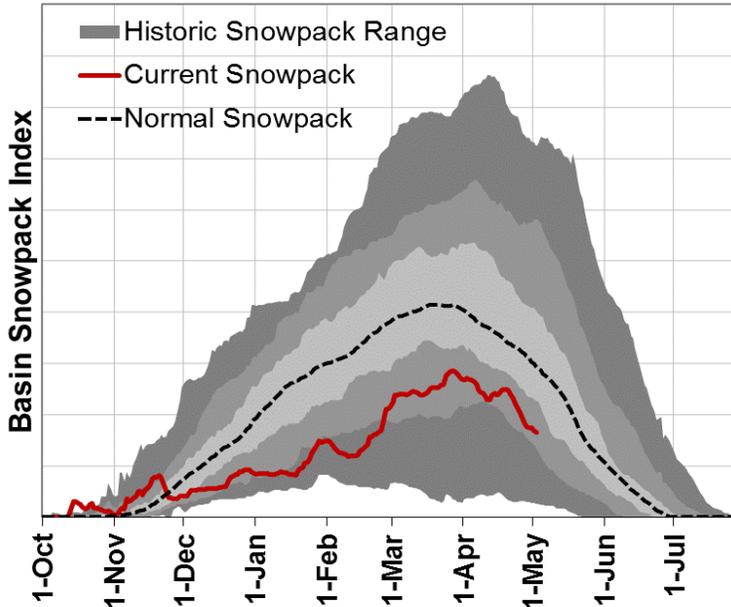
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Anthony Lake (Rev) Snow Course	7160	30-Apr	50	22.8	34.0	26.9	85%
Snow Mountain SNOTEL	6230	1-May	1	0.2	7.8	4.2	5%
Blue Mountain Spring SNOTEL	5870	1-May	0	0.0	9.3	5.7	0%
Bourne SNOTEL	5850	1-May	0	0.0	12.1	4.7	0%
Derr. SNOTEL	5850	1-May	0	0.0	10.6	1.5	0%
Arbuckle Mtn SNOTEL	5770	1-May	0	0.0	17.1	11.0	0%
Ochoco Meadows SNOTEL	5430	1-May	0	0.0	0.0	0.0	
Gold Center SNOTEL	5410	1-May	0	0.0	1.4	0.0	
Starr Ridge SNOTEL	5250	1-May	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-May	0	0.0	0.0	0.0	
Madison Butte SNOTEL	5150	1-May	0	0.0	0.0	0.0	
Tipton SNOTEL	5150	1-May	0	0.0	7.5	2.0	0%
Lucky Strike SNOTEL	4970	1-May	0	0.0	0.0	0.0	
County Line SNOTEL	4830	1-May	0	0.0	0.0	0.0	



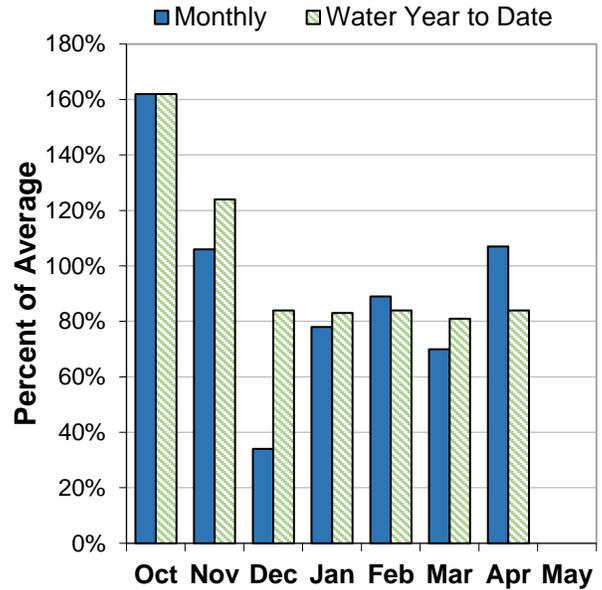
Upper Deschutes and Crooked Basins

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, about half of the snow measurement sites in the basin are snow-free, which is typical for this time of year. However, the remaining snowpack at the higher elevation sites in the Cascade Mountains (above ~5000 ft) is currently 60% of normal. In general, SNOTEL sites in the basin peaked around 40% to 80% of normal peak snowpack levels this winter. The timing of the snowpack peak was near normal for most sites.

PRECIPITATION

April precipitation was 107% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 84% of average.

RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 84% of average at Prineville Reservoir to 157% of average at Crescent Lake.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 14% to 88% of average. Water managers in the Crooked and Little Deschutes basins without access to reservoir water should expect water shortages this summer and prepare accordingly. Streamflow forecasts in the Upper Deschutes basin are slightly higher, but still well below normal to below normal.

Upper Deschutes And Crooked Basins Summary for May 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	11.4	14.9	17.3	72%	19.7	23	24
	MAY-SEP	22	28	32	68%	36	42	47
Crane Prairie Reservoir Inflow ²	MAY-JUL	23	29	33	72%	37	44	46
	MAY-SEP	38	49	56	73%	63	74	77
Crescent Lake Inflow ²	MAY-JUL	2.8	5.1	6.7	56%	8.3	10.7	12.0
	MAY-SEP	2.2	5.2	7.2	50%	9.2	12.1	14.4
Little Deschutes R nr La Pine ²	MAY-JUL	10.1	21	29	64%	37	48	45
	MAY-SEP	9.1	22	31	61%	39	52	51
Deschutes R at Benham Falls ²	MAY-JUL	187	205	215	86%	225	240	250
	MAY-SEP	325	350	365	88%	380	400	415
Wychus Ck nr Sisters	MAY-JUL	19.9	23	24	80%	26	29	30
	MAY-SEP	28	31	34	81%	36	39	42
Prineville Reservoir Inflow ²	MAY-JUL	0.32	3.2	6.9	18%	12.1	22	39
	MAY-SEP	0.01	2.1	5.6	14%	10.7	21	39
Ochoco Reservoir Inflow ²	MAY-JUL	0.22	1.41	2.8	29%	4.7	8.3	9.6
	MAY-SEP	0.07	0.99	2.2	24%	4.0	7.5	9.1

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

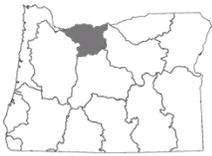
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Crane Prairie	48.2	47.3	44.1	109%	55.3
Crescent Lake	79.5	63.6	50.5	157%	86.9
Ochoco	29.8	41.9	34.5	86%	44.2
Prineville	120.5	148.7	142.9	84%	148.6
Wickiup	183.4	170.4	184.5	99%	200.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Little Deschutes Basin	4	77%	139%
Upper Crooked Basin	2	0%	707%
Upper Deschutes Basin	9	62%	127%

Upper Deschutes And Crooked Basins Summary for May 1, 2018

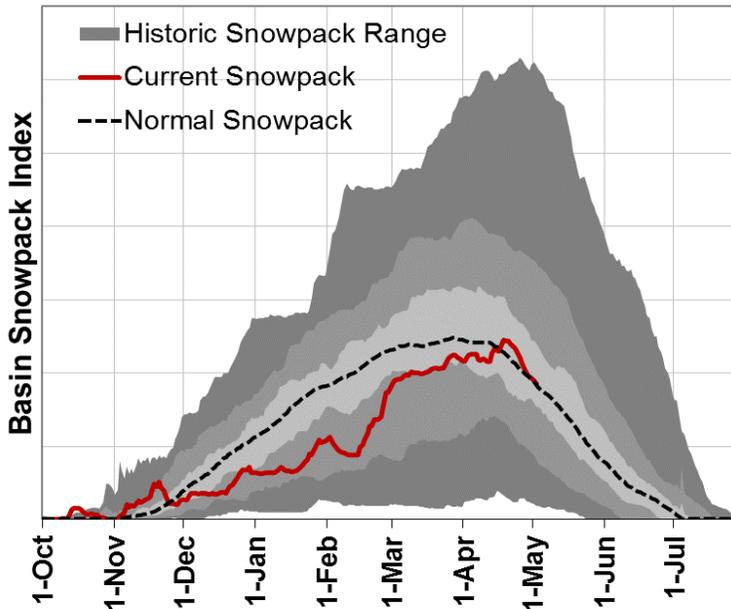
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Snow Mountain SNOTEL	6230	1-May	1	0.2	7.8	4.2	5%
Derr. SNOTEL	5850	1-May	0	0.0	10.6	1.5	0%
Three Creeks Meadow SNOTEL	5690	1-May	0	0.0	8.7	13.4	0%
Summit Lake SNOTEL	5610	1-May	76	35.1	55.7	40.8	86%
Irish Taylor SNOTEL	5540	1-May	61	22.6	41.2	39.8	57%
Ochoco Meadows SNOTEL	5430	1-May	0	0.0	0.0	0.0	
Cascade Summit SNOTEL	5100	1-May	39	15.7	35.6	24.9	63%
Roaring River SNOTEL	4950	1-May	28	13.5	34.4	20.9	65%
New Crescent Lake SNOTEL	4910	1-May	0	0.0	0.0	0.0	
Chemult Alternate SNOTEL	4850	1-May	0	0.0	0.0	0.0	
Hogg Pass SNOTEL	4790	1-May	14	4.8	21.0	19.3	25%
McKenzie SNOTEL	4770	1-May	53	23.9	37.8	35.1	68%
Salt Creek Falls SNOTEL	4220	1-May	7	3.2	21.3	10.1	32%
Santiam Jct. SNOTEL	3740	1-May	0	0.0	0.0	0.0	



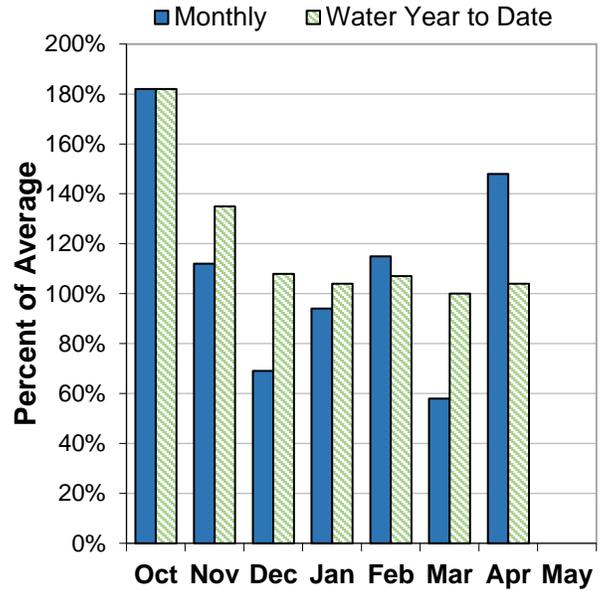
Hood, Sandy and Lower Deschutes Basins

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, about half of snow measurement sites in the basin are snow-free, which is typical for this time of year. However, the remaining snowpack at the higher elevation sites around Mt. Hood is currently 101% of normal. In general, SNOTEL sites in the basin peaked around 60% to 120% of normal peak snowpack levels this winter. Most sites reached their peak snowpack about 2-3 weeks later than normal.

PRECIPITATION

April precipitation was 148% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 104% of average.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 89% to 100% of average. Water managers in the basin should expect below normal to near normal streamflows this summer.

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

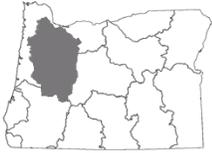
Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 1, 2018	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
WF Hood R nr Dee	MAY-JUL	47	61	70	90%	80	94	78
	MAY-SEP	62	77	88	92%	98	113	96
Hood R at Tucker Bridge	MAY-JUL	100	120	133	88%	147	167	151
	MAY-SEP	132	155	170	89%	185	205	190
Sandy R nr Marmot	MAY-JUL	145	183	210	100%	235	270	210
	MAY-SEP	187	230	255	100%	285	325	255

* 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	5.2	4.6	5.4	96%	13.1

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lower Columbia - Sandy Basin	7	102%	147%
Lower Deschutes Basin	4	82%	120%
Middle Columbia - Hood Basin	6	102%	148%

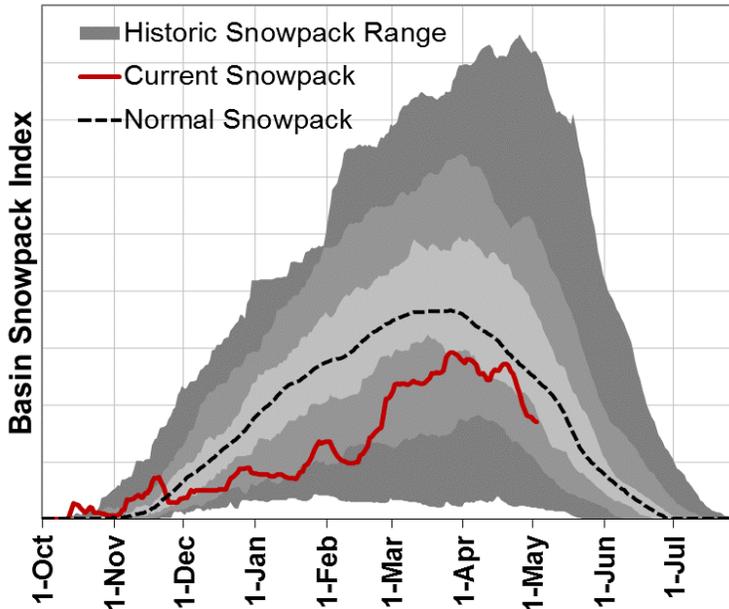
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt Hood Test Site SNOTEL	5370	1-May	109	47.8	59.4	62.0	77%
Red Hill SNOTEL	4410	1-May	77	41.7	62.0	39.8	105%
Surprise Lakes SNOTEL	4290	1-May	89	44.0	65.4	42.6	103%
Mud Ridge SNOTEL	4070	1-May	38	19.3	28.8	17.8	108%
Clear Lake SNOTEL	3810	1-May	0	0.0	9.4	1.6	0%
Blazed Alder SNOTEL	3650	1-May	61	27.0	39.3	20.4	132%
Clackamas Lake SNOTEL	3400	1-May	0	0.0	0.1	0.0	
Greenpoint SNOTEL	3310	1-May	0	0.0	11.1	1.2	0%
North Fork SNOTEL	3060	1-May	34	16.0	19.5	7.3	219%
South Fork Bull Run SNOTEL	2690	1-May	0	0.0	0.0	0.0	



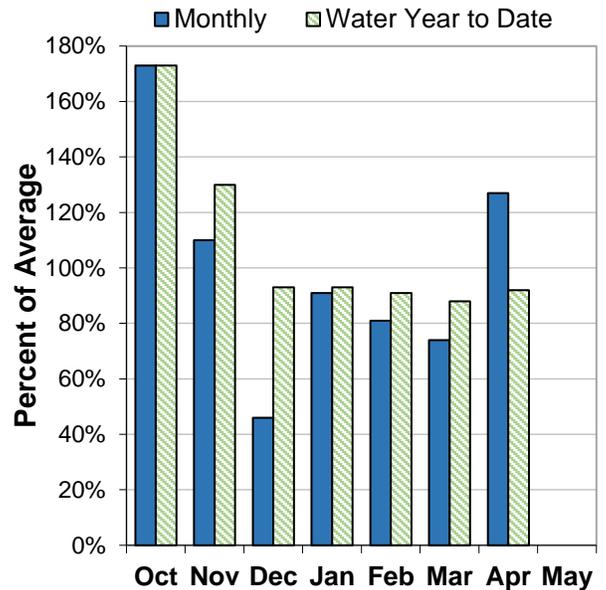
Willamette Basin

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, about half of snow measurement sites in the basin are snow-free, which is typical for this time of year. However, the remaining snowpack at the higher elevation sites (above ~4000 ft) is currently 74% of normal. In general, SNOTEL sites in the basin peaked around 50% to 80% of normal peak snowpack levels this winter. Most sites reached their peak snowpack about 1-3 weeks later than normal.

PRECIPITATION

April precipitation was 128% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 92% of average.

RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 85% of average at Fall Creek Reservoir to 109% of average at Fern Ridge and Foster Reservoir.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 79% to 97% of average. Water managers in the basin should expect well below normal to near normal streamflows this summer.

Willamette Basin Summary for May 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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}	MAY-JUN	57	99	118	78%	137	180	152
	MAY-SEP	113	159	180	82%	200	245	220
Lookout Point Reservoir Inflow ^{1,2}	MAY-JUN	146	260	310	78%	360	475	400
	MAY-SEP	290	410	465	82%	520	635	570
McKenzie R bl Trail Bridge	MAY-JUN	85	104	113	82%	122	141	137
	MAY-SEP	188	220	235	87%	245	280	270
Cougar Lake Inflow ^{1,2}	MAY-JUN	38	69	84	75%	98	130	112
	MAY-SEP	73	110	127	79%	144	180	160
Blue Lake Inflow ^{1,2}	MAY-JUN	6.3	25	34	83%	43	61	41
	MAY-SEP	9.1	30	39	83%	49	69	47
McKenzie R nr Vida ^{1,2}	MAY-JUN	260	370	420	82%	475	585	510
	MAY-SEP	555	695	755	87%	820	960	870
Detroit Lake Inflow ^{1,2}	MAY-JUN	134	210	240	84%	275	350	285
	MAY-SEP	245	335	375	87%	415	500	430
North Santiam R at Mehama ^{1,2}	MAY-JUN	152	275	335	85%	390	515	395
	MAY-SEP	280	430	495	87%	560	705	570
Green Peter Lake Inflow ^{1,2}	MAY-JUN	39	109	140	97%	171	240	145
	MAY-SEP	67	139	171	97%	205	275	177
Foster Lake Inflow ^{1,2}	MAY-JUN	82	205	265	96%	320	445	275
	MAY-SEP	133	265	325	97%	385	520	335
South Santiam R at Waterloo ²	MAY-JUN	84	215	280	98%	340	475	285
	MAY-SEP	135	275	340	97%	405	545	350
Willamette R at Salem ^{1,2}	MAY-JUN	725	1510	1860	85%	2220	3000	2200
	MAY-SEP	1310	2200	2600	87%	3000	3890	2980
Oak Grove Fk ab Powerplant	MAY-JUL	55	66	73	91%	80	90	80
	MAY-SEP	87	101	110	92%	119	133	120
Clackamas R ab Three Lynx	MAY-JUL	158	205	240	83%	270	315	290
	MAY-SEP	235	285	320	84%	355	400	380
Clackamas R at Estacada	MAY-JUL	196	275	330	81%	385	465	405
	MAY-SEP	290	370	430	84%	485	570	510

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

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

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

Willamette Basin Summary for May 1, 2018

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Blue River	77.8	77.3	73.5	106%	82.3
Cottage Grove	27.8	27.6	26.7	104%	31.8
Cougar	157.6	167.4	151.9	104%	174.9
Detroit	423.6	426.1	408.5	104%	426.8
Dorena	60.5	62.8	61.5	98%	72.1
Fall Creek	92.3	107.4	108.0	85%	116.0
Fern Ridge	97.2	96.8	89.1	109%	97.3
Foster	26.8	44.1	24.6	109%	46.2
Green Peter	400.4	391.2	378.4	106%	402.8
Hills Creek	230.5	261.6	247.3	93%	279.2
Lookout Point	333.4	420.3	373.8	89%	433.2
Timothy Lake	63.0	58.8	59.0	107%	63.6
Henry Hagg Lake	53.3	53.2	52.6	101%	53.3

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Clackamas Basin	9	101%	153%
McKenzie Basin	13	60%	133%
Middle Fork Willamette Basin	7	64%	144%
North Santiam Basin	4	139%	329%
South Santiam Basin	4	139%	334%

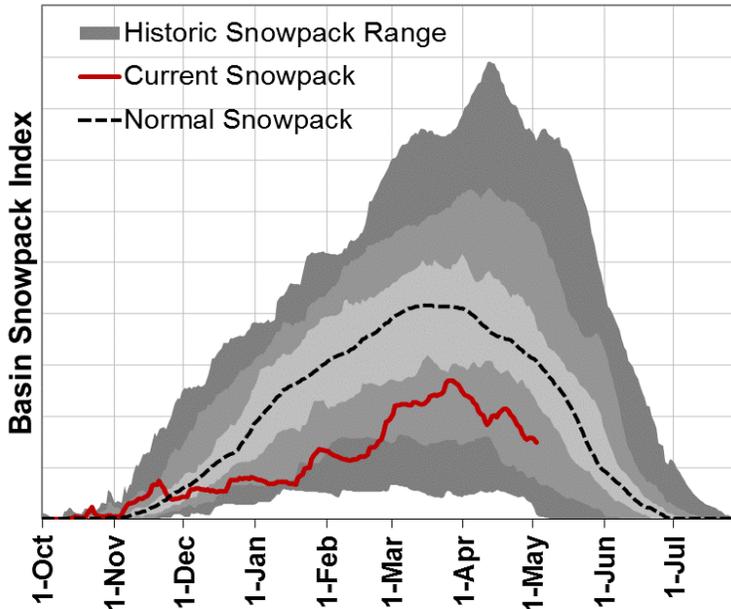
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summit Lake SNOTEL	5610	1-May	76	35.1	55.7	40.8	86%
Irish Taylor SNOTEL	5540	1-May	61	22.6	41.2	39.8	57%
Cascade Summit SNOTEL	5100	1-May	39	15.7	35.6	24.9	63%
Roaring River SNOTEL	4950	1-May	28	13.5	34.4	20.9	65%
Holland Meadows SNOTEL	4930	1-May	10	4.6	23.6	10.7	43%
McKenzie SNOTEL	4770	1-May	53	23.9	37.8	35.1	68%
Bear Grass SNOTEL	4720	1-May	84	42.6	69.9		
Salt Creek Falls SNOTEL	4220	1-May	7	3.2	21.3	10.1	32%
Mud Ridge SNOTEL	4070	1-May	38	19.3	28.8	17.8	108%
Little Meadows SNOTEL	4020	1-May	45	22.6	41.5	16.0	141%
Clear Lake SNOTEL	3810	1-May	0	0.0	9.4	1.6	0%
Santiam Jct. SNOTEL	3740	1-May	0	0.0	0.0	0.0	
Daly Lake SNOTEL	3690	1-May	0	0.0	8.9	0.3	0%
Jump Off Joe SNOTEL	3520	1-May	0	0.0	0.9	0.0	
Peavine Ridge SNOTEL	3420	1-May	0	0.0	5.4	0.0	
Clackamas Lake SNOTEL	3400	1-May	0	0.0	0.1	0.0	
Smith Ridge SNOTEL	3270	1-May	0	0.0	0.0		
Saddle Mountain SNOTEL	3110	1-May	0	0.0	0.0		
Railroad Overpass SNOTEL	2680	1-May	0	0.0	0.0	0.0	
Marion Forks SNOTEL	2590	1-May	0	0.0	3.2	0.0	
Seine Creek SNOTEL	2060	1-May	0	0.0	0.0	0.0	
Miller Woods SNOTEL	420	1-May	0	0.0	0.0		



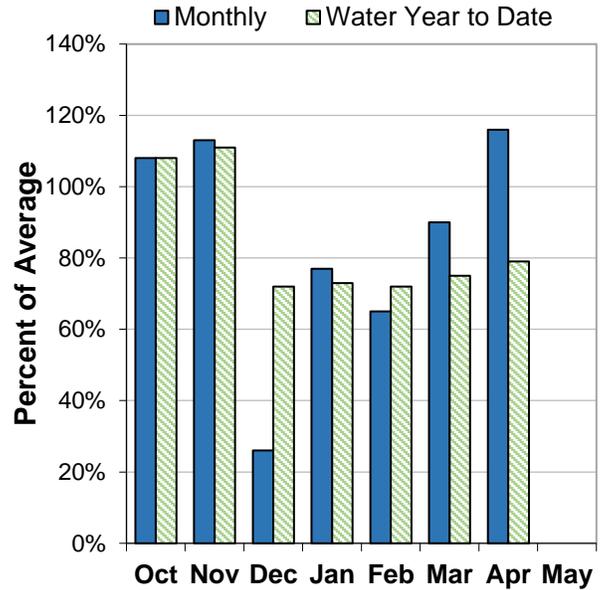
Rogue and Umpqua Basins

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, several snow measurement sites in the basin are snow-free, which is typical for this time of year. However, the remaining snowpack at the higher elevation sites (above ~5500 ft) is currently 53% of normal. In general, SNOTEL sites in the basin peaked around 40% to 80% of normal peak snowpack levels this winter. While the timing of the snowpack peak was near normal for most sites, several peaked up to 3 weeks later than normal.

PRECIPITATION

April precipitation was 116% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 79% of average.

RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 54% of average at Hyatt Prairie Reservoir to 109% of average at Fish Lake.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 33% to 93% of average. Water managers in the Applegate River basin without access to reservoir water should expect water shortages this summer and prepare accordingly. Streamflow forecasts in the rest of the Rogue and Umpqua basins are slightly higher, but still well below normal to below normal.

Rogue And Umpqua Basins Summary for May 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	47	77	98	92%	118	149	106
	MAY-SEP	54	85	107	93%	128	159	115
Cow Ck ab Galesville Reservoir	MAY-JUL	1.66	4.3	6.1	81%	7.9	10.5	7.5
	MAY-SEP	2.6	5.3	7.1	82%	9.0	11.7	8.7
South Umpqua R nr Brockway	MAY-JUL	58	124	169	87%	215	280	194
	MAY-SEP	72	140	187	87%	235	300	215
North Umpqua R at Winchester	MAY-JUL	270	350	410	86%	465	550	475
	MAY-SEP	375	460	515	87%	575	660	590
Lost Creek Lk Inflow ²	MAY-JUL	215	255	280	76%	305	340	370
	MAY-SEP	315	360	390	79%	420	460	495
Rogue R at Raygold ²	MAY-JUL	199	265	310	70%	355	420	440
	MAY-SEP	295	370	420	74%	470	540	570
Rogue R at Grants Pass ²	MAY-JUL	186	265	315	69%	370	450	455
	MAY-SEP	280	365	420	72%	475	555	580
Applegate Lake Inflow ²	MAY-JUL	0.41	12.7	21	30%	29	42	69
	MAY-SEP	4.4	17.0	25	33%	34	47	75
Sucker Ck bl Ltl Grayback nr Holland	MAY-JUL	12.9	19.2	23	70%	28	34	33
	MAY-SEP	15.9	22	27	75%	31	37	36
Illinois R nr Kerby	MAY-JUL	36	62	80	89%	98	124	90
	MAY-SEP	39	66	84	88%	103	130	96

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

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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Applegate	63.3	66.4	62.1	102%	75.2
Emigrant Lake	30.6	38.9	36.0	85%	39.0
Fish Lake	6.3	5.4	5.8	109%	7.9
Fourmile Lake	8.5	7.0	8.7	98%	15.6
Howard Prairie	39.2	60.9	46.7	84%	62.1
Hyatt Prairie	7.1	10.4	13.2	54%	16.2
Lost Creek	299.4	297.6	301.1	99%	315.0

Rogue And Umpqua Basins Summary for May 1, 2018

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Applegate Basin	5	30%	163%
Middle Rogue Basin	7	26%	154%
North Umpqua Basin	7	84%	186%
South Umpqua Basin	10	54%	879%
Upper Rogue Basin	11	51%	145%

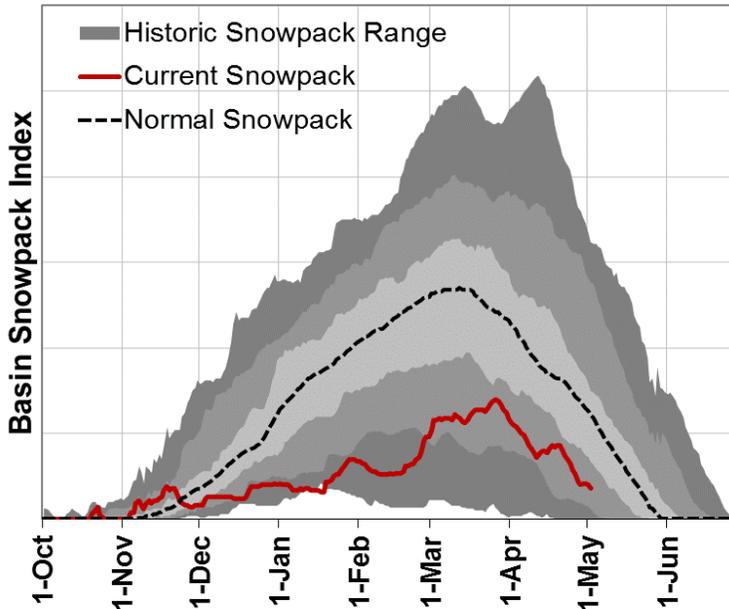
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Park H.Q. Rev Snow Course	6570	30-Apr	96	44.8	93.8	61.0	73%
Caliban (Alt.) Snow Course	6500	30-Apr	32	11.0	47.0	29.2	38%
Mt. Ashland Switchback Snow Course	6430	30-Apr	23	8.0	44.3	30.6	26%
Ski Bowl Road Snow Course	6070	30-Apr	6	2.2	28.7	21.5	10%
Big Red Mountain SNOTEL	6050	1-May	22	10.1	39.0	23.5	43%
Annie Springs SNOTEL	6010	1-May	56	23.2	61.2	43.6	53%
Fourmile Lake SNOTEL	5970	1-May	22	9.1	25.5	22.5	40%
Cold Springs Camp SNOTEL	5940	1-May	9	3.0	26.2	21.1	14%
Sevenmile Marsh SNOTEL	5700	1-May	27	11.0	38.2	24.3	45%
Summit Lake SNOTEL	5610	1-May	76	35.1	55.7	40.8	86%
Billie Creek Divide SNOTEL	5280	1-May	4	1.7	14.7	10.8	16%
Diamond Lake SNOTEL	5280	1-May	0	0.0	10.8	0.0	
Bigelow Camp SNOTEL	5130	1-May	0	0.0	11.5	0.0	
Beaver Dam Creek Snow Course	5120	1-May	0	0.0	1.4	0.0	
King Mountain 1 Snow Course	4760	1-May	0	0.0	5.2	0.0	
Deadwood Junction Snow Course	4660	1-May	0	0.0	0.0	0.0	
Fish Lk. SNOTEL	4660	1-May	0	0.1	0.0	0.0	
Howard Prairie SNOTEL	4580	1-May	0	0.0	0.0		
Howard Prairie Snow Course	4580	1-May	0	0.0	0.0	0.0	
Red Butte 1 Snow Course	4460	30-Apr	4	1.5	14.8	2.8	54%
King Mountain SNOTEL	4340	1-May	0	0.0	0.0	0.0	
Red Butte 2 Snow Course	4050	30-Apr	0	0.0	0.0	0.0	
Silver Burn Snow Course	3680	30-Apr	0	0.0	4.6	0.0	
King Mountain 3 Snow Course	3680	1-May	0	0.0	0.0	0.0	
Red Butte 3 Snow Course	3500	30-Apr	0	0.0	0.0	0.0	
Toketee Airstrip SNOTEL	3240	1-May	0	0.0	0.0	0.0	
King Mountain 4 Snow Course	3050	1-May	0	0.0	0.0	0.0	
Red Butte 4 Snow Course	3000	30-Apr	0	0.0	0.0	0.0	



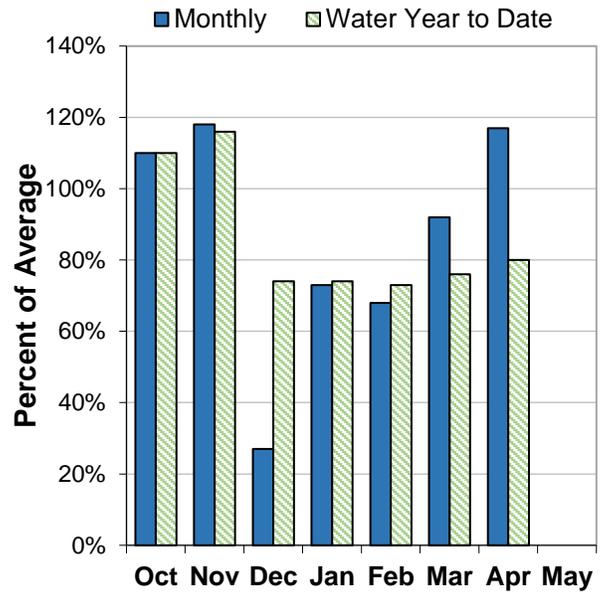
Klamath Basin

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, about half of snow measurement sites in the basin are snow-free, which is typical for this time of year. However, the remaining snowpack at the higher elevation sites (above ~6000 ft) is currently 49% of normal. In general, SNOTEL sites in the basin peaked around 30% to 60% of normal peak snowpack levels this winter. While the timing of the snowpack peak was near normal for most sites, several peaked up to 3 weeks later than normal.

PRECIPITATION

April precipitation was 117% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 80% of average.

RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 90% of average at Clear Lake to 124% of average at Gerber Reservoir.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 26% to 68% of average. Water users in the basin without access to reservoir water should expect water shortages this summer and prepare accordingly.

Klamath Basin Summary for May 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	0.00	0.26	1.37	25%	3.4	7.8	5.4
	MAY-SEP	0.00	0.33	1.53	26%	3.6	8.3	5.8
Sprague R nr Chiloquin	MAY-JUL	35	49	60	51%	72	92	118
	MAY-SEP	51	67	79	56%	92	113	141
Williamson R bl Sprague nr Chiloquin	MAY-JUL	66	93	112	60%	131	158	187
	MAY-SEP	116	146	166	68%	186	215	245
Upper Klamath Lake Inflow ^{1,2}	MAY-JUL	46	105	132	55%	159	220	240
	MAY-SEP	97	164	195	61%	225	295	320

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

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

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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Clear Lake	228.2	331.0	254.1	90%	513.3
Gerber	84.9	95.7	68.2	124%	94.3
Upper Klamath Lake	458.9	480.6	448.0	102%	523.7

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lost Basin	3		
Sprague Basin	5	23%	141%
Upper Klamath Lake Basin	8	51%	142%
Williamson River Basin	5	65%	159%

Klamath Basin Summary for May 1, 2018

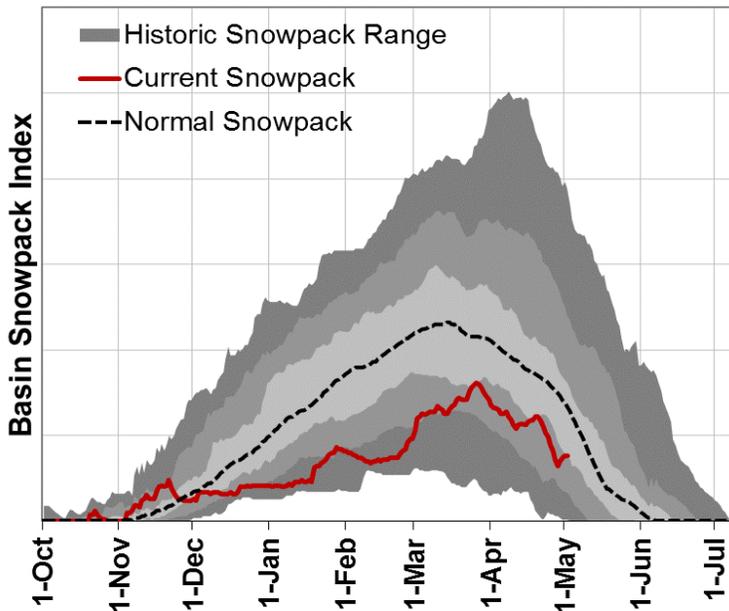
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summer Rim SNOTEL	7080	1-May	15	4.9	13.2	11.7	42%
Swan Lake Mtn SNOTEL	6830	1-May	9	4.6	32.0		
Park H.Q. Rev Snow Course	6570	30-Apr	96	44.8	93.8	61.0	73%
Crazyman Flat SNOTEL	6180	1-May	0	0.0	12.0	4.6	0%
Ski Bowl Road Snow Course	6070	30-Apr	6	2.2	28.7	21.5	10%
Annie Springs SNOTEL	6010	1-May	56	23.2	61.2	43.6	53%
Finley Corrals AM	6000	1-May	0	0.0	4.2	4.6	0%
Fourmile Lake SNOTEL	5970	1-May	22	9.1	25.5	22.5	40%
Cold Springs Camp SNOTEL	5940	1-May	9	3.0	26.2	21.1	14%
Strawberry SNOTEL	5770	1-May	0	0.0	0.0	0.0	
Cox Flat AM	5750	1-May	0	0.0	0.0		
Silver Creek SNOTEL	5740	1-May	0	0.0	0.0	0.0	
Quartz Mountain SNOTEL	5720	1-May	0	0.0	0.0	0.0	
Sevenmile Marsh SNOTEL	5700	1-May	27	11.0	38.2	24.3	45%
State Line SNOTEL	5680	1-May	0	0.0	0.0		
Sun Pass SNOTEL	5400	1-May	0	0.0	12.3		
Billie Creek Divide SNOTEL	5280	1-May	4	1.7	14.7	10.8	16%
Diamond Lake SNOTEL	5280	1-May	0	0.0	10.8	0.0	
Crowder Flat SNOTEL	5170	1-May	0	0.0	0.0	0.0	
Beaver Dam Creek Snow Course	5120	1-May	0	0.0	1.4	0.0	
Taylor Butte SNOTEL	5030	1-May	0	0.0	0.0	0.0	
Gerber Reservoir SNOTEL	4890	1-May	0	0.0	0.0	0.0	
Chemult Alternate SNOTEL	4850	1-May	0	0.0	0.0	0.0	
Deadwood Junction Snow Course	4660	1-May	0	0.0	0.0	0.0	
Fish Lk. SNOTEL	4660	1-May	0	0.1	0.0	0.0	
Howard Prairie SNOTEL	4580	1-May	0	0.0	0.0		
Howard Prairie Snow Course	4580	1-May	0	0.0	0.0	0.0	



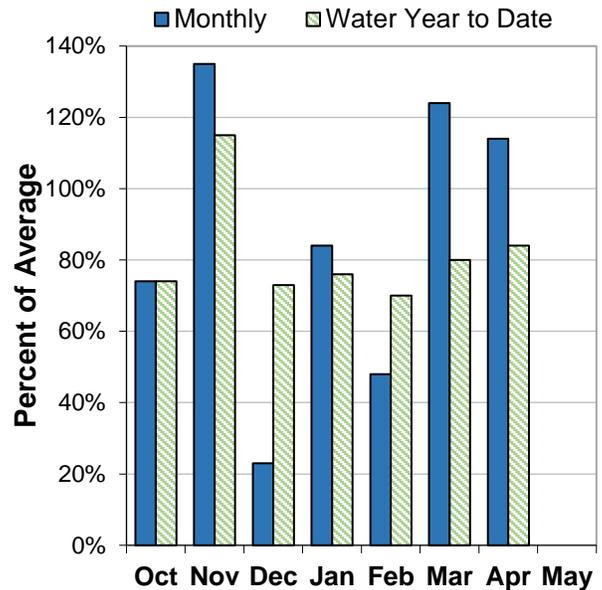
Lake County and Goose Lake Basins

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, about half of snow measurement sites in the basin are snow-free, which is typical for this time of year. However, the remaining snowpack at the higher elevation sites (above ~7000 ft) is currently 46% of normal. In general, SNOTEL sites in the basin peaked around 30% to 70% of normal peak snowpack levels this winter.

PRECIPITATION

April precipitation was 114% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 84% of average.

RESERVOIR

As of May 1, storage at major reservoirs in the basin ranges from 77% of average at Cottonwood Reservoir to 118% of average at Drews Reservoir.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 43% to 53% of average. Water users in the basin without access to reservoir water should expect water shortages this summer and prepare accordingly.

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

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	1.25	2.9	4.5	42%	6.3	9.7	10.8
	MAY-SEP	1.45	3.2	4.8	43%	6.7	10.1	11.2
Deep Ck ab Adel	MAY-JUL	10.3	16.7	22	54%	28	38	41
	MAY-SEP	11.3	18.0	23	53%	30	40	43
Honey Ck nr Plush	MAY-JUL	1.24	2.7	4.0	43%	5.6	8.3	9.2
	MAY-SEP	1.30	2.8	4.1	44%	5.7	8.5	9.3
Chewaucan R nr Paisley	MAY-JUL	14.9	21	25	50%	30	38	50
	MAY-SEP	17.6	24	28	52%	33	42	54

* 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	5.5	9.3	7.1	77%	9.3
Drews	54.1	66.3	45.7	118%	63.5

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Goose Lake Basin	3	59%	175%
Lake Abert Basin	2	30%	107%
Summer Lake Basin	9	46%	164%
Upper Pit Basin	3	32%	195%

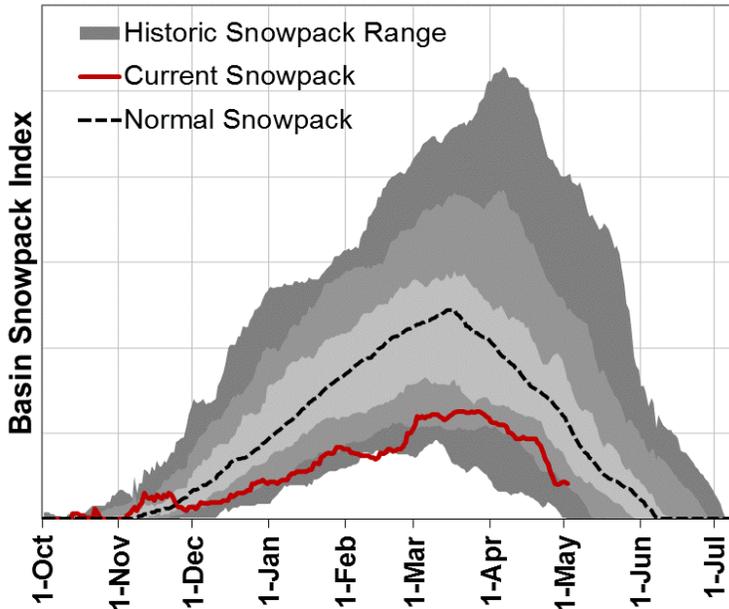
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Dismal Swamp SNOTEL	7360	1-May	50	21.6	50.9	26.0	83%
Summer Rim SNOTEL	7080	1-May	15	4.9	13.2	11.7	42%
Cedar Pass SNOTEL	7030	1-May	10	3.8	18.8	12.9	29%
Patton Meadows AM	6800	1-May	1	0.5	14.6	11.5	4%
Sherman Valley AM	6640	1-May	0	0.0	7.1		
Hart Mountain AM	6430	1-May	0	0.0	0.0		
Rogger Meadow AM	6360	1-May	0	0.0	8.9		
Adin Mtn SNOTEL	6190	1-May	2	0.8	9.1	1.4	57%
Crazyman Flat SNOTEL	6180	1-May	0	0.0	12.0	4.6	0%
Finley Corrals AM	6000	1-May	0	0.0	4.2	4.6	0%
Sheldon SCAN	5860	1-May	0	0.0	0.0	0.0	
Strawberry SNOTEL	5770	1-May	0	0.0	0.0	0.0	
Cox Flat AM	5750	1-May	0	0.0	0.0		
Silver Creek SNOTEL	5740	1-May	0	0.0	0.0	0.0	
State Line SNOTEL	5680	1-May	0	0.0	0.0		
Crowder Flat SNOTEL	5170	1-May	0	0.0	0.0	0.0	



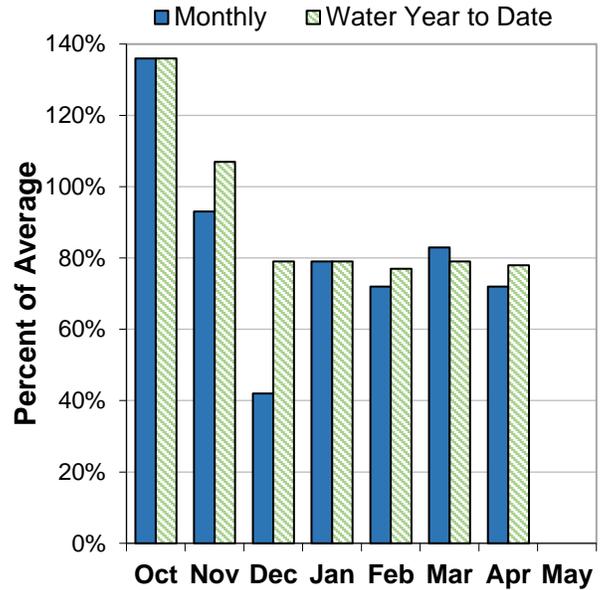
Harney Basin

May 1, 2018

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of May 1, most snow measurement sites in the basin are snow-free. However, the remaining snowpack at the higher elevation sites is currently 37% of normal. In general, SNOTEL sites in the basin peaked around 40% to 60% of normal peak snowpack levels this winter. Most sites melted out 1-2 weeks earlier than normal.

PRECIPITATION

April precipitation was 72% of average. Precipitation since the beginning of the water year (October 1 - May 1) has been 78% of average.

STREAMFLOW FORECAST

The May through September streamflow forecasts in the basin range from 25% to 56% of average. Water users in the basin should expect water shortages this summer and prepare accordingly.

Harney Basin Summary for May 1, 2018

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts May 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	MAY-JUL	1.96	6.3	10.7	24%	16.3	27	45
	MAY-SEP	2.4	7.1	11.7	25%	17.4	28	47
Donner Und Blitzen R nr Frenchglen	MAY-JUL	13.7	20	26	53%	32	42	49
	MAY-SEP	16.7	24	30	56%	36	46	54
Trout Ck nr Denio	MAY-JUL	0.54	1.27	1.94	35%	2.7	4.2	5.6
	MAY-SEP	0.66	1.45	2.2	37%	3.0	4.5	6.0

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

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Alvord Lake Basin	1	64%	172%
Donner und Blitzen River Basin	2	46%	159%
Silvies River Basin	4	5%	186%
Upper Quinn Basin	3	45%	192%

Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-May	23	8.8	36.3	19.5	45%
Trout Creek AM	7890	1-May	5	2.4	13.8		
Fish Creek SNOTEL	7660	1-May	36	16.9	45.7	26.6	64%
Govt Corrals AM	7400	1-May	0	0.0	20.7		
Silvies SNOTEL	6990	1-May	0	0.0	13.0	10.3	0%
Buckskin Lower SNOTEL	6915	1-May	0	0.0	1.6	0.2	0%
V Lake AM	6600	1-May	0	0.0	0.0		
Disaster Peak SNOTEL	6500	1-May	0	0.0	0.0	0.0	
Hart Mountain AM	6430	1-May	0	0.0	0.0		
Snow Mountain SNOTEL	6230	1-May	1	0.2	7.8	4.2	5%
Lamance Creek SNOTEL	6000	1-May	0	0.0	0.0	0.0	
Blue Mountain Spring SNOTEL	5870	1-May	0	0.0	9.3	5.7	0%
Sheldon SCAN	5860	1-May	0	0.0	0.0	0.0	
Rock Springs SNOTEL	5290	1-May	0	0.0	0.0	0.0	
Starr Ridge SNOTEL	5250	1-May	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-May	0	0.0	0.0	0.0	

Recession Forecasts for Oregon

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

The types of forecasts in the table below are:

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

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

UPPER JOHN DAY BASIN					
FORECAST POINT	FORECAST THRESHOLD	FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----			LONG-TERM AVERAGE VALUE
		90%	50%	10%	
John Day R at Service Creek	Average Daily Flow on Aug. 1st	18	120	165	271

UPPER DESCHUTES AND CROOKED BASINS					
FORECAST POINT	FORECAST THRESHOLD	FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----			LONG-TERM AVERAGE VALUE
		90%	50%	10%	
Crane Prairie Inflow *	Date of Peak	May 8	May 22	Jun 5	May 25
Crane Prairie Inflow	Peak Flow	175	295	415	403
Crane Prairie Inflow	Average Daily Flow on Oct. 1st	140	170	200	269
Prineville Reservoir Inflow	150 cfs	Apr 28	May 18	Jun 7	May 30
Prineville Reservoir Inflow	80 cfs	May 4	May 24	Jun 13	June 7
Whychus Creek nr Sisters	100 cfs	Jul 4	Jul 28	Aug 17	August 16

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

ROGUE AND UMPQUA 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%	
South Umpqua R nr Brockway *	90 cfs	Jul 17	Aug 2	Aug 17	August 8
South Umpqua R at Tiller	140 cfs	Jun 18	Jul 6	Jul 23	July 11
South Umpqua R at Tiller	90 cfs	Jul 7	Jul 23	Aug 12	August 1
South Umpqua R at Tiller	60 cfs	Aug 2	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</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Deep Ck ab Adel	100 cfs	May 22	Jun 6	Jun 21	June 17
Honey Ck nr Plush	100 cfs	** Flow did not exceed this level **			May 16
Honey Ck nr Plush	50 cfs	** Observed	Apr 19		June 4
Twentymile Ck nr Adel	50 cfs		** Imminent		May 30
Twentymile Ck nr Adel	10 cfs	May 24	Jun 12	Jul 1	July 7

HARNEY 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%	
Silvies R nr Burns	400 cfs	** Flow did not exceed this level **			May 21
Silvies R nr Burns	200 cfs	** Observed	Apr 21		June 2
Silvies R nr Burns	100 cfs	May 10	May 21	Jun 2	June 13
Silvies R nr Burns	50 cfs	May 16	Jun 7	Jun 30	July 3
Donner Und Blitzen R nr Frenchglen	200 cfs	** Flow did not exceed this level **			June 20
Donner Und Blitzen R nr Frenchglen	100 cfs		** Imminent		July 9

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

Basin Outlook Reports: How Forecasts Are Made

Federal – State – Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

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

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertainty is in the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount. By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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)	Chance Of Exceeding * (% AVG.)	
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.

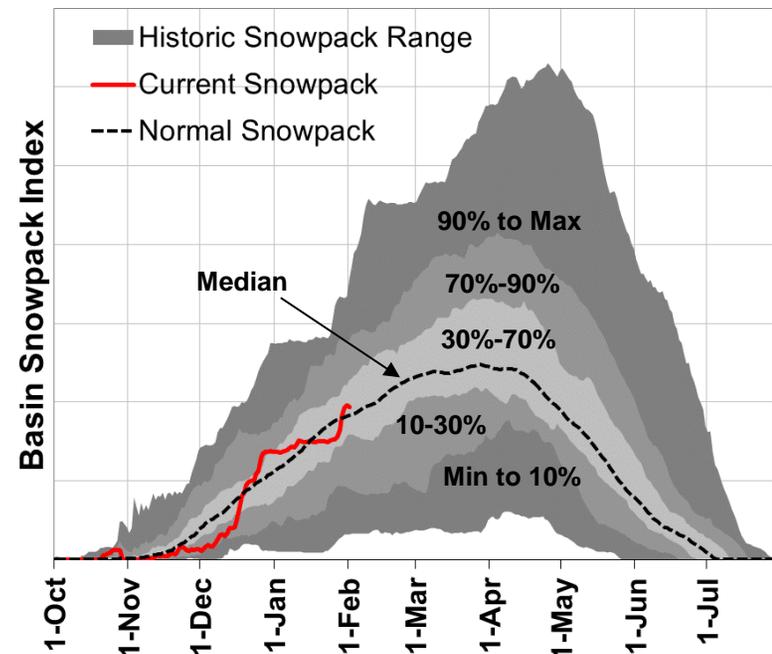
Interpreting Snowpack Plots

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



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

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