



United States
Department of
Agriculture



Natural Resources
Conservation
Service

Oregon Basin Outlook Report

March 1, 2017



An unimpeded view of the Three Sisters volcano complex, framed by lenticular clouds, greets snow surveyors trekking in to measure New Dutchman #3 snow course
Photo courtesy of Kurt Moffit (NRCS Snow Surveyor, Redmond, OR)

February storms brought significant snow accumulation to measuring sites across Oregon. NRCS snow surveyors Gabriella Coughlin and Kurt Moffit measured 42.7 inches of water and 122 inches of snow depth at New Dutchman #3 snow course on March 1st. This amounts to nearly 3 feet of additional depth compared to the February 1st snow survey. Currently, snowpack conditions in the Upper Deschutes and Crooked Basins are 127% of normal. Across Oregon, numerous winter storm systems in February funneled plentiful precipitation to the mountains, resulting in March 1st snowpack conditions that are significantly higher than in recent years and streamflow forecasts that are predicting well above normal summer flows for much of the state.

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General Outlook

March 1st, 2017

SUMMARY

Storm systems during February pummeled the Pacific Northwest, dumping several new feet of snow in Oregon's mountains. Rain on snow during multiple atmospheric river events caused rivers to rise rapidly in Western Oregon resulting in flooding and landslides in some areas. These powerful storms brought record high February precipitation and more than double the normal snow accumulation at numerous measurement sites. Oregon snowpack conditions were essentially unfazed by rain on snow events, and remain above normal throughout the entire state as of the first of March. Streamflow forecasts mirror these conditions and continue to predict well above average spring and summer streamflows.

The long range climate outlook from NOAA's Climate Prediction Center is expecting above normal precipitation for the next three months: <http://www.cpc.noaa.gov>. As storm systems show no signs of stopping anytime soon, confidence is increasing that Oregon is leaning towards an adequate water supply season. However, water users should be aware that temperatures later in the spring and weather patterns over the next few months will play a major role in shaping the final snowpack season and water supply picture.

SNOWPACK

This winter has been characterized by significant mountain snowfall and an unusual amount of long-lasting snow even at the lowest elevation measuring sites. Cold temperatures during most of the winter helped preserve the deep snowpack despite a few warm days and significant rain in some cases. Storms continued during February, bringing with them several feet of new snow in the mountains. The snow accumulation was double the normal amount at many monitoring locations, leading to a well above normal state-wide snowpack on March 1st. Grouping all of the 81 SNOTEL sites together, the statewide snowpack is 131% of normal when last year it was 94% of normal on this date. The last time the entire state had such a well-stocked supply of snow was in 2008, when it was 157% of normal. Currently, the Lake County and Goose Lake region has the highest basin snowpack at 145% of normal, while the lowest is found in the Klamath basin at 119% of normal.

The peak of the seasonal snow accumulation generally occurs during March for many of the low and mid elevations sites in the state. Given the current winter's substantial snowfall so far, snow monitoring sites in this elevation band have already met or surpassed the normal peak snowpack amounts. In general, the higher elevation sites are still below their normal peak snowpack levels as of March 1st, but most of these sites are typically still accumulating snowpack through March and usually don't reach their seasonal peak until late March or April.

PRECIPITATION

February brought more than 150% of average mountain precipitation to most basins and broke records in several locations throughout the state. The Rogue and Umpqua basins experienced 204% of monthly precipitation, the highest in the state. The lowest amounts fell in the Harney basin at 121% of average.

The entire season has been wet. Since the water year began on October 1st, all basins have experienced well above average amounts of rain and snow. Lake County and Goose Lake basins have had the most at 152% of average while Hood, Sandy and Lower Deschutes basins have had only 111% of the usual amount of precipitation for the water year so far.

RESERVOIRS

As of the end of February, there is wide variability in reservoir storage throughout the state as reservoir operators manage the need for flood control space and storage for summer water supplies. The most notable storage amounts can be found in Lake County and Goose Lake basins where Cottonwood and Drews Reservoirs are storing 160% and 175% of average amounts, respectively. Also noteworthy is Lake Owyhee, which is at 128% of average as of March 1st and after several years of well below normal volumes, the lake is now storing over 500,000 acre-feet for the first time since 2012.

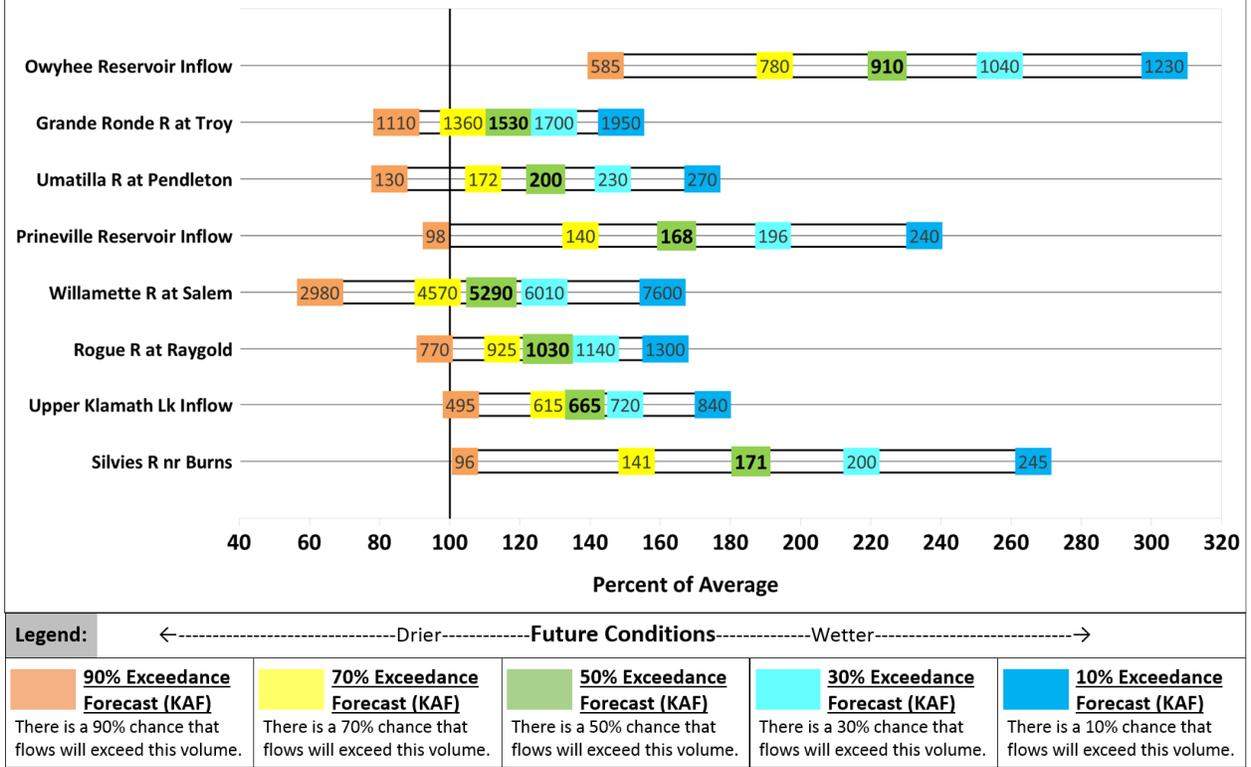
STREAMFLOW

The strong atmospheric river events that brought heavy rain and abundant snow to the mountains drove rivers up during the past month. As a result, February streamflow was well above average for the month throughout the state. Some significant flooding and landslides resulted from the heavy rain in western Oregon.

As of March 1st, most streamflow forecasts have increased since last month and are calling for well above average streamflows for much of Oregon this summer. These forecasts are based on current conditions, which means that the final streamflow volumes will ultimately depend on the weather patterns and outcome of the snowpack over the next couple of months.

To accompany the new forecast summary graphic on the following page, here are some helpful reminders about interpreting streamflow forecasts published in this document. For each forecast point, 5 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. 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. These arrays of forecasts are shown in the chart on the next page and explained in more detail on page 38.

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



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.

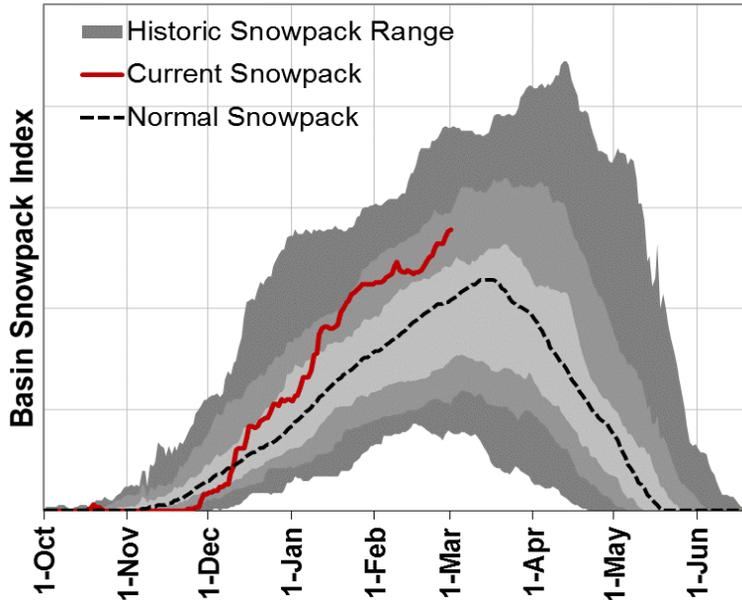
Note: A select set of streamflow forecasts have been discontinued in the Rogue, Grande Ronde and Willamette basins. Please see each basin section for more information.



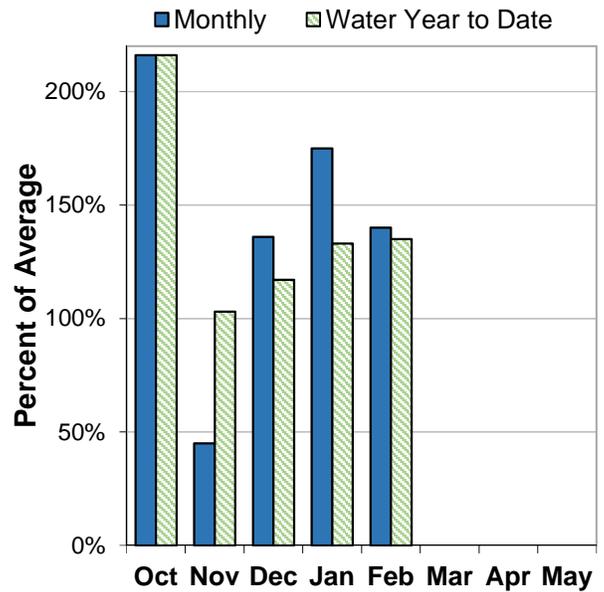
Owyhee and Malheur Basins

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

Almost all SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 139% of normal. While still well above normal, this is significantly lower than last month when the snowpack was 151% of normal. Lookout Butte Aerial Marker set a new record high for March 1st snowpack with a measurement of 2.4 inches of snow water. This marker has been measured since 1961 and typically is snow-free on March 1. In addition, Bully Creek Aerial Marker also has a record high March 1 snowpack of 9.2" of snow water (511% of normal). This site has been measured since 1958 and the previous record was set in 1999.

PRECIPITATION

February precipitation was 140% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 135% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 49% of average at Warm Springs Reservoir to 128% of average at Lake Owyhee. After several years of well below normal volumes, Lake Owyhee is now storing over 500 KAF for the first time since 2012.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 160% to 237% of average. Overall, forecasts decreased slightly from last month's report. Water supplies in the basin are likely to be well above normal this summer.

Owyhee And Malheur Basins Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Owyhee R nr Rome	MAR-JUL	895	1080	1200	233%	1320	1500	515
	MAR-SEP	920	1100	1230	232%	1350	1530	530
	APR-SEP	545	735	865	237%	995	1190	365
Owyhee R bl Owyhee Dam ²	MAR-JUL	955	1140	1270	229%	1390	1580	555
	MAR-SEP	990	1180	1310	224%	1440	1630	585
	APR-SEP	585	780	910	225%	1040	1230	405
Malheur R nr Drewsey	MAR-JUL	116	150	174	171%	197	230	102
	APR-JUL	73	100	119	175%	137	164	68
	APR-SEP	76	103	122	174%	140	168	70
NF Malheur R at Beulah ²	MAR-JUL	90	110	123	162%	137	157	76
	APR-SEP	70	87	99	160%	111	128	62

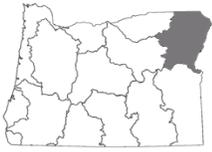
* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume
 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Beulah	25.6	25.9	32.1	80%	59.2
Bully Creek	14.9	15.8	16.4	91%	23.7
Lake Owyhee	504.4	217.7	392.6	128%	715.0
Warm Springs	40.6	37.6	82.2	49%	169.6

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
East Little Owyhee Basin	7	160%	108%
South Fork Owyhee Basin	6	141%	114%
Upper Malheur Basin	8	170%	106%
Upper Owyhee Basin	5	128%	111%

Owyhee And Malheur Basins Summary for March 1, 2017

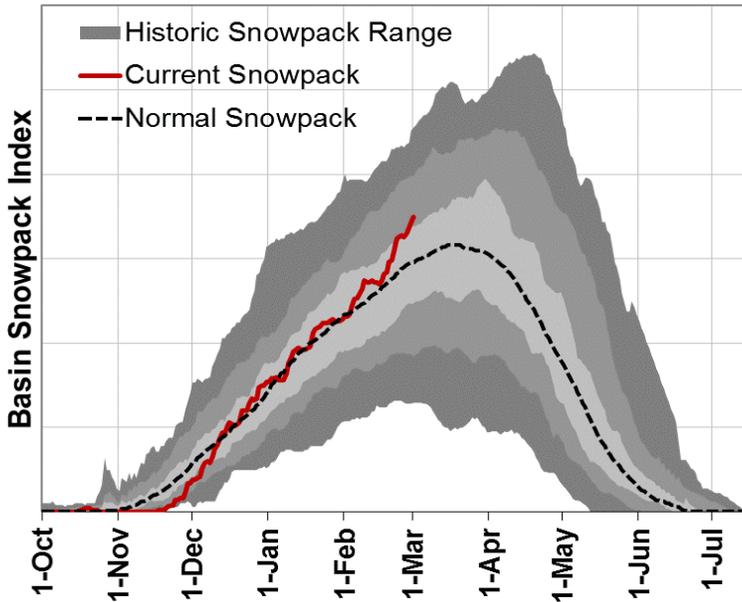
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-Mar	96	30.6	19.0	18.3	167%
Toe Jam SNOTEL	7700	1-Mar	85	28.8	16.6		
Jack Creek Upper SNOTEL	7250	1-Mar	60	17.0	16.2	14.4	118%
Dobson Creek Snow Course	7084	1-Mar	75	24.9	23.8	23.6	106%
Reynolds-Dobson Divide Snow Course	7064	1-Mar	78	25.9	22.4	21.2	122%
Fawn Creek SNOTEL	7000	1-Mar	61	17.6	17.4	13.4	131%
Merritt Mountain AM	7000	27-Feb	34	9.2	5.0	6.2	148%
Buckskin Lower SNOTEL	6915	1-Mar	43	13.0	11.2	8.1	160%
Reynolds West Fork #2 Snow Course	6798	1-Mar	79	26.4	21.2	21.6	122%
Gold Creek Snow Course	6707	27-Feb	31	8.4	6.4	5.8	145%
Big Bend SNOTEL	6700	1-Mar	42	13.7	11.0	8.4	163%
Fry Canyon SNOTEL	6700	1-Mar	25	9.2	1.8		
Fry Canyon Snow Course	6700	27-Feb	35	9.1	6.9	7.9	115%
Laurel Draw SNOTEL	6697	1-Mar	42	12.6	9.4	10.0	126%
Columbia Basin AM	6650	27-Feb	34	9.2	8.6	8.6	107%
Red Canyon AM	6600	1-Mar	26	9.9	6.0	7.7	129%
Louse Canyon AM	6530	1-Mar	21	6.7	7.0	4.2	160%
South Mtn. SNOTEL	6500	1-Mar	55	17.6	14.0	15.0	117%
Succor Creek AM	6310	1-Mar	26	9.9	6.0	8.4	118%
Quinn Ridge AM	6270	1-Mar	10	3.0	1.6	2.0	150%
Taylor Canyon SNOTEL	6200	1-Mar	30	13.7	7.0	5.2	263%
Blue Mountain Spring SNOTEL	5870	1-Mar	58	15.8	15.4	14.4	110%
Vaught Ranch AM	5850	1-Mar	13	4.9	1.2	4.8	102%
Barney Creek (New) Snow Course	5830	1-Mar	43	13.0	8.7		
Buck Pasture AM	5740	2-Mar	11	3.5	1.2	1.6	219%
Lookout Butte AM	5740	1-Mar	8	2.4	0.0	0.0	
Mud Flat SNOTEL	5730	1-Mar	19	7.2	4.9	7.1	101%
Battle Creek AM	5710	1-Mar	15	5.7	2.8	3.6	158%
Boulder Creek AM	5710	2-Mar	23	7.8	0.8	3.0	260%
Democrat Creek Snow Course	5686	1-Mar	33	11.4	10.2	9.4	121%
Reynolds Creek SNOTEL	5600	1-Mar	15	6.2	1.7	2.1	295%
Bull Basin AM	5460	1-Mar	5	1.9	0.8	1.9	100%
Dooley Mountain Snow Course	5440	1-Mar	39	12.0	6.9	8.2	146%
Call Meadows AM	5380	2-Mar	30	10.2	4.4	4.4	232%
Bully Creek AM	5300	2-Mar	27	9.2	3.6	1.8	511%
Rock Springs SNOTEL	5290	1-Mar	27	9.3	5.1	6.2	150%
Lake Creek R.S. SNOTEL	5240	1-Mar	43	14.7	10.7	10.3	143%
Flag Prairie AM	4720	2-Mar	24	8.2	3.6	4.0	205%
Eldorado Pass Snow Course	4630	1-Mar	20	6.8	4.6	3.0	227%



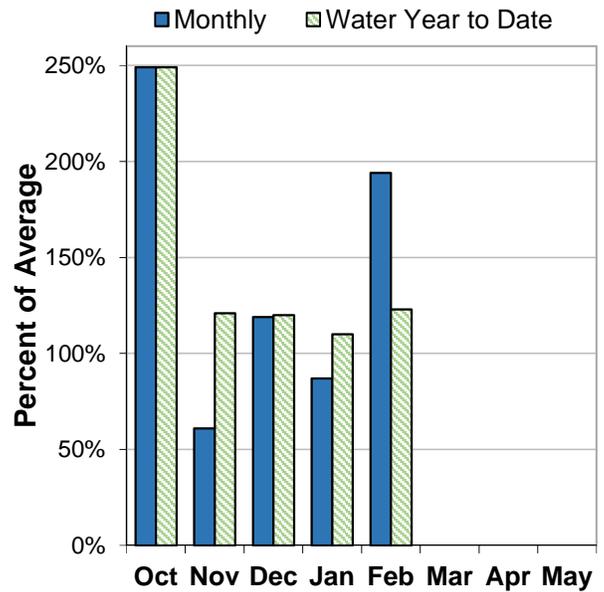
Grande Ronde, Powder, Burnt and Imnaha Basins

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

More than half of the SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 120% of normal. This is significantly higher than last month when the snowpack was 98% of normal. Measured since 1959, Little Alps Snow Course set a record high for March 1 snowpack with 15.6 inches of snow water (150% of normal). In addition, both Mt. Howard and Aneroid Lake SNOTEL sites had record high snow accumulation during February. Both of these sites had a below normal snowpack last month and are now above normal.

PRECIPITATION

February precipitation was 194% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 123% of average. Three long-term SNOTEL sites received the most February precipitation since measurements began in 1980: Eilertson Meadows (7.5", 275% of average), Mt. Howard (11.5", 291% of average), and Aneroid Lake (13.2", 288% of average).

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 22% of average at Phillips Lake to 162% of average at Wallowa Lake.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 108% to 160% of average. Overall, forecasts increased significantly from last month's report. Water supplies in the basin are likely to be above normal to well above normal this summer.

Grande Ronde, Powder, Burnt And Imnaha Basins Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Burnt R nr Hereford ²	MAR-JUL	53	65	74	161%	82	94	46
	APR-SEP	36	48	56	160%	65	77	35
Powder R nr Sumpter ²	MAR-JUL	79	91	99	157%	108	120	63
	APR-JUL	62	75	83	157%	91	103	53
	APR-SEP	64	76	85	157%	93	106	54
Pine Ck nr Oxbow	MAR-JUL	159	199	225	113%	255	295	200
	APR-JUL	115	152	178	113%	205	240	157
	APR-SEP	120	158	184	113%	210	250	163
Imnaha R at Imnaha	APR-JUL	230	280	315	124%	350	400	255
	APR-SEP	250	305	340	121%	375	425	280
Catherine Ck nr Union	APR-JUL	48	60	68	113%	76	87	60
	APR-SEP	51	64	72	113%	80	93	64
Lostine R nr Lostine	APR-JUL	103	113	120	113%	127	137	106
	APR-SEP	111	122	130	113%	137	148	115
Bear Ck nr Wallowa	APR-JUL	52	61	68	108%	74	84	63
	APR-SEP	54	64	70	108%	77	87	65
Grande Ronde R at Troy	MAR-JUL	1370	1610	1780	118%	1950	2200	1510
	APR-SEP	1110	1360	1530	117%	1700	1950	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	7.7	8.6	34.8	22%	73.5
Thief Valley	14.1	14.1	13.7	103%	13.3
Unity	10.6	11.2	14.5	73%	25.5
Wallowa Lake	26.5	17.4	16.4	162%	37.5
Wolf Creek	3.6	2.3	3.4	107%	11.1

Grande Ronde, Powder, Burnt And Imnaha Basins Summary for March 1, 2017

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Burnt Basin	5	165%	114%
Imnaha Basin	5	114%	98%
Lower Grande Ronde Basin	4	109%	87%
Powder Basin	11	129%	109%
Upper Grande Ronde Basin	8	119%	101%
Wallowa Basin	5	104%	92%

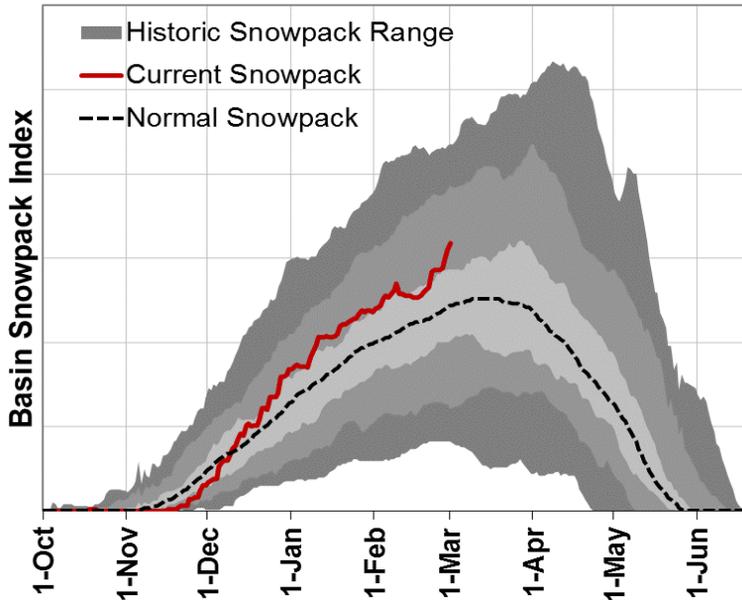
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt. Howard SNOTEL	7910	1-Mar	50	14.9	10.8	11.8	126%
Aneroid Lake #2 SNOTEL	7400	1-Mar	71	21.8	17.2	20.2	108%
Anthony Lake (Rev) Snow Course	7160	2-Mar	73	32.1	22.8	19.8	162%
Bald Mtn AM	6600	2-Mar	85	25.5		22.2	115%
Little Alps Snow Course	6360	2-Mar	49	15.6	11.3	10.4	150%
Bear Saddle SNOTEL	6180	1-Mar	75	21.6	24.4	21.0	103%
Placer Creek Snow Course	5860	26-Feb	65	7.6	19.6	15.4	49%
Bourne SNOTEL	5850	1-Mar	61	18.6	15.0	14.0	133%
Barney Creek (New) Snow Course	5830	1-Mar	43	13.0	8.7		
Moss Springs SNOTEL	5760	1-Mar	70	21.5	21.3	20.9	103%
Taylor Green SNOTEL	5740	1-Mar	59	16.9	18.9	18.1	93%
Boulder Creek AM	5710	2-Mar	23	7.8	0.8	3.0	260%
Spruce Springs SNOTEL	5700	1-Mar	54	13.8	10.2	14.7	94%
Wolf Creek SNOTEL	5630	1-Mar	60	15.0	13.9	14.6	103%
Milk Shakes SNOTEL	5580	1-Mar	116	35.0	33.9		
West Branch SNOTEL	5560	1-Mar	71	19.6	19.2	19.0	103%
Touchet SNOTEL	5530	1-Mar	91	30.5	27.7	26.5	115%
Eilertson Meadows SNOTEL	5510	1-Mar	52	15.7	10.3	9.2	171%
Dooley Mountain Snow Course	5440	1-Mar	39	12.0	6.9	8.2	146%
Gold Center SNOTEL	5410	1-Mar	51	15.1	12.3	9.0	168%
Schneider Meadows SNOTEL	5400	1-Mar	92	29.4	29.4	25.3	116%
Beaver Reservoir SNOTEL	5150	1-Mar	41	11.4	9.8	8.9	128%
Tipton SNOTEL	5150	1-Mar	53	14.9	14.5	11.1	134%
Thorson Cabin #2 Snow Course	5100	25-Feb	34	12.4	14.0		
High Ridge SNOTEL	4920	1-Mar	79	27.8	23.7	21.4	130%
County Line SNOTEL	4830	1-Mar	15	4.2	0.0	4.3	98%
Eldorado Pass Snow Course	4630	1-Mar	20	6.8	4.6	3.0	227%
Little Antone (Alt.) Snow Course	4560	1-Mar	35	11.0	9.7	8.8	125%
Bowman Springs SNOTEL	4530	1-Mar	32	9.1	5.8	7.5	121%
East Eagle Snow Course	4400	28-Feb	69	23.4	23.0	21.1	111%
Sourdough Gulch SNOTEL	4000	1-Mar	13	3.0	0.0	0.2	1500%



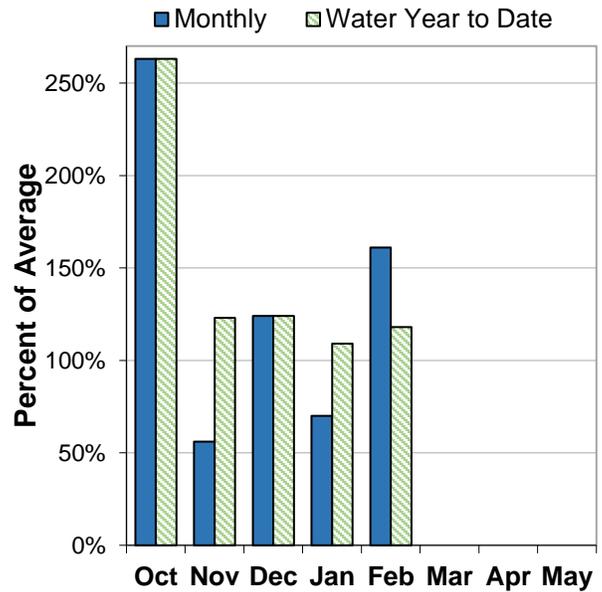
Umatilla, Walla Walla and Willow Basins

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

Almost all SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 131% of normal. This is significantly higher than last month when the snowpack was 120% of normal.

PRECIPITATION

February precipitation was 161% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 118% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 57% of average at Cold Springs Reservoir to 105% of average at Willow Creek Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 118% to 142% of average. Water supplies in the basin are likely to be above normal to well above normal this summer.

Umatilla, Walla Walla And Willow Basins Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
SF Walla Walla R nr Milton-Freewater	MAR-SEP	78	88	94	118%	100	110	80
	APR-JUL	50	59	64	119%	70	78	54
	APR-SEP	63	72	78	118%	84	93	66
Umatilla R ab Meacham nr Gibbon	MAR-SEP	100	120	133	125%	146	165	106
	APR-JUL	63	82	94	127%	107	125	74
	APR-SEP	69	87	100	125%	112	131	80
Umatilla R at Pendleton	MAR-SEP	215	260	290	126%	320	365	230
	APR-JUL	123	165	194	128%	220	265	151
	APR-SEP	130	172	200	127%	230	270	157
McKay Ck nr Pilot Rock	MAR-JUL	34	50	62	127%	73	90	49
	APR-SEP	11.7	26	36	124%	46	60	29
Butter Ck nr Pine City	MAR-JUL	12.9	17.2	20	134%	23	27	14.9
	APR-SEP	7.0	10.4	12.8	131%	15.1	18.6	9.8
Willow Ck ab Willow Lk nr Heppner	MAR-JUL	8.0	11.7	14.2	141%	16.7	20	10.1
	APR-JUL	4.1	7.5	9.8	140%	12.1	15.5	7.0
	APR-SEP	4.3	7.7	10.1	142%	12.4	15.9	7.1
Rhea Ck nr Heppner	MAR-JUL	9.1	12.9	15.4	139%	18.0	22	11.1
	APR-SEP	4.5	7.8	10.1	135%	12.4	15.8	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	11.1	16.6	19.6	57%	38.6
Mckay	34.8	38.4	39.2	89%	71.5
Willow Creek	4.8	4.2	4.6	105%	9.8

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Umatilla Basin	5	135%	90%
Walla Walla Basin	7	131%	93%

Umatilla, Walla Walla And Willow Basins Summary for March 1, 2017

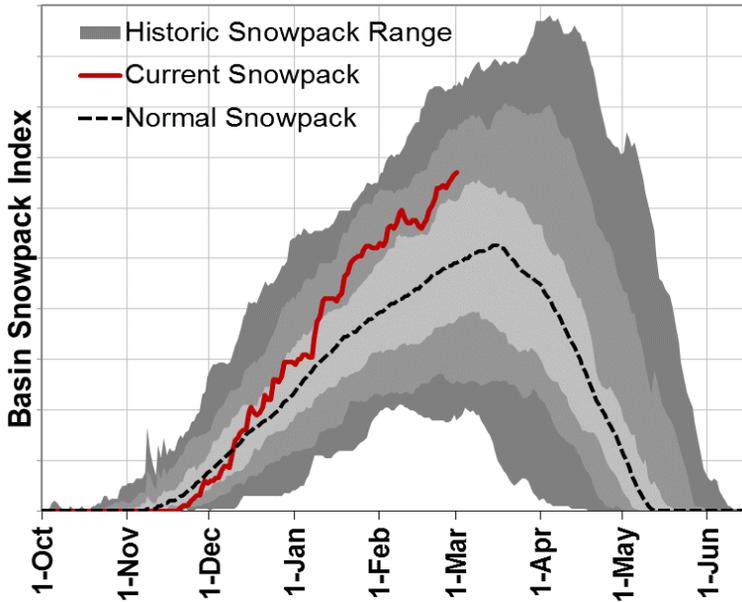
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Arbuckle Mtn SNOTEL	5770	1-Mar	61	17.6	13.9	15.2	116%
Spruce Springs SNOTEL	5700	1-Mar	54	13.8	10.2	14.7	94%
Milk Shakes SNOTEL	5580	1-Mar	116	35.0	33.9		
Touchet SNOTEL	5530	1-Mar	91	30.5	27.7	26.5	115%
Madison Butte SNOTEL	5150	1-Mar	22	7.0	2.2	3.9	179%
Lucky Strike SNOTEL	4970	1-Mar	29	10.2	6.3	6.8	150%
High Ridge SNOTEL	4920	1-Mar	79	27.8	23.7	21.4	130%
Indian Ridge Snow Course	4908	23-Feb	62	20.0	22.2		
Bowman Springs SNOTEL	4530	1-Mar	32	9.1	5.8	7.5	121%
Emigrant Springs SNOTEL	3800	1-Mar	30	9.3	0.0	4.1	227%



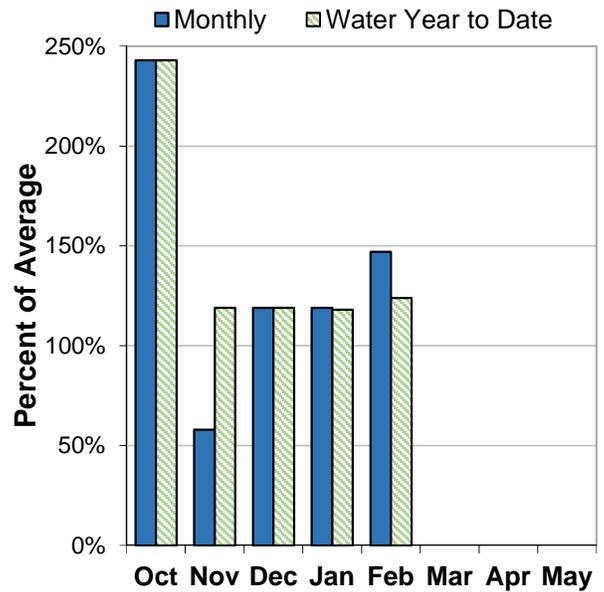
John Day Basin

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

Almost all SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 139% of normal.

PRECIPITATION

February precipitation was 147% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 124% of average.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 117% to 153% of average. Overall, forecasts increased slightly from last month's report. Water supplies in the basin are likely to be above normal to well above normal this summer.

John Day Basin Summary for March 1, 2017

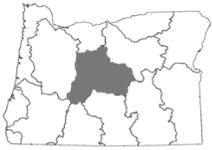
Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Strawberry Ck nr Prairie City	MAR-JUL	7.3	9.1	10.3	121%	11.6	13.4	8.5
	APR-SEP	7.6	9.4	10.7	122%	11.9	13.7	8.8
Mountain Ck nr Mitchell	MAR-JUL	7.0	8.5	9.6	152%	10.6	12.2	6.3
	APR-SEP	5.1	6.5	7.5	153%	8.5	10.0	4.9
Camas Ck nr Ukiah	MAR-JUL	40	50	57	119%	64	74	48
	APR-SEP	23	33	41	117%	48	59	35
MF John Day R at Ritter	MAR-JUL	144	181	205	131%	230	265	156
	APR-SEP	106	141	165	131%	189	225	126
NF John Day R at Monument	MAR-JUL	715	865	970	127%	1070	1220	765
	APR-SEP	500	650	750	125%	850	1000	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	148%	108%
North Fork John Day Basin	8	142%	103%
Upper John Day Basin	6	139%	120%

John Day Basin Summary for March 1, 2017

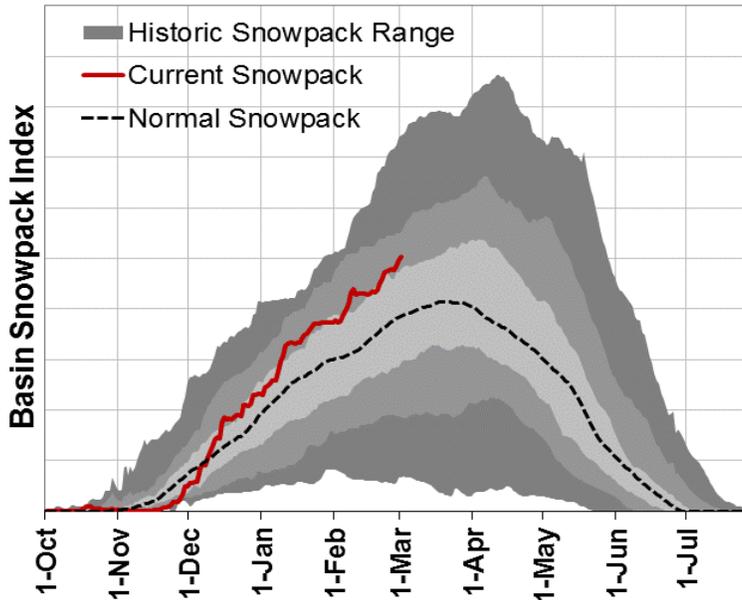
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Anthony Lake (Rev) Snow Course	7160	2-Mar	73	32.1	22.8	19.8	162%
Little Alps Snow Course	6360	2-Mar	49	15.6	11.3	10.4	150%
Snow Mountain SNOTEL	6230	1-Mar	38	13.5	12.7	9.8	138%
Blue Mountain Spring SNOTEL	5870	1-Mar	58	15.8	15.4	14.4	110%
Derr Snow Course	5860	1-Mar	40	13.6	10.7	9.2	148%
Bourne SNOTEL	5850	1-Mar	61	18.6	15.0	14.0	133%
Derr. SNOTEL	5850	1-Mar	55	19.2	18.5	12.8	150%
Barney Creek (New) Snow Course	5830	1-Mar	43	13.0	8.7		
Arbuckle Mtn SNOTEL	5770	1-Mar	61	17.6	13.9	15.2	116%
Ochoco Meadows SNOTEL	5430	1-Mar	40	13.9	10.0	10.0	139%
Gold Center SNOTEL	5410	1-Mar	51	15.1	12.3	9.0	168%
Starr Ridge SNOTEL	5250	1-Mar	27	10.3	7.3	6.2	166%
Lake Creek R.S. SNOTEL	5240	1-Mar	43	14.7	10.7	10.3	143%
Ochoco Meadows Snow Course	5190	28-Feb	41	13.1	9.9	10.0	131%
Madison Butte SNOTEL	5150	1-Mar	22	7.0	2.2	3.9	179%
Tipton SNOTEL	5150	1-Mar	53	14.9	14.5	11.1	134%
Lucky Strike SNOTEL	4970	1-Mar	29	10.2	6.3	6.8	150%
County Line SNOTEL	4830	1-Mar	15	4.2	0.0	4.3	98%
Marks Creek Snow Course	4580	28-Feb	17	5.6	1.7	3.1	181%
Little Antone (Alt.) Snow Course	4560	1-Mar	35	11.0	9.7	8.8	125%



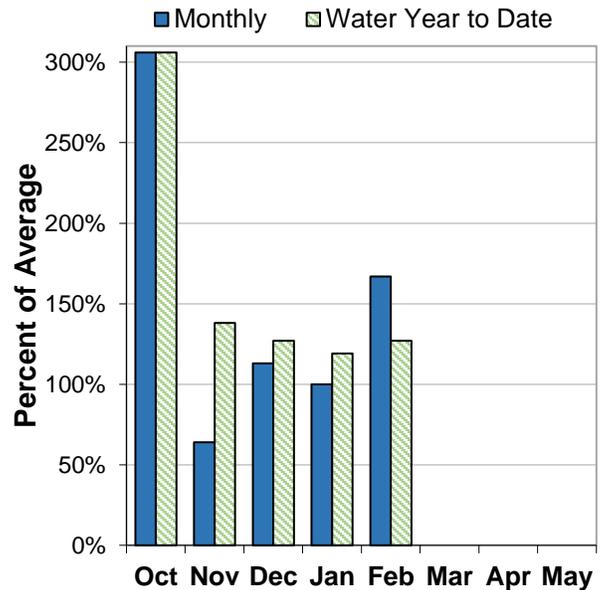
Upper Deschutes and Crooked Basins

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

Almost all SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 127% of normal. This is slightly higher than last month when the snowpack was 122% of normal.

PRECIPITATION

February precipitation was 167% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 127% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 89% of average at Wickiup Reservoir to 125% of average at Ochoco Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 110% to 165% of average. Overall, forecasts increased significantly from last month's report. Summer streamflow forecasts in the Crooked River basin are significantly higher than normal for the summer of 2017, while streamflow forecasts for the western drainages of the Deschutes Basin are slightly lower, but still above normal.

Upper Deschutes And Crooked Basins Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Deschutes R bl Snow Ck	MAR-JUL	32	37	40	111%	44	49	36
	MAR-SEP	54	63	68	117%	74	82	58
	APR-JUL	27	32	35	117%	38	42	30
	APR-SEP	45	53	59	113%	64	73	52
Crane Prairie Reservoir Inflow ²	MAR-JUL	64	74	80	121%	87	97	66
	MAR-SEP	95	110	120	124%	130	145	97
	APR-JUL	54	64	70	125%	76	85	56
	APR-SEP	85	100	110	125%	120	134	88
Crescent Lake Inflow ²	MAR-JUL	17.8	22	24	140%	27	31	17.2
	MAR-SEP	20	25	28	144%	31	36	19.5
	APR-JUL	16.6	19.8	22	147%	24	28	15.0
	APR-SEP	19.0	23	26	149%	29	33	17.4
Little Deschutes R nr La Pine ²	MAR-JUL	90	106	117	152%	128	143	77
	MAR-SEP	97	115	127	153%	139	157	83
	APR-JUL	78	91	101	160%	110	124	63
	APR-SEP	85	100	111	161%	122	137	69
Deschutes R at Benham Falls ²	MAR-JUL	395	415	430	109%	445	465	395
	MAR-SEP	565	590	610	109%	625	655	560
	APR-JUL	330	345	355	111%	370	385	320
	APR-SEP	495	520	535	110%	550	575	485
Wychus Ck nr Sisters	MAR-JUL	38	42	44	113%	47	51	39
	MAR-SEP	50	55	58	114%	61	66	51
	APR-JUL	34	38	40	114%	42	46	35
	APR-SEP	46	51	53	113%	56	60	47
Prineville Reservoir Inflow ²	MAR-JUL	187	240	270	158%	305	360	171
	MAR-SEP	186	240	275	161%	310	360	171
	APR-JUL	98	139	167	164%	195	235	102
	APR-SEP	98	140	168	165%	196	240	102
Ochoco Reservoir Inflow ²	MAR-JUL	35	44	51	155%	57	66	33
	MAR-SEP	35	44	51	159%	57	66	32
	APR-JUL	18.4	27	32	152%	38	46	21
	APR-SEP	18.3	27	32	160%	38	46	20

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

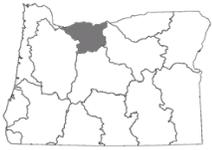
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Upper Deschutes And Crooked Basins Summary for March 1, 2017

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Crane Prairie	41.2	38.8	39.8	104%	55.3
Crescent Lake	57.0	52.7	47.5	120%	86.9
Ochoco	29.2	31.1	23.4	125%	44.2
Prineville	95.5	110.0	98.9	97%	148.6
Wickiup	157.1	154.6	176.1	89%	200.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Little Deschutes Basin	4	140%	113%
Upper Crooked Basin	5	145%	113%
Upper Deschutes Basin	12	123%	93%

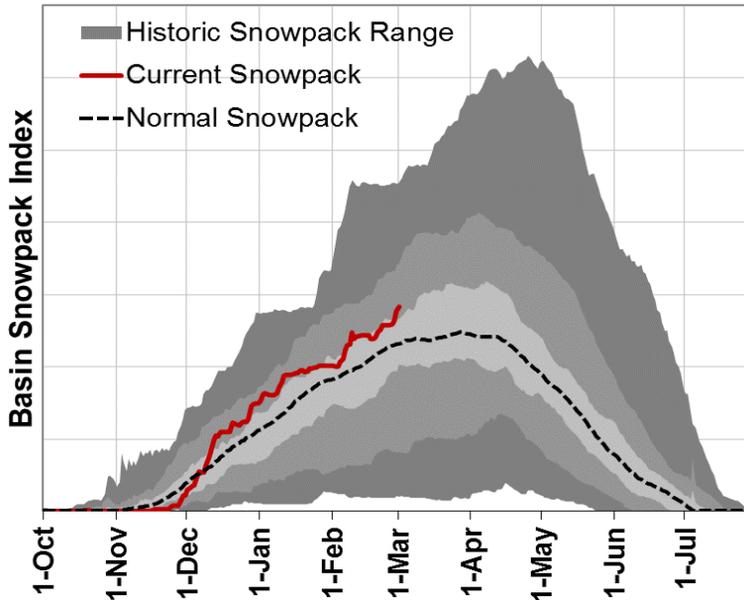
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
New Dutchman #3 Snow Course	6320	1-Mar	122	42.7	40.4	39.6	108%
Snow Mountain SNOTEL	6230	1-Mar	38	13.5	12.7	9.8	138%
Derr Snow Course	5860	1-Mar	40	13.6	10.7	9.2	148%
Derr. SNOTEL	5850	1-Mar	55	19.2	18.5	12.8	150%
Three Creeks Meadow SNOTEL	5690	1-Mar	60	20.3	13.8	16.1	126%
Summit Lake SNOTEL	5610	1-Mar	111	41.3	35.4	31.2	132%
Bald Peter Snow Course	5600	3-Mar	83	32.8		26.4	124%
Irish Taylor SNOTEL	5540	1-Mar	103	33.4	27.7	30.8	108%
Tangent Snow Course	5470	1-Mar	64	22.4	18.0	18.1	124%
Ochoco Meadows SNOTEL	5430	1-Mar	40	13.9	10.0	10.0	139%
Ochoco Meadows Snow Course	5190	28-Feb	41	13.1	9.9	10.0	131%
Racing Creek Snow Course	5160	2-Mar	59	21.6		12.3	176%
Cascade Summit SNOTEL	5100	1-Mar	105	33.0	27.4	26.2	126%
Roaring River SNOTEL	4950	1-Mar	86	30.9	21.5	25.0	124%
New Crescent Lake SNOTEL	4910	1-Mar	64	20.3	12.0	12.0	169%
Chemult Alternate SNOTEL	4850	1-Mar	44	14.2	12.6	8.1	175%
Hogg Pass SNOTEL	4790	1-Mar	81	29.6	14.4	20.1	147%
McKenzie SNOTEL	4770	1-Mar	109	37.9	27.0	36.4	104%
Marks Creek Snow Course	4580	28-Feb	17	5.6	1.7	3.1	181%
Hungry Flat Snow Course	4400	1-Mar	17	5.9	0.0	2.1	281%
Salt Creek Falls SNOTEL	4220	1-Mar	72	24.6	16.1	16.3	151%
Santiam Jct. SNOTEL	3740	1-Mar	60	19.5	10.3	15.5	126%



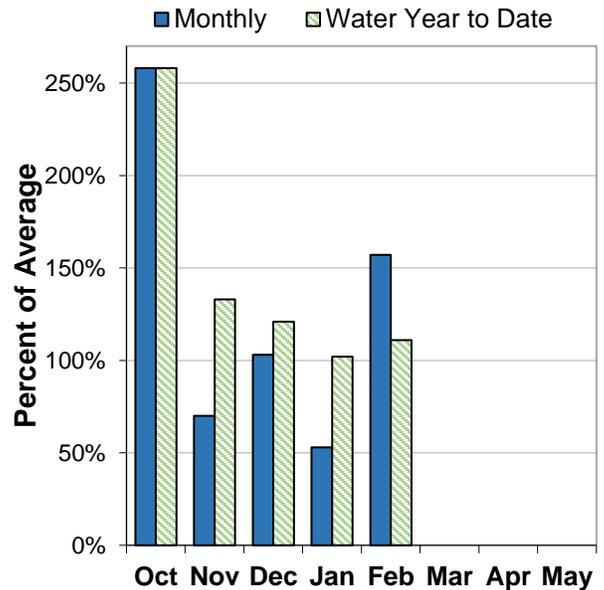
Hood, Sandy and Lower Deschutes Basins

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

Almost all SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 123% of normal. This is significantly higher than last month when the snowpack was 110% of normal.

PRECIPITATION

February precipitation was 157% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 111% of average.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 102% to 107% of average. Overall, forecasts increased slightly from last month's report. Water supplies in the basin are likely to be near normal to above normal this summer.

Hood, Sandy And Lower Deschutes Basins Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *

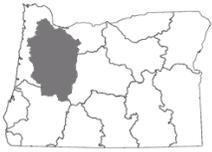
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
WF Hood R nr Dee	APR-JUL	84	108	124	103%	140	163	120
	APR-SEP	100	125	142	102%	160	185	139
Hood R at Tucker Bridge	APR-JUL	168	210	240	107%	265	310	225
	APR-SEP	200	250	280	106%	310	355	265
Sandy R nr Marmot	APR-JUL	235	295	335	108%	375	430	310
	APR-SEP	280	340	385	107%	425	485	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	1.1	2.6	3.8	30%	13.1

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lower Columbia - Sandy Basin	7	122%	80%
Lower Deschutes Basin	4	104%	76%
Middle Columbia - Hood Basin	6	118%	90%

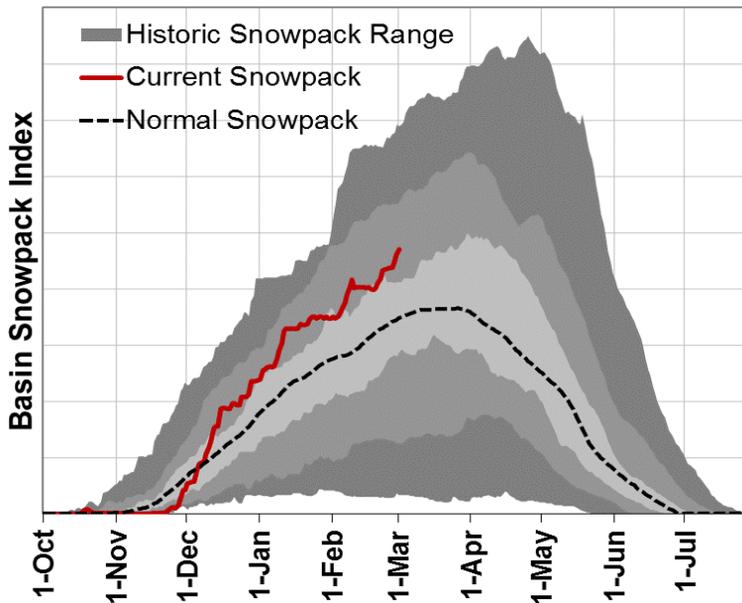
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Bald Peter Snow Course	5600	3-Mar	83	32.8		26.4	124%
Mt Hood Test Site SNOTEL	5370	1-Mar	124	41.4	39.4	48.0	86%
Racing Creek Snow Course	5160	2-Mar	59	21.6		12.3	176%
Red Hill SNOTEL	4410	1-Mar	116	47.1	35.9	41.7	113%
Surprise Lakes SNOTEL	4290	1-Mar	124	47.6	45.6	39.7	120%
Beaver Creek #2 Snow Course	4220	28-Feb	43	12.2		9.0	136%
Beaver Creek #1 Snow Course	4210	28-Feb	53	16.4		14.0	117%
Mud Ridge SNOTEL	4070	1-Mar	81	27.2	18.8	24.1	113%
Clear Lake SNOTEL	3810	1-Mar	52	15.3	7.2	12.4	123%
Blazed Alder SNOTEL	3650	1-Mar	101	35.1	19.6	25.0	140%
Clackamas Lake SNOTEL	3400	1-Mar	48	16.8	8.4	12.4	135%
Greenpoint SNOTEL	3310	1-Mar	69	22.8	15.9	18.0	127%
North Fork SNOTEL	3060	1-Mar	82	26.5	12.7	14.8	179%
South Fork Bull Run SNOTEL	2690	1-Mar	40	11.4	0.0	1.7	671%



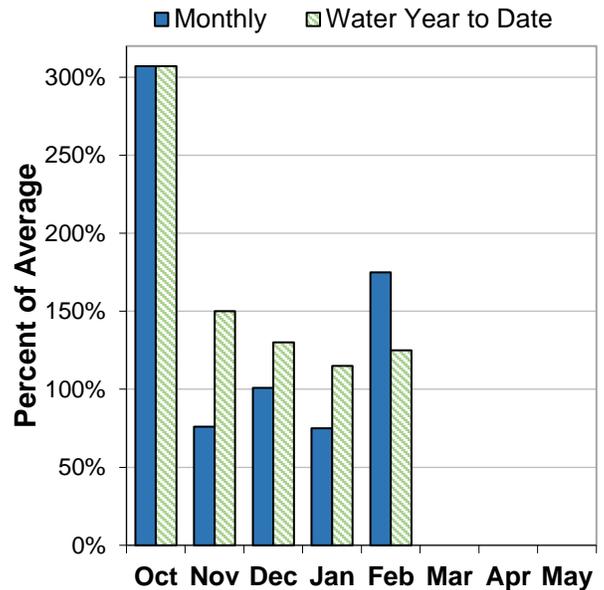
Willamette Basin

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

Almost all SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 134% of normal. This is significantly higher than last month when the snowpack was 125% of normal.

PRECIPITATION

February precipitation was 175% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 125% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 89% of average at Dorena Reservoir to 121% of average at Lookout Point Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 106% to 121% of average. Overall, forecasts increased slightly from last month's report. Water supplies in the basin are likely to be near normal to well above normal this summer. Note: As of 2017, there are 17 forecasts in this basin have been discontinued due to low forecast verification. Provided instead are a range of historic streamflows that have occurred in the past - Link: <http://bit.ly/2iWsfkt>

Willamette Basin Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Hills Creek Reservoir Inflow ^{1,2}	APR-JUN	183	260	295	120%	330	410	245
	APR-SEP	250	340	380	121%	420	510	315
Lookout Point Reservoir Inflow ^{1,2}	APR-JUN	480	680	770	118%	860	1060	650
	APR-SEP	650	875	975	118%	1070	1300	825
McKenzie R bl Trail Bridge	APR-JUN	186	210	225	107%	240	265	210
	APR-SEP	310	345	365	106%	390	425	345
Cougar Lake Inflow ^{1,2}	APR-JUN	122	180	205	111%	230	290	185
	APR-SEP	165	230	260	111%	290	355	235
Blue Lake Inflow ^{1,2}	APR-JUN	38	71	86	108%	101	134	80
	APR-SEP	43	77	92	107%	107	141	86
McKenzie R nr Vida ^{1,2}	APR-JUN	595	800	890	107%	985	1190	830
	APR-SEP	915	1160	1270	107%	1380	1620	1190
Detroit Lake Inflow ^{1,2}	APR-JUN	320	455	520	111%	580	715	470
	APR-SEP	450	605	675	111%	745	900	610
North Santiam R at Mehama ^{1,2}	APR-JUN	430	645	745	112%	840	1060	665
	APR-SEP	580	820	930	111%	1040	1280	840
Green Peter Lake Inflow ^{1,2}	APR-JUN	131	235	285	108%	330	435	265
	APR-SEP	161	270	320	108%	365	475	295
Foster Lake Inflow ^{1,2}	APR-JUN	250	450	535	107%	625	825	500
	APR-SEP	310	515	605	107%	700	905	565
South Santiam R at Waterloo ²	APR-JUN	335	475	565	108%	660	800	525
	APR-SEP	395	540	635	108%	735	880	590
Willamette R at Salem ^{1,2}	APR-JUN	2300	3750	4410	112%	5070	6520	3950
	APR-SEP	2980	4570	5290	112%	6010	7600	4730
Oak Grove Fk ab Powerplant	APR-JUL	98	116	128	111%	140	158	115
	APR-SEP	132	155	170	110%	185	205	155
Clackamas R ab Three Lynx	APR-JUL	365	440	490	109%	540	615	450
	APR-SEP	455	530	585	109%	640	715	535
Clackamas R at Estacada	APR-JUL	480	600	680	109%	760	880	625
	APR-SEP	590	715	800	110%	880	1010	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 March 1, 2017

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Blue River	35.9	37.5	34.6	104%	82.3
Cottage Grove	10.9	12.2	11.0	99%	31.8
Cougar	88.0	29.7	85.4	103%	174.9
Detroit	279.5	278.5	252.3	111%	426.8
Dorena	23.5	24.3	26.5	89%	72.1
Fall Creek	5.8	28.6	50.3	12%	116.0
Fern Ridge	38.1	39.5	42.5	90%	97.3
Foster	25.2	25.8	27.7	91%	46.2
Green Peter	263.6	278.6	264.2	100%	402.8
Hills Creek	183.2	171.7	154.3	119%	279.2
Lookout Point	260.7	241.1	216.2	121%	433.2
Timothy Lake	54.0	56.2	51.2	105%	63.6
Henry Hagg Lake	46.9	47.9	45.2	104%	53.3

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Clackamas Basin	9	123%	80%
McKenzie Basin	17	127%	97%
Middle Fork Willamette Basin	7	129%	98%
North Santiam Basin	4	169%	70%
South Santiam Basin	4	175%	65%

Willamette Basin Summary for March 1, 2017

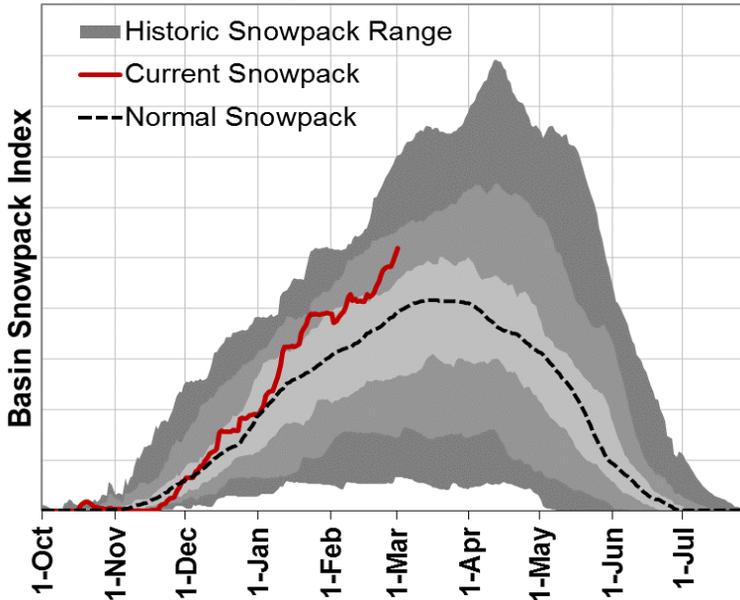
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summit Lake SNOTEL	5610	1-Mar	111	41.3	35.4	31.2	132%
Irish Taylor SNOTEL	5540	1-Mar	103	33.4	27.7	30.8	108%
Cascade Summit SNOTEL	5100	1-Mar	105	33.0	27.4	26.2	126%
Roaring River SNOTEL	4950	1-Mar	86	30.9	21.5	25.0	124%
Holland Meadows SNOTEL	4930	1-Mar	77	27.0	16.4	18.0	150%
McKenzie SNOTEL	4770	1-Mar	109	37.9	27.0	36.4	104%
Bear Grass SNOTEL	4720	1-Mar	138	54.5	36.8		
Beaver Creek #2 Snow Course	4220	28-Feb	43	12.2		9.0	136%
Salt Creek Falls SNOTEL	4220	1-Mar	72	24.6	16.1	16.3	151%
Beaver Creek #1 Snow Course	4210	28-Feb	53	16.4		14.0	117%
Mud Ridge SNOTEL	4070	1-Mar	81	27.2	18.8	24.1	113%
Little Meadows SNOTEL	4020	1-Mar	102	38.9	20.1	21.2	183%
Clear Lake SNOTEL	3810	1-Mar	52	15.3	7.2	12.4	123%
Santiam Jct. SNOTEL	3740	1-Mar	60	19.5	10.3	15.5	126%
Daly Lake SNOTEL	3690	1-Mar	63	19.3	4.2	11.3	171%
Marys Peak (Rev.) Snow Course	3580	28-Feb	32	6.8	0.0		
Jump Off Joe SNOTEL	3520	1-Mar	53	14.9	4.7	11.2	133%
Peavine Ridge SNOTEL	3420	1-Mar	52	19.7	6.4	11.2	176%
Clackamas Lake SNOTEL	3400	1-Mar	48	16.8	8.4	12.4	135%
Smith Ridge SNOTEL	3270	1-Mar	37	12.4	0.0		
Saddle Mountain SNOTEL	3110	1-Mar	30	12.5	0.0		
Railroad Overpass SNOTEL	2680	1-Mar	2	0.6	0.0	0.0	
Marion Forks SNOTEL	2590	1-Mar	43	16.3	4.1	7.5	217%
Seine Creek SNOTEL	2060	1-Mar	4	1.0	0.0	0.0	
Miller Woods SNOTEL	420	1-Mar	0	0.0	0.0		



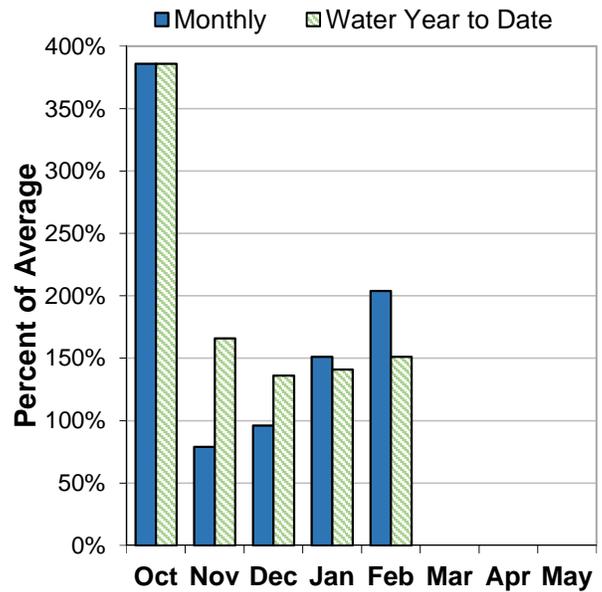
Rogue and Umpqua Basins

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

More than half of the SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 134% of normal.

PRECIPITATION

February precipitation was 204% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 151% of average. Two SNOTEL sites set new records for the most February precipitation since measurements began in 1980: Bigelow Camp (21.2", 247% of average) and Big Red (17.5", 251% of average). In addition, Bigelow Camp, Big Red, and King Mountain SNOTEL sites have had record high precipitation amounts since the water year began on October 1.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 56% of average at Fourmile Lake to 111% of average at Emigrant Lake.

STREAMFLOW FORECAST

Four streamflow gages in the basin measured the highest February flows on record (Cow Creek 332% of average, Illinois River 266% of average, Sucker Creek 283% of average, and Applegate Lake Inflow 420% of average). All have been measured for at least 30 years, and several date back to before 1965. The April through September streamflow forecasts in the basin range from 120% to 178% of average. Overall, forecasts increased significantly from last month's report. Water supplies in the basin are likely to be above normal to well above normal this summer.

Rogue And Umpqua Basins Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
South Umpqua R at Tiller	APR-JUL	165	225	270	140%	310	370	193
	APR-SEP	176	240	280	140%	320	385	200
Cow Ck ab Galesville Reservoir	MAR-JUL	25	34	40	174%	47	56	23
	APR-JUL	15.0	21	24	173%	28	34	13.9
	APR-SEP	16.6	22	26	173%	30	36	15.0
South Umpqua R nr Brockway	APR-JUL	350	495	595	153%	695	845	390
	APR-SEP	375	525	630	154%	730	880	410
North Umpqua R at Winchester	APR-JUL	680	855	975	126%	1100	1270	775
	APR-SEP	815	1000	1120	126%	1240	1430	890
Lost Creek Lk Inflow ²	MAR-JUL	640	740	805	121%	870	970	665
	MAR-SEP	770	880	950	120%	1020	1130	790
	APR-JUL	495	575	630	121%	685	765	520
	APR-SEP	625	715	775	120%	835	925	645
Rogue R at Raygold ²	APR-JUL	625	770	870	129%	970	1120	675
	APR-SEP	770	925	1030	128%	1140	1300	805
Rogue R at Grants Pass ²	APR-JUL	650	825	945	130%	1070	1240	725
	APR-SEP	780	970	1100	130%	1230	1420	845
Applegate Lake Inflow ²	MAR-JUL	200	245	275	177%	300	345	155
	MAR-SEP	210	255	285	177%	310	355	161
	APR-JUL	141	172	193	177%	215	245	109
	APR-SEP	150	182	205	178%	225	255	115
Sucker Ck bl Ltl Grayback nr Holland	APR-JUL	62	82	95	173%	108	127	55
	APR-SEP	68	87	101	171%	114	134	59
Illinois R nr Kerby	APR-JUL	182	255	305	162%	355	425	188
	APR-SEP	192	265	315	163%	365	440	193

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

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

Rogue And Umpqua Basins Summary for March 1, 2017

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Applegate	22.8	28.7	25.0	91%	75.2
Emigrant Lake	30.1	25.3	27.2	111%	39.0
Fish Lake	4.1	3.2	5.0	83%	7.9
Fourmile Lake	4.2	3.7	7.5	56%	15.6
Howard Prairie	40.4	22.3	37.9	107%	62.1
Hyatt Prairie	10.0	5.6	10.9	92%	16.2
Lost Creek	231.0	230.8	219.0	105%	315.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Applegate Basin	5	153%	102%
Middle Rogue Basin	8	180%	102%
North Umpqua Basin	9	160%	105%
South Umpqua Basin	10	263%	93%
Upper Rogue Basin	11	113%	105%

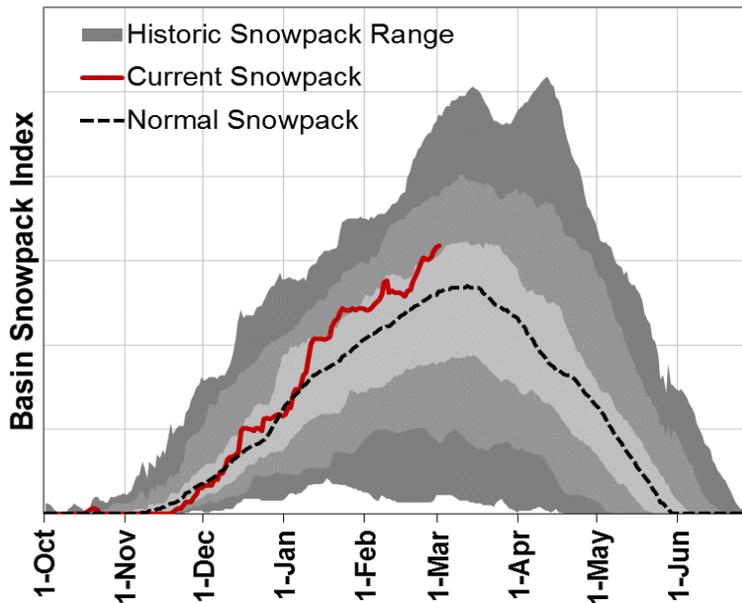
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Park H.Q. Rev Snow Course	6570	28-Feb	176	55.6	53.6	53.2	105%
Caliban (Alt.) Snow Course	6500	27-Feb	124	38.6	27.1	25.2	153%
Mt. Ashland Switchback Snow Course	6430	27-Feb	121	40.4	25.3	27.6	146%
Ski Bowl Road Snow Course	6070	27-Feb	88	27.4	21.8	21.0	130%
Big Red Mountain SNOTEL	6050	1-Mar	108	34.8	24.4	22.6	154%
Annie Springs SNOTEL	6010	1-Mar	136	48.1	38.2	35.1	137%
Fourmile Lake SNOTEL	5970	1-Mar	83	24.8	28.5	27.2	91%
Cold Springs Camp SNOTEL	5940	1-Mar	83	28.9	25.4	29.9	97%
Sevenmile Marsh SNOTEL	5700	1-Mar	105	35.6	28.2	28.7	124%
Summit Lake SNOTEL	5610	1-Mar	111	41.3	35.4	31.2	132%
Billie Creek Divide SNOTEL	5280	1-Mar	70	24.1	28.4	20.6	117%
Diamond Lake SNOTEL	5280	1-Mar	64	22.7	15.0	15.6	146%
Bigelow Camp SNOTEL	5130	1-Mar	71	22.9	10.4	10.6	216%
Beaver Dam Creek Snow Course	5120	1-Mar	42	13.4	11.1	10.9	123%
King Mountain 1 Snow Course	4760	2-Mar	57	20.8	5.3	5.0	416%
Deadwood Junction Snow Course	4660	1-Mar	29	9.6	8.5	6.8	141%
Fish Lk. SNOTEL	4660	1-Mar	37	10.1	13.8	10.7	94%
Howard Prairie SNOTEL	4580	1-Mar	26	8.3	5.7		
Howard Prairie Snow Course	4580	1-Mar	24	7.3	3.2	6.6	111%
Siskiyou Summit Rev. 2 Snow Course	4560	27-Feb	43	14.0	8.5	6.1	230%
Red Butte 1 Snow Course	4460	1-Mar	69	22.5	10.0	9.8	230%
King Mountain SNOTEL	4340	1-Mar	37	14.5	1.1	2.4	604%
North Umpqua Snow Course	4200	2-Mar	44	14.9	11.8	10.4	143%
Red Butte 2 Snow Course	4050	1-Mar	18	3.2	0.0	2.9	110%
Trap Creek Snow Course	3830	2-Mar	36	14.7	11.4	8.8	167%
Silver Burn Snow Course	3680	28-Feb	53	15.5	13.8	11.5	135%
King Mountain 3 Snow Course	3680	2-Mar	6	1.2	0.0	0.0	
Red Butte 3 Snow Course	3500	1-Mar	13	1.7	0.0	0.1	1700%
Toketee Airstrip SNOTEL	3240	1-Mar	14	5.0	0.0	0.8	625%
King Mountain 4 Snow Course	3050	2-Mar	0	0.0	0.0	0.0	
Red Butte 4 Snow Course	3000	1-Mar	7	1.2	0.0	0.0	



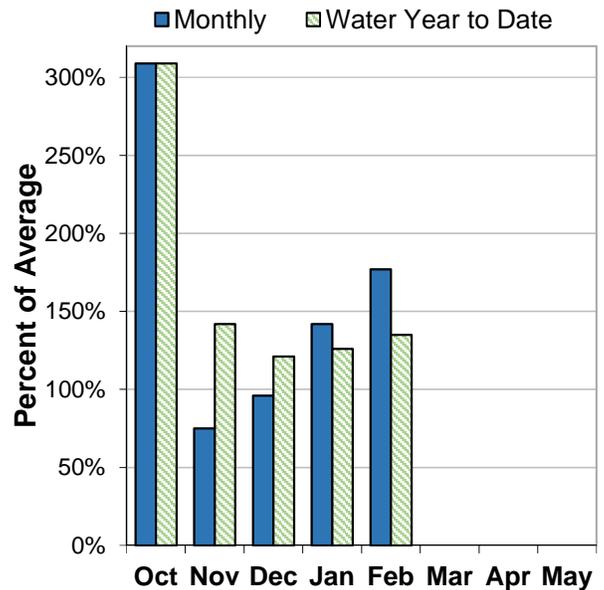
Klamath Basin

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

More than half of the SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 119% of normal.

PRECIPITATION

February precipitation was 177% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 135% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 46% of average at Gerber Reservoir to 118% of average at Upper Klamath Lake.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 137% to 181% of average. Overall, forecasts increased significantly from last month's report. Water supplies in the basin are likely to be well above normal this summer.

Klamath Basin Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Gerber Reservoir Inflow ²	MAR-JUL	34	47	57	178%	66	80	32
	APR-SEP	10.0	19.4	26	181%	32	42	14.4
Sprague R nr Chiloquin	MAR-JUL	325	380	415	163%	450	505	255
	MAR-SEP	350	405	445	162%	480	535	275
	APR-SEP	265	310	340	162%	370	415	210
Williamson R bl Sprague nr Chiloquin	MAR-JUL	440	505	555	139%	600	665	400
	MAR-SEP	500	570	620	135%	670	740	460
	APR-SEP	385	445	485	137%	525	585	355
Upper Klamath Lake Inflow ^{1,2}	MAR-JUL	590	730	795	137%	860	1000	580
	MAR-SEP	670	820	890	136%	960	1110	655
	APR-SEP	495	615	665	139%	720	840	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	103.9	82.7	217.4	48%	513.3
Gerber	23.2	31.2	50.3	46%	94.3
Upper Klamath Lake	439.0	410.8	370.9	118%	523.7

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lost Basin	5	140%	25%
Sprague Basin	8	152%	86%
Upper Klamath Lake Basin	8	111%	105%
Williamson River Basin	5	126%	103%

Klamath Basin Summary for March 1, 2017

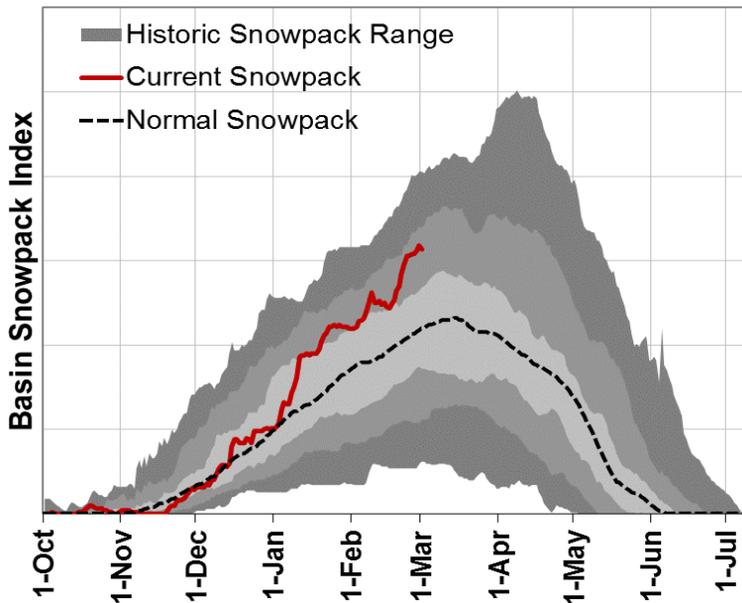
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summer Rim SNOTEL	7080	1-Mar	55	18.4	14.3	14.1	131%
Swan Lake Mtn SNOTEL	6830	1-Mar	83	29.4	25.7		
Park H.Q. Rev Snow Course	6570	28-Feb	176	55.6	53.6	53.2	105%
Colvin Creek AM	6520	1-Mar	30	9.0	0.0	2.9	310%
Crazyman Flat SNOTEL	6180	1-Mar	61	18.5	15.0	14.8	125%
Ski Bowl Road Snow Course	6070	27-Feb	88	27.4	21.8	21.0	130%
Annie Springs SNOTEL	6010	1-Mar	136	48.1	38.2	35.1	137%
Fourmile Lake SNOTEL	5970	1-Mar	83	24.8	28.5	27.2	91%
Cold Springs Camp SNOTEL	5940	1-Mar	83	28.9	25.4	29.9	97%
Strawberry SNOTEL	5770	1-Mar	21	8.3	1.7	4.3	193%
Silver Creek SNOTEL	5740	1-Mar	43	15.3	10.1	10.3	149%
Quartz Mountain SNOTEL	5720	1-Mar	11	2.9	0.0	1.5	193%
Sevenmile Marsh SNOTEL	5700	1-Mar	105	35.6	28.2	28.7	124%
Sycan Flat AM	5580	1-Mar	27	9.5	4.8	6.2	153%
Sun Pass SNOTEL	5400	1-Mar	77	25.1	22.5		
Billie Creek Divide SNOTEL	5280	1-Mar	70	24.1	28.4	20.6	117%
Diamond Lake SNOTEL	5280	1-Mar	64	22.7	15.0	15.6	146%
Beaver Dam Creek Snow Course	5120	1-Mar	42	13.4	11.1	10.9	123%
Taylor Butte SNOTEL	5030	1-Mar	28	9.9	3.7	7.0	141%
Dog Hollow AM	4920	1-Mar	2	0.8	0.0	0.0	
Gerber Reservoir SNOTEL	4890	1-Mar	1	0.4	0.0	0.5	80%
Chemult Alternate SNOTEL	4850	1-Mar	44	14.2	12.6	8.1	175%
Deadwood Junction Snow Course	4660	1-Mar	29	9.6	8.5	6.8	141%
Fish Lk. SNOTEL	4660	1-Mar	37	10.1	13.8	10.7	94%
Howard Prairie SNOTEL	4580	1-Mar	26	8.3	5.7		
Howard Prairie Snow Course	4580	1-Mar	24	7.3	3.2	6.6	111%
Siskiyou Summit Rev. 2 Snow Course	4560	27-Feb	43	14.0	8.5	6.1	230%



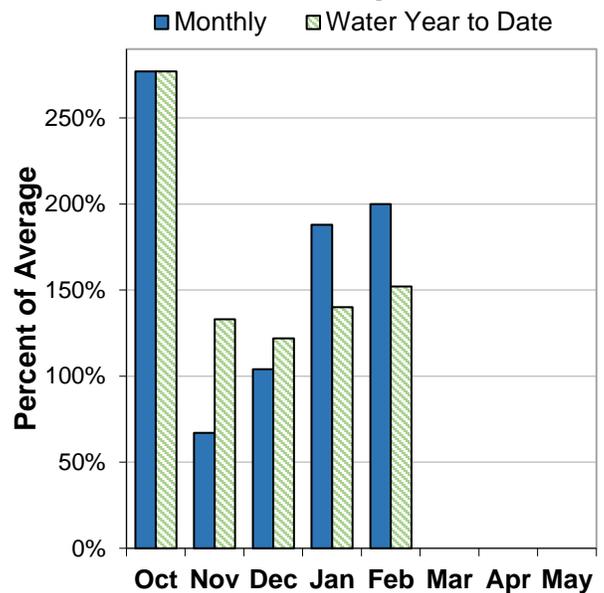
Lake County and Goose Lake Basins

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

Almost all SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 145% of normal. This is significantly higher than last month when the snowpack was 130% of normal. Two long-term monitoring sites in the basin set a record high for March 1 snowpack: Dismal Swamp SNOTEL (37.5" of snow water, 152% of normal) and Barley Camp aerial marker (27" of snow water, 188% of normal).

PRECIPITATION

February precipitation was 200% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 152% of average.

RESERVOIR

Reservoir storage across the basin is currently well above average. As of March 1, storage at major reservoirs in the basin ranges from 160% of average at Cottonwood Reservoir to 175% of average at Drews Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 160% to 191% of average. Overall, forecasts increased significantly from last month's report. Water supplies in the basin are likely to be well above normal this summer.

Lake County And Goose Lake Basins Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Twentymile Ck nr Adel	MAR-JUL	34	44	51	189%	59	69	27
	APR-SEP	17.7	26	31	178%	37	45	17.4
Deep Ck ab Adel	MAR-JUL	102	121	134	170%	147	165	79
	APR-SEP	79	97	110	169%	122	140	65
Honey Ck nr Plush	MAR-JUL	23	29	33	193%	37	43	17.1
	APR-SEP	17.9	23	27	191%	30	36	14.1
Chewaucan R nr Paisley	MAR-JUL	101	121	135	161%	148	168	84
	APR-SEP	89	108	120	160%	133	152	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	7.0	3.3	4.4	160%	9.3
Drews	56.9	21.6	32.4	175%	63.5

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Goose Lake Basin	8	149%	85%
Lake Abert Basin	7	156%	79%
Summer Lake Basin	13	145%	95%
Upper Pit Basin	3	154%	123%

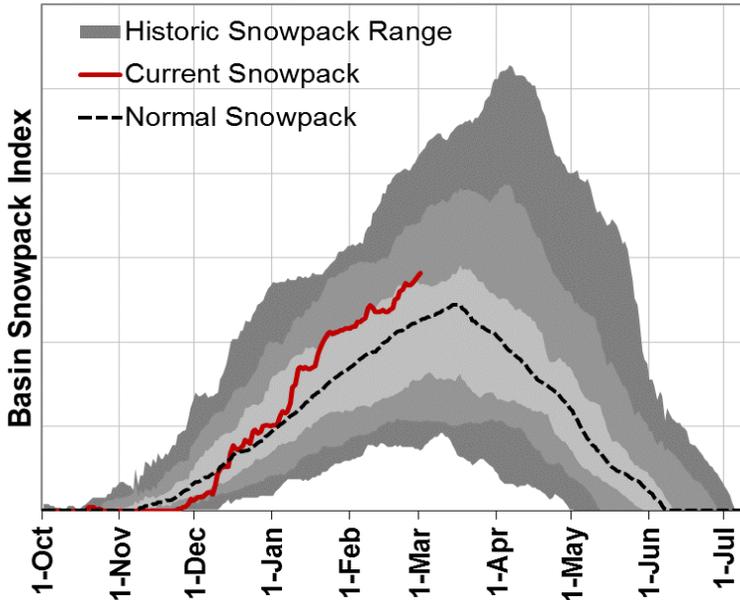
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summer Rim SNOTEL	7080	1-Mar	55	18.4	14.3	14.1	131%
Barley Camp AM	6890	1-Mar	77	27.0	16.0	14.4	188%
Bear Flat Meadow AM	6580	1-Mar	48	15.3	6.8	11.2	137%
Colvin Creek AM	6520	1-Mar	30	9.0	0.0	2.9	310%
Rogger Meadow AM	6360	2-Mar	51	17.0	7.2	10.1	168%
Crazyman Flat SNOTEL	6180	1-Mar	61	18.5	15.0	14.8	125%
Camas Creek #3 Snow Course	5860	1-Mar	56	16.0	11.2	11.4	140%
Sheldon SCAN	5860	1-Mar	0	0.0	0.0	0.0	
Strawberry SNOTEL	5770	1-Mar	21	8.3	1.7	4.3	193%
Silver Creek SNOTEL	5740	1-Mar	43	15.3	10.1	10.3	149%
Sycan Flat AM	5580	1-Mar	27	9.5	4.8	6.2	153%



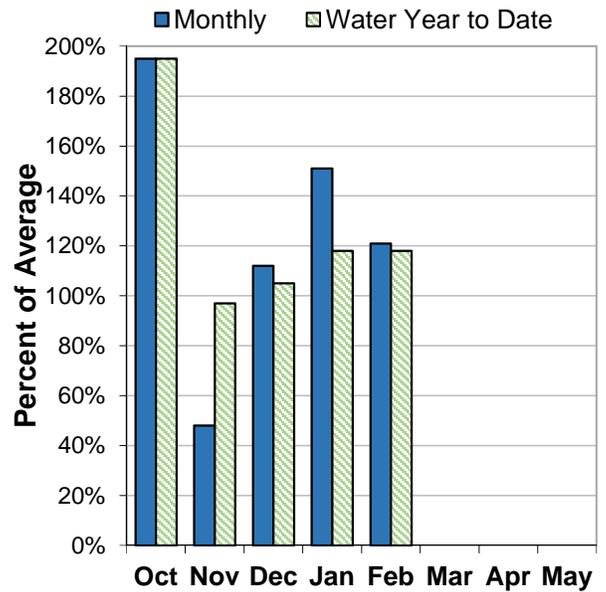
Harney Basin

March 1, 2017

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

More than half of the SNOTEL sites in the basin have accumulated enough snow this winter to reach or surpass their normal peak snowpack levels. As of March 1, the basin snowpack was 126% of normal.

PRECIPITATION

February precipitation was 121% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 118% of average.

STREAMFLOW FORECAST

Trout Creek near Denio broke the record for highest February streamflow volumes since records began in 1911. Total volume was 385% of average (2,215 AF). The April through September streamflow forecasts in the basin range from 107% to 186% of average. Overall, forecasts increased slightly from last month's report. Water supplies in the basin are likely to be above normal to well above normal this summer.

Harney Basin Summary for March 1, 2017

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2017	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Silvies R nr Burns	MAR-JUL	143	191	225	183%	255	305	123
	APR-SEP	96	141	171	186%	200	245	92
Donner Und Blitzen R nr Frenchglen	MAR-JUL	47	66	79	110%	92	111	72
	APR-SEP	42	61	73	107%	86	105	68
Trout Ck nr Denio	MAR-JUL	4.4	8.8	11.8	136%	14.8	19.2	8.7
	APR-SEP	3.6	8.0	10.9	136%	13.9	18.3	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	6	130%	107%
Donner und Blitzen River Basin	5	116%	115%
Silvies River Basin	4	147%	110%
Upper Quinn Basin	5	145%	95%

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-Mar	96	30.6	19.0	18.3	167%
Fish Creek SNOTEL	7660	1-Mar	75	26.6	30.0	21.3	125%
Oregon Canyon AM	7050	1-Mar	27	8.6	4.8	5.8	148%
Silvies SNOTEL	6990	1-Mar	46	12.9	12.6	14.6	88%
Pueblo Summit AM	6970	1-Mar	10	3.2	0.0	2.4	133%
Buckskin Lower SNOTEL	6915	1-Mar	43	13.0	11.2	8.1	160%
Louse Canyon AM	6530	1-Mar	21	6.7	7.0	4.2	160%
Disaster Peak SNOTEL	6500	1-Mar	29	9.3	3.8	7.6	122%
Quinn Ridge AM	6270	1-Mar	10	3.0	1.6	2.0	150%
Snow Mountain SNOTEL	6230	1-Mar	38	13.5	12.7	9.8	138%
Lamance Creek SNOTEL	6000	1-Mar	28	12.0	7.3	11.0	109%
Blue Mountain Spring SNOTEL	5870	1-Mar	58	15.8	15.4	14.4	110%
Sheldon SCAN	5860	1-Mar	0	0.0	0.0	0.0	
Buck Pasture AM	5740	2-Mar	11	3.5	1.2	1.6	219%
Call Meadows AM	5380	2-Mar	30	10.2	4.4	4.4	232%
Rock Springs SNOTEL	5290	1-Mar	27	9.3	5.1	6.2	150%
Starr Ridge SNOTEL	5250	1-Mar	27	10.3	7.3	6.2	166%
Lake Creek R.S. SNOTEL	5240	1-Mar	43	14.7	10.7	10.3	143%
Buckskin Lake AM	5190	2-Mar	2	0.8	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	Apr 10	May 22	Jul 3	May 6
Owyhee R nr Rome	1000 cfs	Apr 27	Jun 9	Jul 23	May 18
Owyhee R nr Rome	500 cfs	May 16	Jun 27	Aug 7	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	145	370	595	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 9	May 25	Jun 10	May 25
Crane Prairie Inflow	Peak Flow	360	500	640	403
Crane Prairie Inflow	Average Daily Flow on Oct. 1st	270	315	365	269
Prineville Reservoir Inflow	150 cfs	May 25	Jun 17	Jul 10	May 30
Prineville Reservoir Inflow	80 cfs	May 29	Jun 22	Jul 16	June 7
Whychus Creek nr Sisters	100 cfs	Aug 7	Sep 1	Sep 26	August 16

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

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>
		<i>90%</i>	<i>50%</i>	<i>10%</i>	
South Umpqua R nr Brockway *	90 cfs	Aug 8	Aug 27	Sep 16	August 8
South Umpqua R at Tiller	140 cfs	Jul 8	Jul 28	Aug 17	July 11
South Umpqua R at Tiller	90 cfs	Jul 28	Aug 22	Sep 11	August 1
South Umpqua R at Tiller	60 cfs	Aug 12	Sep 11	Oct 11	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>
		<i>90%</i>	<i>50%</i>	<i>10%</i>	
Deep Ck ab Adel	100 cfs	Jun 13	Jul 5	Jul 28	June 17
Honey Ck nr Plush	100 cfs	Apr 23	May 26	Jun 28	May 16
Honey Ck nr Plush	50 cfs	May 14	Jun 13	Jul 13	June 4
Twentymile Ck nr Adel	50 cfs	Jun 6	Jul 2	Jul 28	May 30
Twentymile Ck nr Adel	10 cfs	Jul 6	Jul 28	Aug 22	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>
		<i>90%</i>	<i>50%</i>	<i>10%</i>	
Silvies R nr Burns	400 cfs	Apr 29	May 28	Jun 26	May 21
Silvies R nr Burns	200 cfs	May 18	Jun 16	Jul 15	June 2
Silvies R nr Burns	100 cfs	Jun 3	Jul 5	Aug 7	June 13
Silvies R nr Burns	50 cfs	Jun 25	Jul 28	Sep 1	July 3
Donner Und Blitzen R nr Frenchglen	200 cfs	May 27	Jun 18	Jul 10	June 20
Donner Und Blitzen R nr Frenchglen	100 cfs	Jun 19	Jul 9	Jul 28	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.

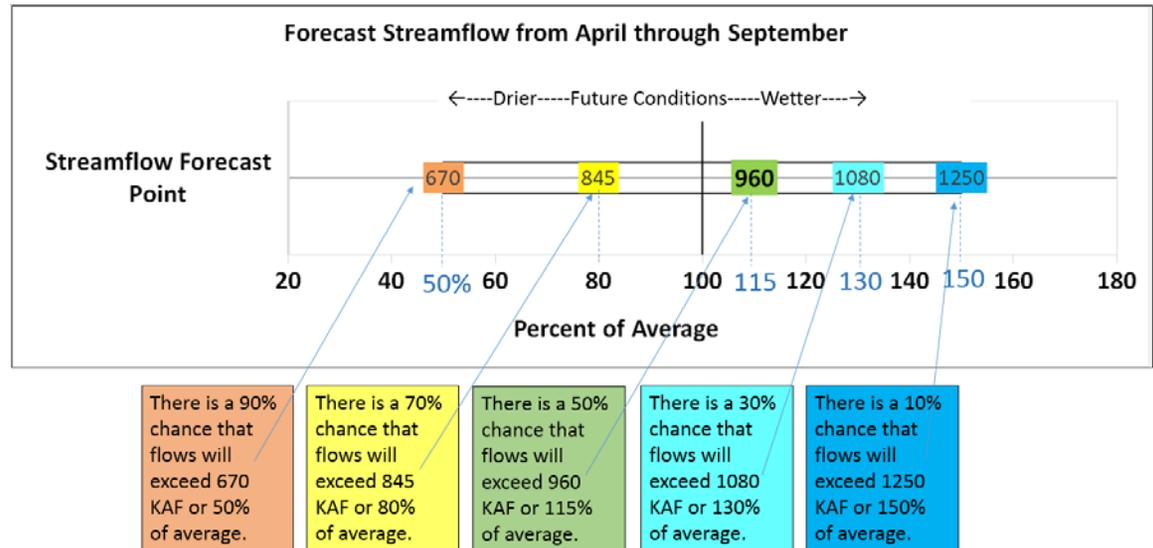
30-Year Average. The 30-year average streamflow for each forecast period is provided for comparison. The average is based on data from 1981-2010. The % AVG. column compares the 50% chance of exceedance forecast to the 30-year average streamflow; values above 100% denote when the 50% chance of exceedance 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 Burnt River Hereford will be less than 41 KAF between April 1 and Sept 30. There is also a 50% chance that actual streamflow volume will be greater than 41 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 31 KAF (from the 70 percent exceedance forecast). There is a 30% chance of receiving less than 31 KAF.

Alternatively, if users determine the risk of using the 70 percent exceedance forecast is too great, then they might plan on receiving 17.4 KAF (from the 90 percent exceedance forecast). There is 10% chance of receiving less than 17.4 KAF.

Grande Ronde, Powder, Burnt And Innaha Basins Summary for January 1, 2017

		Forecast Exceedance Probabilities for Risk Assessment *						
		←-----Drier-----Future Conditions-----Wetter-----→						
Streamflow Forecasts January 1, 2017	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	Average (KAF)
Burnt R nr Hereford	FEB-JUL	32	48	59	116%	70	86	51
	APR-SEP	17.4	31	41	117%	50	64	35

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 50 KAF (from the 30 percent exceedance forecast). There is a 30% chance of receiving more than 50 KAF.

Alternatively, if users determine the risk of using the 30 percent exceedance forecast is too great, then they might plan on receiving 64 KAF (from the 10 percent exceedance forecast). There is a 10% chance of receiving more than 64 KAF.

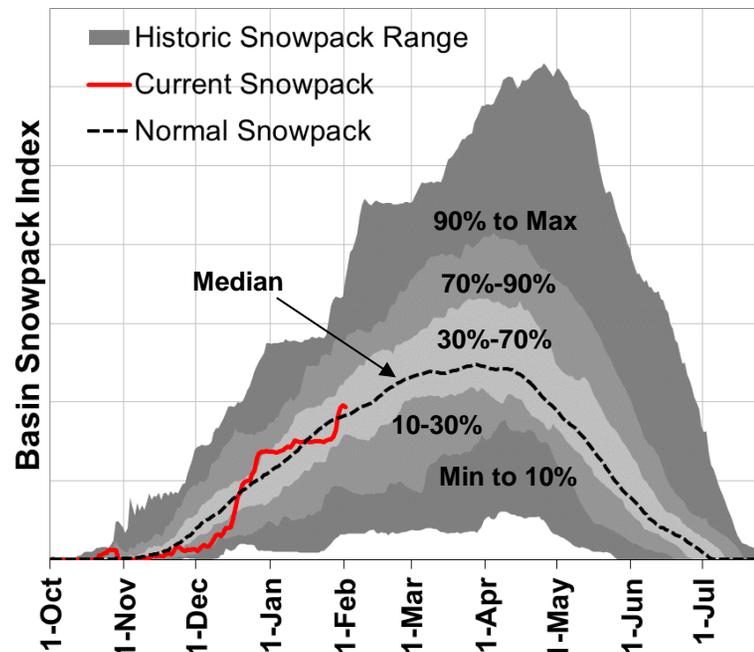
Interpreting Snowpack Plots

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 for the basin. This gives users important context about the current year and historic variability of snowpack in the basin.

The grey shaded areas represent different percentiles of the historical range of the snowpack index for each day. The dark grey shading indicates the extreme lows and highs in the SNOTEL record (minimum to the 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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