



United States
Department of
Agriculture



Natural Resources
Conservation
Service

Oregon Basin Outlook Report

March 1, 2020



Mud Ridge SNOTEL near Mt. Hood - 02/25/2020 during site visit to repair the snow depth sensor
(Photo: Allen Buckman, Oregon NRCS Snow Survey Staff)

Snowpack across Oregon is quite varied as of March 1st. After a high-precipitation January that helped bring the snowpack near normal, February received very little precipitation in many parts of the state, resulting in a mixed outlook with some basins still near or above normal snowpack and others well below normal. Most of the state has received below normal water year precipitation (since October 1st), with southern Oregon well below normal.

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General Outlook

March 1st, 2020

SUMMARY

February saw a wide variation in precipitation and snow accumulation across Oregon. The first week of February brought a storm to the northeast corner of the state that included heavy snow and heavy rain on snow, resulting in catastrophic flooding of the Umatilla and Walla Walla River systems. At the same time, the southwestern basins in the state received well below normal snow and precipitation, which led to significantly lower snow water equivalent and water year precipitation values on March 1st compared to a month ago.

Streamflows across Oregon also varied in February, with well above average streamflow in Umatilla, Walla Walla, and Wallowa basins due to the early February event. The northern Oregon Cascades had near average flow in most streams, and in central and southern Oregon, well below average flows were observed. Reservoirs storage varies from near normal to above normal for most locations across the state on March 1st. There remains a large range of values due to required operations, facility maintenance, and/or other storage activities.

The National Oceanic Atmospheric Administration Climate Prediction Center is forecasting greater probability of above normal temperatures for the state and increased chances for below normal precipitation west of the Cascades for March, April, and May: <http://www.cpc.ncep.noaa.gov/>.

SNOWPACK

Statewide snow water equivalent decreased slightly from 93% of normal on February 1st to 92% of normal on March 1st. Snow accumulation varied quite a bit across the state, with northeastern Oregon continuing to build above normal snowpacks and southern Oregon experiencing decreases in snowpack since February 1st.

March 1st basin snowpack values range from 66% of normal in the Klamath Basin to 123% of normal in the Umatilla, Walla Walla, and Willow Basins. With peak snowpack generally occurring between March 15th and April 1st there is less than one month left in the snow accumulation season. This will be a critical time in determining the overall water supply outlook for this spring and summer.

As of March 1st, snow densities are higher than normal and many snow surveyors across the state reported spring-like snow conditions during their March 1st surveys. If temperatures continue to stay warm, the snowpack could melt off earlier than normal.

PRECIPITATION

In a stark reversal to January's plentiful precipitation, most of Oregon's basins recorded below normal precipitation for the month of February. Only three of the eleven Oregon basins received above normal precipitation, all in northeastern Oregon (Grande Ronde, Powder, Burnt, and Imnaha Basins; Umatilla, Walla Walla, and Willow Basins; and the John Day Basin). The remaining eight ranged from 16% in Lake County and Goose Lake Basins to 77% in the Willamette Basin.

On March 1st, statewide water year precipitation was 82% of normal, a slight increase from 80% of normal on February 1st. This increase did not apply equally across the state, and southern Oregon basins saw decreases in percent normal water year precipitation on March 1st, while northeastern Oregon basins experienced large increases during February that increased their water year percent normal. Water year precipitation amounts range from 66% of normal in the Klamath Basin and Lake and Goose Lake Basins to 107% of normal in the Grande Ronde, Powder, Burnt, and Imnaha Basins.

RESERVOIRS

Reservoir storage amounts across Oregon are varied as of March 1st, but most are near or above average. The lowest storage amounts are in the Rogue and Umpqua Basins at 79% of average. The Owyhee and Malheur reservoirs are storing the highest amounts of water relative to normal in the state at 134% of average, collectively.

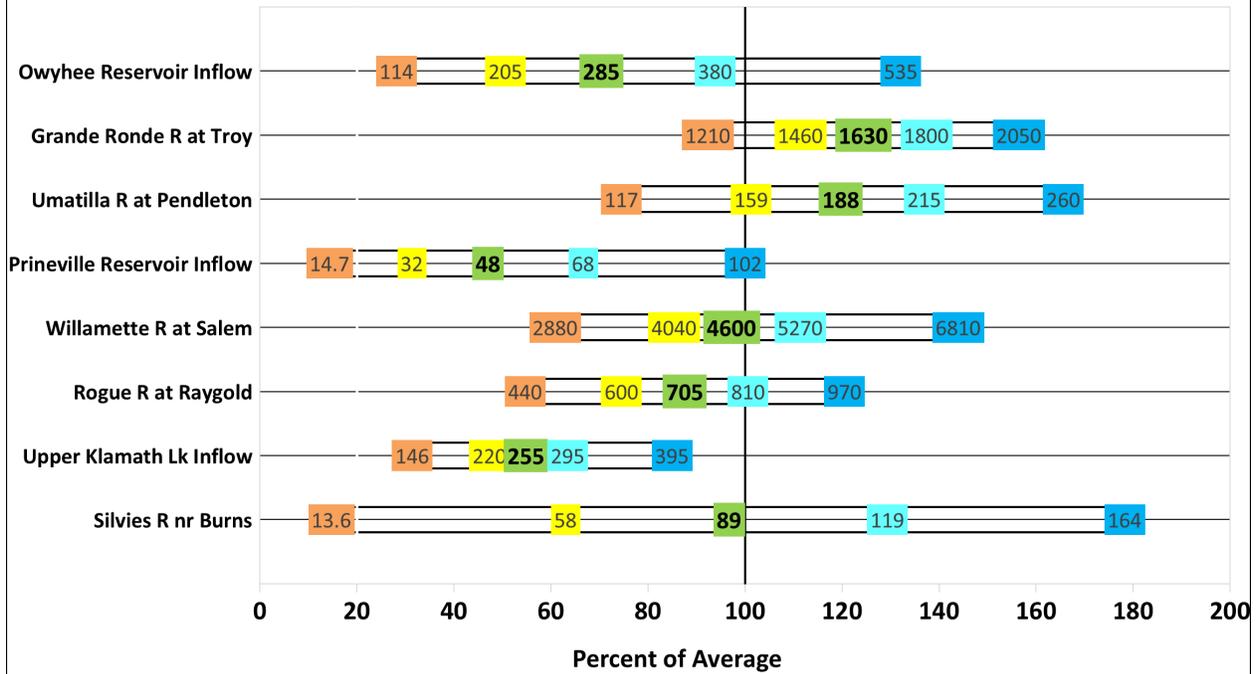
STREAMFLOW

February was a month of extremes for streamflows in Oregon. February streamflows were mostly near average or below average across Oregon, with the exception of the northeast corner of the state, which experienced substantial flooding of rivers and streams in early February and overall above average flows for the month. The Umatilla River flooded significantly, inundating homes, farms, and roads, and closing sections of Interstate 84 for several days. The rest of the state told a much different story: streams in the northern half of the Oregon Cascades experienced near average flows, and the rest of the state had mostly below average flows. Far southern Oregon, including the Klamath Basin, had well below average streamflows in February, leading to the Governor's office declaration of drought emergency on March 2nd.

Streamflow forecasts have responded with increases and decreases (some significant) since February 1st, depending upon location. Current April through September forecasts call for flows ranging from 36% of average to 124% of average, variable by basin and location. The lowest forecasted streamflows are currently in the Klamath basin, with forecasted flows ranging from 36% to 66%. The highest are in the Grand Ronde, Powder, Burnt, and Harney basins where forecasted flows are between 81% and 124% of average. The next two to four weeks will provide an opportunity to continue building the snowpack, and the timing of peak flows in the spring will depend on snowpack accumulation and temperature.

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

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



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

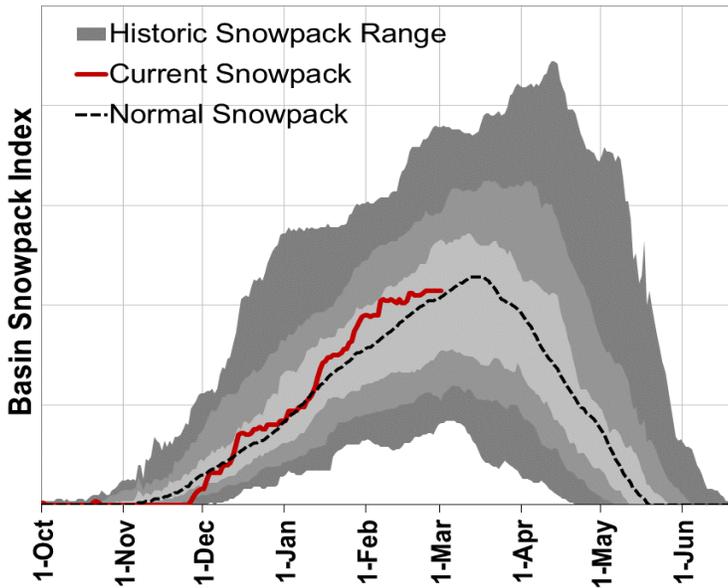
All forecasts are listed with units of 1000 acre-feet (KAF). This report contains data furnished by the Oregon Department of Water Resources, U.S. Geological Survey, NOAA National Weather Service and other cooperators. This report will be updated monthly, January through June.



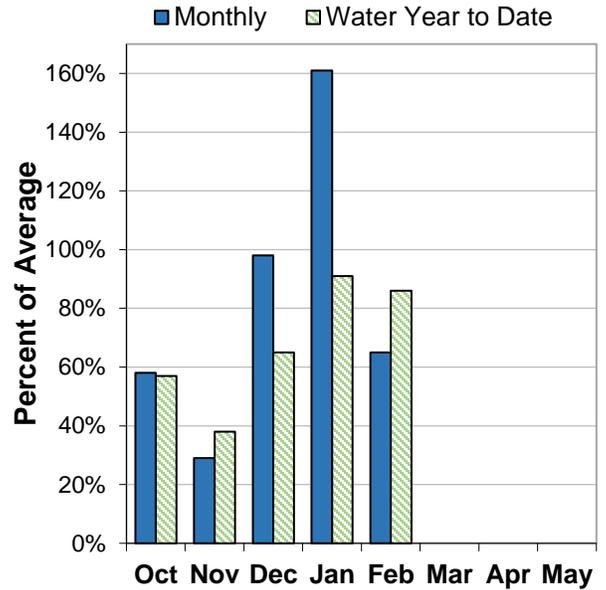
Owyhee and Malheur Basins

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 104% of normal. This is lower than last month when the snowpack was 126% of normal.

PRECIPITATION

February precipitation was 65% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 86% 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 101% of average at Beulah Reservoir to 137% of average at Lake Owyhee.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 67% to 98% of average. Overall, forecasts decreased significantly from last month's report. Water supplies in the basin are likely to be well below normal to near normal this summer.

Owyhee And Malheur Basins Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	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	MAR-JUL	170	270	355	69%	450	605	515
	MAR-SEP	182	285	370	70%	465	625	530
	APR-JUL	72	155	230	67%	315	475	345
	APR-SEP	83	169	245	67%	335	495	365
Owyhee R bl Owyhee Dam ²	MAR-JUL	184	300	390	70%	500	680	555
	MAR-SEP	210	325	420	72%	525	700	585
	APR-JUL	91	180	255	68%	350	510	375
	APR-SEP	114	205	285	70%	380	535	405
Malheur R nr Drewsey	MAR-JUL	52	77	97	95%	119	157	102
	APR-SEP	32	52	68	97%	86	117	70
NF Malheur R at Beulah ²	MAR-JUL	40	60	74	97%	87	107	76
	APR-SEP	32	49	61	98%	73	91	62

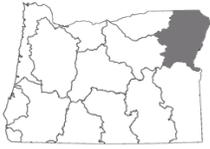
* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume
 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Beulah	32.4	18.3	32.1	101%	59.2
Bully Creek	17.6	10.6	16.4	107%	23.7
Lake Owyhee	538.7	305.4	392.6	137%	715.0
Warm Springs	110.4	23.0	82.2	134%	169.6

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
East Little Owyhee Basin	7	121%	158%
South Fork Owyhee Basin	6	113%	125%
Upper Malheur Basin	8	103%	205%
Upper Owyhee Basin	5	106%	116%

Owyhee And Malheur Basins Summary for March 1, 2020

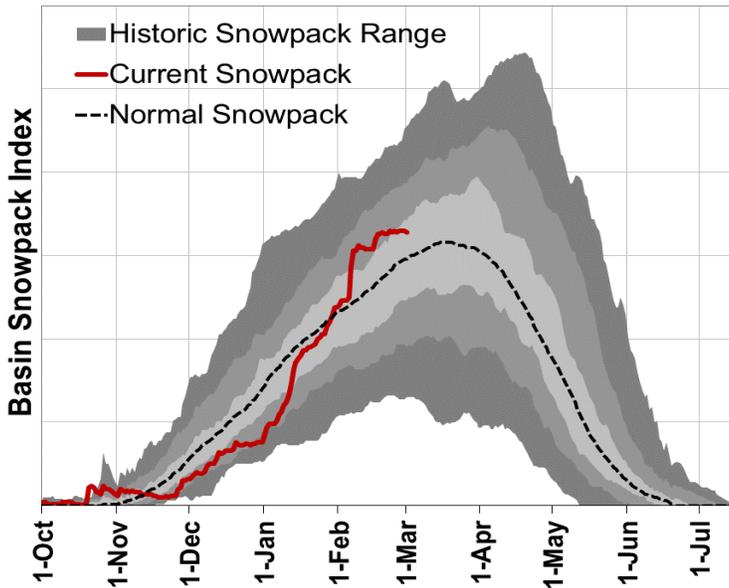
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-Mar	48	15.7	25.4	18.3	86%
Trout Creek AM	7890	1-Mar	29	9.4	11.2	11.5	82%
Toe Jam SNOTEL	7700	1-Mar	41	13.5	19.4		
Govt Corrals AM	7400	1-Mar	38	12.5	17.7		
Jack Creek Upper SNOTEL	7250	1-Mar	45	14.5	14.1	14.4	101%
Dobson Creek Snow Course	7084	2-Mar	56	19.9	24.6	23.6	84%
Reynolds-Dobson Divide Snow Course	7064	2-Mar	58	19.8	25.6	21.2	93%
Fawn Creek SNOTEL	7000	1-Mar	51	15.6	16.8	13.4	116%
Merritt Mountain AM	7000	25-Feb	28	7.8	10.4	6.2	126%
Buckskin Lower SNOTEL	6915	1-Mar	34	10.4	12.0	8.1	128%
Reynolds West Fork #2 Snow Course	6798	2-Mar	58	20.2	23.3	21.6	94%
Gold Creek Snow Course	6707	25-Feb	25	7.0	7.4	5.8	121%
Big Bend SNOTEL	6700	1-Mar	30	9.4	11.3	8.4	112%
Fry Canyon SNOTEL	6700	1-Mar	10	4.3	4.6		
Fry Canyon Snow Course	6700	25-Feb	30	8.7	8.3	7.9	110%
Laurel Draw SNOTEL	6697	1-Mar	39	12.5	11.9	10.0	125%
Columbia Basin AM	6650	25-Feb	35	9.8	11.2	8.6	114%
Louse Canyon AM	6530	26-Feb	26	9.1	10.4	4.2	217%
South Mtn. SNOTEL	6500	1-Mar	36	13.2	16.6	15.0	88%
Quinn Ridge AM	6270	26-Feb	14	5.2	6.0	2.0	260%
Taylor Canyon SNOTEL	6200	1-Mar	17	6.0	10.4	5.2	115%
Blue Mountain Spring SNOTEL	5870	1-Mar	41	14.8	20.5	14.4	103%
Barney Creek (New) Snow Course	5830	1-Mar	37	8.4	13.6		
Buck Pasture AM	5740	26-Feb	13	4.9	5.8	1.6	306%
Lookout Butte AM	5740	26-Feb	0	0.0	0.0	0.0	
Mud Flat SNOTEL	5730	1-Mar	13	4.6	7.6	7.1	65%
Boulder Creek AM	5710	26-Feb	13	4.7	9.3	3.0	157%
Democrat Creek Snow Course	5686	3-Mar	29	10.8	11.7	9.4	115%
Reynolds Creek SNOTEL	5600	1-Mar	11	3.5	8.7	2.1	167%
Dooley Mountain Snow Course	5440	2-Mar	29	10.8	13.6	8.2	132%
Call Meadows AM	5380	1-Mar	10	4.0	10.8	4.4	91%
Bully Creek AM	5300	26-Feb	3	1.4	10.2	1.8	78%
Rock Springs SNOTEL	5290	1-Mar	14	6.9	10.3	6.2	111%
Lake Creek R.S. SNOTEL	5240	1-Mar	26	10.1	16.1	10.3	98%
Flag Prairie AM	4720	26-Feb	5	2.2	10.2	4.0	55%
Eldorado Pass Snow Course	4630	2-Mar	8	2.8	9.6	3.0	93%



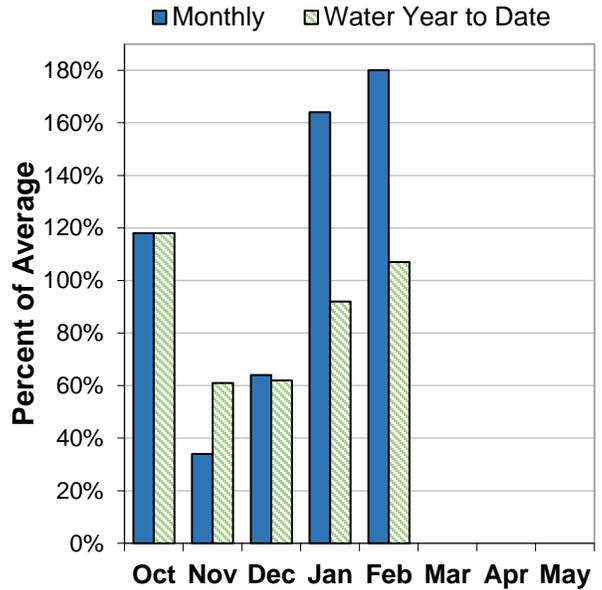
Grande Ronde, Powder, Burnt and Imnaha Basins

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 108% of normal. This is slightly higher than last month when the snowpack was 101% of normal.

PRECIPITATION

February precipitation was 180% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 107% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 56% of average at Phillips Lake to 147% of average at Wallowa Lake.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 81% to 124% of average. Overall, forecasts increased slightly from last month's report.

Grande Ronde, Powder, Burnt And Imnaha Basins Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	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	MAR-JUL	23	32	40	87%	48	62	46
	APR-SEP	13.0	22	29	83%	37	51	35
Powder R nr Sumpter ²	MAR-JUL	35	45	52	83%	61	73	63
	APR-SEP	27	37	44	81%	53	66	54
Pine Ck nr Oxbow	MAR-JUL	122	163	191	96%	220	260	200
	APR-SEP	90	128	153	94%	179	215	163
Imnaha R at Imnaha	APR-JUL	178	230	265	104%	295	345	255
	APR-SEP	195	250	285	102%	320	370	280
Catherine Ck nr Union	APR-JUL	49	61	69	115%	77	88	60
	APR-SEP	52	65	73	114%	81	93	64
Lostine R nr Lostine	APR-JUL	100	110	117	110%	123	134	106
	APR-SEP	107	118	126	110%	133	145	115
Bear Ck nr Wallowa	APR-JUL	57	67	73	116%	80	89	63
	APR-SEP	60	69	76	117%	83	92	65
Grande Ronde R at Troy	MAR-JUL	1480	1730	1900	126%	2070	2310	1510
	APR-SEP	1210	1460	1630	124%	1800	2050	1310

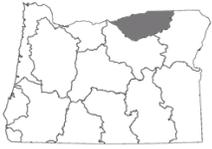
* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume
 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Phillips Lake	19.6	7.0	34.8	56%	73.5
Thief Valley	13.6	14.0	13.7	99%	13.3
Unity	15.0	9.6	14.5	104%	25.5
Wallowa Lake	24.2	21.1	16.4	147%	37.5
Wolf Creek	4.1	2.4	3.4	119%	11.1

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Burnt Basin	5	121%	178%
Imnaha Basin	5	84%	112%
Lower Grande Ronde Basin	4	104%	112%
Powder Basin	12	114%	136%
Upper Grande Ronde Basin	10	131%	132%
Wallowa Basin	7	114%	115%

Grande Ronde, Powder, Burnt And Innaha Basins Summary for March 1, 2020

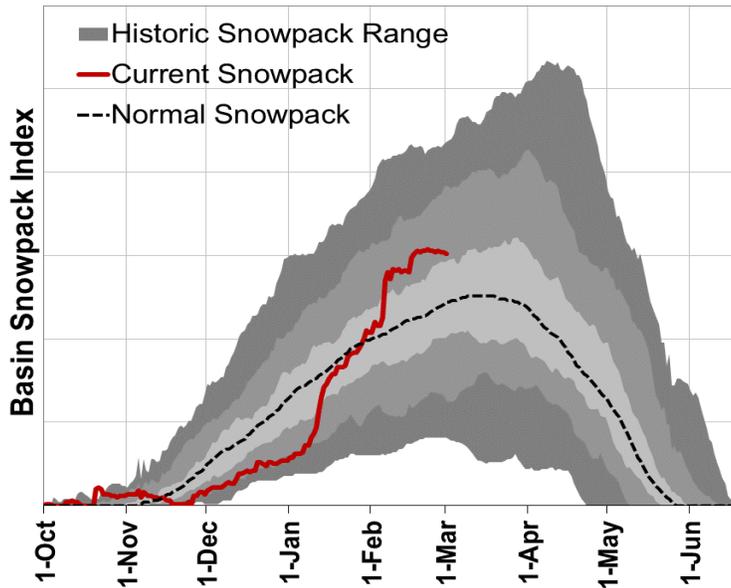
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mt. Howard SNOTEL	7910	1-Mar	34	11.8	13.4	11.8	100%
Aneroid Lake #2 SNOTEL	7400	1-Mar	50	14.6	16.8	20.2	72%
Anthony Lake (Rev) Snow Course	7160	28-Feb	70	26.2	25.5	19.8	132%
TV Ridge AM	7050	1-Mar	31	9.6	14.6	14.2	68%
Bald Mtn AM	6600	1-Mar	94	33.3	27.1	22.2	150%
Little Alps Snow Course	6360	28-Feb	41	11.8	12.8	10.4	113%
Big Sheep AM	6230	1-Mar	38	11.4	21.0	21.4	53%
Bear Saddle SNOTEL	6180	1-Mar	52	17.8	28.1	21.0	85%
Placer Creek Snow Course	5860	28-Feb	48	15.0	23.1	15.4	97%
Bourne SNOTEL	5850	1-Mar	43	14.6	18.6	14.0	104%
Barney Creek (New) Snow Course	5830	1-Mar	37	8.4	13.6		
Moss Springs SNOTEL	5760	1-Mar	79	32.1	24.1	20.9	154%
Taylor Green SNOTEL	5740	1-Mar	62	25.8	26.3	18.1	143%
Boulder Creek AM	5710	26-Feb	13	4.7	9.3	3.0	157%
Spruce Springs SNOTEL	5700	1-Mar	52	18.0	13.8	14.7	122%
Wolf Creek SNOTEL	5630	1-Mar	53	16.2	18.4	14.6	111%
Milk Shakes SNOTEL	5580	1-Mar	119	43.2	34.8		
West Branch SNOTEL	5560	1-Mar	52	19.2	27.8	19.0	101%
Touchet SNOTEL	5530	1-Mar	86	30.2	28.2	26.5	114%
Eilertson Meadows SNOTEL	5510	1-Mar	26	9.9	16.0	9.2	108%
West Eagle Meadows AM	5500	1-Mar	69	26.9	33.0	27.4	98%
Dooley Mountain Snow Course	5440	2-Mar	29	10.8	13.6	8.2	132%
Gold Center SNOTEL	5410	1-Mar	36	12.5	14.9	9.0	139%
Schneider Meadows SNOTEL	5400	1-Mar	70	23.2	35.4	25.3	92%
Beaver Reservoir SNOTEL	5150	1-Mar	37	11.6	13.2	8.9	130%
Tipton SNOTEL	5150	1-Mar	38	10.7	13.6	11.1	96%
High Ridge SNOTEL	4920	1-Mar	79	27.2	28.6	21.4	127%
County Line SNOTEL	4830	1-Mar	12	5.5	6.8	4.3	128%
Eldorado Pass Snow Course	4630	2-Mar	8	2.8	9.6	3.0	93%
Little Antone (Alt.) Snow Course	4560	28-Feb	29	9.4	13.2	8.8	107%
Bowman Springs SNOTEL	4530	1-Mar	29	11.6	14.6	7.5	155%
East Eagle Snow Course	4400	29-Feb	60	23.2	25.4	21.1	110%
Sourdough Gulch SNOTEL	4000	1-Mar	0	0.0	5.6	0.2	0%



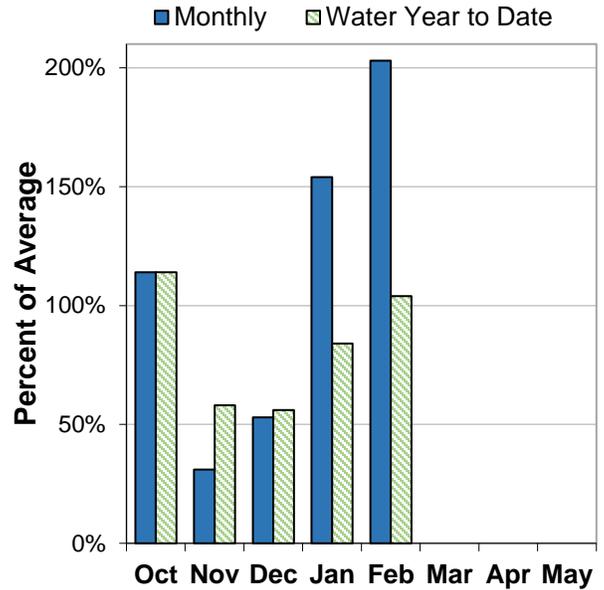
Umatilla, Walla Walla and Willow Basins

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 123% of normal. This is higher than last month when the snowpack was 104% of normal.

PRECIPITATION

February precipitation was 203% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 104% of average. An unprecedented rain on snow event in early February led to extreme flooding in the Umatilla and Walla Walla Basins.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 83% of average at Cold Springs Reservoir to 128% of average at McKay Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 86% to 120% of average. Overall, forecasts increased significantly from last month's report.

Umatilla, Walla Walla And Willow Basins Summary for March 1, 2020

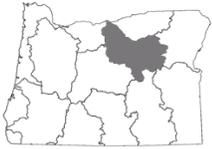
Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
SF Walla Walla R nr Milton-Freewater	MAR-JUL	62	70	76	112%	82	91	68
	APR-SEP	59	68	74	112%	80	89	66
Umatilla R ab Meacham nr Gibbon	MAR-JUL	88	107	120	119%	133	152	101
	APR-SEP	64	82	94	118%	107	125	80
Umatilla R at Pendleton	MAR-JUL	191	235	265	118%	295	340	225
	APR-SEP	117	159	188	120%	215	260	157
McKay Ck nr Pilot Rock	MAR-JUL	29	43	54	106%	66	86	51
	APR-SEP	11.9	22	31	107%	41	59	29
Butter Ck nr Pine City	MAR-JUL	7.0	10.1	12.6	85%	15.4	19.9	14.9
	APR-SEP	4.0	6.4	8.4	86%	10.6	14.4	9.8
Willow Ck ab Willow Lk nr Heppner	MAR-JUL	4.4	6.9	9.0	89%	11.3	15.2	10.1
	APR-SEP	2.4	4.5	6.3	89%	8.4	12.1	7.1
Rhea Ck nr Heppner	MAR-JUL	4.9	7.5	9.6	86%	11.9	15.8	11.1
	APR-SEP	2.5	4.7	6.5	87%	8.5	12.1	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	16.3	17.6	19.6	83%	38.6
Mckay	50.3	37.2	39.2	128%	71.5
Willow Creek	4.7	5.2	4.6	102%	9.8

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Umatilla Basin	5	126%	154%
Walla Walla Basin	7	123%	144%

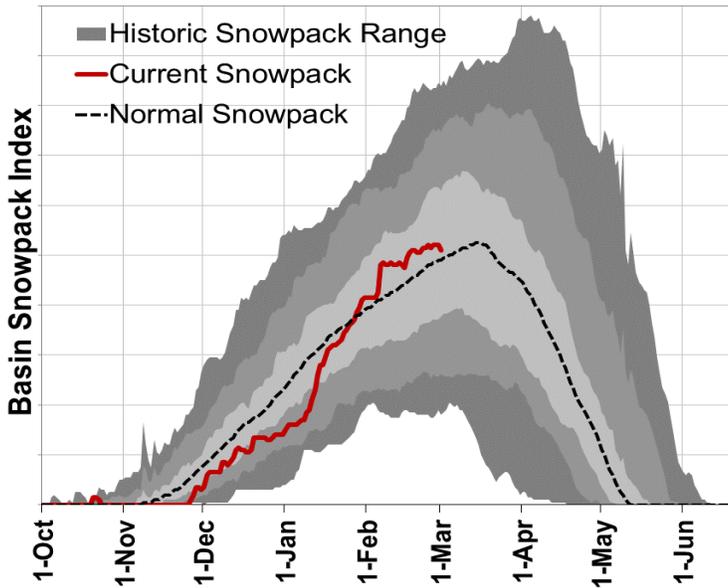
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Arbuckle Mtn SNOTEL	5770	1-Mar	48	14.8	19.1	15.2	97%
Spruce Springs SNOTEL	5700	1-Mar	52	18.0	13.8	14.7	122%
Milk Shakes SNOTEL	5580	1-Mar	119	43.2	34.8		
Touchet SNOTEL	5530	1-Mar	86	30.2	28.2	26.5	114%
Madison Butte SNOTEL	5150	1-Mar	16	5.8	10.6	3.9	149%
Lucky Strike SNOTEL	4970	1-Mar	30	10.1	13.2	6.8	149%
High Ridge SNOTEL	4920	1-Mar	79	27.2	28.6	21.4	127%
Bowman Springs SNOTEL	4530	1-Mar	29	11.6	14.6	7.5	155%
Emigrant Springs SNOTEL	3800	1-Mar	18	5.7	9.1	4.1	139%



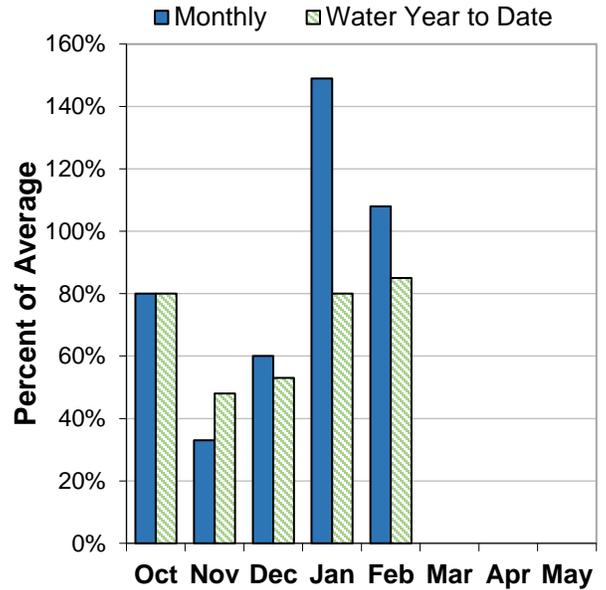
John Day Basin

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 103% of normal. This is similar to last month when the snowpack was 104% of normal.

PRECIPITATION

February precipitation was 108% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 85% of average.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 51% to 120% of average. Overall, forecasts remain similar to last month's report.

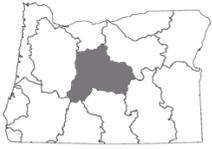
John Day Basin Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Strawberry Ck nr Prairie City	MAR-JUL	4.5	6.3	7.5	88%	8.8	10.6	8.5
	APR-SEP	4.6	6.4	7.7	88%	8.9	10.7	8.8
Mountain Ck nr Mitchell	MAR-JUL	1.78	2.7	3.4	54%	4.2	5.6	6.3
	APR-SEP	1.00	1.80	2.5	51%	3.3	4.6	4.9
Camas Ck nr Ukiah	MAR-JUL	42	52	59	123%	66	76	48
	APR-SEP	24	35	42	120%	50	61	35
MF John Day R at Ritter	MAR-JUL	88	125	149	96%	174	210	156
	APR-SEP	62	97	121	96%	145	180	126
NF John Day R at Monument	MAR-JUL	510	665	765	100%	870	1020	765
	APR-SEP	350	500	600	100%	700	845	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	91%	159%
North Fork John Day Basin	8	119%	145%
Upper John Day Basin	6	98%	145%

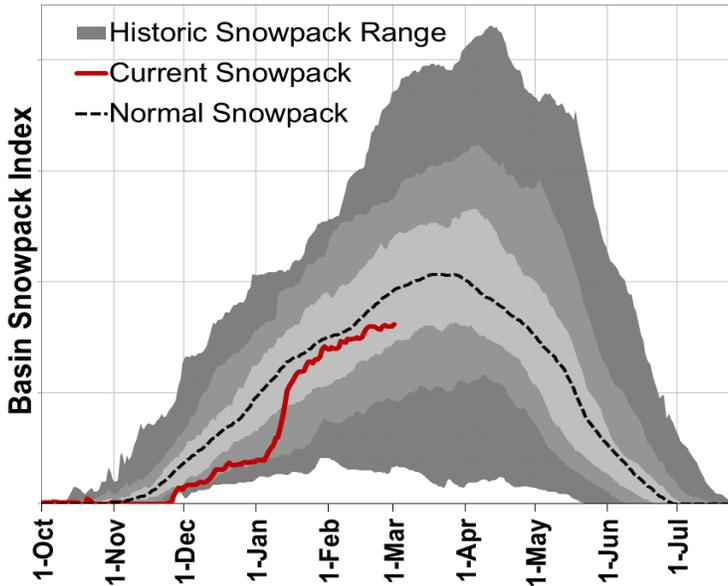
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Anthony Lake (Rev) Snow Course	7160	28-Feb	70	26.2	25.5	19.8	132%
Little Alps Snow Course	6360	28-Feb	41	11.8	12.8	10.4	113%
Snow Mountain SNOTEL	6230	1-Mar	27	9.4	13.6	9.8	96%
Blue Mountain Spring SNOTEL	5870	1-Mar	41	14.8	20.5	14.4	103%
Derr Snow Course	5860	2-Mar	23	10.2	13.5	9.2	111%
Bourne SNOTEL	5850	1-Mar	43	14.6	18.6	14.0	104%
Derr. SNOTEL	5850	1-Mar	30	9.9	17.3	12.8	77%
Barney Creek (New) Snow Course	5830	1-Mar	37	8.4	13.6		
Arbuckle Mtn SNOTEL	5770	1-Mar	48	14.8	19.1	15.2	97%
Ochoco Meadows SNOTEL	5430	1-Mar	23	8.3	15.4	10.0	83%
Gold Center SNOTEL	5410	1-Mar	36	12.5	14.9	9.0	139%
Starr Ridge SNOTEL	5250	1-Mar	19	6.8	10.0	6.2	110%
Lake Creek R.S. SNOTEL	5240	1-Mar	26	10.1	16.1	10.3	98%
Ochoco Meadows Snow Course	5190	2-Mar	23	9.6	13.1	10.0	96%
Madison Butte SNOTEL	5150	1-Mar	16	5.8	10.6	3.9	149%
Tipton SNOTEL	5150	1-Mar	38	10.7	13.6	11.1	96%
Lucky Strike SNOTEL	4970	1-Mar	30	10.1	13.2	6.8	149%
County Line SNOTEL	4830	1-Mar	12	5.5	6.8	4.3	128%
Marks Creek Snow Course	4580	2-Mar	2	0.6	8.0	3.1	19%
Little Antone (Alt.) Snow Course	4560	28-Feb	29	9.4	13.2	8.8	107%



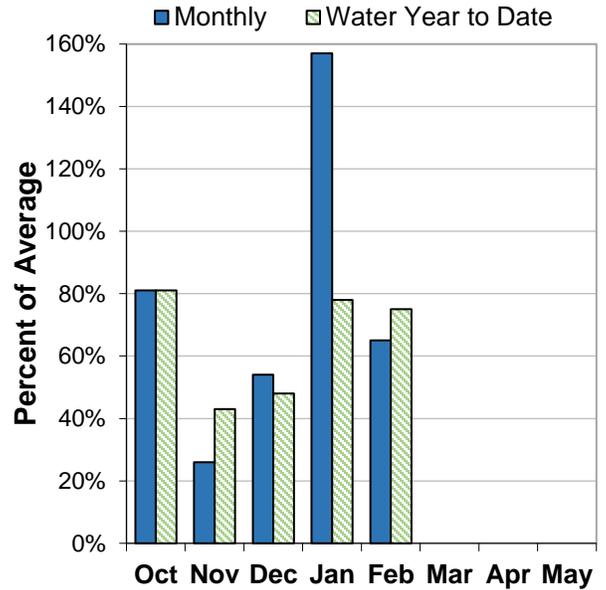
Upper Deschutes and Crooked Basins

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 83% of normal. This is slightly lower than last month when the snowpack was 91% of normal.

PRECIPITATION

February precipitation was 65% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 75% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 72% of average at Wickiup Reservoir to 115% of average at Crane Prairie Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 43% to 84% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should prepare for significantly reduced water supplies in the coming summer if conditions do not improve.

Upper Deschutes And Crooked Basins Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	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	MAR-JUL	14.2	19.3	23	64%	26	31	36
	MAR-SEP	22	30	36	62%	42	50	58
	APR-JUL	11.0	15.6	18.6	62%	22	26	30
	APR-SEP	19.6	28	34	65%	40	48	52
Crane Prairie Reservoir Inflow ²	MAR-JUL	31	41	47	71%	54	64	66
	MAR-SEP	44	59	69	71%	79	94	97
	APR-JUL	24	33	40	71%	46	55	56
	APR-SEP	37	51	61	69%	71	85	88
Crescent Lake Inflow ²	MAR-JUL	5.5	7.9	9.7	56%	11.8	15.2	17.2
	MAR-SEP	4.1	6.6	8.7	45%	11.1	15.1	19.5
	APR-JUL	4.9	6.9	8.5	57%	10.3	13.2	15.0
	APR-SEP	3.5	5.7	7.5	43%	9.6	13.1	17.4
Little Deschutes R nr La Pine ²	MAR-JUL	25	35	43	56%	51	65	77
	MAR-SEP	24	34	42	51%	51	66	83
	APR-JUL	19.0	27	34	54%	41	53	63
	APR-SEP	17.4	26	33	48%	41	54	69
Deschutes R at Benham Falls ²	MAR-JUL	280	300	315	80%	330	350	395
	MAR-SEP	415	440	460	82%	475	505	560
	APR-JUL	230	250	260	81%	275	290	320
	APR-SEP	365	390	405	84%	420	445	485
Wychus Ck nr Sisters	MAR-JUL	27	31	34	87%	36	40	39
	MAR-SEP	35	40	43	84%	47	51	51
	APR-JUL	24	28	30	86%	32	35	35
	APR-SEP	32	37	39	83%	42	46	47
Prineville Reservoir Inflow ²	MAR-JUL	46	71	91	53%	113	150	171
	MAR-SEP	45	70	90	53%	112	150	171
	APR-JUL	15.9	34	50	49%	69	102	102
	APR-SEP	14.7	32	48	47%	68	102	102
Ochoco Reservoir Inflow ²	MAR-JUL	9.6	15.1	19.4	59%	24	33	33
	MAR-SEP	8.9	14.2	18.5	58%	23	31	32
	APR-JUL	4.4	8.6	12.3	59%	16.7	24	21
	APR-SEP	3.7	7.8	11.4	57%	15.7	23	20

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

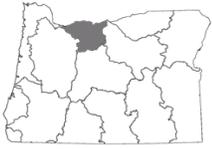
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Upper Deschutes And Crooked Basins Summary for March 1, 2020

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Crane Prairie	45.6	42.3	39.8	115%	55.3
Crescent Lake	44.5	59.7	47.5	94%	86.9
Ochoco	22.2	6.8	23.4	95%	44.2
Prineville	94.7	60.5	98.9	96%	148.6
Wickiup	127.3	121.8	176.1	72%	200.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Little Deschutes Basin	4	85%	117%
Upper Crooked Basin	5	86%	149%
Upper Deschutes Basin	13	84%	107%

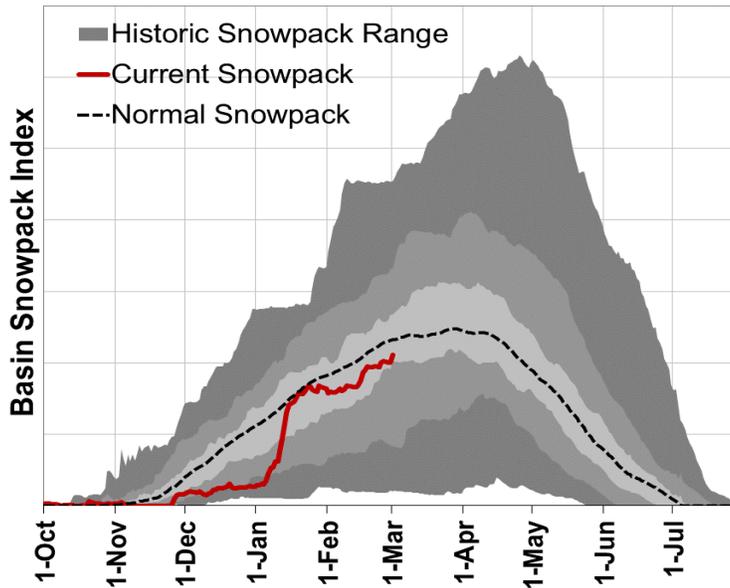
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
New Dutchman #3 Snow Course	6320	28-Feb	86	34.0	36.2	39.6	86%
Snow Mountain SNOTEL	6230	1-Mar	27	9.4	13.6	9.8	96%
Derr Snow Course	5860	2-Mar	23	10.2	13.5	9.2	111%
Derr. SNOTEL	5850	1-Mar	30	9.9	17.3	12.8	77%
Three Creeks Meadow SNOTEL	5690	1-Mar	30	12.0	17.2	16.1	75%
Summit Lake SNOTEL	5610	1-Mar	64	23.3	33.9	31.2	75%
Bald Peter Snow Course	5600	3-Mar	45	20.0		26.4	76%
Irish Taylor SNOTEL	5540	1-Mar	69	22.6	28.8	30.8	73%
Tangent Snow Course	5470	28-Feb	34	13.0	18.6	18.1	72%
Ochoco Meadows SNOTEL	5430	1-Mar	23	8.3	15.4	10.0	83%
Ochoco Meadows Snow Course	5190	2-Mar	23	9.6	13.1	10.0	96%
Racing Creek Snow Course	5160	3-Mar	23	10.2	20.8	12.3	83%
Cascade Summit SNOTEL	5100	1-Mar	70	26.0	29.4	26.2	99%
Roaring River SNOTEL	4950	1-Mar	56	23.5	27.3	25.0	94%
New Crescent Lake SNOTEL	4910	1-Mar	30	12.4	14.9	12.0	103%
Chemult Alternate SNOTEL	4850	1-Mar	12	3.9	12.4	8.1	48%
Hogg Pass SNOTEL	4790	1-Mar	36	14.5	22.6	20.1	72%
McKenzie SNOTEL	4770	1-Mar	76	29.7	32.9	36.4	82%
Marks Creek Snow Course	4580	2-Mar	2	0.6	8.0	3.1	19%
Hungry Flat Snow Course	4400	28-Feb	0	0.0	5.6	2.1	0%
Salt Creek Falls SNOTEL	4220	1-Mar	45	18.6	22.7	16.3	114%
Santiam Jct. SNOTEL	3740	1-Mar	31	12.6	14.1	15.5	81%



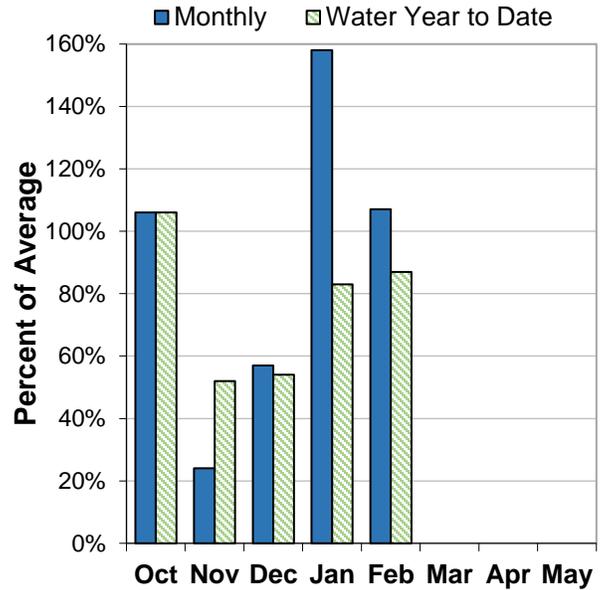
Hood, Sandy and Lower Deschutes Basins

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 91% of normal. This is slightly higher than last month when the snowpack was 86% of normal.

PRECIPITATION

February precipitation was 107% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 87% of average.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 92% to 96% of average. Overall, forecasts decreased slightly from last month's report. Water supplies in the basin are likely to be below normal to near normal this summer.

Hood, Sandy And Lower Deschutes Basins Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
WF Hood R nr Dee	APR-JUL	74	98	114	95%	130	154	120
	APR-SEP	90	115	132	95%	149	174	139
Hood R at Tucker Bridge	APR-JUL	140	182	210	93%	240	280	225
	APR-SEP	169	215	245	92%	275	320	265
Sandy R nr Marmot	APR-JUL	225	270	295	95%	325	370	310
	APR-SEP	270	315	345	96%	375	420	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	2.1	3.8	13.1		

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lower Columbia - Sandy Basin	6	96%	94%
Lower Deschutes Basin	7	81%	95%
Middle Columbia - Hood Basin	8	91%	88%

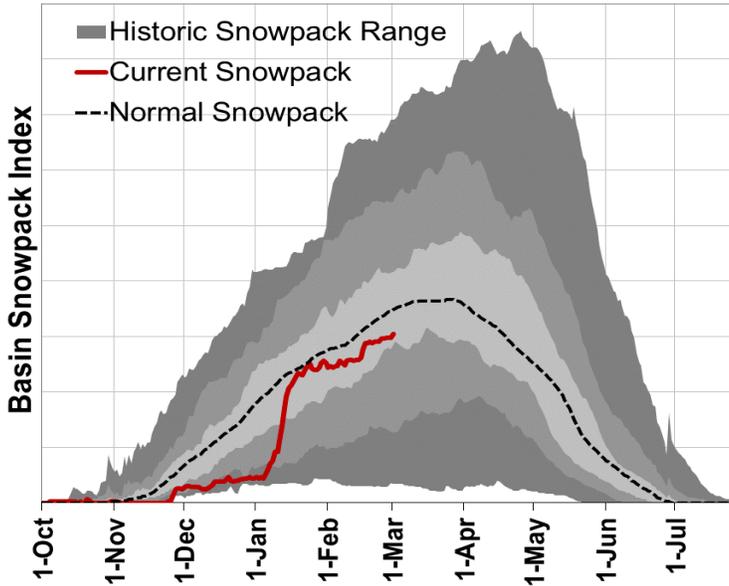
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
High Prairie Snow Course	6080	27-Feb	89	34.3	32.4	36.6	94%
Bald Peter Snow Course	5600	3-Mar	45	20.0		26.4	76%
Mt Hood Test Site SNOTEL	5370	1-Mar	120	41.3	35.7	48.0	86%
Racing Creek Snow Course	5160	3-Mar	23	10.2	20.8	12.3	83%
Red Hill SNOTEL	4410	1-Mar	96	39.4	35.0	41.7	94%
Mill Creek Meadow Snow Course	4400	27-Feb	29	10.4	15.7	11.7	89%
Surprise Lakes SNOTEL	4290	1-Mar	90	32.2	32.9	39.7	81%
Beaver Creek #2 Snow Course	4220	2-Mar	14	4.8	10.4	9.0	53%
Beaver Creek #1 Snow Course	4210	2-Mar	28	9.4	14.0	14.0	67%
Clear Lake SNOTEL	3810	1-Mar	17	5.6	10.6	12.4	45%
Blazed Alder SNOTEL	3650	1-Mar	81	29.5	23.1	25.0	118%
Clackamas Lake SNOTEL	3400	1-Mar	31	11.2	13.1	12.4	90%
Greenpoint SNOTEL	3310	1-Mar	23	8.5	15.3	18.0	47%
North Fork SNOTEL	3060	1-Mar	51	18.3	18.0	14.8	124%
South Fork Bull Run SNOTEL	2690	1-Mar	9	4.1	12.1	1.7	241%



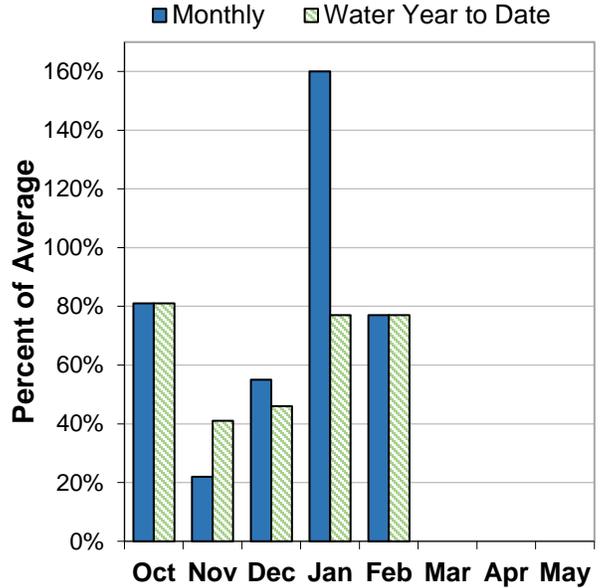
Willamette Basin

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 88% of normal. This is similar to last month when the snowpack was 88% of normal.

PRECIPITATION

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

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 66% of average at Fern Ridge Reservoir to 111% of average at Timothy Lake.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 91% to 100% of average. Overall, forecasts remain similar to last month's report. Water supplies in the basin are likely to be below normal to near normal this summer.

Willamette Basin Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Hills Creek Reservoir Inflow ^{1,2}	APR-JUN	133	210	240	98%	275	350	245
	APR-SEP	188	275	315	100%	355	445	315
Lookout Point Reservoir Inflow ^{1,2}	APR-JUN	360	555	640	98%	730	920	650
	APR-SEP	500	715	810	98%	910	1120	825
McKenzie R bl Trail Bridge	APR-JUN	146	178	193	92%	210	245	210
	APR-SEP	250	300	320	93%	345	395	345
Cougar Lake Inflow ^{1,2}	APR-JUN	103	147	170	92%	194	255	185
	APR-SEP	135	187	215	91%	240	310	235
Blue Lake Inflow ^{1,2}	APR-JUN	38	60	72	90%	85	118	80
	APR-SEP	40	65	79	92%	94	132	86
McKenzie R nr Vida ^{1,2}	APR-JUN	580	705	770	93%	835	990	830
	APR-SEP	800	1010	1110	93%	1220	1480	1190
Detroit Lake Inflow ^{1,2}	APR-JUN	255	390	450	96%	510	640	470
	APR-SEP	400	520	575	94%	630	750	610
North Santiam R at Mehama ^{1,2}	APR-JUN	345	555	650	98%	750	960	665
	APR-SEP	470	710	815	97%	925	1160	840
Green Peter Lake Inflow ^{1,2}	APR-JUN	130	210	250	94%	300	415	265
	APR-SEP	169	240	280	95%	320	415	295
Foster Lake Inflow ^{1,2}	APR-JUN	280	410	475	95%	545	725	500
	APR-SEP	335	475	550	97%	630	820	565
South Santiam R at Waterloo ²	APR-JUN	465	500	515	98%	530	570	525
	APR-SEP	360	510	580	98%	670	870	590
Willamette R at Salem ^{1,2}	APR-JUN	2240	3260	3790	96%	4360	5750	3950
	APR-SEP	2880	4040	4600	97%	5270	6810	4730
Oak Grove Fk ab Powerplant	APR-JUL	86	100	110	96%	120	135	115
	APR-SEP	114	131	143	92%	155	172	155
Clackamas R ab Three Lynx	APR-JUL	325	385	425	94%	460	520	450
	APR-SEP	405	465	505	94%	545	605	535
Clackamas R at Estacada	APR-JUL	445	530	590	94%	650	735	625
	APR-SEP	545	635	695	95%	755	845	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%

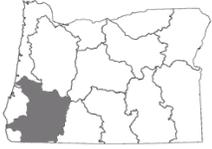
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Willamette Basin Summary for March 1, 2020

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Blue River	27.6	25.4	34.6	80%	82.3
Cottage Grove	10.3	16.4	11.0	94%	31.8
Cougar	78.0	57.4	85.4	91%	174.9
Detroit	211.5	195.7	252.3	84%	426.8
Dorena	21.9	40.8	26.5	83%	72.1
Fall Creek	35.3	32.9	50.3	70%	116.0
Fern Ridge	28.1	67.7	42.5	66%	97.3
Foster	29.1	34.9	27.7	105%	46.2
Green Peter	239.5	230.8	264.2	91%	402.8
Hills Creek	132.6	146.0	154.3	86%	279.2
Lookout Point	194.3	174.7	216.2	90%	433.2
Timothy Lake	56.9	56.5	51.2	111%	63.6
Henry Hagg Lake	43.7	43.7	45.2	97%	53.3

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Clackamas Basin	10	91%	95%
McKenzie Basin	17	83%	111%
Middle Fork Willamette Basin	7	88%	117%
North Santiam Basin	4	106%	117%
South Santiam Basin	4	106%	121%

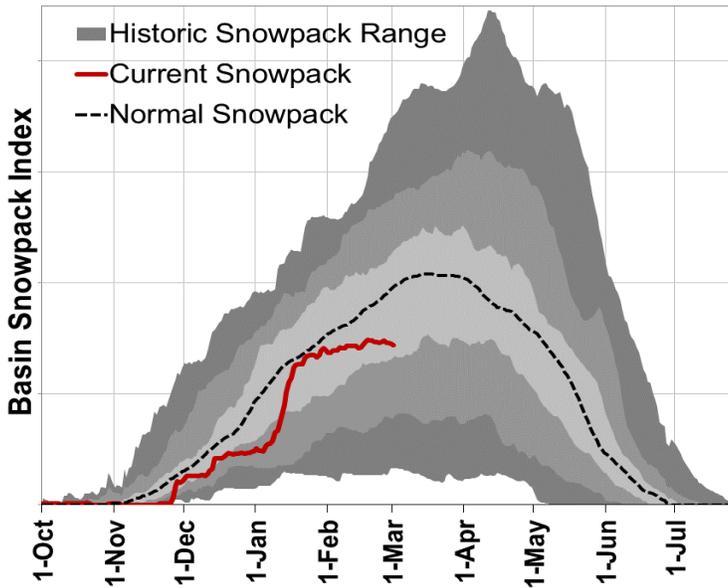
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summit Lake SNOTEL	5610	1-Mar	64	23.3	33.9	31.2	75%
Irish Taylor SNOTEL	5540	1-Mar	69	22.6	28.8	30.8	73%
Cascade Summit SNOTEL	5100	1-Mar	70	26.0	29.4	26.2	99%
Roaring River SNOTEL	4950	1-Mar	56	23.5	27.3	25.0	94%
Holland Meadows SNOTEL	4930	1-Mar	38	15.1	25.4	18.0	84%
McKenzie SNOTEL	4770	1-Mar	76	29.7	32.9	36.4	82%
Bear Grass SNOTEL	4720	1-Mar	88	37.0	44.0		
Beaver Creek #2 Snow Course	4220	2-Mar	14	4.8	10.4	9.0	53%
Salt Creek Falls SNOTEL	4220	1-Mar	45	18.6	22.7	16.3	114%
Beaver Creek #1 Snow Course	4210	2-Mar	28	9.4	14.0	14.0	67%
Little Meadows SNOTEL	4020	1-Mar	61	24.4	26.2	21.2	115%
Clear Lake SNOTEL	3810	1-Mar	17	5.6	10.6	12.4	45%
Santiam Jct. SNOTEL	3740	1-Mar	31	12.6	14.1	15.5	81%
Daly Lake SNOTEL	3690	1-Mar	30	12.7	13.6	11.3	112%
Marys Peak (Rev.) Snow Course	3580	28-Feb	1	0.5	16.8		
Jump Off Joe SNOTEL	3520	1-Mar	24	8.2	10.8	11.2	73%
Peavine Ridge SNOTEL	3420	1-Mar		11.0	15.1	11.2	98%
Clackamas Lake SNOTEL	3400	1-Mar	31	11.2	13.1	12.4	90%
Smith Ridge SNOTEL	3270	1-Mar	7	3.1	12.1		
Saddle Mountain SNOTEL	3110	1-Mar	3	1.0	12.4		
Railroad Overpass SNOTEL	2680	1-Mar	0	0.0	5.3	0.0	
Marion Forks SNOTEL	2590	1-Mar	11	8.9	11.2	7.5	119%
Seine Creek SNOTEL	2060	1-Mar	0	0.1	4.8	0.0	
Miller Woods SNOTEL	420	1-Mar	0	0.0	0.0		



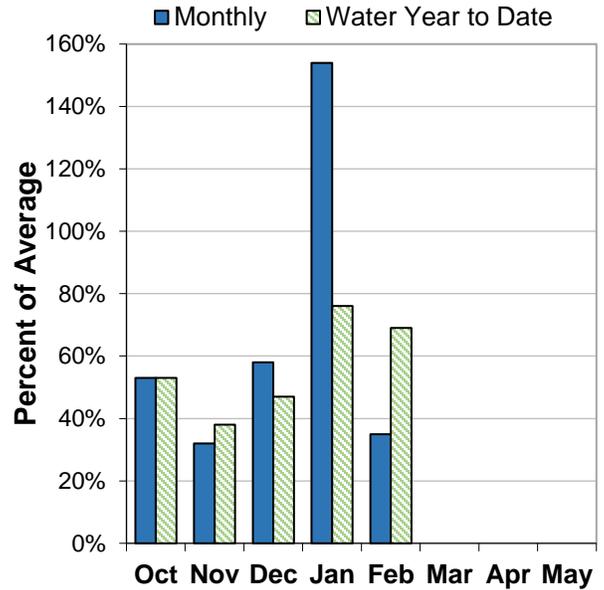
Rogue and Umpqua Basins

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 71% of normal. This is lower than last month when the snowpack was 89% of normal.

PRECIPITATION

February precipitation was 35% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 69% of average.

RESERVOIR

Reservoir storage across the basin is currently below average. As of March 1, storage at major reservoirs in the basin ranges from 46% of average at Fourmile Lake and Howard Prairie to 89% of average at Lost Creek Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 75% to 89% of average. Overall, forecasts decreased slightly from last month's report. Water supplies in the basin are likely to be well below normal to below normal this summer.

Rogue And Umpqua Basins Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
South Umpqua R at Tiller	APR-JUL	83	134	169	88%	205	255	193
	APR-SEP	91	143	177	89%	210	265	200
Cow Ck ab Galesville Reservoir	APR-JUL	1.67	7.2	11.0	79%	14.8	20	13.9
	APR-SEP	2.4	8.1	12.0	80%	15.9	22	15.0
South Umpqua R nr Brockway	APR-JUL	240	300	340	87%	380	440	390
	APR-SEP	255	315	355	87%	395	455	410
North Umpqua R at Winchester	APR-JUL	395	565	685	88%	800	975	775
	APR-SEP	485	665	790	89%	910	1090	890
Lost Creek Lk Inflow ²	MAR-JUL	410	510	580	87%	645	745	665
	MAR-SEP	510	620	695	88%	770	880	790
	APR-JUL	315	395	450	87%	505	585	520
	APR-SEP	410	500	560	87%	620	715	645
Rogue R at Raygold ²	APR-JUL	345	490	590	87%	685	835	675
	APR-SEP	440	600	705	88%	810	970	805
Rogue R at Grants Pass ²	APR-JUL	415	535	620	86%	705	825	725
	APR-SEP	515	640	725	86%	815	940	845
Applegate Lake Inflow ²	MAR-JUL	70	108	132	85%	159	197	155
	MAR-SEP	74	113	137	85%	165	205	161
	APR-JUL	41	71	92	84%	113	143	109
	APR-SEP	46	77	98	85%	119	150	115
Sucker Ck bl Ltl Grayback nr Holland	APR-JUL	8.0	27	40	73%	53	72	55
	APR-SEP	10.8	30	44	75%	57	76	59
Illinois R nr Kerby	APR-JUL	31	102	150	80%	198	270	188
	APR-SEP	35	106	154	80%	200	275	193

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

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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Applegate	15.9	27.0	25.0	63%	75.2
Emigrant Lake	20.3	19.3	27.2	74%	39.0
Fish Lake	3.7	3.8	5.0	74%	7.9
Fourmile Lake	3.4	3.9	7.5	46%	15.6
Howard Prairie	17.5	17.3	37.9	46%	62.1
Hyatt Prairie	7.5	2.5	10.9	69%	16.2
Lost Creek	195.0	211.6	219.0	89%	315.0

Rogue And Umpqua Basins Summary for March 1, 2020

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Applegate Basin	5	57%	116%
Middle Rogue Basin	8	55%	150%
North Umpqua Basin	7	79%	168%
South Umpqua Basin	10	91%	318%
Upper Rogue Basin	11	72%	101%

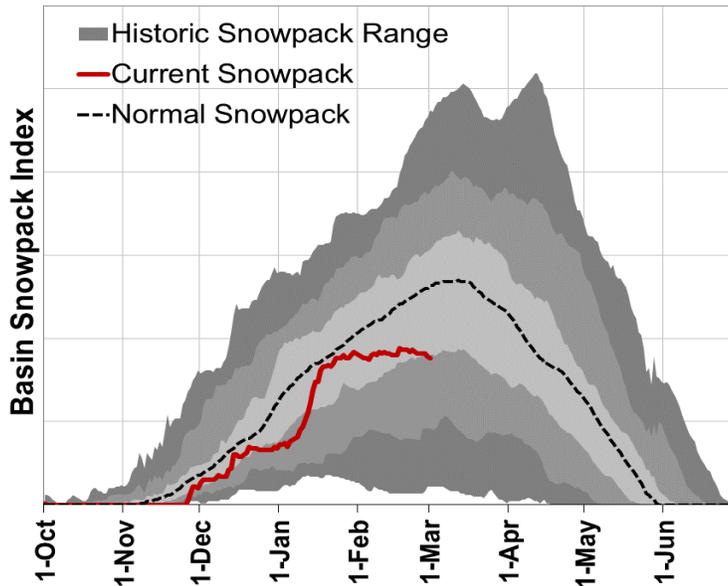
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Park H.Q. Rev Snow Course	6570	27-Feb	88	35.4	45.6	53.2	67%
Caliban (Alt.) Snow Course	6500	2-Mar	43	14.8	29.6	25.2	59%
Mt. Ashland Switchback Snow Course	6430	2-Mar	37	13.5	29.0	27.6	49%
Ski Bowl Road Snow Course	6070	2-Mar	27	9.6	20.8	21.0	46%
Big Red Mountain SNOTEL	6050	1-Mar	39	12.6	25.6	22.6	56%
Annie Springs SNOTEL	6010	1-Mar	60	22.7	36.4	35.1	65%
Fourmile Lake SNOTEL	5970	1-Mar	50	17.8	25.0	27.2	65%
Cold Springs Camp SNOTEL	5940	1-Mar	35	16.4	23.8	29.9	55%
Sevenmile Marsh SNOTEL	5700	1-Mar	58	23.4	30.6	28.7	82%
Summit Lake SNOTEL	5610	1-Mar	64	23.3	33.9	31.2	75%
Billie Creek Divide SNOTEL	5280	1-Mar	43	18.7	22.6	20.6	91%
Diamond Lake SNOTEL	5280	1-Mar	19	11.8	19.9	15.6	76%
Bigelow Camp SNOTEL	5130	1-Mar	17	11.0	18.7	10.6	104%
Beaver Dam Creek Snow Course	5120	27-Feb	20	8.7	13.1	10.9	80%
King Mountain 1 Snow Course	4760	28-Feb	10	4.5	19.0	5.0	90%
Deadwood Junction Snow Course	4660	27-Feb	15	6.0	11.0	6.8	88%
Fish Lk. SNOTEL	4660	1-Mar	29	10.4	11.6	10.7	97%
Howard Prairie SNOTEL	4580	1-Mar	13	5.3	8.4		
Howard Prairie Snow Course	4580	27-Feb	7	2.6	7.8	6.6	39%
Siskiyou Summit Rev. 2 Snow Course	4560	2-Mar	11	4.0	11.2	6.1	66%
Red Butte 1 Snow Course	4460	27-Feb	28	9.5	17.5	9.8	97%
King Mountain SNOTEL	4340	1-Mar	1	1.5	13.6	2.4	63%
Red Butte 2 Snow Course	4050	27-Feb	0	0.0	9.5	2.9	0%
Silver Burn Snow Course	3680	27-Feb	29	10.9	15.9	11.5	95%
King Mountain 3 Snow Course	3680	28-Feb	0	0.0	6.7	0.0	
Red Butte 3 Snow Course	3500	27-Feb	0	0.0	7.7	0.1	0%
Toketee Airstrip SNOTEL	3240	1-Mar	4	3.1	8.4	0.8	388%
King Mountain 4 Snow Course	3050	28-Feb	0	0.0	0.8	0.0	
Red Butte 4 Snow Course	3000	27-Feb	0	0.0	4.3	0.0	



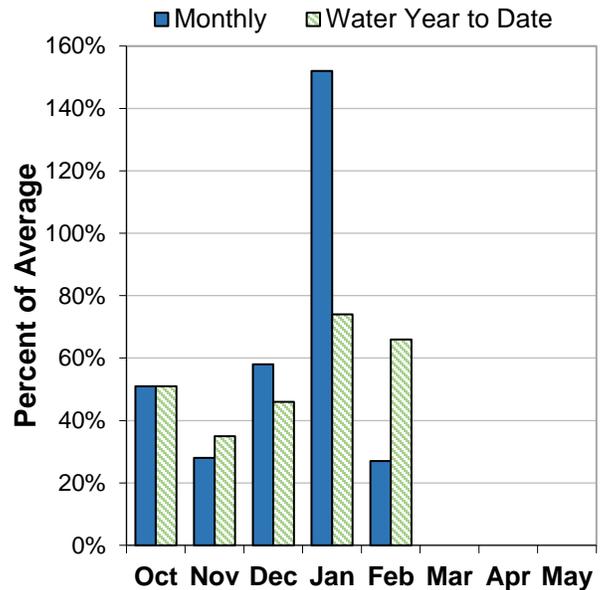
Klamath Basin

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 66% of normal. This is lower than last month when the snowpack was 85% of normal.

PRECIPITATION

February precipitation was 27% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 66% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 99% of average at Clear Lake to 136% of average at Gerber Reservoir.

STREAMFLOW FORECAST

The March through September streamflow forecasts in the basin range from 36% to 66% of average. Overall, forecasts decreased significantly from last month's report. Water managers in the basin should prepare for significantly reduced water supplies in the coming summer if conditions do not improve.

Klamath Basin Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	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	MAR-JUL	0.00	3.4	12.8	40%	22	36	32
	APR-SEP	0.00	0.00	5.2	36%	11.6	21	14.4
Sprague R nr Chiloquin	MAR-SEP	90	124	151	55%	180	230	275
	APR-SEP	67	94	115	55%	138	176	210
Williamson R bl Sprague nr Chiloquin	MAR-SEP	180	250	300	65%	350	420	460
	APR-SEP	142	198	235	66%	275	330	355
Upper Klamath Lake Inflow ^{1,2}	MAR-SEP	235	325	370	57%	420	535	645
	APR-SEP	146	220	255	55%	295	395	465

* 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	215.8	183.6	217.4	99%	513.3
Gerber	68.5	61.7	50.3	136%	94.3
Upper Klamath Lake	405.5	374.5	370.9	109%	523.7

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lost Basin	4	16%	202%
Sprague Basin	8	60%	158%
Upper Klamath Lake Basin	8	71%	96%
Williamson River Basin	5	65%	102%

Klamath Basin Summary for March 1, 2020

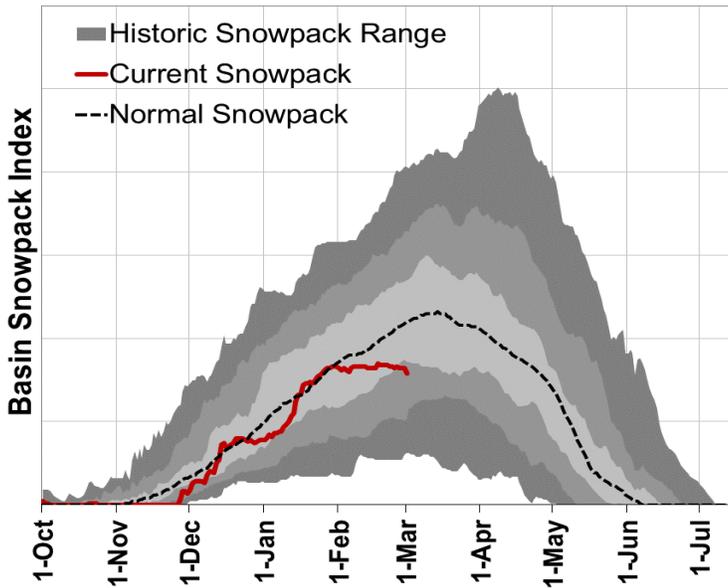
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summer Rim SNOTEL	7080	1-Mar	22	7.8	18.8	14.1	55%
Swan Lake Mtn SNOTEL	6830	1-Mar	39	16.0	27.9		
Park H.Q. Rev Snow Course	6570	27-Feb	88	35.4	45.6	53.2	67%
Colvin Creek AM	6520	26-Feb	5	2.0	9.6	2.9	69%
Crazyman Flat SNOTEL	6180	1-Mar	18	9.1	23.6	14.8	61%
Ski Bowl Road Snow Course	6070	2-Mar	27	9.6	20.8	21.0	46%
Annie Springs SNOTEL	6010	1-Mar	60	22.7	36.4	35.1	65%
Finley Corrals AM	6000	1-Mar	31	10.8	23.1	13.2	82%
Fourmile Lake SNOTEL	5970	1-Mar	50	17.8	25.0	27.2	65%
Cold Springs Camp SNOTEL	5940	1-Mar	35	16.4	23.8	29.9	55%
Strawberry SNOTEL	5770	1-Mar	2	1.4	7.7	4.3	33%
Cox Flat AM	5750	1-Mar	9	4.0	9.5	5.8	69%
Silver Creek SNOTEL	5740	1-Mar	17	6.8	14.4	10.3	66%
Quartz Mountain SNOTEL	5720	1-Mar	0	0.1	4.7	1.5	7%
Sevenmile Marsh SNOTEL	5700	1-Mar	58	23.4	30.6	28.7	82%
State Line SNOTEL	5680	1-Mar	9	4.6	11.4		
Sycan Flat AM	5580	26-Feb	2	1.0	11.2	6.2	16%
Sun Pass SNOTEL	5400	1-Mar	34	12.9	23.4		
Billie Creek Divide SNOTEL	5280	1-Mar	43	18.7	22.6	20.6	91%
Diamond Lake SNOTEL	5280	1-Mar	19	11.8	19.9	15.6	76%
Crowder Flat SNOTEL	5170	1-Mar	0	0.0	5.2	4.0	0%
Beaver Dam Creek Snow Course	5120	27-Feb	20	8.7	13.1	10.9	80%
Taylor Butte SNOTEL	5030	1-Mar	4	3.4	7.2	7.0	49%
Dog Hollow AM	4920	26-Feb	0	0.0	2.6	0.0	
Gerber Reservoir SNOTEL	4890	1-Mar	0	0.0	2.3	0.5	0%
Chemult Alternate SNOTEL	4850	1-Mar	12	3.9	12.4	8.1	48%
Deadwood Junction Snow Course	4660	27-Feb	15	6.0	11.0	6.8	88%
Fish Lk. SNOTEL	4660	1-Mar	29	10.4	11.6	10.7	97%
Howard Prairie SNOTEL	4580	1-Mar	13	5.3	8.4		
Howard Prairie Snow Course	4580	27-Feb	7	2.6	7.8	6.6	39%
Siskiyou Summit Rev. 2 Snow Course	4560	2-Mar	11	4.0	11.2	6.1	66%



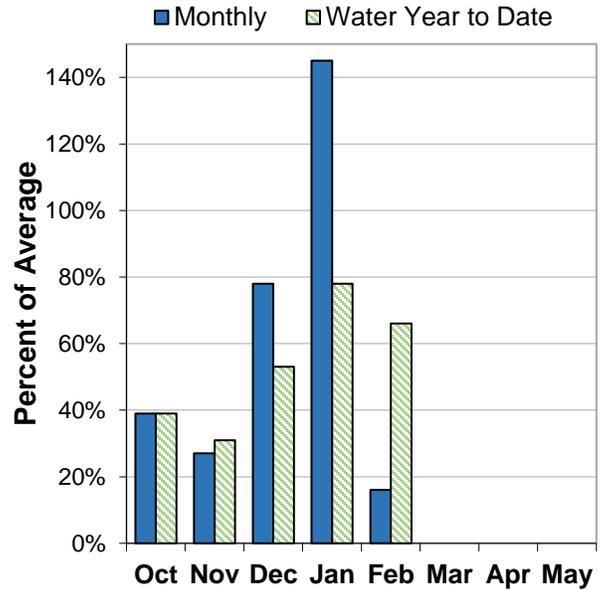
Lake County and Goose Lake Basins

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 79% of normal. This is lower than last month when the snowpack was 100% of normal.

PRECIPITATION

February precipitation was 16% of average. Precipitation since the beginning of the water year (October 1 - March 1) has been 66% of average.

RESERVOIR

As of March 1, storage at major reservoirs in the basin ranges from 68% of average at Cottonwood Reservoir to 127% of average at Drews Reservoir.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 61% to 90% of average. Overall, forecasts decreased significantly from last month's report. Water supplies in the basin are likely to be well below normal to below normal this summer.

Lake County And Goose Lake Basins Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	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	MAR-JUL	5.2	16.7	25	93%	32	44	27
	APR-SEP	1.61	9.9	15.6	90%	21	30	17.4
Deep Ck ab Adel	MAR-JUL	37	54	66	84%	77	94	79
	APR-SEP	28	43	53	82%	63	78	65
Honey Ck nr Plush	MAR-JUL	5.4	10.1	13.3	78%	16.4	21	17.1
	APR-SEP	2.9	7.5	10.6	75%	13.8	18.4	14.1
Chewaucan R nr Paisley	MAR-JUL	24	44	57	68%	70	90	84
	APR-SEP	22	36	46	61%	56	70	75

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

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Cottonwood	3.0	1.6	4.4	68%	9.3
Drews	41.1	28.8	32.4	127%	63.5

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Goose Lake Basin	7	89%	157%
Lake Abert Basin	7	73%	161%
Summer Lake Basin	12	79%	149%
Upper Pit Basin	3	71%	149%

Lake County And Goose Lake Basins Summary for March 1, 2020

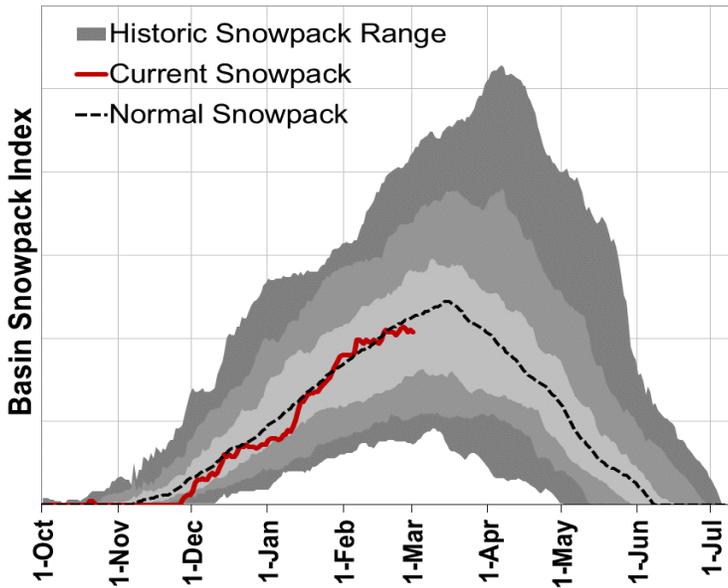
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Dismal Swamp SNOTEL	7360	1-Mar	61	25.5	33.8	24.5	104%
Summer Rim SNOTEL	7080	1-Mar	22	7.8	18.8	14.1	55%
Cedar Pass SNOTEL	7030	1-Mar	34	12.5	19.2	14.2	88%
Barley Camp AM	6890	26-Feb	50	18.0	24.8	14.4	125%
Patton Meadows AM	6800	1-Mar	32	11.2	21.8	14.4	78%
Sherman Valley AM	6640	1-Mar	21	8.5	15.5	11.3	75%
Bear Flat Meadow AM	6580	1-Mar	18	7.0	19.1	11.2	63%
Colvin Creek AM	6520	26-Feb	5	2.0	9.6	2.9	69%
Hart Mountain AM	6430	1-Mar	0	0.0	3.7	1.0	0%
Rogger Meadow AM	6360	1-Mar	31	12.4	19.5	10.1	123%
Adin Mtn Snow Course	6190	27-Feb	25	10.4		10.6	98%
Adin Mtn SNOTEL	6190	1-Mar	20	8.2	19.1	10.9	75%
Crazyman Flat SNOTEL	6180	1-Mar	18	9.1	23.6	14.8	61%
Finley Corrals AM	6000	1-Mar	31	10.8	23.1	13.2	82%
Camas Creek #3 Snow Course	5860	28-Feb	32	10.9	16.6	11.4	96%
Strawberry SNOTEL	5770	1-Mar	2	1.4	7.7	4.3	33%
Cox Flat AM	5750	1-Mar	9	4.0	9.5	5.8	69%
Silver Creek SNOTEL	5740	1-Mar	17	6.8	14.4	10.3	66%
State Line SNOTEL	5680	1-Mar	9	4.6	11.4		
Sycan Flat AM	5580	26-Feb	2	1.0	11.2	6.2	16%
Crowder Flat SNOTEL	5170	1-Mar	0	0.0	5.2	4.0	0%



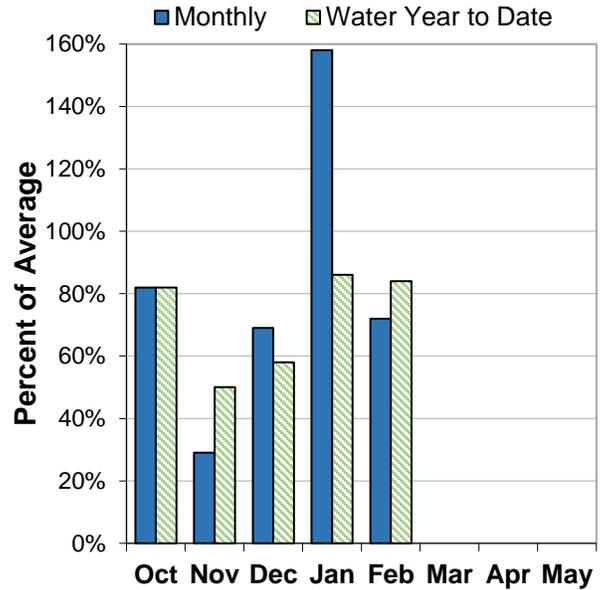
Harney Basin

March 1, 2020

Mountain Snowpack



Basin Precipitation



Summary of Water Supply Conditions

SNOWPACK

As of March 1, the basin snowpack was 96% of normal. This is lower than last month when the snowpack was 111% of normal.

PRECIPITATION

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

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin range from 87% to 97% of average. Overall, forecasts decreased significantly from last month's report. Water supplies in the basin are likely to be below normal to near normal this summer.

Harney Basin Summary for March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts March 1, 2020	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						30-Year Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Silvies R nr Burns	MAR-JUL	40	87	118	96%	150	196	123
	APR-SEP	13.6	58	89	97%	119	164	92
Donner Und Blitzen R nr Frenchglen	MAR-JUL	34	51	62	86%	74	91	72
	APR-SEP	32	48	59	87%	70	86	68
Trout Ck nr Denio	MAR-JUL	0.57	5.0	8.0	92%	11.0	15.4	8.7
	APR-SEP	0.24	4.4	7.4	93%	10.3	14.7	8.0

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

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Alvord Lake Basin	6	106%	129%
Donner und Blitzen River Basin	5	103%	123%
Silvies River Basin	4	102%	154%
Upper Quinn Basin	5	93%	127%

Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Snow Depth	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	% of Median	% of Median
Granite Peak SNOTEL	8543	1-Mar	48	15.7	25.4	18.3	86%
Trout Creek AM	7890	1-Mar	29	9.4	11.2	11.5	82%
Fish Creek SNOTEL	7660	1-Mar	62	20.3	23.3	21.3	95%
Govt Corrals AM	7400	1-Mar	38	12.5	17.7		
Oregon Canyon AM	7050	26-Feb	20	6.2	8.7	5.8	107%
Silvies SNOTEL	6990	1-Mar	38	12.0	14.4	14.6	82%
Pueblo Summit AM	6970	26-Feb	10	3.1	3.6	2.4	129%
Buckskin Lower SNOTEL	6915	1-Mar	34	10.4	12.0	8.1	128%
V Lake AM	6600	1-Mar	22	7.3	9.6	5.6	130%
Louse Canyon AM	6530	26-Feb	26	9.1	10.4	4.2	217%
Disaster Peak SNOTEL	6500	1-Mar	11	4.3	10.9	7.6	57%
Hart Mountain AM	6430	1-Mar	0	0.0	3.7	1.0	0%
Quinn Ridge AM	6270	26-Feb	14	5.2	6.0	2.0	260%
Snow Mountain SNOTEL	6230	1-Mar	27	9.4	13.6	9.8	96%
Lamance Creek SNOTEL	6000	1-Mar	24	9.2	12.1	11.0	84%
Blue Mountain Spring SNOTEL	5870	1-Mar	41	14.8	20.5	14.4	103%
Buck Pasture AM	5740	26-Feb	13	4.9	5.8	1.6	306%
Call Meadows AM	5380	1-Mar	10	4.0	10.8	4.4	91%
Rock Springs SNOTEL	5290	1-Mar	14	6.9	10.3	6.2	111%
Starr Ridge SNOTEL	5250	1-Mar	19	6.8	10.0	6.2	110%
Lake Creek R.S. SNOTEL	5240	1-Mar	26	10.1	16.1	10.3	98%
Buckskin Lake AM	5190	1-Mar	0	0.0	0.0	0.0	

Recession Forecasts for Oregon

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

The types of forecasts in the table below are:

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

OWYHEE AND MALHEUR BASINS					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Owyhee R nr Rome	2000 cfs	Mar 11	Apr 22	Jun 3	May 5
Owyhee R nr Rome	1000 cfs	Mar 15	Apr 27	Jun 9	May 18
Owyhee R nr Rome	500 cfs	Apr 2	May 14	Jun 25	June 2

UPPER JOHN DAY BASIN					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
John Day R at Service Creek	Average Daily Flow on Aug. 1st	38	186	410	271

UPPER DESCHUTES AND CROOKED BASINS					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Crane Prairie Inflow *	Date of Peak				May 25
Crane Prairie Inflow	Peak Flow	181	320	460	403
Crane Prairie Inflow	Average Daily Flow on Oct. 1st	148	196	245	269
Prineville Reservoir Inflow	150 cfs	Apr 30	May 23	Jun 15	May 30
Prineville Reservoir Inflow	80 cfs	May 5	May 29	Jun 22	June 7
Whychus Creek nr Sisters	100 cfs	Jul 4	Jul 28	Aug 27	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>
		90%	50%	10%	
South Umpqua R nr Brockway *	90 cfs	Jul 12	Aug 2	Aug 17	August 8
South Umpqua R at Tiller	140 cfs	Jun 13	Jul 4	Jul 23	July 11
South Umpqua R at Tiller	90 cfs	Jul 2	Jul 23	Aug 17	August 1
South Umpqua R at Tiller	60 cfs	Jul 28	Aug 22	Sep 21	August 28

*Dates are based on streamflow data adjusted for releases from Galesville Reservoir to reflect natural flow conditions and do not match observed gage data. There is an approximately 20% chance in any given year that the flow will not recede below 90 cfs; the dates given here are for the event that the flow does recede below 90 cfs.

LAKE COUNTY AND GOOSE LAKE BASINS					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----</i>			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Deep Ck ab Adel	100 cfs	May 18	Jun 9	Jul 1	June 17
Honey Ck nr Plush	100 cfs	Mar 31	May 3	Jun 5	May 16
Honey Ck nr Plush	50 cfs	Apr 16	May 16	Jun 15	June 4
Twentymile Ck nr Adel	50 cfs	Apr 16	May 12	Jun 7	May 30
Twentymile Ck nr Adel	10 cfs	Jun 5	Jun 28	Jul 23	July 7

HARNEY BASIN					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----</i>			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Silvies R nr Burns	400 cfs	Apr 13	May 12	Jun 10	May 21
Silvies R nr Burns	200 cfs	Apr 24	May 23	Jun 21	June 2
Silvies R nr Burns	100 cfs	May 5	Jun 6	Jul 8	June 13
Silvies R nr Burns	50 cfs				July 3
Donner Und Blitzen R nr Frenchglen	200 cfs	May 20	Jun 11	Jul 3	June 20
Donner Und Blitzen R nr Frenchglen	100 cfs	Jun 11	Jul 1	Jul 23	July 9

Basin Outlook Reports: How Forecasts Are Made

Federal – State – Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

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

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

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

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

Interpreting Water Supply Forecasts

Each month, five forecasts are issued for each forecast point and each forecast period. Unless otherwise specified, all streamflow forecasts are for streamflow volumes that would occur naturally without any upstream influences. Streamflow forecasts help users make risk-based decisions. Water users can select the forecast corresponding to the level of risk they are willing to accept in order to minimize the negative impacts of having more or less water than planned for. Users need to know what the different forecasts represent if they are to use the information correctly when making operational decisions. The following is an explanation of each of the forecasts.

90 Percent Chance of Exceedance Forecast. There is a 90 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 10 percent chance that the actual streamflow volume will be less than this forecast value.

70 Percent Chance of Exceedance Forecast. There is a 70 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 30 percent chance that the actual streamflow volume will be less than this forecast value.

50 Percent Chance of Exceedance Forecast. There is a 50 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 50 percent chance that the actual streamflow volume will be less than this forecast value. Generally, this forecast is the middle of the range of possible streamflow volumes that can be produced given current conditions.

30 Percent Chance of Exceedance Forecast. There is a 30 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 70 percent chance that the actual streamflow volume will be less than this forecast value.

10 Percent Chance of Exceedance Forecast. There is a 10 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 90 percent chance that the actual streamflow volume will be less than this forecast value.

*Note: There is still a 20 percent chance that actual streamflow volumes will fall either below the 90 percent exceedance forecast or above the 10 percent exceedance forecast.

These forecasts represent the uncertainty inherent in making streamflow predictions. This uncertainty may include sources such as: unknown future weather conditions, uncertainties associated with the various prediction methodologies, and the spatial coverage of the data network in a given basin. AF stands for acre-feet. Forecasted volumes of water are typically in thousands of acre-feet.

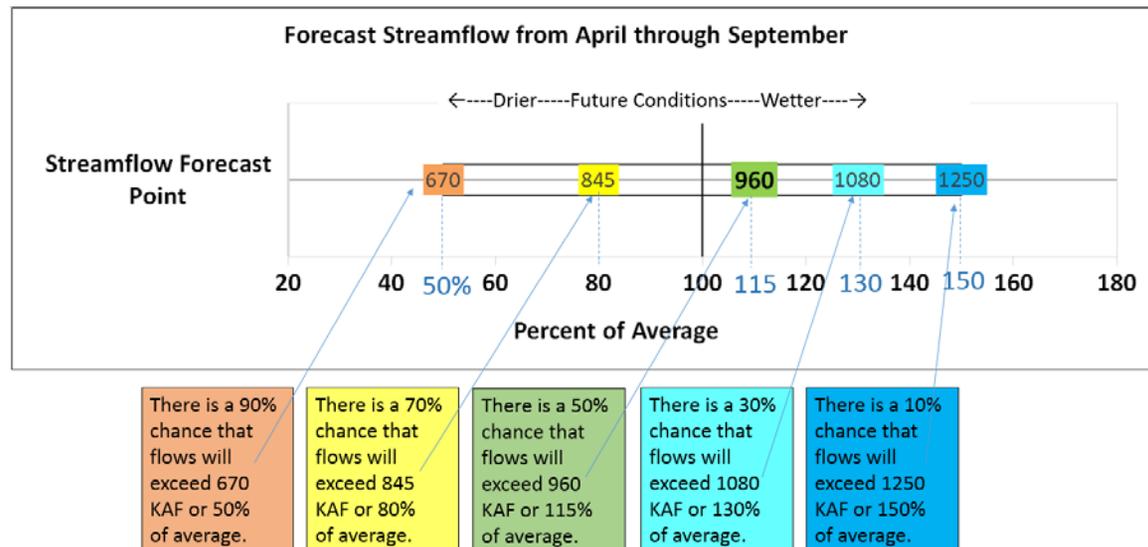
30-Year Average. The 30-year average streamflow for each forecast period is provided for comparison. The average is based on data from 1981-2010. The % AVG. column compares the 50% chance of exceedance forecast to the 30-year average streamflow; values above 100% denote when the 50% chance of exceedance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

To Decrease the Chance of Having Less Water than Planned for: A user might determine that making decisions based on a 50 percent chance of exceedance forecast is too much risk to take (there is still a 50% chance that the user will receive less than this amount). To reduce the risk of having less water than planned for, users can base their operational decisions on one of the forecasts with a greater chance of being exceeded such as the 90 or 70 percent exceedance forecasts.

To Decrease the Chance of Having More Water than Planned for: A user might determine that making decisions based on a 50 percent chance of exceedance forecast is too much risk to take (there is still a 50% chance that the user will receive more than this amount). To reduce the risk of having more water than planned for, users can base their operational decisions on one of the forecasts with a lesser chance of being exceeded such as the 30 or 10 percent exceedance forecasts.

Graphical Representation of Streamflow Forecast Range:

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



Using the Forecasts - an Example

Using the 50 Percent Exceedance Forecast. Using the example forecasts shown here, there is a 50% chance that actual streamflow volume at the Mountain Creek near Mitchell will be less than 4.4 KAF between April 1 and Sept 30. There is also a 50% chance that actual streamflow volume will be greater than 4.4 KAF.

Using the 90 and 70 Percent Exceedance Forecasts. If an unexpected shortage of water could cause problems (such as irrigated agriculture), users might want to plan on receiving 3.3 KAF (from the 70 percent exceedance forecast). There is a 30% chance of receiving *less* than 3.3 KAF.

Alternatively, if users determine the risk of using the 70 percent exceedance forecast is too great, then they might plan on receiving 1.7 KAF (from the **90** percent exceedance forecast). There is 10% chance of receiving less than 1.7 KAF.

JOHN DAY BASIN Streamflow Forecasts - February 1, 2013								
Forecast Point	Forecast Period	Drier Future Conditions			Wetter			30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (1000AF)	30% (1000AF)	10% (1000AF)		
Strawberry Ck nr Prairie City	MAR-JUL	5.0	6.6	7.6	89	8.6	10.2	8.5
	APR-SEP	5.2	6.8	7.9	90	9.0	10.6	8.8
Mountain Ck nr Mitchell	FEB-JUL	3.2	5.4	6.9	99	8.4	10.6	7.0
	APR-SEP	1.7	3.3	4.4	90	5.5	7.1	4.9

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

Using the 30 or 10 Percent Exceedance Forecasts. If an unexpected excess of water could cause problems (such as operating a flood control reservoir), users might plan on receiving 5.5 KAF (from the 30 percent exceedance forecast). There is a 30% chance of receiving *more* than 5.5 KAF.

Alternatively, if users determine the risk of using the 30 percent exceedance forecast is too great, then they might plan on receiving 7.1 KAF (from the 10 percent exceedance forecast). There is a 10% chance of receiving more than 7.1 KAF.

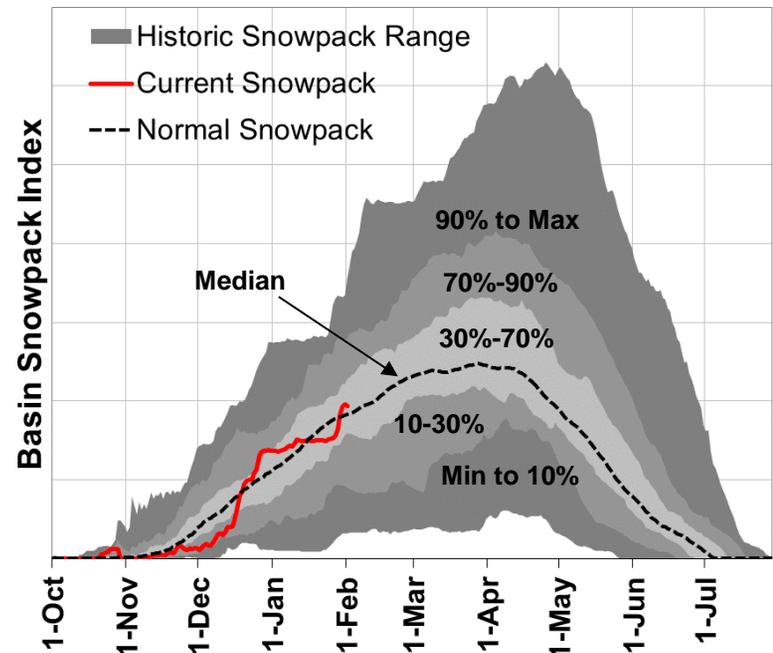
Interpreting Snowpack Plots

The basin snowpack plots display an index calculated using daily SNOTEL data for many sites in each basin. They show how the current year's snowpack data compares to historical data in the basin. The "Current Snowpack" line can be compared with the "Normal Snowpack" (median) line, as well as the historic range of snowpack in the basin.

The grey shaded areas represent different percentiles of the historical range of the snowpack index for each day. The dark grey shading indicates the extreme lows and highs in the SNOTEL record (minimum to the 10th percentile and the 90th percentile to maximum). The medium grey shading indicates the range from the 10th to 30th percentiles and the 70th to 90th percentiles. The light grey shading indicates the range between the 30th to 70th percentiles, while the median is the 50th percentile. A percentile is the value of the snowpack index below which the given percent of historical years fall. For instance, the 90th percentile line indicates that the snowpack index has been below this line for 90 percent of the years of record.

** Please note: These plots only use daily data from SNOTEL sites in the basin. Because snow course data is collected monthly, it cannot be included in these plots. The official snowpack percent of normal for the basin incorporates both SNOTEL and snow course data, so occasionally there might be slight discrepancies between the plot and official basin percent of normal (stated in basin summary below each plot).

Mountain Snowpack



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Official Business



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<http://www.or.nrcs.usda.gov/snow>

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