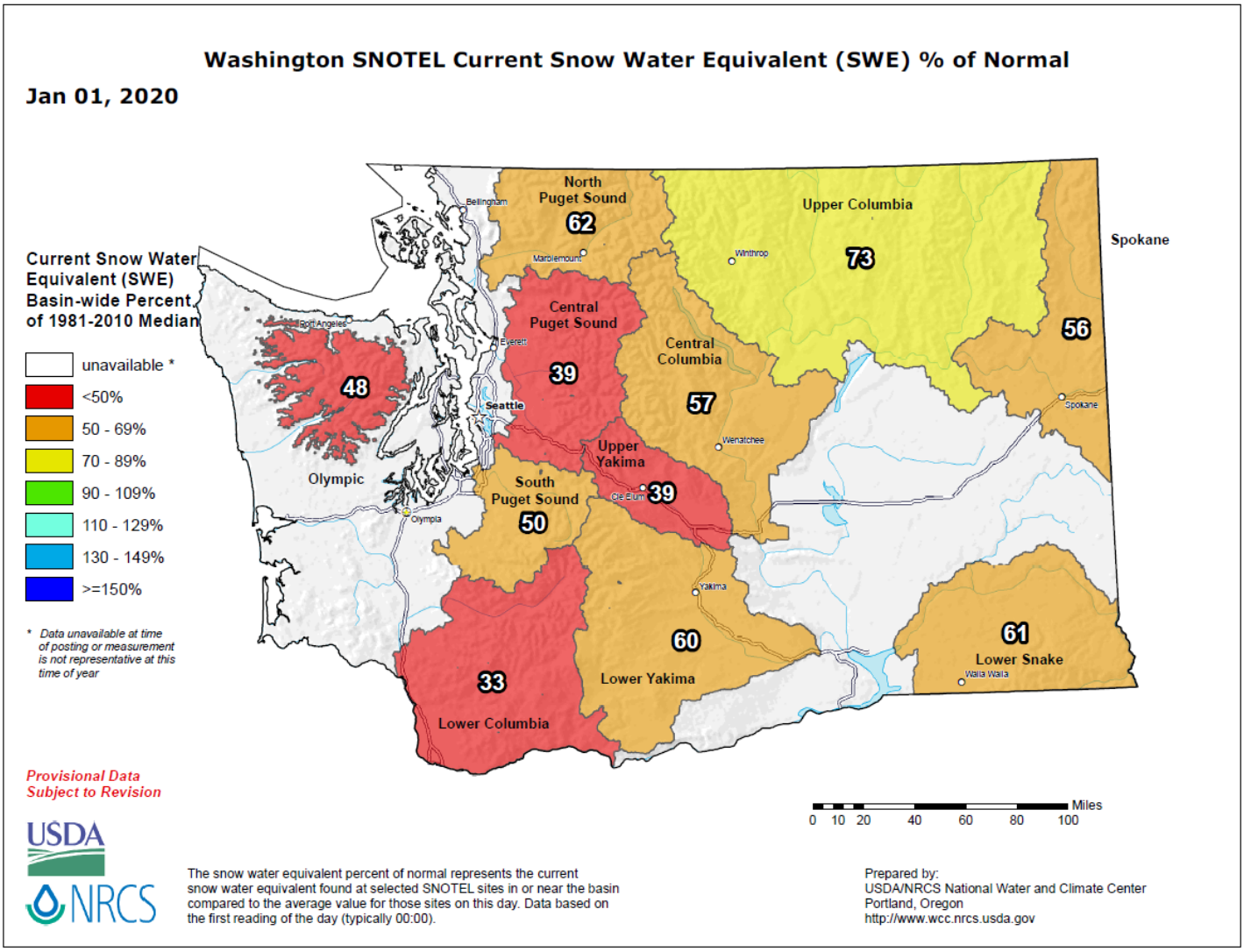
NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington Water Supply Outlook Report January 1, 2020



Water Supply Outlook Reports
and
Federal - State – Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

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How forecasts are made

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. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. 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 uncertain 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.

Washington
Water Supply Outlook

January 2020

General Outlook

Water-Year 2020 Started off extremely slow with warm/dry weather through mid-December, when it finally started to snow in earnest. On average the state had collected less than one-half of normal snow by January 1st. However recent storm activity has boosted that number to well over 60% of normal. On January 6th-7th we set record high snow water content increases at nearly one-half of our SNOTEL stations. Now is the time that we should be building for maximum snowpack for adequate water supply next summer so let's keep those storms rolling in. The most recent forecast through late-January shows a high probability for below normal temperatures and above normal precipitation. NWS 3-month (JFM) forecast indicates above normal temperatures and equal chances of below, above or normal precipitation. The US Drought Monitor indicates that most of the state is still in the grip of D0-D1 drought designation. (see page 4) http://www.cpc.ncep.noaa.gov/

Snowpack

The January 1 statewide SNOTEL readings were 48% of normal. The lowest readings in the state were at 18% of the 30-year median for January 1 in the Tolt River Basin. The Kettle River Basin had the most snow with 112%. Westside medians from SNOTEL, and January 1 snow surveys, included the North Puget Sound river basins with 62% of normal, the Central and South Puget river basins with 37% and 58% respectively, and the Lower Columbia basins with 35% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 54% and the Wenatchee area with 57%. Snowpack in the Spokane River Basin was at 49% and the Upper Columbia river basins had 78% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	49	82
Newman Lake	67	106
Pend Oreille	86	93
Okanogan	89	93
Methow	64	95
Conconully Lake	38	62
Central Columbia	57	95
Upper Yakima	41	95
Lower Yakima	66	100
Ahtanum Creek	61	91
Walla Walla	43	117
Lower Snake	60	96
Cowlitz	44	85
Lewis	25	69
White	76	120
Green	31	69
Puyallup	76	124
Cedar	43	91
Snoqualmie	28	75
Skykomish	33	73
Skagit	63	104
Nooksack	60	86
Olympic Peninsula	48	86

Precipitation

December precipitation from SNOTEL was pretty good across most of the state but only stacked up to be 71% of normal for the Water-Year starting October 1. November turned out to be one of the driest Novembers on record. November is typically the wettest month of the year. The big winner for December were the Central and North Puget Sound basins with 103% of average and the driest area was the Olympic Peninsula at 59%

RIVER BASIN	DECEMBER PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	79	65
Pend Oreille	75	74
Upper Columbia	83	65
Central Columbia	97	75
Upper Yakima	97	73
Lower Yakima	97	71
Walla Walla	53	62
Lower Snake	67	64
Lower Columbia	91	65
South Puget Sound	95	75
Central Puget Sound	103	82
North Puget Sound	103	73
Olympic Peninsula	59	45

Reservoir

Water-year 2018 ended with varied storage levels, most likely due to management/maintenance practices. Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. January 1 Reservoir storage in the Yakima Basin was 190,000-acre feet, 55% of average for the Upper Reaches and 90,000-acre feet or 87% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 38,000-acre feet, 40% of average and 16% of capacity; and Ross lake within the Skagit River Basin at 73% of average and 59% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	16	40
Pend Oreille	36	78
Upper Columbia	63	108
Central Columbia	46	75
Upper Yakima	23	55
Lower Yakima	39	87
Lower Snake	63	91
North Puget Sound	59	73

For more information contact your local Natural Resources Conservation Service office.

Streamflow

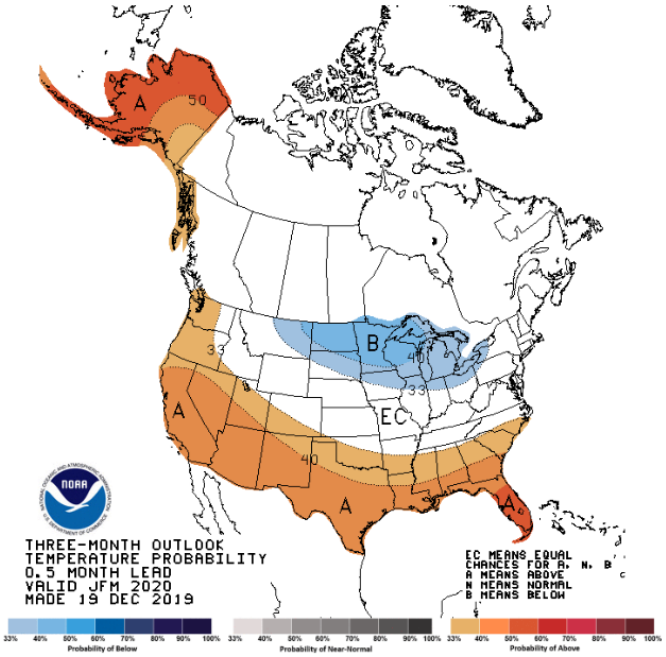
Early winter forecasts for April-September stream flows are never quite as robust as they are later in the season when we know more about the winter climatology. At times only a few degrees warmer or cooler than forecasted can make or break stream flow predictions. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. Caution should be used when using early season forecasts for critical water resource management decisions since governing conditions are likely to change for the better or the worse

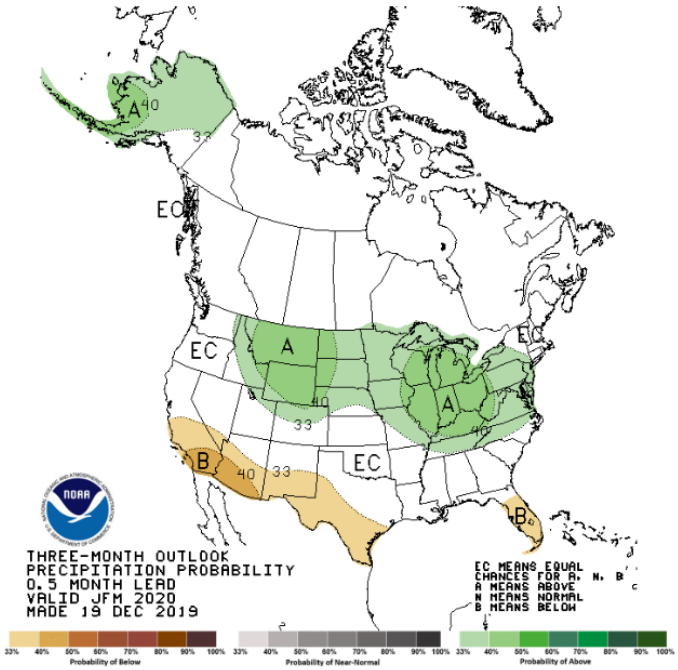
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	66-79
Pend Oreille	89-91
Upper Columbia	74-103
Central Columbia	86-104
Upper Yakima	69-81
Lower Yakima	82-93
Walla Walla	78-83
Lower Snake	60-92
Lower Columbia	77-101
South Puget Sound	88-92
Central Puget Sound	82-92
North Puget Sound	91-101
Olympic Peninsula	79-80

STREAM	PERCENT OF AVERAGE DECEMBER STREAMFLOWS
Pend Oreille at Albeni Fall Dam	86
Kettle at Laurier	151
Columbia at Birchbank	102
Spokane at Spokane	48
Similkameen at Nighthawk	97
Okanogan at Tonasket	94
Methow at Pateros	97
Chelan at Chelan	78
Stehekin near Stehekin	81
Wenatchee at Pashastin	58
Cle Elum near Roslyn	78
Yakima at Parker	76
Naches at Naches	83
Grande Ronde at Troy	53
Snake below Lower Granite Dam	69
Columbia River at The Dalles	73
Lewis at Merwin Dam	77
Cowlitz below Mayfield Dam	69
Skagit at Concrete	84
Dungeness near Sequim	40

For more information contact your local Natural Resources Conservation Service office.

Climate





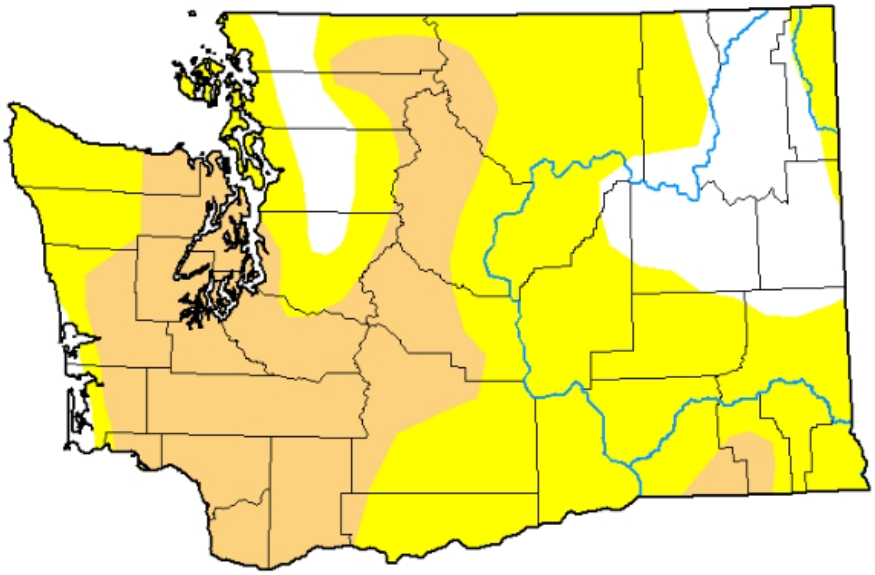
U.S. Drought Monitor

Washington

December 31, 2019

(Released Thursday, Jan. 2, 2020)

Valid 7 a.m. EST



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

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droughtmonitor.unl.edu

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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/wa/snow/

Oregon:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/snow/

Idaho:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

USDA-NRCS Agency Homepages

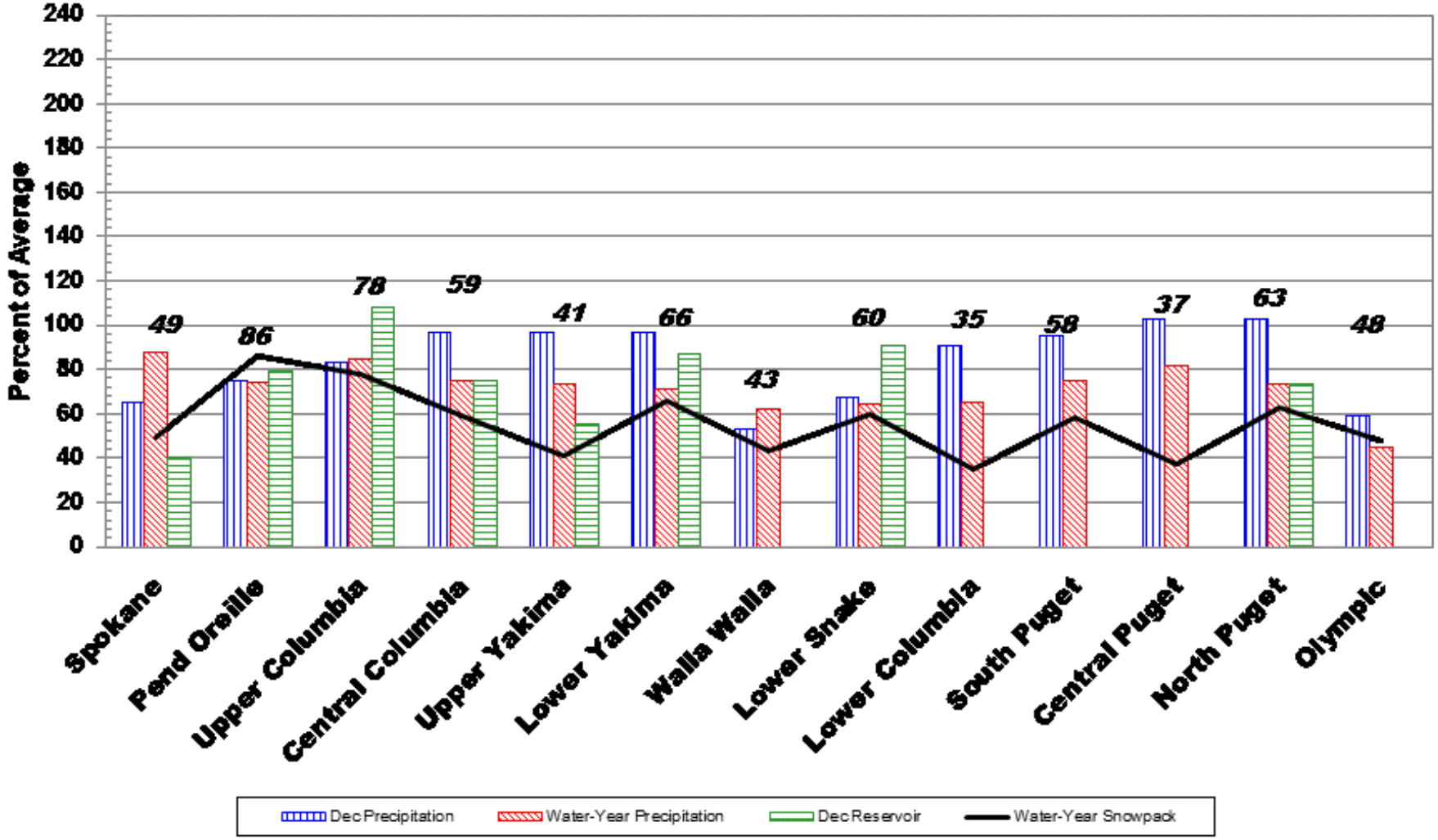
Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/

NRCS National:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

NRCS Natural Resources Conservation Service

January 1, 2020 - Snowpack, Precipitation and Reservoir Conditions at a Glance

(Water Year = October 1 - Current Date)



88th Meeting of the Western Snow Conference

The Western Snow Conference is an annual tradition which started in 1932 as an international forum for individuals and organizations to share scientific, management and socio-political information on snow and runoff. The principal aim of the Western Snow Conference is to advance snow and hydrological sciences. The North Pacific Area Committee is making plans for the 88th Annual Western Snow Conference in 2020.

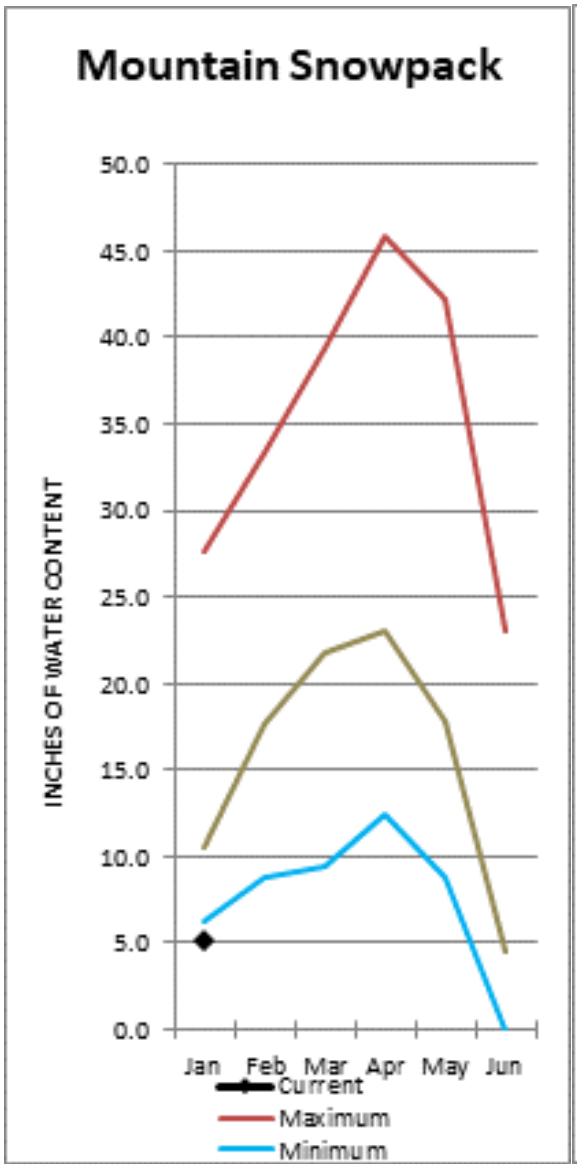
Mark your calendar and start thinking about submitting a paper to attend the 2018 Western Snow Conference:

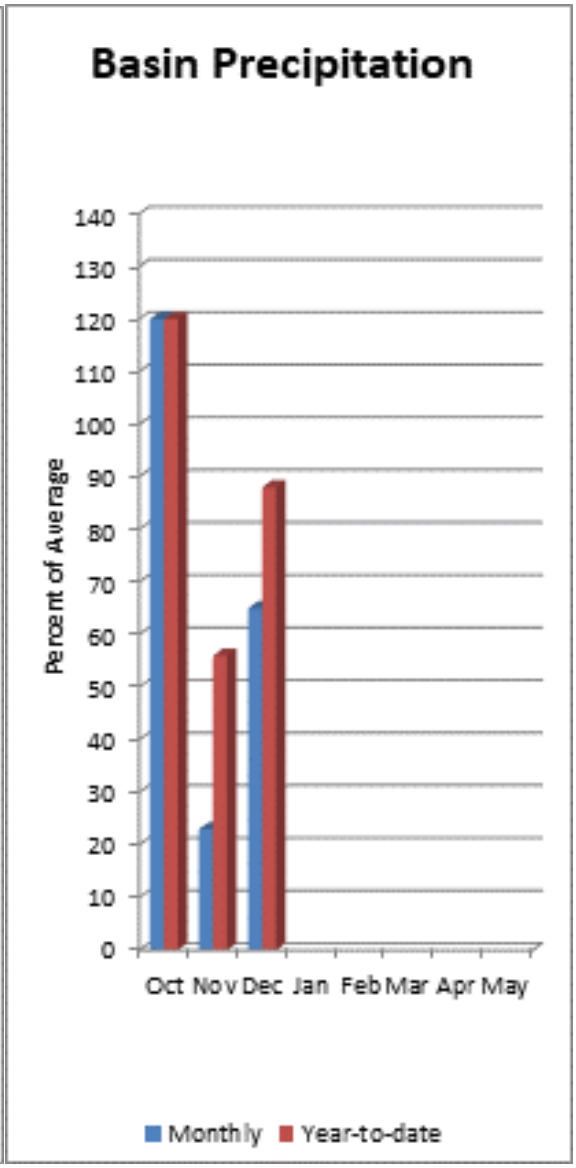
Dates: April 20-23, 2020
Location: Whistler, British Columbia, Canada

The 2020 conference will be held at the Hilton Hotel in Whistler, British Columbia, Canada. The Hilton is in the vibrant Whistler village within close walking distance of restaurants, shopping, and close to the breathtaking Whistler ski areas.

Additional information about the conference and the Call for Papers will be posted on the WSC web page at http://www.westernsnowconference.org/

Also find Western Snow Conference on Facebook.





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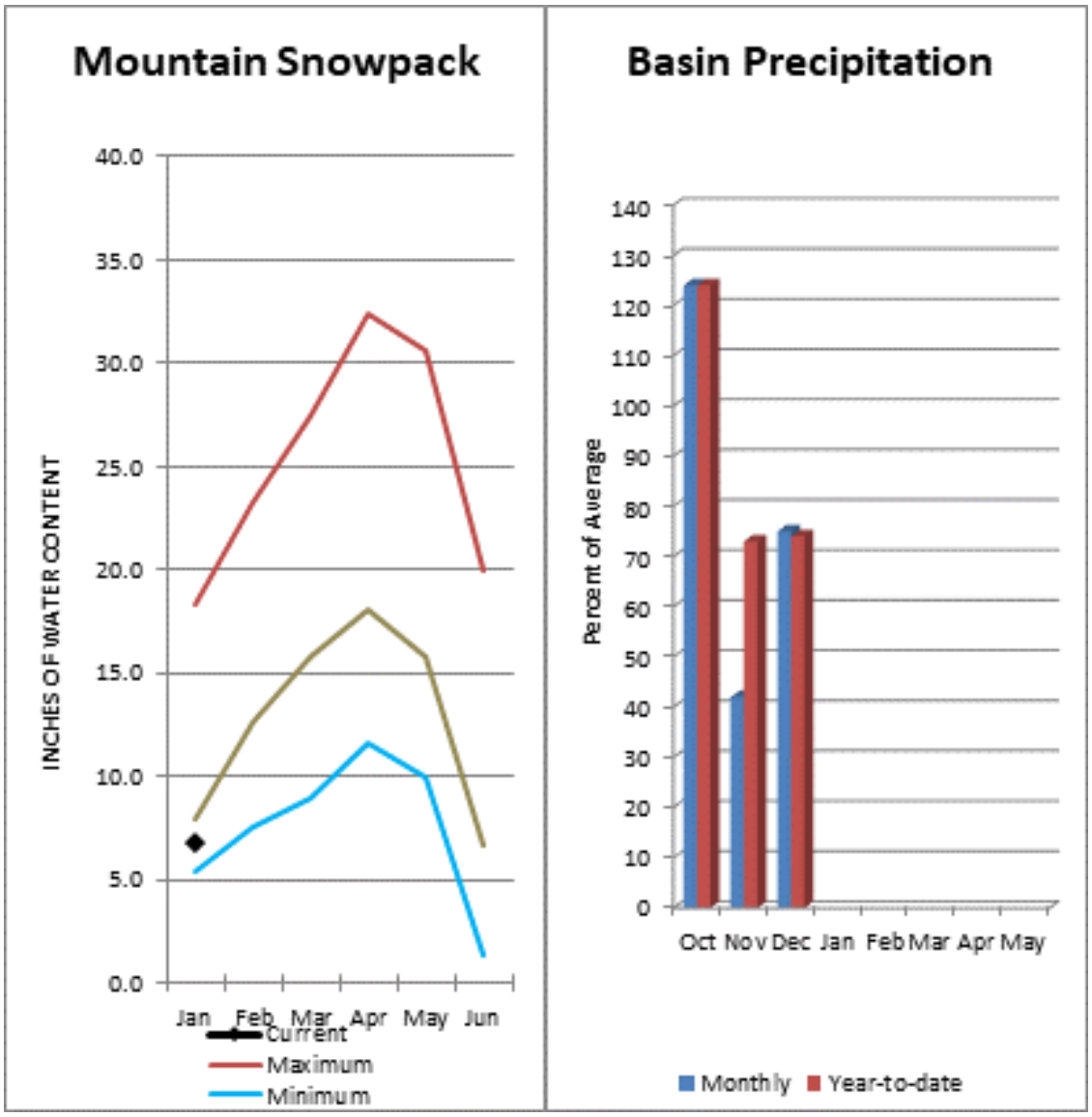
Spokane
Streamflow Forecasts - January 1, 2020

Spokane	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment: Chance that actual volume will exceed forecast — 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Spokane R nr Post Falls[2]								
	APR-JUL	725	1380	1830	77%	2270	2930	2390
	APR-SEP	770	1440	1890	76%	2340	3000	2480
Spokane R at Long Lake[2]								
	APR-JUL	930	1610	2080	79%	2540	3230	2620
	APR-SEP	1060	1760	2240	79%	2720	3420	2850
Chamokane Ck nr Long Lake								
	MAR-JUL	6.2	12	17.1	66%	23	33	26

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
3) Median value used in place of average

Reservoir Storage End of December, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	37.5	55.2	93.7	238.5
Basin-wide Total	37.5	55.2	93.7	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Spokane	11	49%	82%
Newman Lake	1	67%	106%



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Pend Oreille Basins
Streamflow Forecasts - January 1, 2020

Pend Oreille Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Pend Oreille Lake Inflow[2]								
	APR-JUL	5780	8690	10700	91%	12600	15600	11800
	APR-SEP	6280	9440	11600	91%	13700	16900	12800
Priest R nr Priest River[2]								
	APR-JUL	400	575	695	89%	820	995	780
	APR-SEP	425	610	735	89%	860	1050	830
Pend Oreille R bl Box Canyon[2]								
	APR-JUL	6110	8930	10800	91%	12800	15600	11900
	APR-SEP	6540	9640	11700	90%	13800	16900	13000

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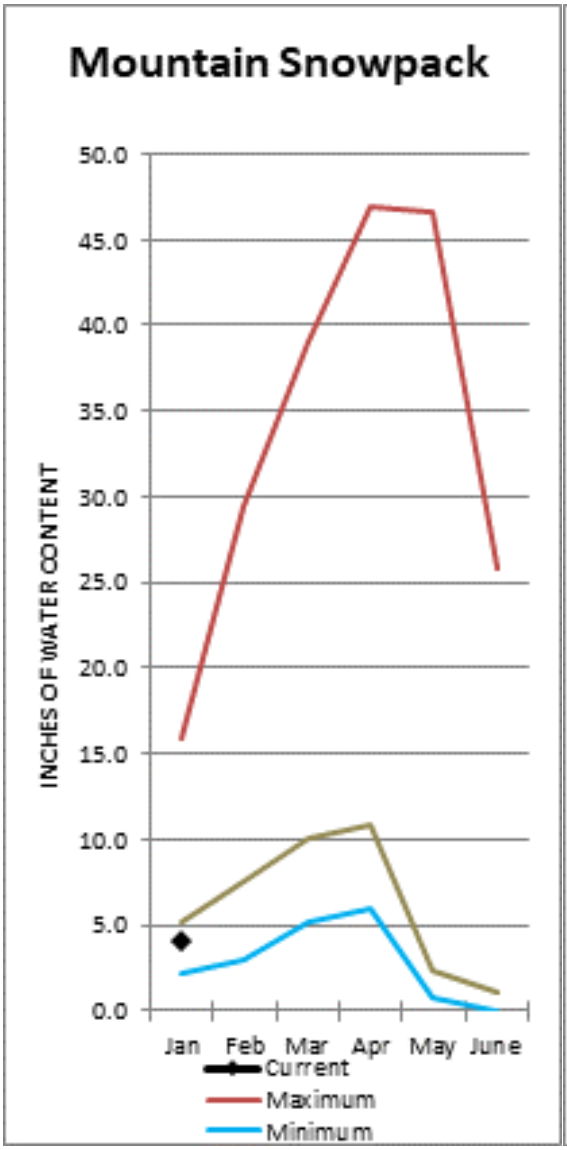
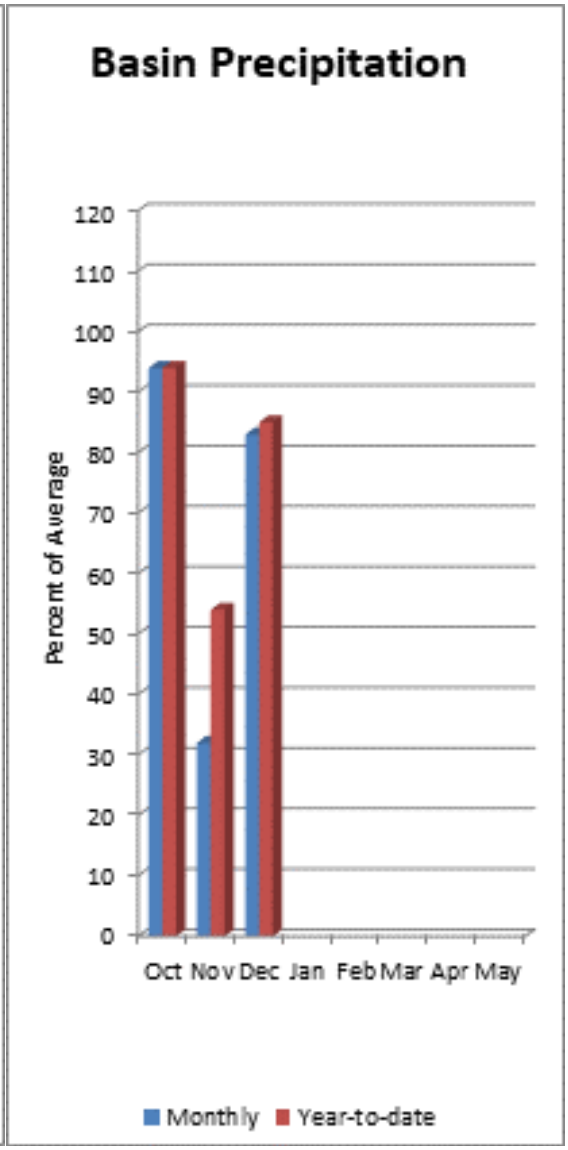
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
3) Median value used in place of average

Reservoir Storage End of December, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	547.4	567.4	708.2	1561.3
Priest Lake	56.3	50.6	56.5	119.3
Basin-wide Total	603.7	618.0	764.7	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Pend Oreille Basins	40	86%	93%
Colville River	0		
Kettle River	3	112%	99%


Mountain Snowpack
INCHES OF WATER CONTENT
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jan
Feb
Mar
Apr
May
June
Current
Maximum
Minimum


Basin Precipitation
Percent of Average
120
110
100
90
80
70
60
50
40
30
20
10
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Monthly
Year-to-date

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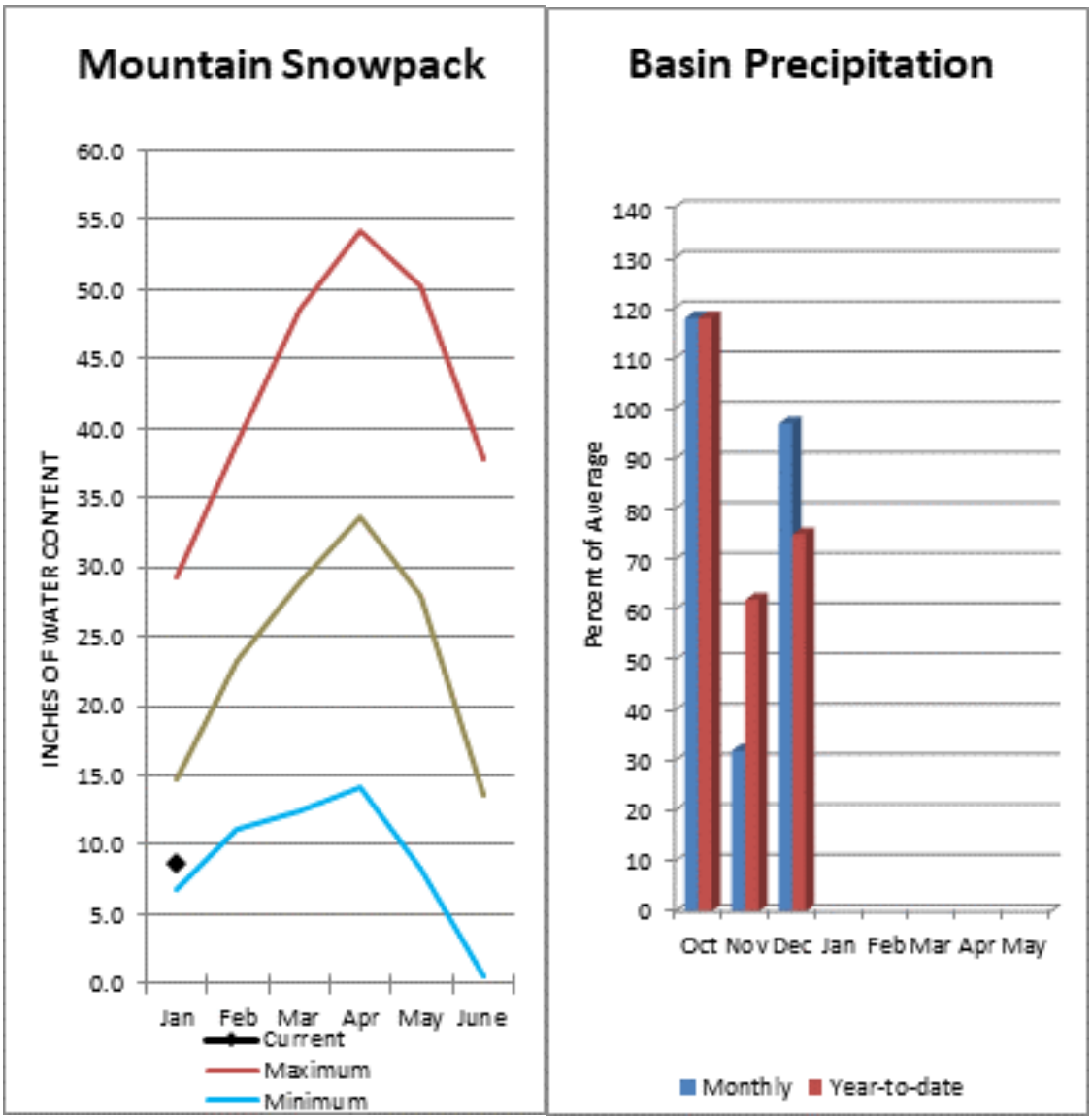
Upper Columbia Basins
Streamflow Forecasts - January 1, 2020

Upper Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Kettle R nr Laurier								
	APR-JUL	1150	1480	1710	95%	1930	2260	1800
	APR-SEP	1190	1540	1770	94%	2010	2360	1880
Colville R at Kettle Falls								
	APR-JUL	20	66	98	82%	129	175	119
	APR-SEP	23	73	107	82%	142	192	131
Columbia R at Grand Coulee-NWS[2]								
	APR-JUL	44000		52300	103%		63900	51015
	APR-SEP	52800		62200	103%		73800	60110
Similkameen R nr Nighthawk								
	APR-JUL	600	830	985	82%	1140	1370	1200
	APR-SEP	640	885	1050	82%	1220	1460	1280
Okanogan R nr Tonasket								
	APR-JUL	685	1020	1240	84%	1470	1800	1480
	APR-SEP	750	1120	1370	83%	1620	1990	1650
Okanogan R at Malott								
	APR-JUL	680	1030	1260	87%	1500	1840	1450
	APR-SEP	750	1130	1390	86%	1650	2040	1620
Methow R nr Pateros								
	APR-JUL	300	490	620	74%	750	945	835
	APR-SEP	320	525	665	74%	805	1010	895

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
3) Median value used in place of average

Reservoir Storage End of December, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	6.9	7.4	7.3	10.5
Conconully Reservoir	8.0	9.7	6.5	13.0
Basin-wide Total	14.8	17.2	13.8	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Upper Columbia Basins	7	78%	92%
Okanogan River	6	89%	93%
Omak Creek	1	46%	68%
Sanpoil River	0		
Similkameen River	1	73%	93%
Toats Coulee Creek	0		
Conconully Lake	1	38%	62%
Methow River	3	64%	95%



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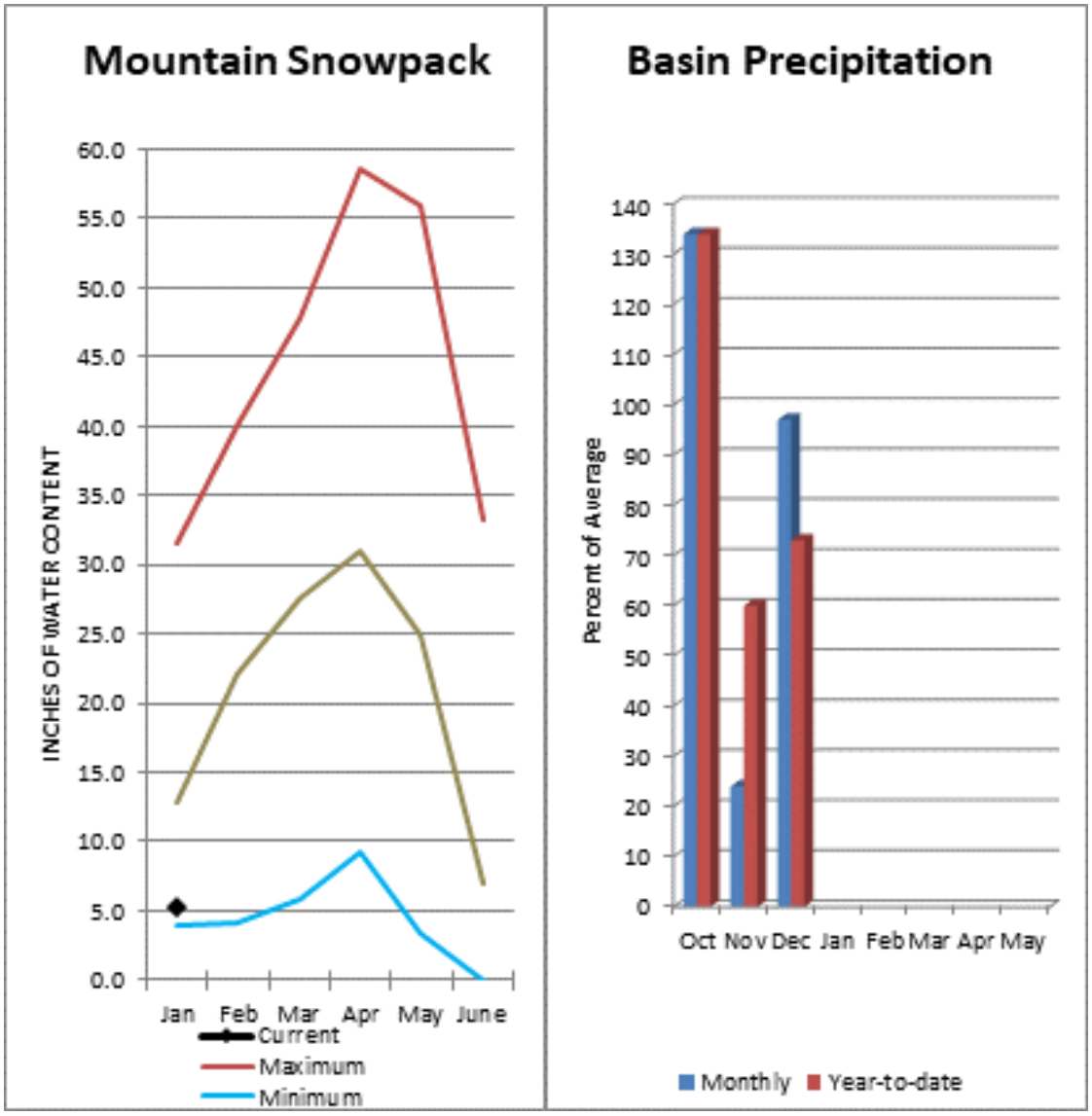
Central Columbia Basins
Streamflow Forecasts - January 1, 2020

Central Columbia Basins	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin								
	APR-JUL	450	545	610	90%	675	770	680
	APR-SEP	520	630	700	89%	775	880	790
Chelan R at Chelan								
	APR-JUL	645	790	890	89%	990	1130	1000
	APR-SEP	705	870	985	88%	1100	1270	1120
Entiat R nr Ardenvoir								
	APR-JUL	112	151	177	89%	205	240	200
	APR-SEP	120	163	192	87%	220	265	220
Wenatchee R at Plain								
	APR-JUL	570	740	855	86%	970	1140	990
	APR-SEP	605	795	925	86%	1050	1240	1080
Icicle Ck nr Leavenworth								
	APR-JUL	165	215	245	89%	280	325	275
	APR-SEP	177	230	265	88%	300	355	300
Wenatchee R at Peshastin								
	APR-JUL	820	1040	1190	87%	1340	1560	1370
	APR-SEP	875	1120	1290	87%	1460	1700	1490
Columbia R bl Rock Island Dam-NWS[2]								
	APR-JUL	48300		56600	101%		70000	55770
	APR-SEP	57400		67600	104%		80900	65200

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
3) Median value used in place of average

Reservoir Storage End of December, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	309.4	325.6	411.3	677.4
Basin-wide Total	309.4	325.6	411.3	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Central Columbia Basins	3	59%	92%
Chelan Lake Basin	3	59%	92%
Entiat River	1	47%	76%
Wenatchee River	6	57%	95%
Stemilt Creek	1	74%	100%
Colockum Creek	1	71%	102%


Mountain Snowpack
INCHES OF WATER CONTENT
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jan Feb Mar Apr May June
Current
Maximum
Minimum
Basin Precipitation
Percent of Average
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Oct Nov Dec Jan Feb Mar Apr May
Monthly
Year-to-date

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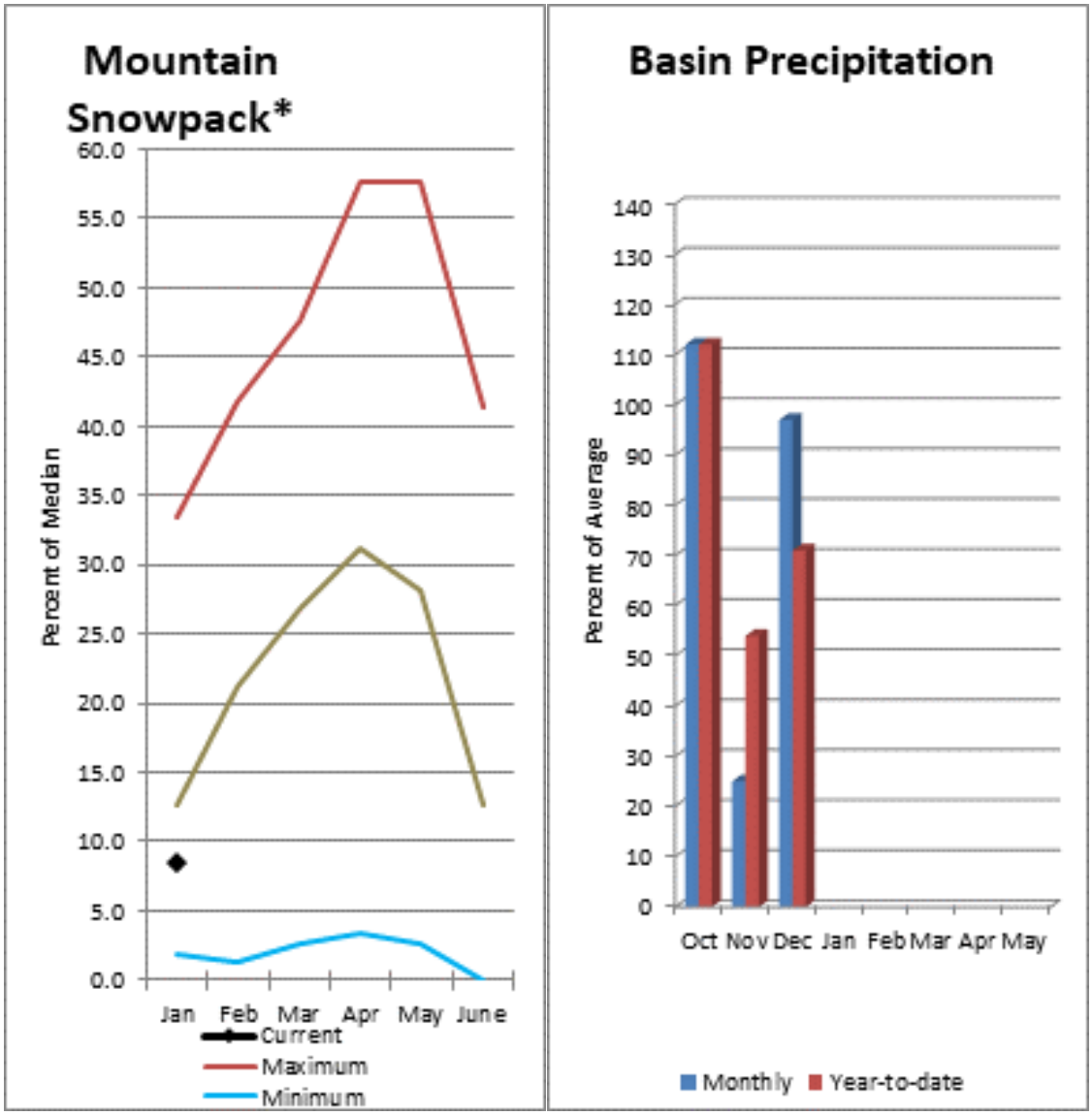
Upper Yakima River
Streamflow Forecasts - January 1, 2020

Upper Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Keechelus Reservoir Inflow[2]								
	APR-JUL	49	76	93	80%	111	137	116
	APR-SEP	56	83	102	81%	120	147	126
Kachess Reservoir Inflow [2]								
	APR-JUL	42	66	81	78%	97	121	104
	APR-SEP	49	72	88	78%	104	128	113
Cle Elum Lake Inflow [2]								
	APR-JUL	191	260	310	81%	360	430	385
	APR-SEP	205	285	335	81%	385	465	415
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	26	64	90	69%	116	154	130
	APR-SEP	28	66	92	69%	118	156	133

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
3) Median value used in place of average

Reservoir Storage End of December, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	44.8	70.7	68.5	157.8
Kachess	65.2	128.7	113.4	239.0
Cle Elum	80.0	128.8	164.0	436.9
Basin-wide Total	190.0	328.1	345.9	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Upper Yakima River	5	41%	95%


Mountain Snowpack*
Percent of Median
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jan Feb Mar Apr May June
Current
Maximum
Minimum
Basin Precipitation
Percent of Average
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Oct Nov Dec Jan Feb Mar Apr May
Monthly
Year-to-date

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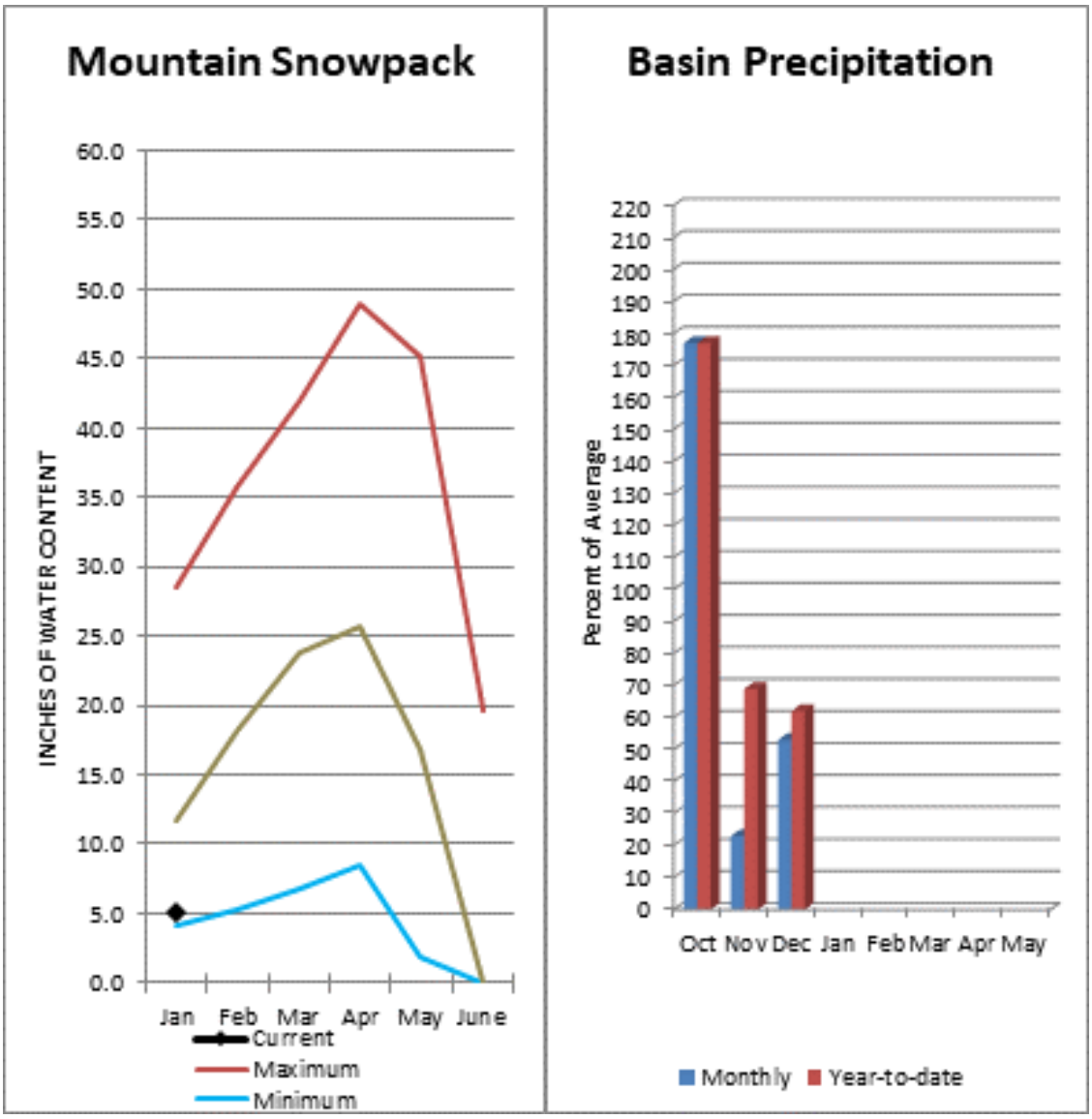
Lower Yakima River
Streamflow Forecasts - January 1, 2020

Lower Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Bumping Lake Inflow [2]								
	APR-JUL	67	89	104	91%	119	142	114
	APR-SEP	71	96	113	92%	129	154	123
American R nr Nile								
	APR-JUL	59	79	93	91%	107	127	102
	APR-SEP	62	85	100	91%	115	138	110
Rimrock Lake Inflow [2]								
	APR-JUL	119	151	173	93%	195	225	187
	APR-SEP	141	179	205	93%	230	270	220
Naches R nr Naches								
	APR-JUL	365	530	645	92%	760	925	700
	APR-SEP	395	580	705	93%	830	1010	760
Ahtanum Ck at Union Gap								
	APR-JUL	5.2	16	23	85%	31	41	27
	APR-SEP	7	18	25	86%	33	44	29
Yakima R nr Parker [2]								
	APR-JUL	720	1110	1370	83%	1640	2020	1660
	APR-SEP	795	1210	1500	82%	1780	2190	1820
Klickitat R nr Glenwood								
	APR-JUL	51	82	103	82%	125	156	126
	APR-SEP	58	91	114	82%	137	170	139
Klickitat R nr Pitt								
	APR-JUL	225	315	380	87%	445	535	435
	APR-SEP	285	390	460	88%	535	640	520

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
3) Median value used in place of average

Reservoir Storage End of December, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	10.3	7.9	11.5	33.7
Rimrock	79.6	68.5	92.4	198.0
Basin-wide Total	89.9	76.5	103.9	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Lower Yakima River	5	66%	100%
Ahtanum Creek	2	61%	91%



For more information contact your local Natural Resources Conservation Service office.

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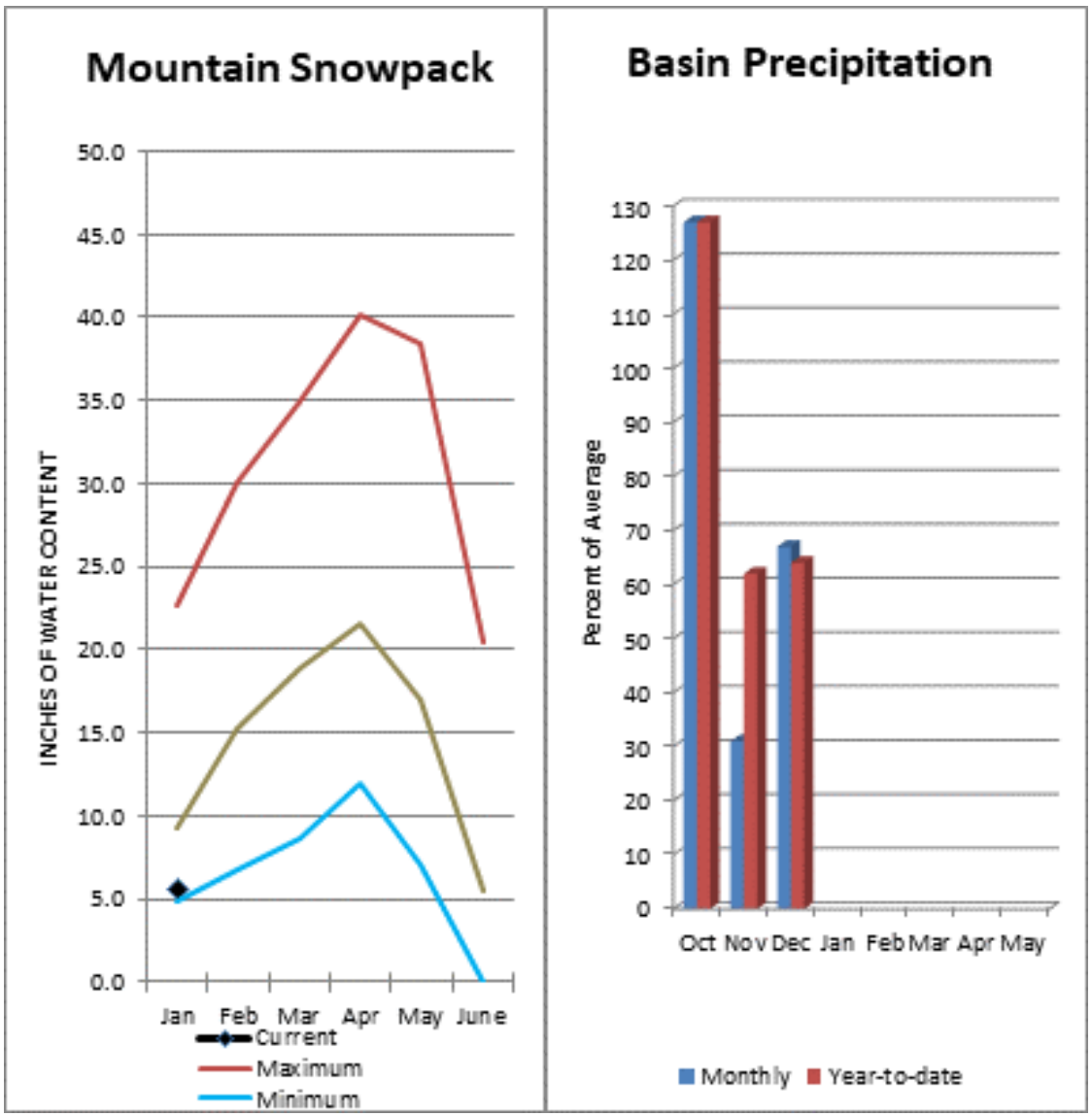
Walla Walla River
Streamflow Forecasts - January 1, 2020

Walla Walla River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
SF Walla Walla R nr Milton-Freewater								
	MAR-JUL	40	50	57	84%	64	74	68
	APR-SEP	39	48	55	83%	61	71	66
Mill Ck nr Walla Walla								
	APR-JUL	10.7	14.8	17.5	73%	20	24	24
	APR-SEP	13.7	18	21	78%	24	28	27

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
3) Median value used in place of average

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Walla Walla River	2	43%	117%



For more information contact your local Natural Resources Conservation Service office.

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Lower Snake, Grande Ronde, Clearwater Basins
Streamflow Forecasts - January 1, 2020

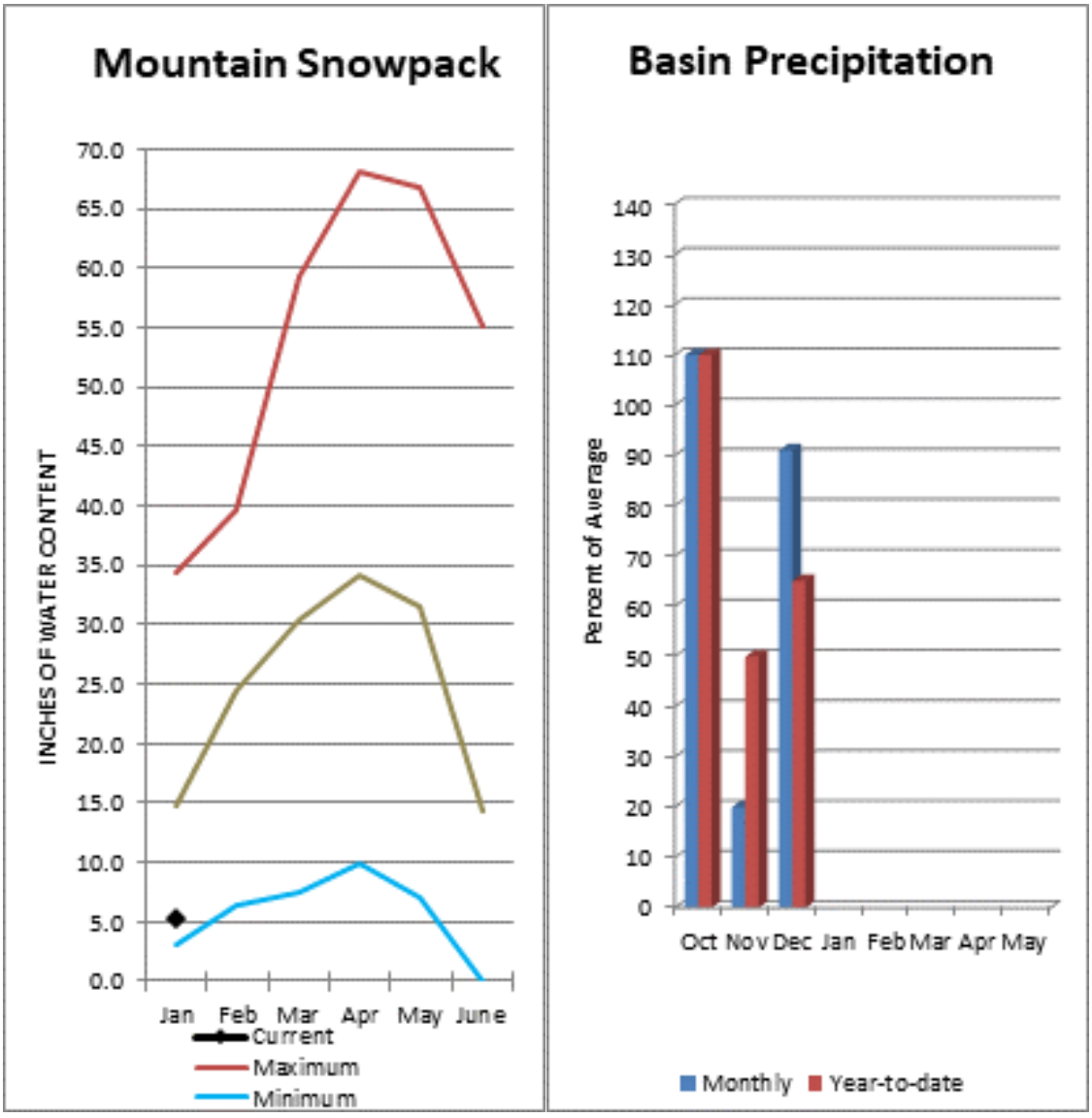
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake, Grande Ronde, Clearwater Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	MAR-JUL	660	950	1150	76%	1340	1630	1510
	APR-SEP	530	795	975	74%	1160	1430	1310
Asotin Ck at Asotin								
	APR-JUL	8.1	14.9	21	60%	28	39	35
Clearwater R at Spalding[2]								
	APR-JUL	3320	4760	5740	83%	6730	8170	6890
	APR-SEP	3570	5040	6040	83%	7040	8510	7270
Snake R bl Lower Granite Dam-NWS[2]								
	APR-JUL	13500		18100	91%		24000	19848
	APR-SEP	15600		20600	92%		27000	22280

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
3) Median value used in place of average

Reservoir Storage End of December, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2179.5	2255.0	2403.0	3468.0
Basin-wide Total	2179.5	2255.0	2403.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Lower Snake, Grande Ronde, Clearwater Basins	11	60%	96%


Mountain Snowpack
INCHES OF WATER CONTENT
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jan Feb Mar Apr May June
Current
Maximum
Minimum
Basin Precipitation
Percent of Average
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Oct Nov Dec Jan Feb Mar Apr May
Monthly
Year-to-date

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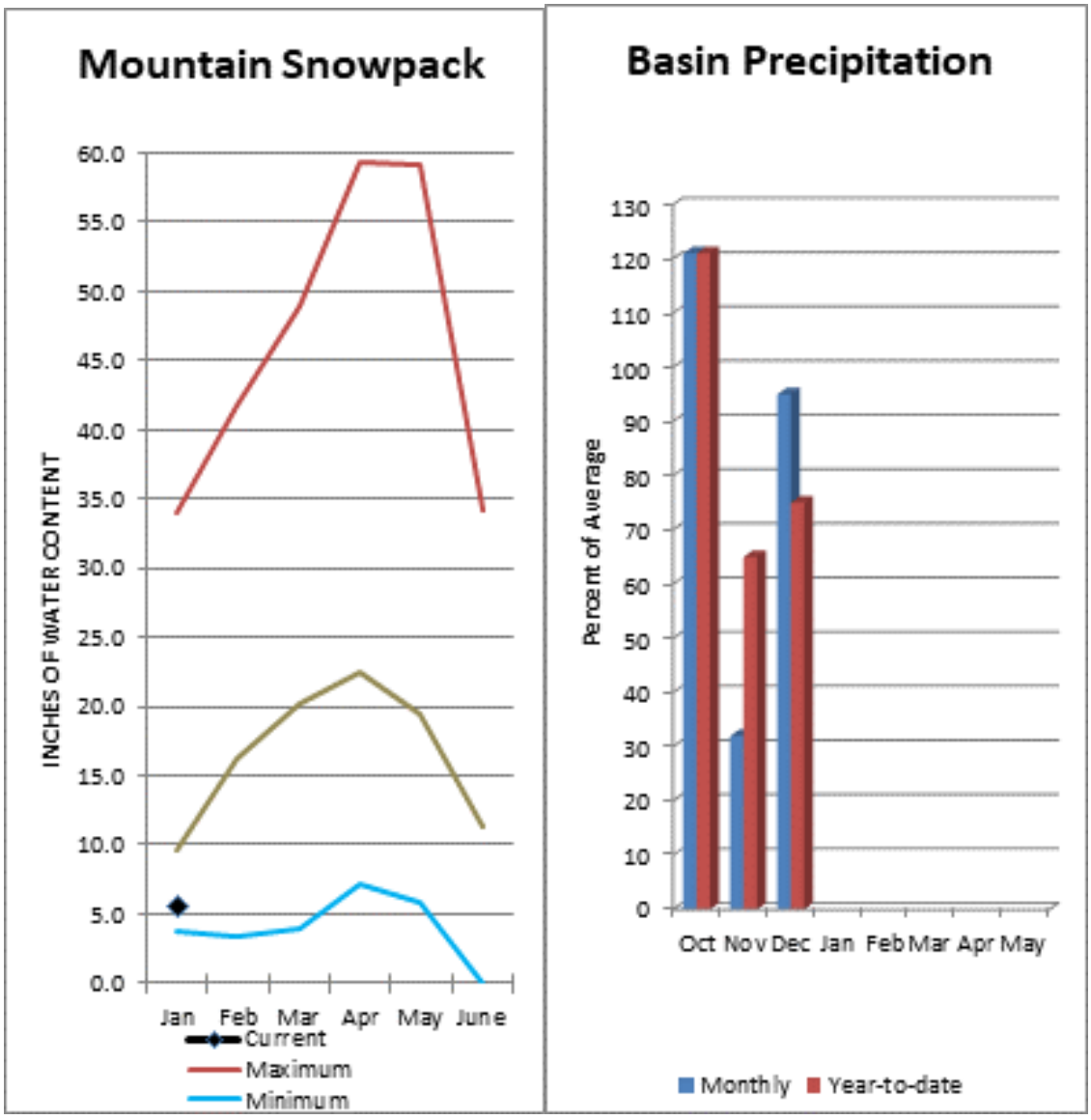
Lower Columbia Basins
Streamflow Forecasts - January 1, 2020

Lower Columbia Basins	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment: Chance that actual volume will exceed forecast — 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Columbia R at The Dalles-NWS[2]								
	APR-JUL	65400		79100	99%		95300	79855
	APR-SEP	77600		93200	101%		108000	92704
Klickitat R nr Glenwood								
	APR-JUL	51	82	103	82%	125	156	126
	APR-SEP	58	91	114	82%	137	170	139
Klickitat R nr Pitt								
	APR-JUL	225	315	380	87%	445	535	435
	APR-SEP	285	390	460	88%	535	640	520
Lewis R at Ariel[2]								
	APR-JUL	490	665	785	81%	900	1080	970
	APR-SEP	580	760	885	79%	1010	1200	1120
Cowlitz R bl Mayfiled[2]								
	APR-JUL	745	1050	1260	77%	1460	1770	1630
	APR-SEP	830	1210	1470	80%	1730	2110	1840
Cowlitz R at Castle Rock[2]								
	APR-JUL	1170	1480	1680	75%	1890	2200	2240
	APR-SEP	1380	1730	1960	77%	2200	2540	2540

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
3) Median value used in place of average

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Lower Columbia Basins	11	35%	77%
Lewis River	5	25%	69%
Cowlitz River	6	44%	85%



For more information contact your local Natural Resources Conservation Service office.

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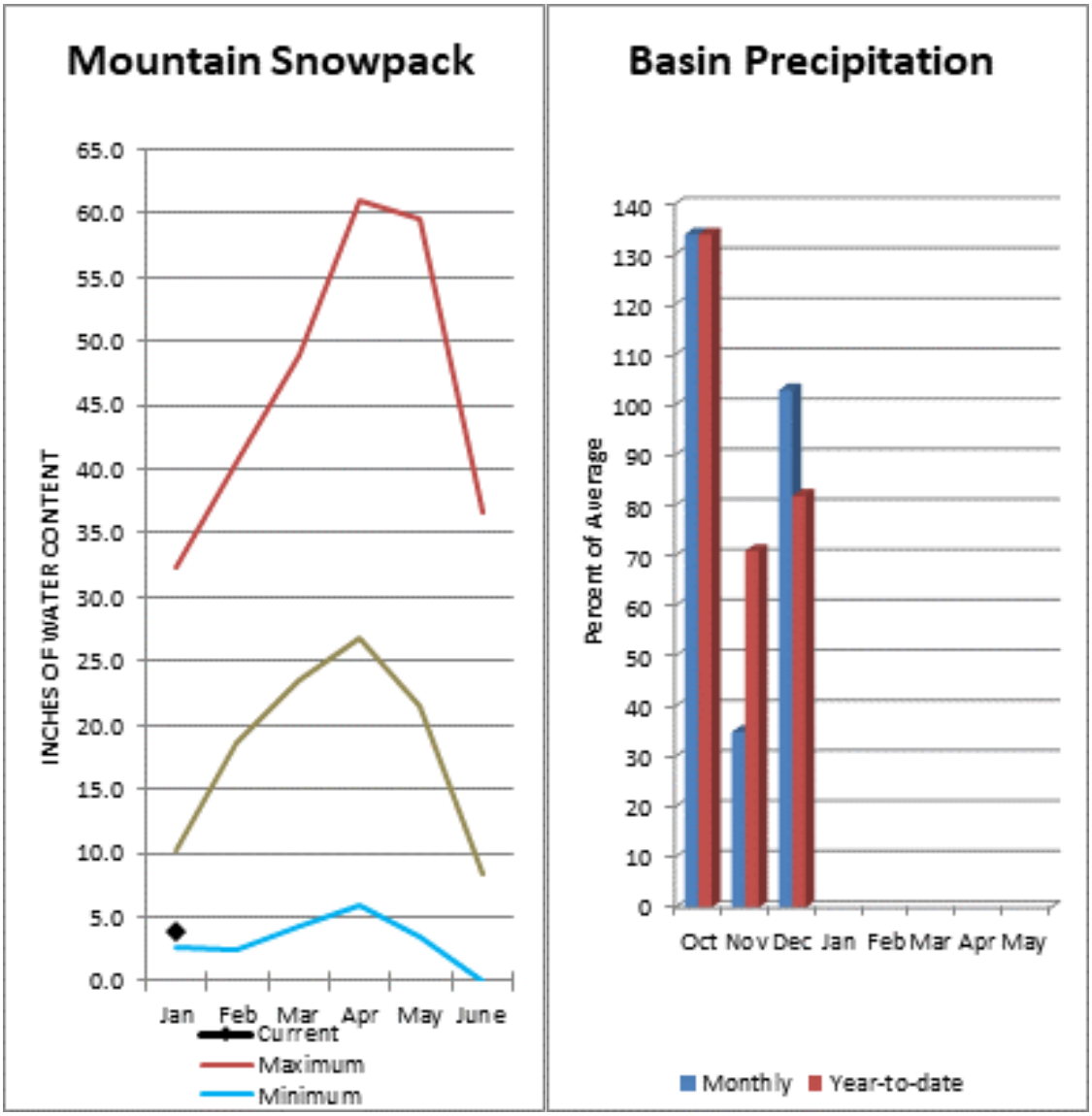
South Puget Sound Basins
Streamflow Forecasts - January 1, 2020

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
South Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
White R nr Buckley[1,2]								
	APR-JUL	285	365	400	93%	435	515	430
	APR-SEP	340	435	475	92%	515	605	515
Green R bl Howard A Hanson Dam[1,2]								
	APR-JUL	122	182	210	89%	235	295	235
	APR-SEP	144	205	230	88%	260	320	260

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
3) Median value used in place of average

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
South Puget Sound Basins	8	58%	101%
White River	2	76%	120%
Green River	2	31%	69%



For more information contact your local Natural Resources Conservation Service office.

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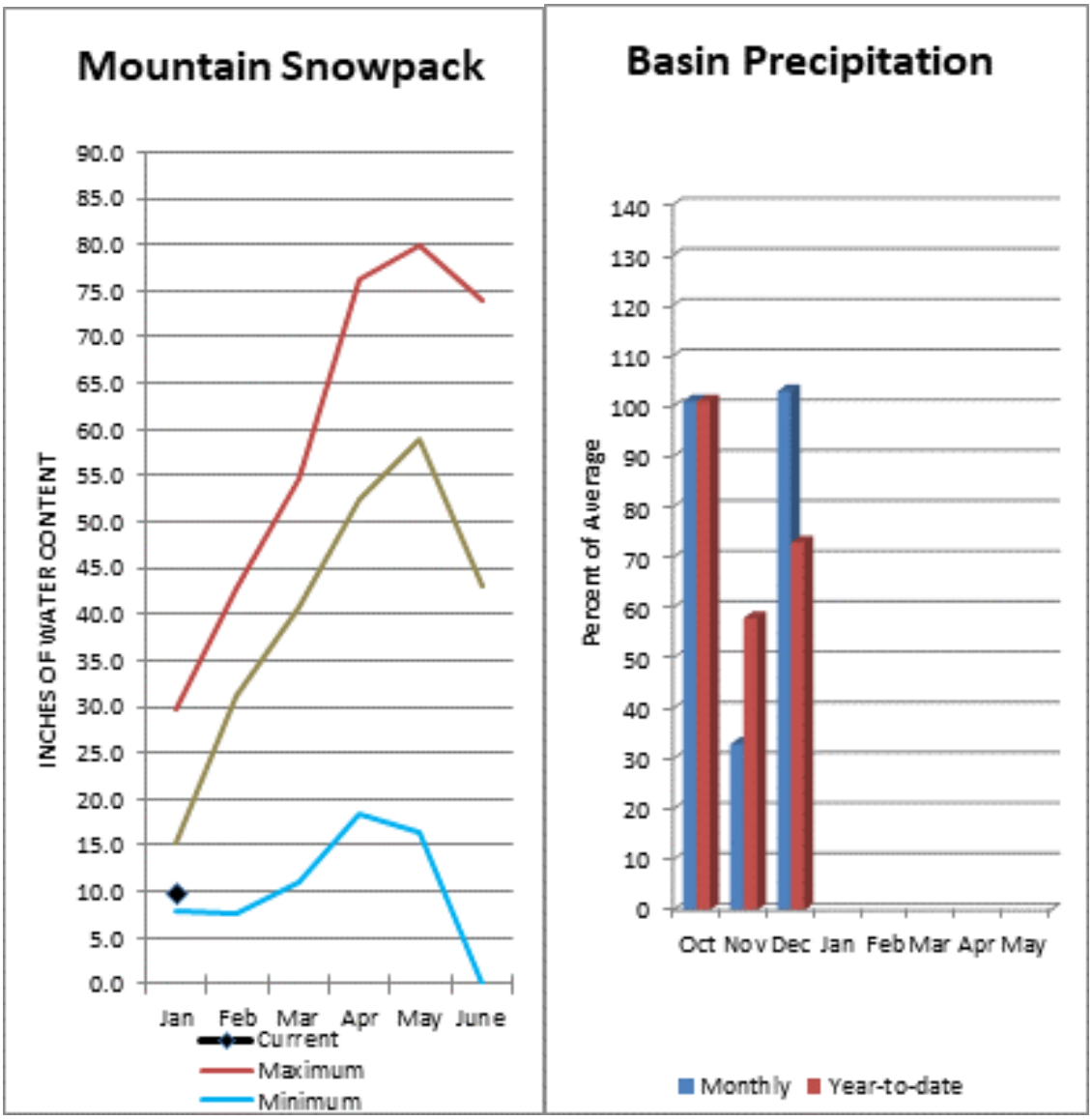
Central Puget Sound Basins
Streamflow Forecasts - January 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	APR-JUL	38	53	63	90%	73	88	70
	APR-SEP	44	59	70	92%	80	95	76
Rex R nr Cedar Falls								
	APR-JUL	11.1	17.3	21	88%	26	32	24
	APR-SEP	13.6	19.8	24	89%	28	35	27
Taylor Ck nr Selleck								
	APR-JUL	10.8	15.4	18.6	93%	22	26	20
	APR-SEP	13.6	18.5	22	92%	25	30	24
SF Tolt R nr Index								
	APR-JUL	7.1	9.8	11.7	82%	13.6	16.3	14.2
	APR-SEP	8.4	11.2	13.2	82%	15.1	17.9	16.1

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
3) Median value used in place of average

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Central Puget Sound Basins	12	37%	85%
Puyallup River	4	76%	124%
Cedar River	4	43%	91%
Tolt River	2	18%	61%
Snoqualimie River	4	28%	75%
Skykomish River	2	33%	73%



For more information contact your local Natural Resources Conservation Service office.

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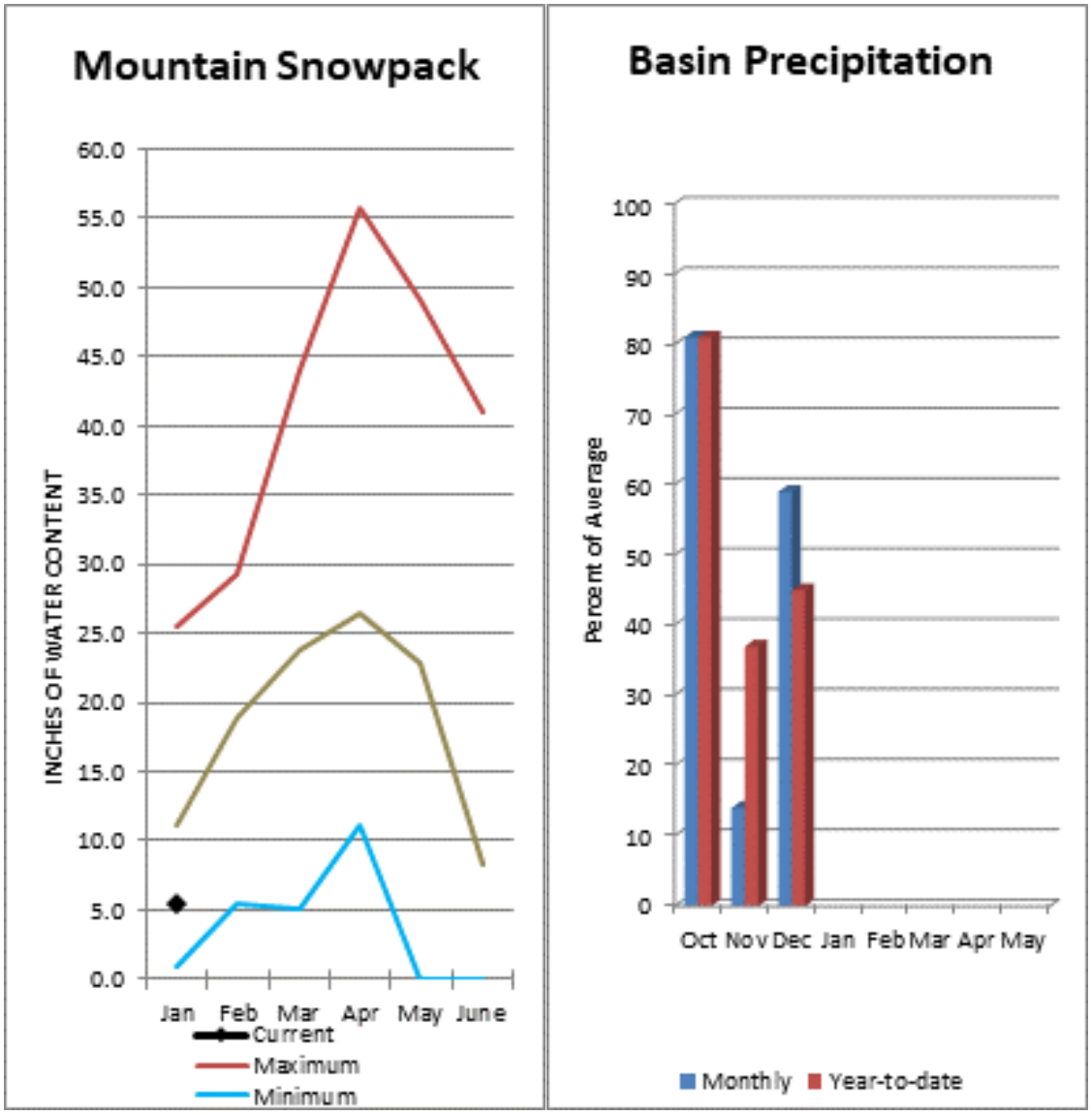
North Puget Sound Basins
Streamflow Forecasts - January 1, 2020

North Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Thunder Ck nr Newhalem								
	APR-JUL	187	210	220	94%	235	255	235
	APR-SEP	275	300	315	95%	335	360	330
Skagit R at Newhalem[2]								
	APR-JUL	1270	1460	1590	91%	1720	1910	1750
	APR-SEP	1520	1730	1880	91%	2030	2250	2070
Baker R at Concrete								
	APR-JUL	585	685	755	97%	825	930	780
	APR-SEP	760	895	990	101%	1090	1220	980

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
3) Median value used in place of average

Reservoir Storage End of December, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	832.2	1094.3	1135.0	1434.7
Basin-wide Total	832.2	1094.3	1135.0	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
North Puget Sound Basins	10	62%	99%
Skagit River	7	63%	104%
Baker River	0		
Nooksack River	3	60%	86%



For more information contact your local Natural Resources Conservation Service office.

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Olympic Penninsula
Streamflow Forecasts - January 1, 2020

Olympic Penninsula	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Dungeness R nr Sequim								
	APR-JUL	71	87	98	82%	109	125	120
	APR-SEP	83	103	116	80%	129	149	145
Elwha R at McDonald Br nr Port Angeles								
	APR-JUL	225	280	315	79%	355	405	400
	APR-SEP	265	330	370	79%	415	475	470

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
3) Median value used in place of average

Watershed Snowpack Analysis January 1, 2020	# of Sites	% Median	Last Year % Median
Olympic Penninsula	3	48%	86%

Issued by

Matthew J. Lohr
Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Rides-at-the-Door
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada	Snow Survey Network Program – British Columbia Ministry of Environment
	River Forecast Center – British Columbia Ministry of Forests, Lands and Natural Resource Operations
State	Washington State Department of Ecology
	Washington State Department of Natural Resources
Federal	Department of the Army
	Corps of Engineers
	U.S. Department of Agriculture
	Forest Service
	U.S. Department of Commerce
	NOAA, National Weather Service
	U.S. Department of Interior
	Bonneville Power Administration
	Bureau of Reclamation
	Geological Survey
	National Park Service
	Bureau of Indian Affairs
Local	City of Tacoma
	City of Seattle
	City of Bellingham
	Chelan County P.U.D.
	Pacific Power/PacificCorp
	Puget Sound Energy
	Washington Water Power Company
	Snohomish County P.U.D.
	Colville Confederated Tribes
	Spokane County
	Yakama Indian Nation
	Whatcom County
	Pierce County
	Kalispel Tribe of Indians
	Spokane Indian Tribe
	Jamestown S'Klallam Tribe
Private	Okanogan Irrigation District
	Wenatchee Heights Irrigation District
	Newman Lake Homeowners Association
	Whitestone Reclamation District
	Kinross Mining

***Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.**

Washington Snow Survey Office
2005 E. College Way, Suite 203
Mount Vernon, WA 98273-2873

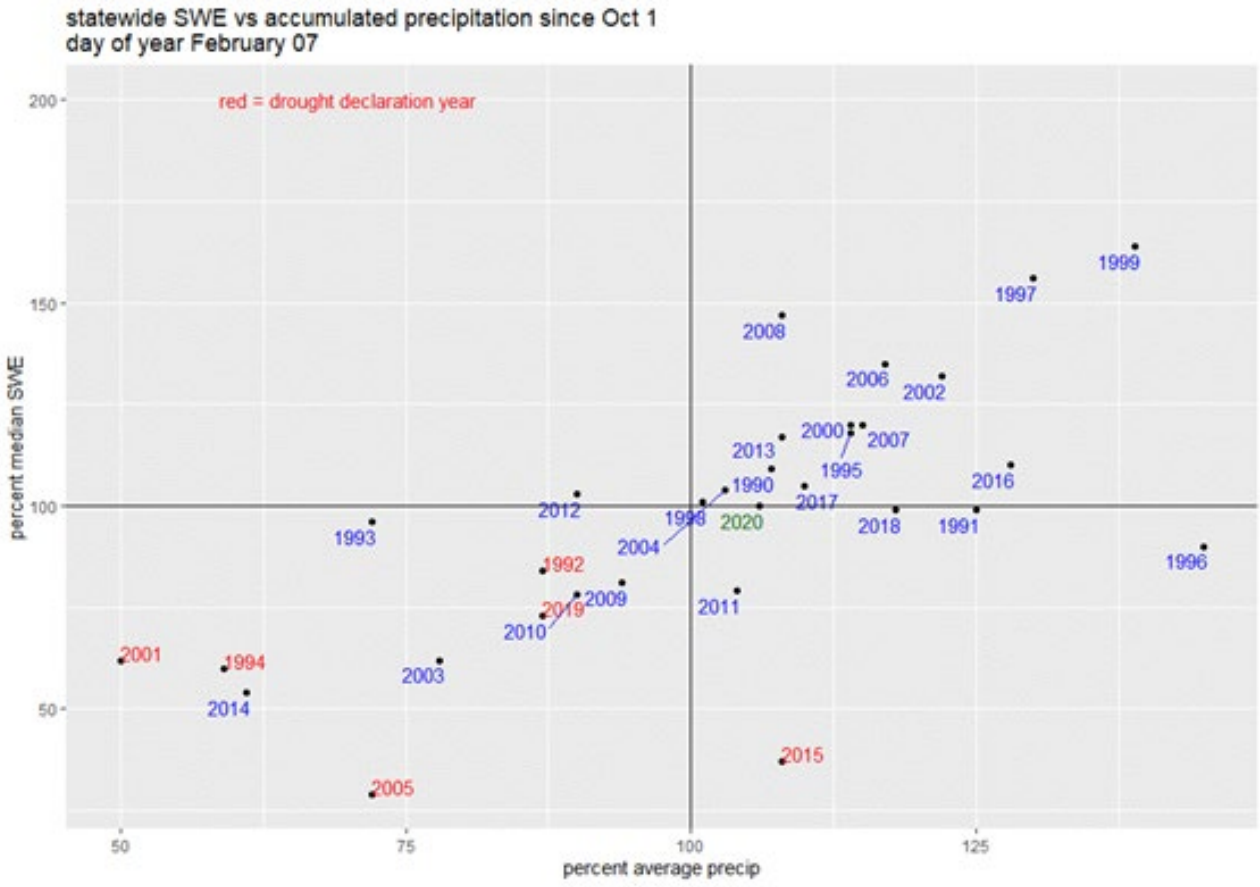
Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA

NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington
Water Supply Outlook Report
February 1, 2020



Graphic curtesy Jeff Marti, Department of Ecology

Graphic shows the comparison of statewide snow water equivalent to total precipitation, where we are now at or above normal. Early last month this graph depicted a completely different story where 2020 was hovering just above the 2005 mark. 2005 was a major drought year for the state.

Water Supply Outlook Reports
and
Federal - State – Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

Local Natural Resources Conservation Service Field Office

or

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W 316 Boone Ave., Suite 450
Spokane, WA 99201
(509) 323-2955

How forecasts are made

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. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. 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 uncertain 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.

Washington
Water Supply Outlook

February 2020

General Outlook

Coming into February we knew we were going to set the threshold for the rest of the snow season, either boom or bust. Fortunately, mother nature brought a bounty of record snowfall and precipitation throughout the month. In fact, the sun was scarcely seen between rain and snowstorms, making it one of the cloudiest January's on record and the 4th wettest. During the first half of February, when most of the new snow fell, over 50% of the SNOTEL sites set or came close to setting new snow water and snow depth accumulation records. The most recent forecast through mid-February shows a high probability for below normal temperatures and near normal precipitation. NWS 3-month (FMA) forecast indicates equal chances for above, below or normal temperatures and precipitation. The US Drought Monitor indicates D0-D1 drought designation shrinking from last month however still persistent from the Cascade crest through the SE part of the state. (see page 4) http://www.cpc.ncep.noaa.gov/

Snowpack

The February 1 statewide SNOTEL readings were 96% of normal, which was an amazing rebound from January 1. The lowest readings in the state were at 64% of the 30-year median for February 1 in the Green River Basin. Newman Lake, near Spokane, had the most snow with 135%. Westside medians from SNOTEL, and February 1 snow surveys, included the North Puget Sound river basins with 97% of normal, the Central and South Puget river basins with 84% and 96% respectively, and the Lower Columbia basins with 100% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 98% and the Wenatchee area with 93%. Snowpack in the Spokane River Basin was at 101% and the Upper Columbia river basins had 95% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	101	76
Newman Lake	135	97
Pend Oreille	106	88
Okanogan	115	82
Methow	92	87
Conconully Lake	79	74
Central Columbia	93	85
Upper Yakima	89	77
Lower Yakima	106	84
Ahtanum Creek	87	89
Walla Walla	109	109
Lower Snake	95	80
Cowlitz	106	77
Lewis	93	64
White	123	95
Green	69	45
Puyallup	119	85
Cedar	75	53
Snoqualmie	80	53
Skykomish	95	56
Skagit	95	88
Nooksack	102	64
Olympic Peninsula	119	76

Precipitation

January precipitation from SNOTEL was much above normal across the state and near normal for the Water-Year starting October 1. Alpine Meadows SNOTEL in the Tolt River Basin received the most precipitation with 50.1" or 211% of normal. Quartz Peak SNOTEL had the highest percentage at 255% of the long-term average.

RIVER BASIN	JANUARY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	79	65
Pend Oreille	75	74
Upper Columbia	83	65
Central Columbia	97	75
Upper Yakima	97	73
Lower Yakima	97	71
Walla Walla	53	62
Lower Snake	67	64
Lower Columbia	91	65
South Puget Sound	95	75
Central Puget Sound	103	82
North Puget Sound	103	73
Olympic Peninsula	59	45

Reservoir

Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. February 1 Reservoir storage in the Yakima Basin was 312,000-acre feet, 77% of average for the Upper Reaches and 116,000-acre feet or 95% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 129,000-acre feet, 134% of average and 54% of capacity; and Ross lake within the Skagit River Basin at 86% of average and 61% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	54	134
Pend Oreille	37	77
Upper Columbia	67	109
Central Columbia	37	73
Upper Yakima	37	77
Lower Yakima	50	95
Lower Snake	64	94
North Puget Sound	61	86

For more information contact your local Natural Resources Conservation Service office.

Streamflow

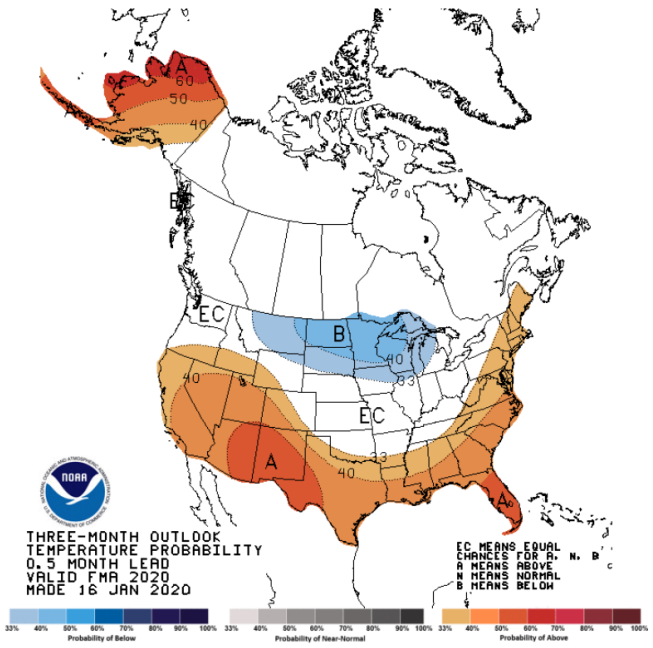
Early winter forecasts for April-September stream flows are never quite as robust as they are later in the season when we know more about the winter climatology. At times only a few degrees warmer or cooler than forecasted can make or break stream flow predictions. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. Caution should be used when using early season forecasts for critical water resource management decisions since governing conditions are likely to change for the better or the worse

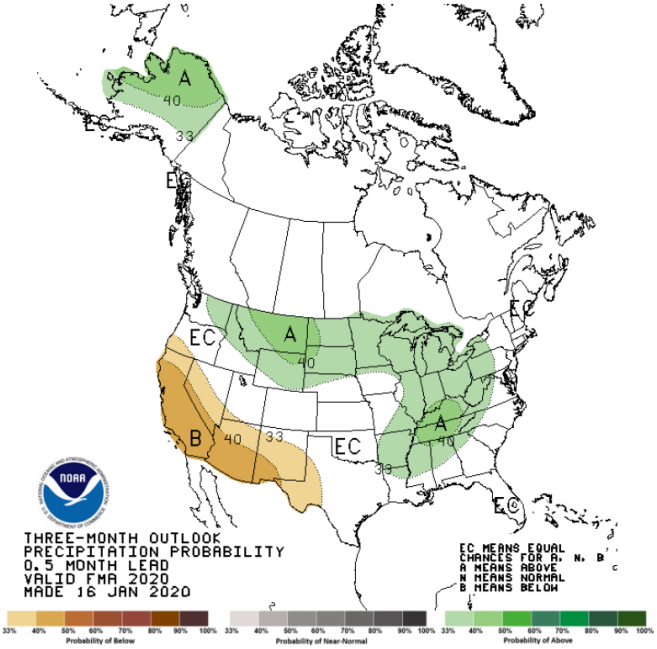
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	104-146
Pend Oreille	106-120
Upper Columbia	93-144
Central Columbia	101-111
Upper Yakima	92-98
Lower Yakima	98-109
Walla Walla	96-98
Lower Snake	80-102
Lower Columbia	92-113
South Puget Sound	110-94
Central Puget Sound	100-121
North Puget Sound	105-108
Olympic Peninsula	106-107

STREAM	PERCENT OF AVERAGE JANUARY STREAMFLOWS
Pend Oreille at Albeni Fall Dam	102
Kettle at Laurier	148
Columbia at Birchbank	102
Spokane at Spokane	94
Similkameen at Nighthawk	92
Okanogan at Tonasket	120
Methow at Pateros	96
Chelan at Chelan	94
Stehekin near Stehekin	98
Wenatchee at Pashastin	108
Cle Elum near Roslyn	176
Yakima at Parker	130
Naches at Naches	97
Grande Ronde at Troy	53
Snake below Lower Granite Dam	70
Columbia River at The Dalles	82
Lewis at Merwin Dam	178
Cowlitz below Mayfield Dam	159
Skagit at Concrete	138
Dungeness near Sequim	96

For more information contact your local Natural Resources Conservation Service office.

Climate





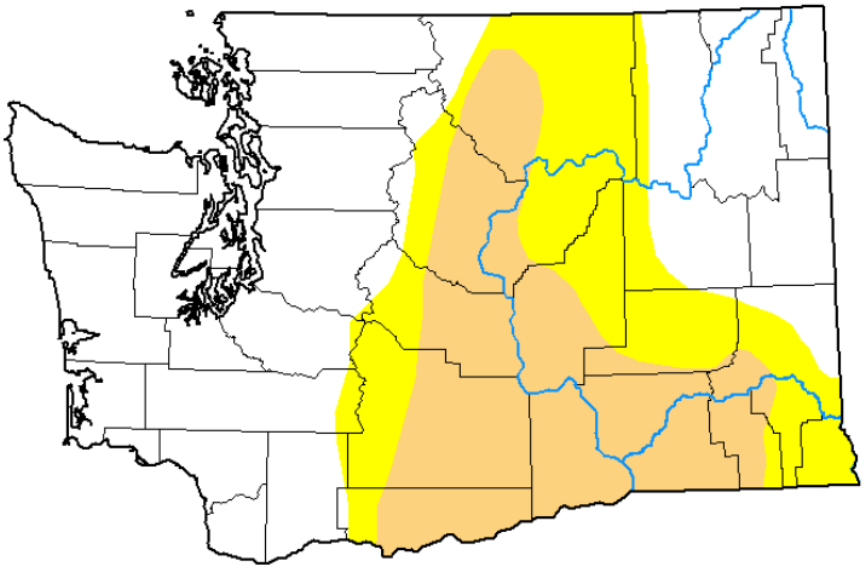
U.S. Drought Monitor

Washington

February 4, 2020

(Released Thursday, Feb. 6, 2020)

Valid 7 a.m. EST



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

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droughtmonitor.unl.edu

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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/wa/snow/

Oregon:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/snow/

Idaho:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

USDA-NRCS Agency Homepages

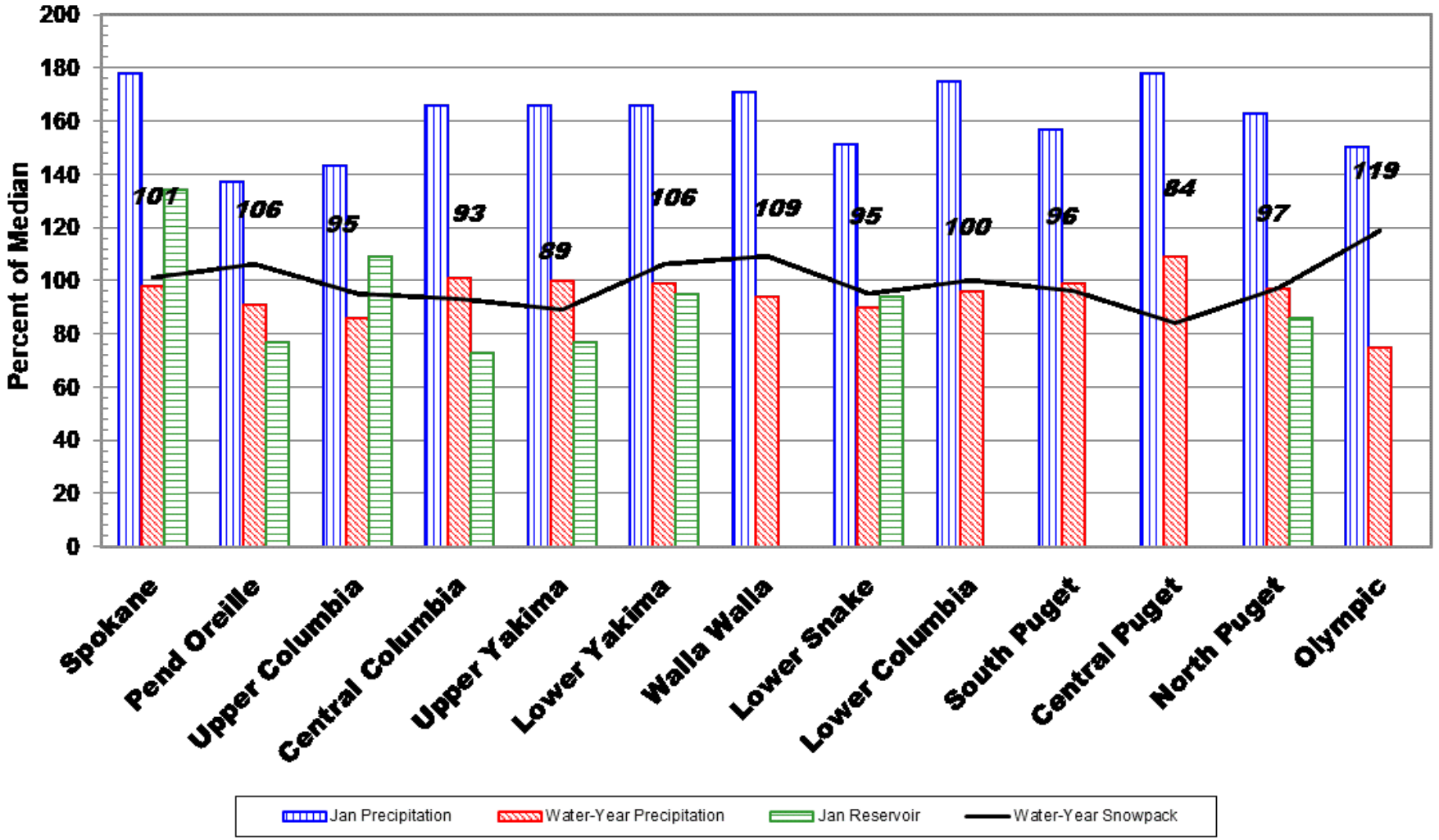
Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/

NRCS National:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

NRCS Natural Resources Conservation Service

February 1, 2020 - Snowpack, Precipitation and Reservoir Conditions at a Glance

(Water Year = October 1 - Current Date)



88th Meeting of the Western Snow Conference

The Western Snow Conference is an annual tradition which started in 1932 as an international forum for individuals and organizations to share scientific, management and socio-political information on snow and runoff. The principal aim of the Western Snow Conference is to advance snow and hydrological sciences. The North Pacific Area Committee is making plans for the 88th Annual Western Snow Conference in 2020.

Mark your calendar and start thinking about submitting a paper to attend the 2018 Western Snow Conference:

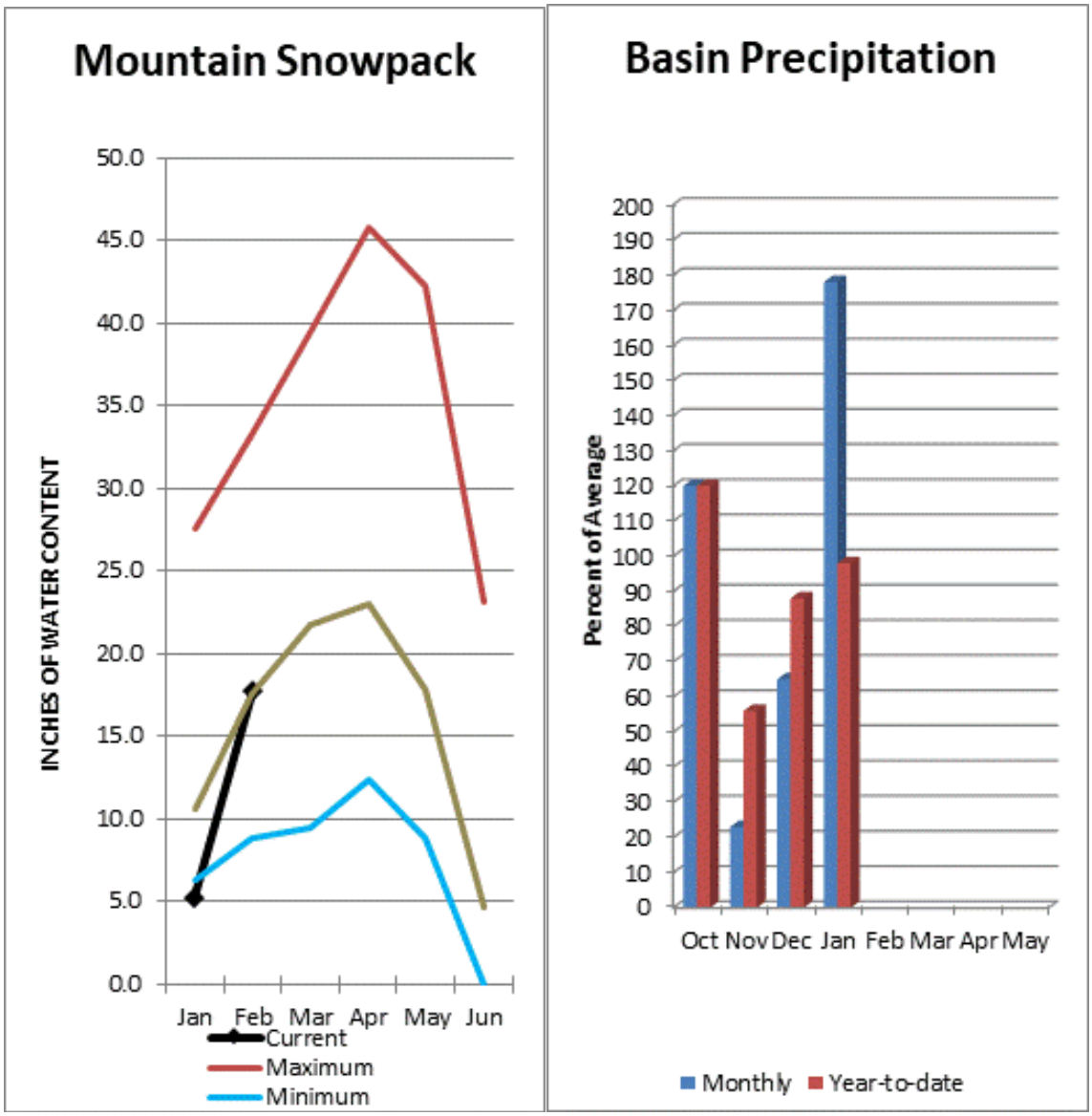
Dates: April 20-23, 2020
Location: Whistler, British Columbia, Canada

The 2020 conference will be held at the Hilton Hotel in Whistler, British Columbia, Canada. The Hilton is in the vibrant Whistler village within close walking distance of restaurants, shopping, and close to the breathtaking Whistler ski areas.

Additional information about the conference and the Call for Papers will be posted on the WSC web page at http://www.westernsnowconference.org/

Also find Western Snow Conference on Facebook.

Spokane River Basin



Basin snowpack is 101% of normal and precipitation is 98% of average for the water year. Precipitation for January was slightly above normal at 178% of average. Streamflow on the Spokane River at Spokane was 98% of average for January. February 1 storage in Coeur d'Alene Lake was 129,000-acre feet, 134% of average and 54% of capacity. Snowpack at Quartz Peak SNOTEL site was 135% of average with 20.0 inches of water content.

For more information contact your local Natural Resources Conservation Service office.

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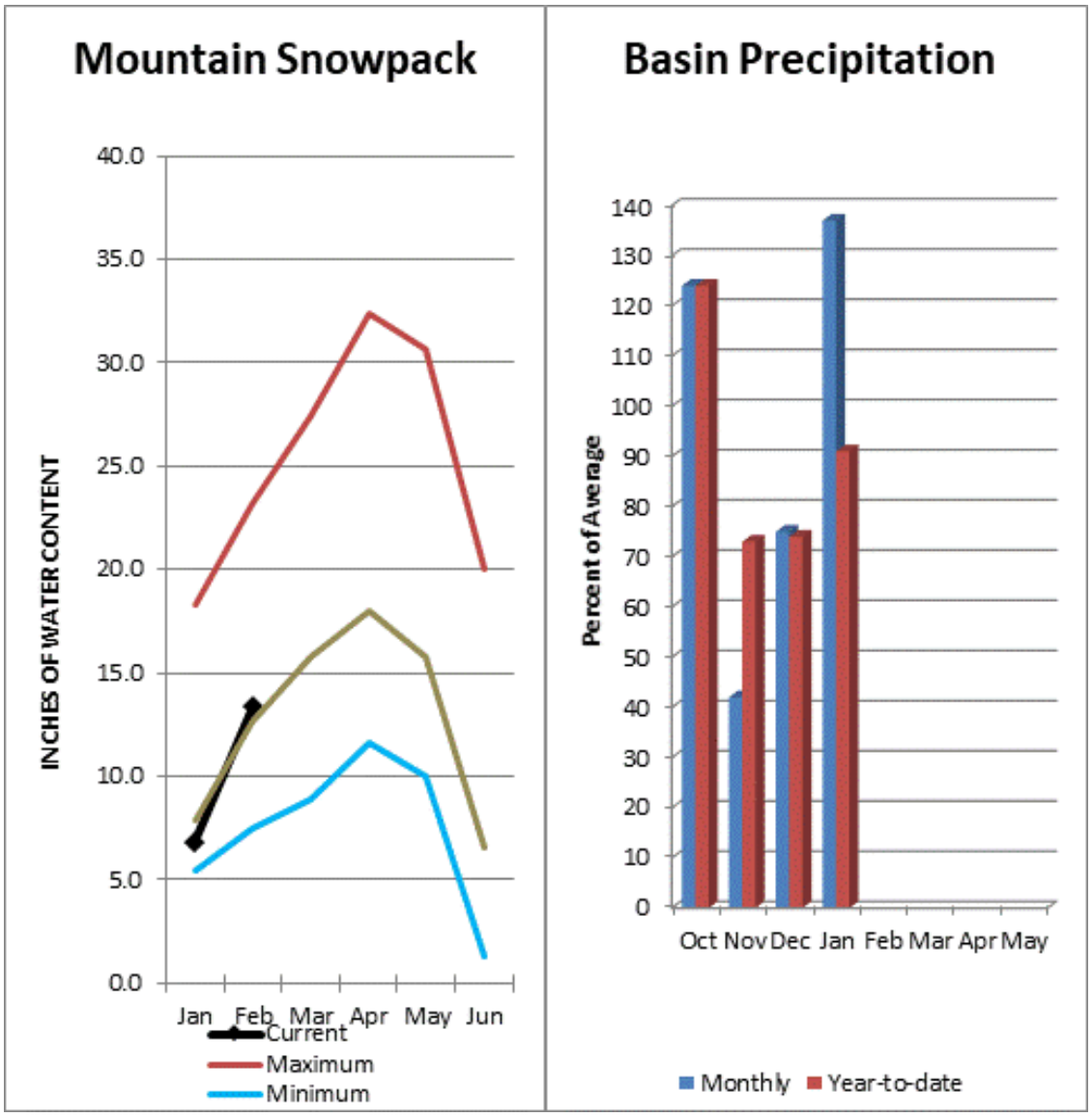
Spokane
Streamflow Forecasts - February 1, 2020

Spokane	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment: Chance that actual volume will exceed forecast — 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Spokane R nr Post Falls[2]								
	APR-JUL	1550	2120	2500	105%	2890	3460	2390
	APR-SEP	1630	2200	2590	104%	2980	3550	2480
Spokane R at Long Lake[2]								
	APR-JUL	1810	2390	2780	106%	3180	3760	2620
	APR-SEP	1990	2580	2990	105%	3390	3980	2850
Chamokane Ck nr Long Lake								
	MAR-JUL	19.9	30	38	146%	47	62	26

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
3) Median value used in place of average

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	129.1	51.2	96.3	238.5
Basin-wide Total	129.1	51.2	96.3	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Spokane	11	101%	76%
Newman Lake	1	135%	97%



January streamflow was 102% of average on both the Pend Oreille River on the Columbia at Birchbank. February 1 snow cover was 106% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 23.6 inches of snow water on the snow pillow which is 131% of normal for February 1. Precipitation during January was 137% of average, the year-to-date precipitation is 91% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 77% of normal.

For more information contact your local Natural Resources Conservation Service office.

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Pend Oreille Basins
Streamflow Forecasts - February 1, 2020

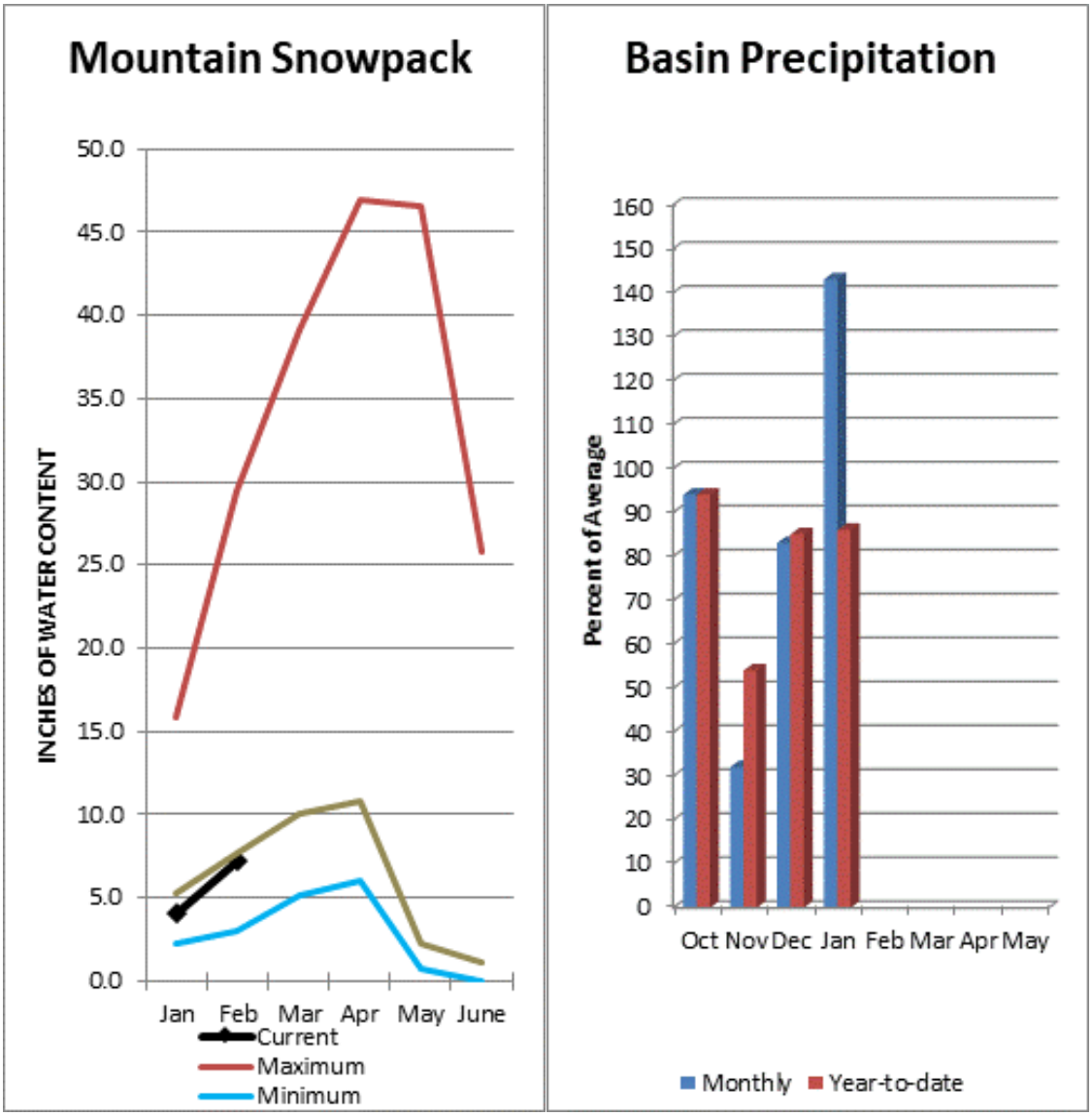
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Pend Oreille Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pend Oreille Lake Inflow[2]								
	APR-JUL	9240	11300	12600	107%	14000	16000	11800
	APR-SEP	10100	12200	13600	106%	15100	17200	12800
Priest R nr Priest River[2]								
	APR-JUL	665	825	935	120%	1040	1200	780
	APR-SEP	725	890	1000	120%	1120	1280	830
Pend Oreille R bl Box Canyon[2]								
	APR-JUL	9400	11400	12700	107%	14100	16100	11900
	APR-SEP	10200	12300	13800	106%	15200	17300	13000

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
3) Median value used in place of average

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	572.7	566.6	753.9	1561.3
Priest Lake	54.6	52.5	56.7	119.3
Basin-wide Total	627.3	619.1	810.6	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Pend Oreille Basins	53	106%	88%
Colville River	1	107%	87%
Kettle River	6	119%	99%



February 1 snow cover on the Okanogan was 115% of normal, Omak Creek was 83% and the Methow was 92%. January precipitation in the Upper Columbia was 143% of average, with precipitation for the water year at 86% of average. January streamflow for the Methow River was 96% of average, 120% for the Okanogan River and 92% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 2.9 inches or 62% of normal for February 1. Combined storage in the Conconully Reservoirs was 15,600 acre-feet or 109% of normal.

Upper Columbia River Basins

Data Current as of: 2/6/2020 12:51:28 PM

Upper Columbia Basins
Streamflow Forecasts - February 1, 2020

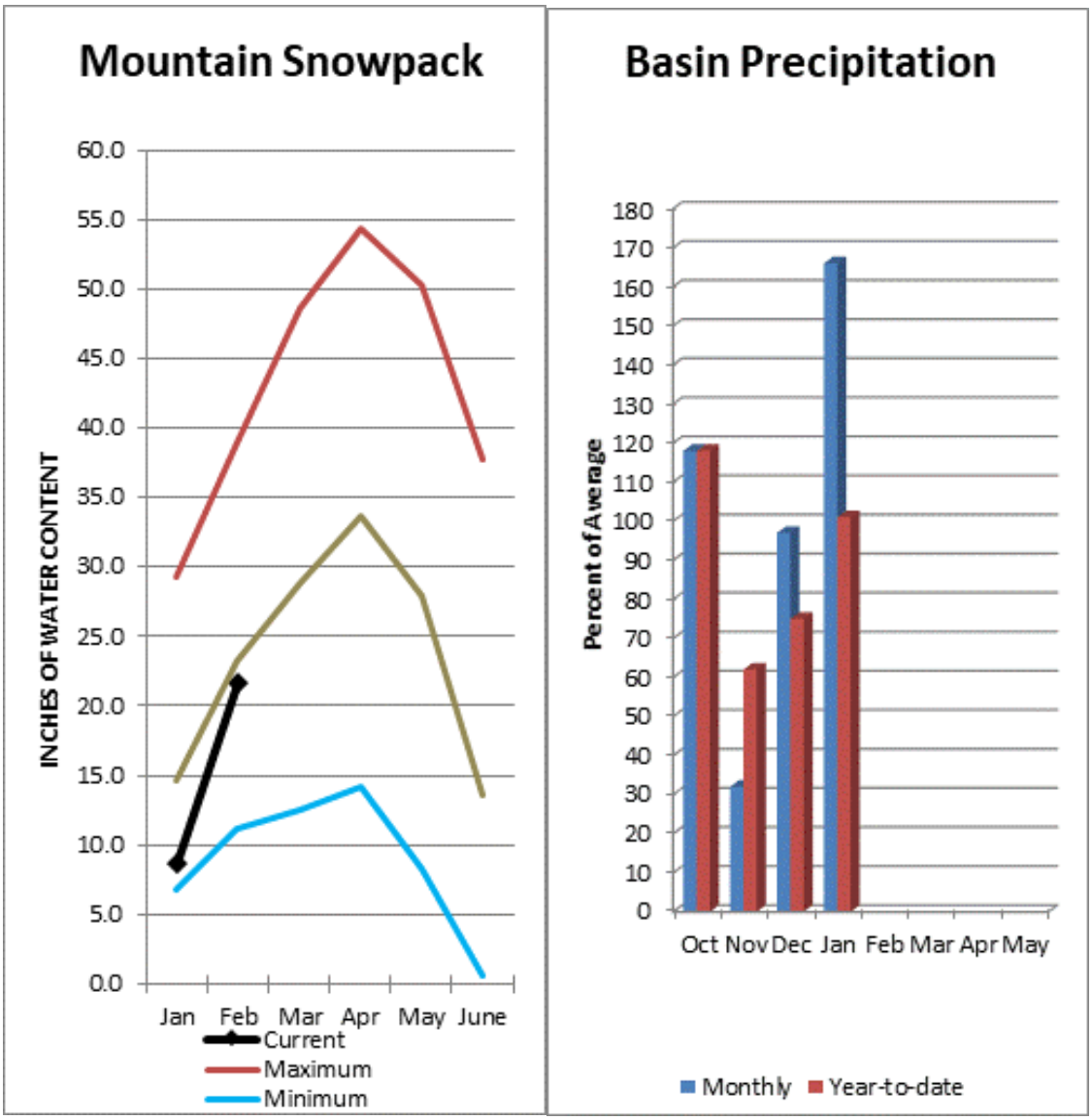
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kettle R nr Laurier								
	APR-JUL	1610	1860	2040	113%	2210	2470	1800
	APR-SEP	1670	1940	2120	113%	2300	2570	1880
Colville R at Kettle Falls								
	APR-JUL	102	145	174	146%	205	245	119
	APR-SEP	110	157	189	144%	220	270	131
Columbia R at Grand Coulee-NWS[2]								
	APR-JUL	48800		57000	112%		63300	51015
	APR-SEP	58500		66600	111%		74800	60110
Similkameen R nr Nighthawk								
	APR-JUL	900	1090	1230	103%	1360	1550	1200
	APR-SEP	965	1170	1310	102%	1450	1650	1280
Okanogan R nr Tonasket								
	APR-JUL	1080	1360	1560	105%	1750	2040	1480
	APR-SEP	1200	1520	1730	105%	1950	2270	1650
Okanogan R at Malott								
	APR-JUL	1100	1390	1590	110%	1790	2080	1450
	APR-SEP	1210	1540	1760	109%	1980	2300	1620
Methow R nr Pateros								
	APR-JUL	505	665	775	93%	885	1050	835
	APR-SEP	540	715	830	93%	950	1120	895

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
3) Median value used in place of average

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	6.9	7.4	7.3	10.5
Conconully Reservoir	8.7	10.3	7.0	13.0
Basin-wide Total	15.6	17.8	14.3	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Upper Columbia Basins	15	95%	83%
Okanogan River	10	115%	82%
Omak Creek	3	83%	90%
Sanpoil River	0		
Similkameen River	4	93%	74%
Toats Coulee Creek	0		
Conconully Lake	1	79%	74%
Methow River	4	92%	87%



Precipitation during January was 166% of average in the basin and 101% for the year-to-date. January average streamflow on the Chelan River was 94% and on the Wenatchee River 108%. February 1 snowpack in the Wenatchee River Basin was 93% of normal; the Chelan, 97%; the Entiat, 82%; Stemilt Creek, 76% and Colockum Creek, 89%. Reservoir storage in Lake Chelan was 73% of average. Lyman Lake SNOTEL had the most snow water with 32.3 inches of water. This site would normally have 40.1 inches on February 1.

For more information contact your local Natural Resources Conservation Service office.

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Central Columbia Basins
Streamflow Forecasts - February 1, 2020

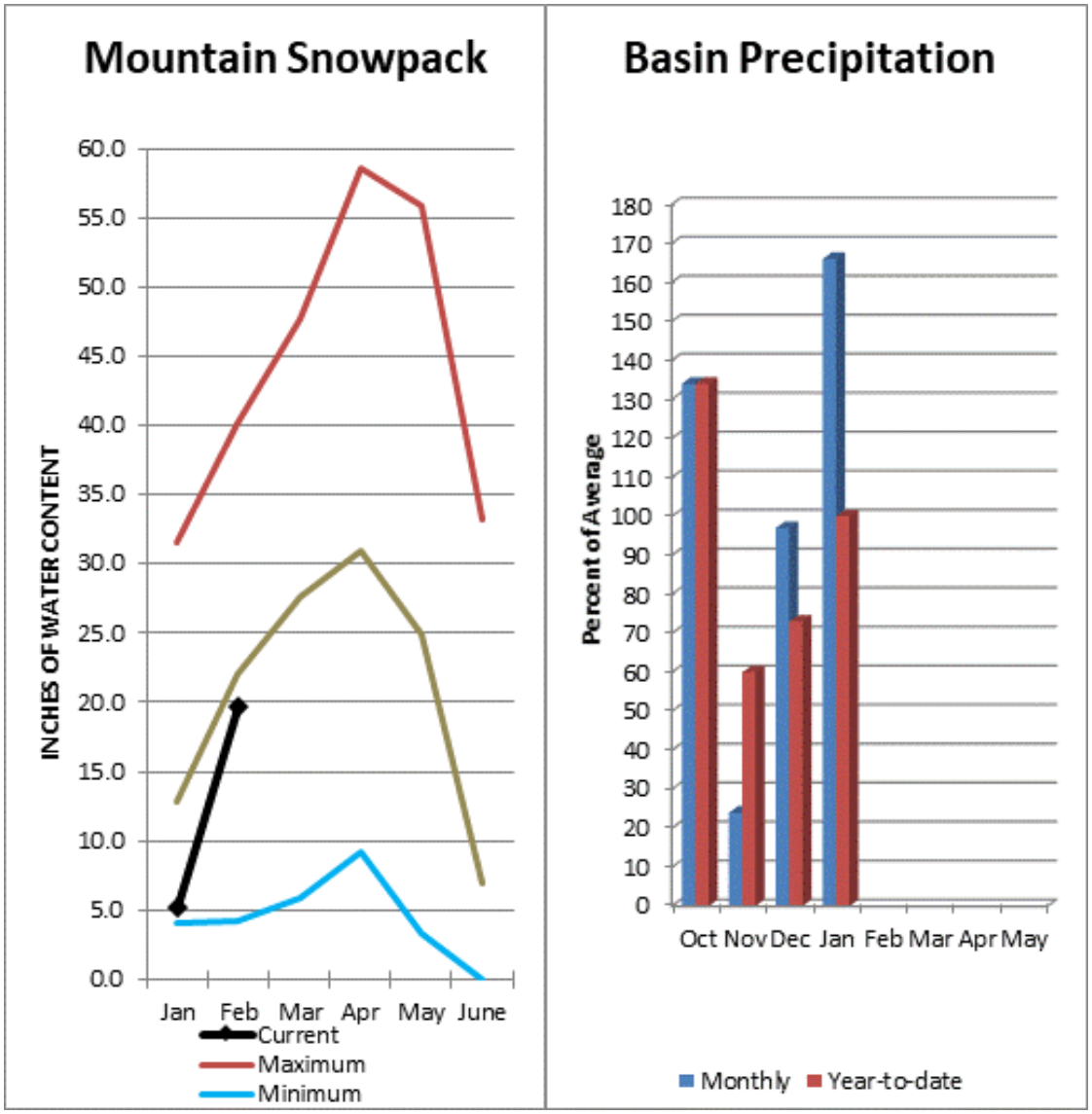
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin								
	APR-JUL	570	650	705	104%	760	840	680
	APR-SEP	660	755	815	103%	880	970	790
Chelan R at Chelan								
	APR-JUL	835	955	1040	104%	1120	1240	1000
	APR-SEP	915	1060	1160	104%	1260	1410	1120
Entiat R nr Ardenvoir								
	APR-JUL	154	186	205	103%	230	260	200
	APR-SEP	165	200	225	102%	250	285	220
Wenatchee R at Plain								
	APR-JUL	755	895	990	100%	1090	1230	990
	APR-SEP	830	990	1100	102%	1210	1370	1080
Icicle Ck nr Leavenworth								
	APR-JUL	215	255	285	104%	315	355	275
	APR-SEP	235	285	315	105%	345	395	300
Wenatchee R at Peshastin								
	APR-JUL	1090	1260	1380	101%	1500	1680	1370
	APR-SEP	1160	1370	1510	101%	1640	1850	1490
Columbia R bl Rock Island Dam-NWS[2]								
	APR-JUL	52800		62100	111%		69500	55770
	APR-SEP	62500		72200	111%		82300	65200

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
3) Median value used in place of average

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	251.4	237.2	343.1	677.4
Basin-wide Total	251.4	237.2	343.1	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Central Columbia Basins	5	97%	89%
Chelan Lake Basin	5	97%	89%
Entiat River	1	82%	78%
Wenatchee River	7	93%	85%
Stemilt Creek	1	76%	83%
Colockum Creek	1	89%	100%



February 1 reservoir storage for the Upper Yakima reservoirs was 312,000-acre feet, 77% of average. January streamflow within the basin was Cle Elum River near Roslyn at 176%. February 1 snowpack was 89% based upon 8 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 166% of average for January and 100% for the water-year. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

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Upper Yakima River
Streamflow Forecasts - February 1, 2020

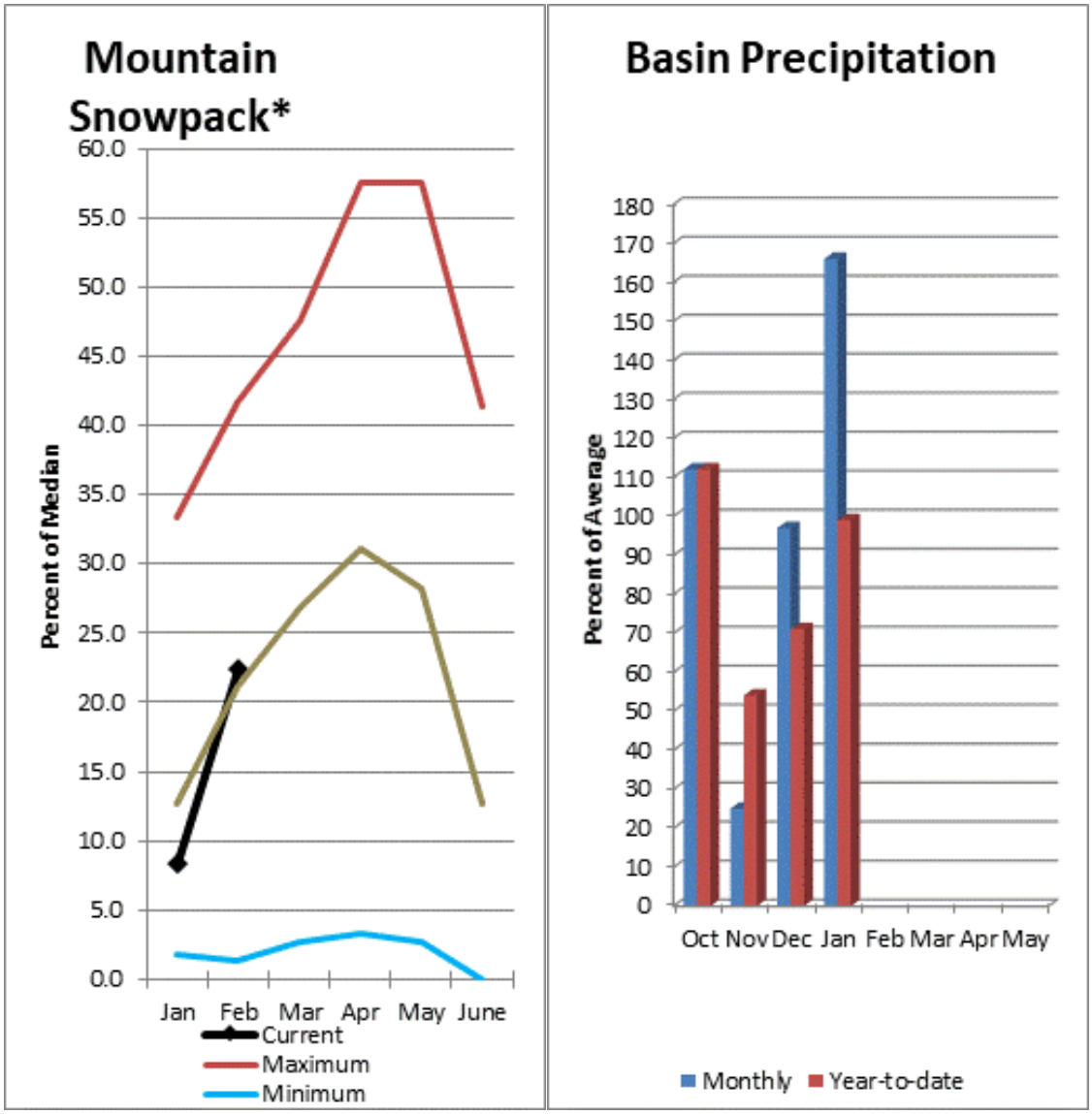
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Keechelus Reservoir Inflow[2]								
	APR-JUL	73	96	112	97%	128	151	116
	APR-SEP	80	104	121	96%	138	162	126
Kachess Reservoir Inflow [2]								
	APR-JUL	65	85	98	94%	111	131	104
	APR-SEP	77	97	111	98%	125	145	113
Cle Elum Lake Inflow [2]								
	APR-JUL	270	325	365	95%	405	460	385
	APR-SEP	285	350	390	94%	430	495	415
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	67	99	120	92%	141	173	130
	APR-SEP	70	101	123	92%	145	176	133

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
3) Median value used in place of average

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	77.3	85.3	82.1	157.8
Kachess	96.1	144.6	130.8	239.0
Cle Elum	138.0	155.9	191.5	436.9
Basin-wide Total	311.5	385.8	404.4	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Upper Yakima River	8	89%	77%



January average streamflows within the basin were: Yakima River near Parker, 130% and the Naches River near Naches, 97%. February 1 reservoir storage for Bumping and Rimrock reservoirs was 116,000-acre feet, 95% of average. February 1 snowpack was 106% based upon 6 snow course and SNOTEL readings within the Lower Yakima Basin and Ahtanum Creek reported in at 87% of normal. Precipitation was 166% of average for January and 99% for the water-year. Volume forecasts for Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

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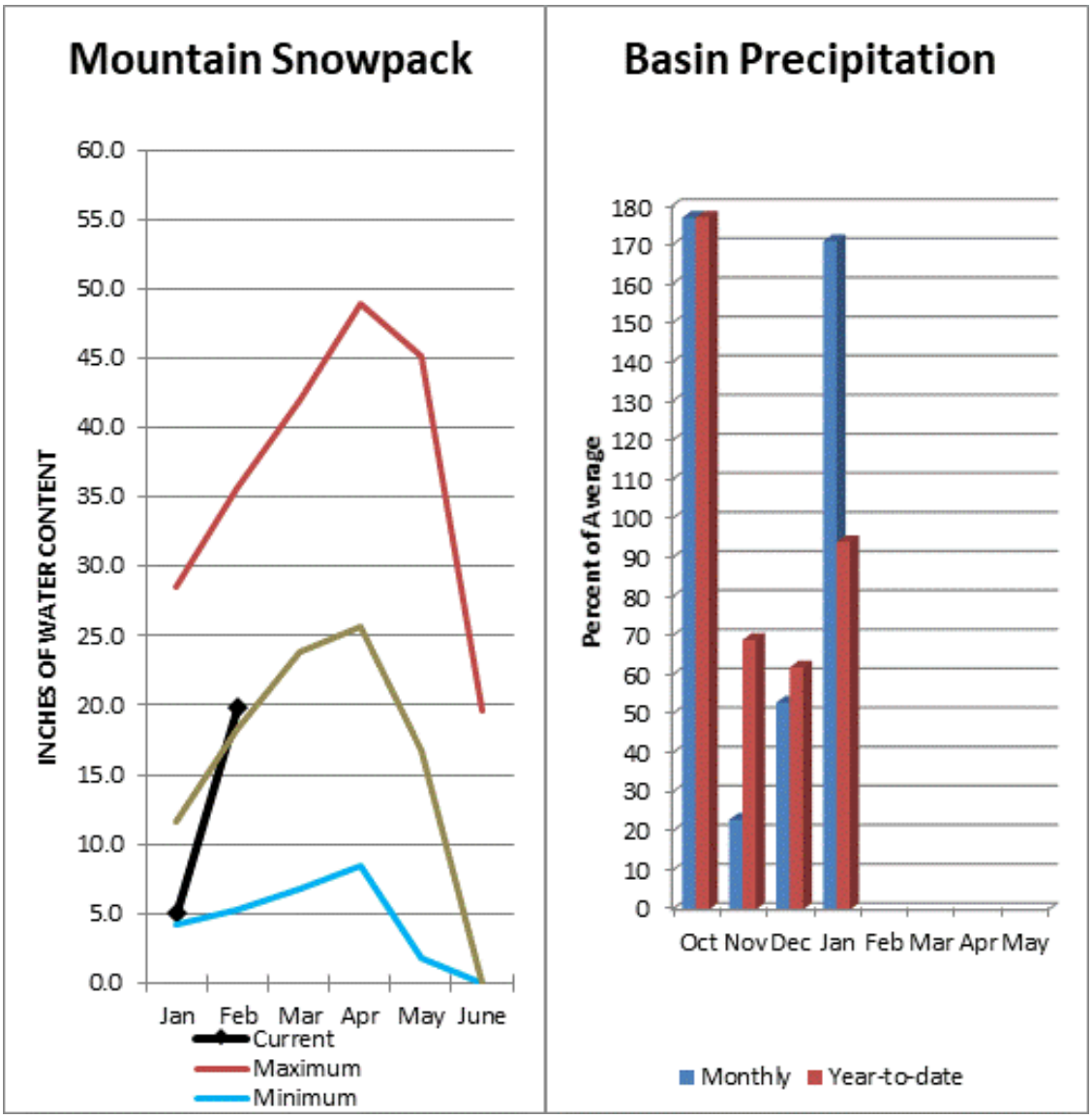
Lower Yakima River
Streamflow Forecasts - February 1, 2020

Lower Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Bumping Lake Inflow [2]								
	APR-JUL	91	108	120	105%	132	149	114
	APR-SEP	97	117	130	106%	143	163	123
American R nr Nile								
	APR-JUL	83	98	108	106%	118	133	102
	APR-SEP	91	108	117	106%	132	149	110
Rimrock Lake Inflow [2]								
	APR-JUL	154	178	194	104%	210	235	187
	APR-SEP	180	210	230	105%	250	280	220
Naches R nr Naches								
	APR-JUL	535	665	755	108%	845	975	700
	APR-SEP	575	725	825	109%	925	1070	760
Ahtanum Ck at Union Gap								
	APR-JUL	12.9	22	28	104%	34	42	27
	APR-SEP	14.8	24	30	103%	36	45	29
Yakima R nr Parker [2]								
	APR-JUL	1160	1460	1660	100%	1860	2160	1660
	APR-SEP	1250	1570	1790	98%	2010	2330	1820
Klickitat R nr Glenwood								
	APR-JUL	99	123	139	110%	155	179	126
	APR-SEP	109	135	153	110%	171	197	139
Klickitat R nr Pitt								
	APR-JUL	365	440	490	113%	540	615	435
	APR-SEP	445	530	590	113%	650	735	520

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
3) Median value used in place of average

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	17.3	10.5	12.7	33.7
Rimrock	99.1	79.1	109.6	198.0
Basin-wide Total	116.3	89.6	122.3	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Lower Yakima River	6	106%	84%
Ahtanum Creek	2	87%	89%



January precipitation was 171% of average, maintaining the year-to-date precipitation at 94% of average. Snowpack in the basin was only 109% of normal.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 2/6/2020 12:51:53 PM

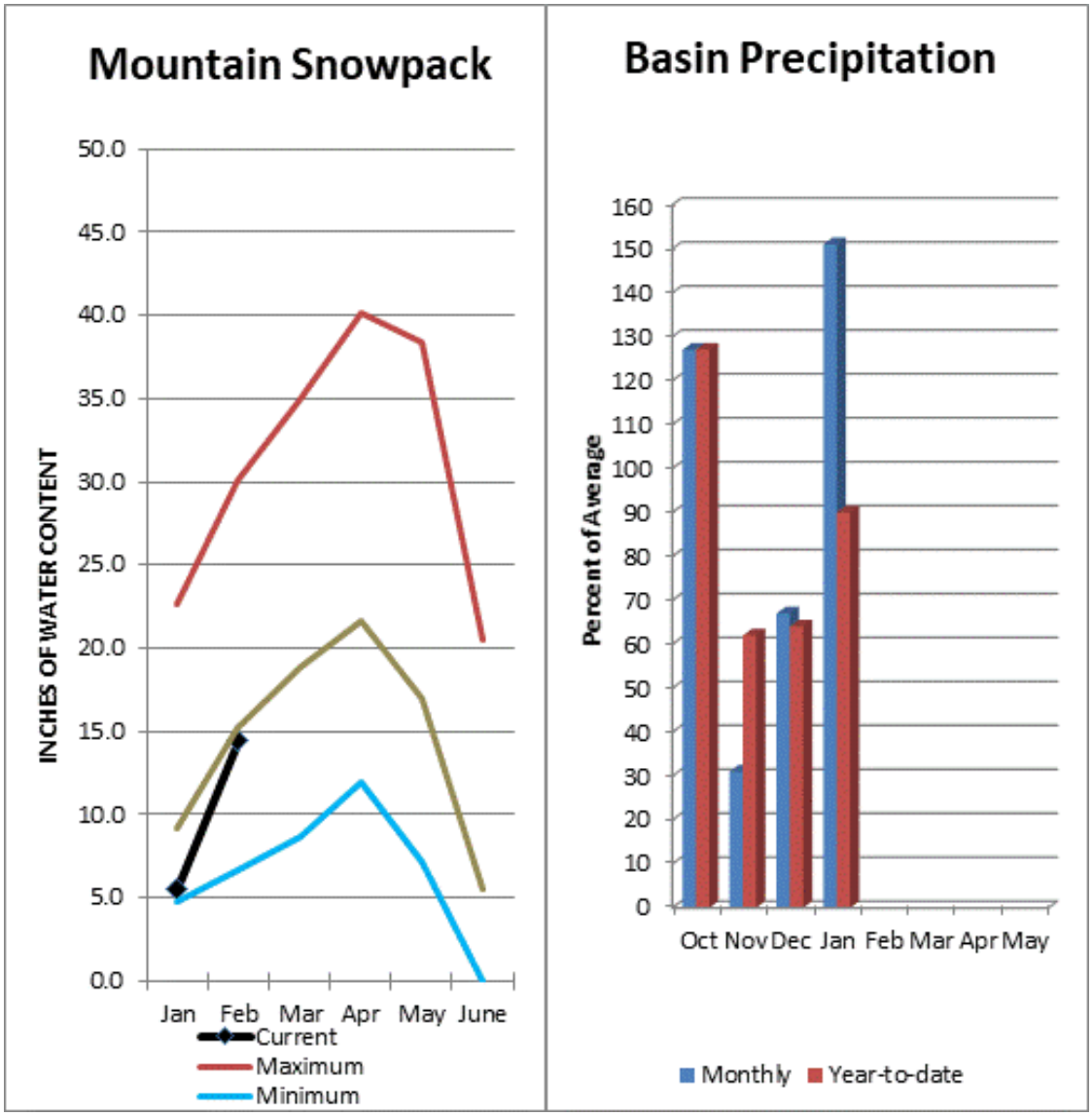
Walla Walla River
Streamflow Forecasts - February 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Walla Walla River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
SF Walla Walla R nr Milton-Freewater								
	MAR-JUL	51	61	67	99%	73	82	68
	APR-SEP	50	59	65	98%	71	80	66
Mill Ck nr Walla Walla								
	APR-JUL	16.5	20	23	96%	25	29	24
	APR-SEP	19.5	23	26	96%	29	33	27

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
3) Median value used in place of average

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Walla Walla River	2	109%	109%



January precipitation was 151% of average, bringing the year-to-date precipitation to 90% of average. February 1 snowpack readings averaged 95% of normal. January streamflow was 70% of average for Snake River below Lower Granite Dam and 53% for Grande Ronde River near Troy. Dworshak Reservoir storage was 94% of average.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 2/6/2020 12:51:59 PM

Lower Snake, Grande Ronde, Clearwater Basins
Streamflow Forecasts - February 1, 2020

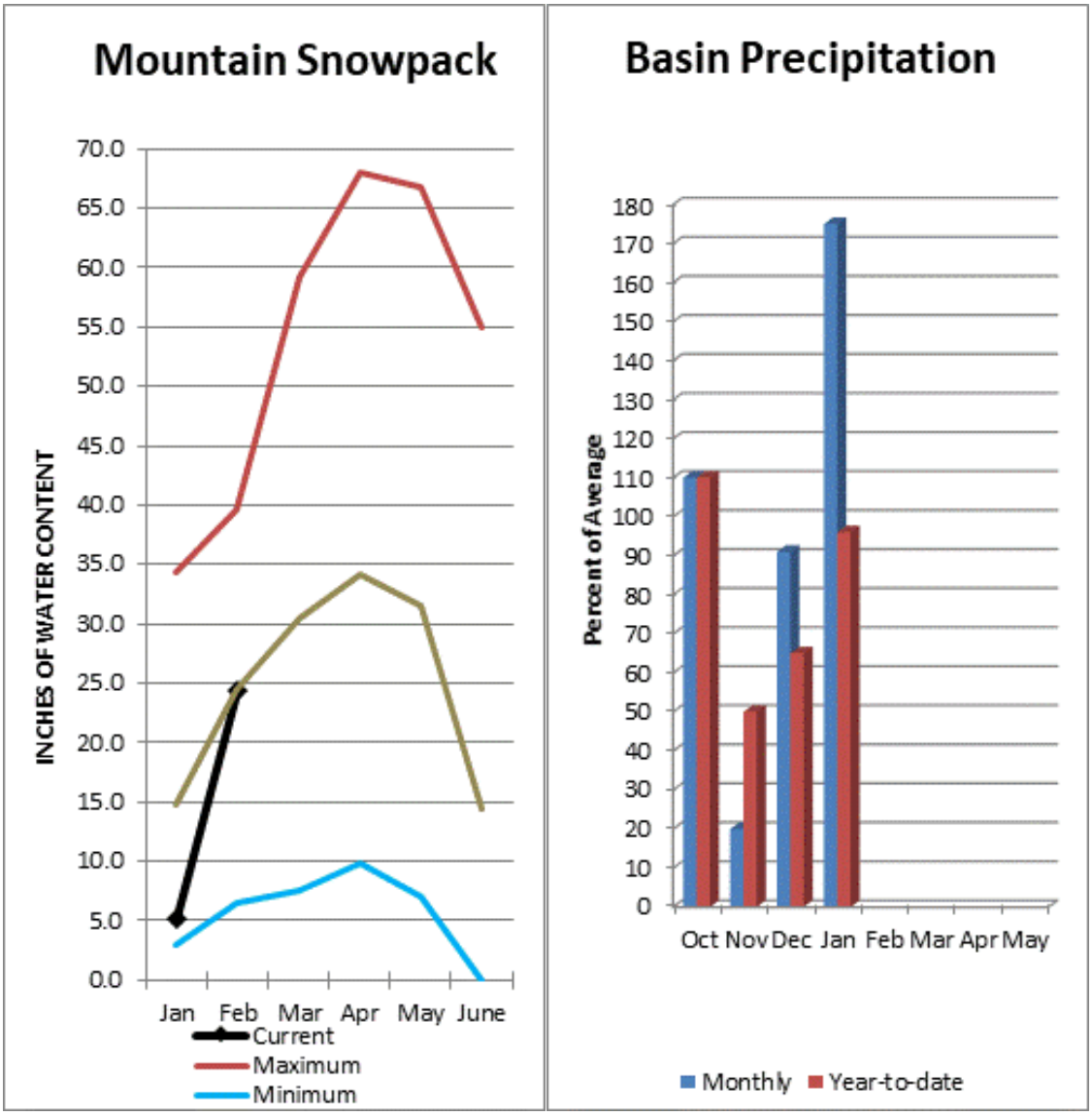
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake, Grande Ronde, Clearwater Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	MAR-JUL	1140	1390	1550	103%	1720	1970	1510
	APR-SEP	950	1180	1340	102%	1500	1730	1310
Asotin Ck at Asotin								
	APR-JUL	13.5	21	28	80%	35	47	35
Clearwater R at Spalding[2]								
	APR-JUL	4970	6110	6880	100%	7660	8800	6890
	APR-SEP	5290	6460	7250	100%	8040	9210	7270
Snake R bl Lower Granite Dam-NWS[2]								
	APR-JUL	15300		19400	98%		23200	19848
	APR-SEP	17300		21800	98%		25900	22280

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
3) Median value used in place of average

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2204.5	2266.0	2335.0	3468.0
Basin-wide Total	2204.5	2266.0	2335.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Lower Snake, Grande Ronde, Clearwater Basins	14	95%	83%



January average streamflow for Cowlitz River was 152% and the Columbia River at The Dalles was 89% of average. January precipitation was 175% of average and the water-year average was 96%. February 1 snow cover for Cowlitz River was 106%, and Lewis River was 93% of normal.

Lower Columbia River Basins

Data Current as of: 2/6/2020 12:52:05 PM

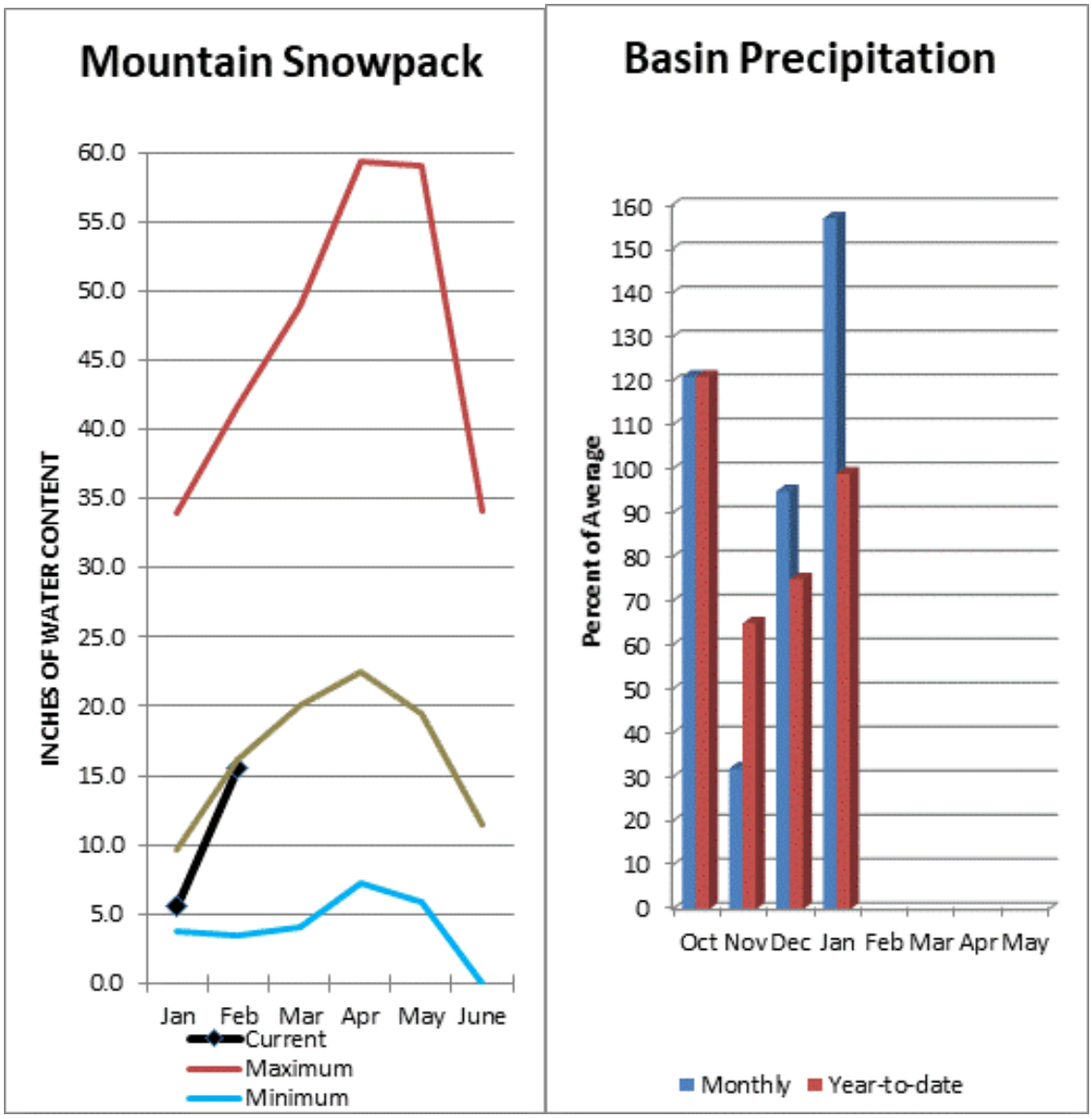
Lower Columbia Basins
Streamflow Forecasts - February 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Columbia R at The Dalles-NWS[2]								
	APR-JUL	73100		83600	105%		96000	79855
	APR-SEP	86200		98500	106%		111000	92704
Klickitat R nr Glenwood								
	APR-JUL	99	123	139	110%	155	179	126
	APR-SEP	109	135	153	110%	171	197	139
Klickitat R nr Pitt								
	APR-JUL	365	440	490	113%	540	615	435
	APR-SEP	445	530	590	113%	650	735	520
Lewis R at Ariel[2]								
	APR-JUL	630	800	920	95%	1040	1210	970
	APR-SEP	725	910	1030	92%	1160	1340	1120
Cowlitz R bl Mayfiled[2]								
	APR-JUL	1270	1470	1610	99%	1740	1940	1630
	APR-SEP	1520	1750	1900	103%	2060	2300	1840
Cowlitz R at Castle Rock[2]								
	APR-JUL	1830	2060	2220	99%	2380	2600	2240
	APR-SEP	2430	2550	2630	104%	2710	2830	2540

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
3) Median value used in place of average

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Lower Columbia Basins	11	100%	70%
Lewis River	5	93%	64%
Cowlitz River	6	106%	77%



February 1 snowpack was 123% of average for the White River, 119% for Puyallup River and 69% in the Green River Basin. January precipitation was 157% of average, bringing the water year-to-date to 99% of average for the basins.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 2/6/2020 12:52:10 PM

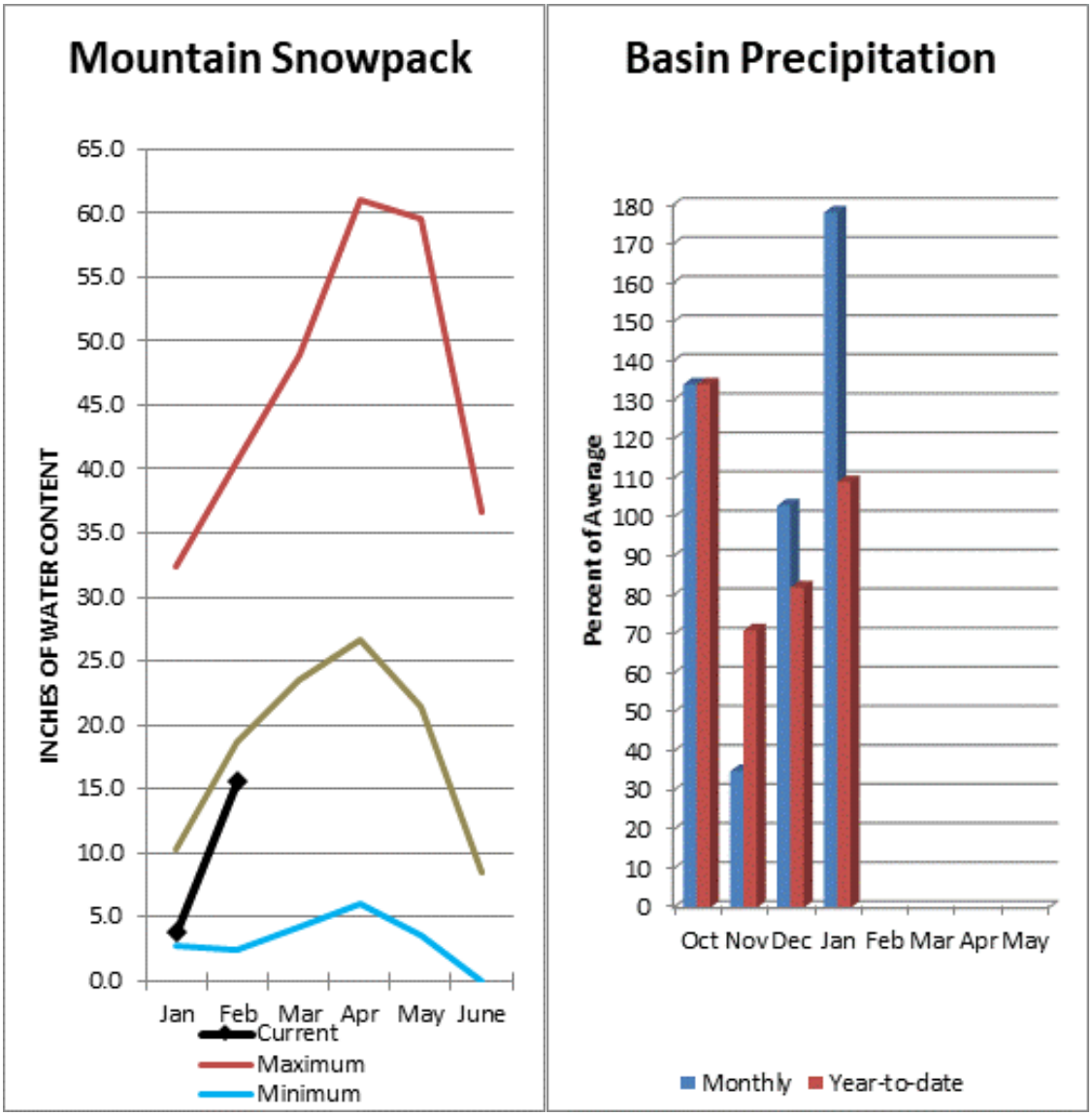
South Puget Sound Basins
Streamflow Forecasts - February 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

South Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
White R nr Buckley[1,2]								
	APR-JUL	360	440	470	109%	505	585	430
	APR-SEP	435	525	565	110%	605	695	515
Green R bl Howard A Hanson Dam[1,2]								
	APR-JUL	128	194	225	96%	255	320	235
	APR-SEP	149	215	245	94%	275	345	260

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
3) Median value used in place of average

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
South Puget Sound Basins	9	96%	68%
White River	2	123%	95%
Green River	3	69%	45%



Basin-wide precipitation for January was 178% of average, bringing water-year-to-date to 109% of average. February 1 median snow cover in Cedar River Basin was 75%, Tolt River Basin was 81%, Snoqualmie River Basin was 80%, and Skykomish River Basin was 95%.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 2/6/2020 12:52:16 PM

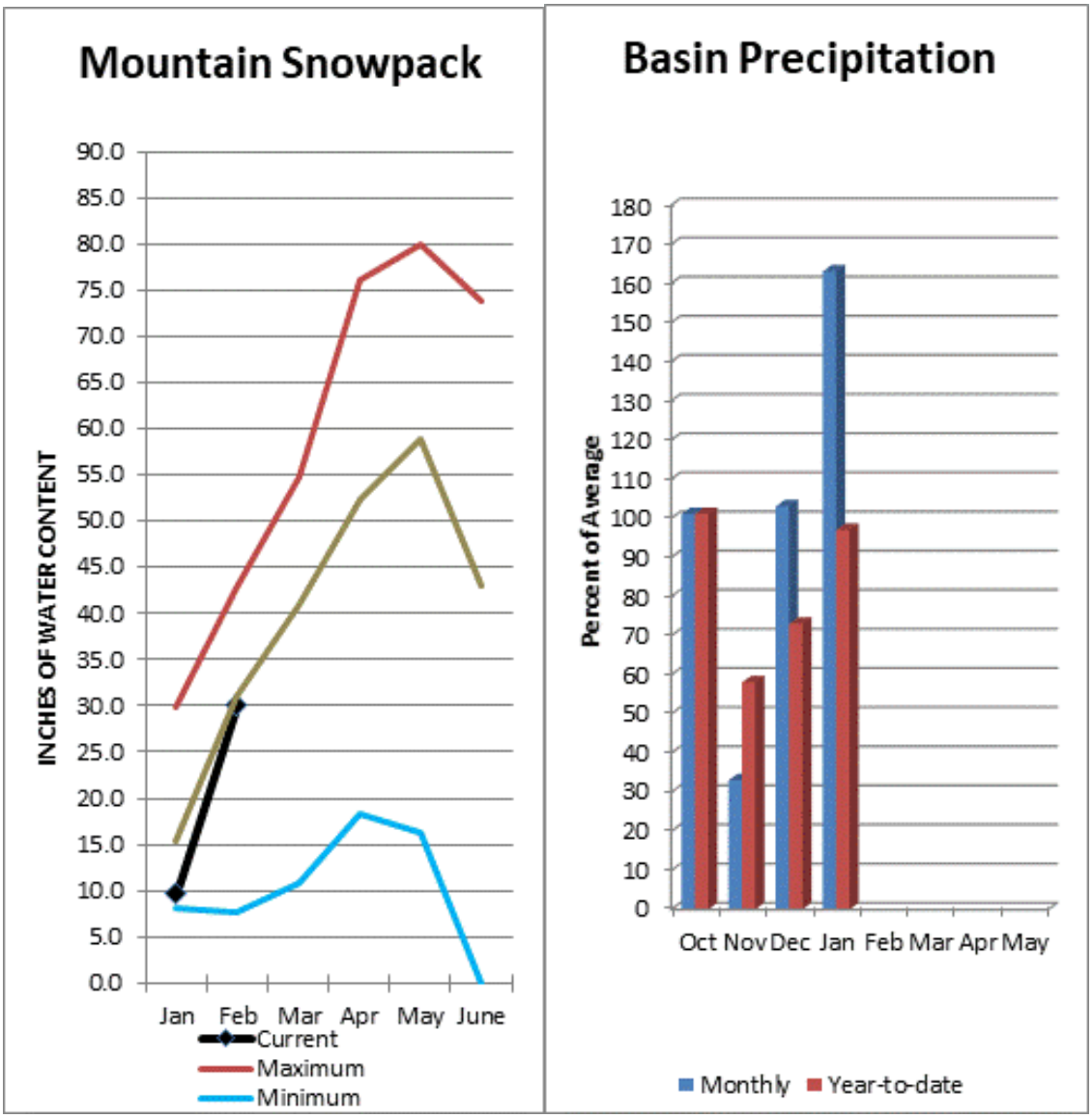
Central Puget Sound Basins
Streamflow Forecasts - February 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	APR-JUL	53	64	71	101%	79	90	70
	APR-SEP	60	71	78	103%	86	97	76
Rex R nr Cedar Falls								
	APR-JUL	16.3	21	25	104%	28	33	24
	APR-SEP	18.6	24	27	100%	30	35	27
Taylor Ck nr Selleck								
SF Tolt R nr Index								
	APR-JUL	13.7	16	17.6	124%	19.2	21	14.2
	APR-SEP	15.3	17.8	19.5	121%	21	24	16.1

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
3) Median value used in place of average

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Central Puget Sound Basins	12	84%	56%
Puyallup River	4	119%	85%
Cedar River	4	75%	53%
Tolt River	2	81%	39%
Snoqualimie River	4	80%	53%
Skykomish River	2	95%	56%



January streamflow in Skagit River was 138% of average. Basin-wide precipitation for January was 163% of average, bringing water-year-to-date to 97% of average. February 1 average snow cover in Skagit River Basin was 95% and the Nooksack River Basin was 102%. February 1 Skagit River reservoir storage was 86% of average and 61% of capacity.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 2/6/2020 12:52:22 PM

North Puget Sound Basins
Streamflow Forecasts - February 1, 2020

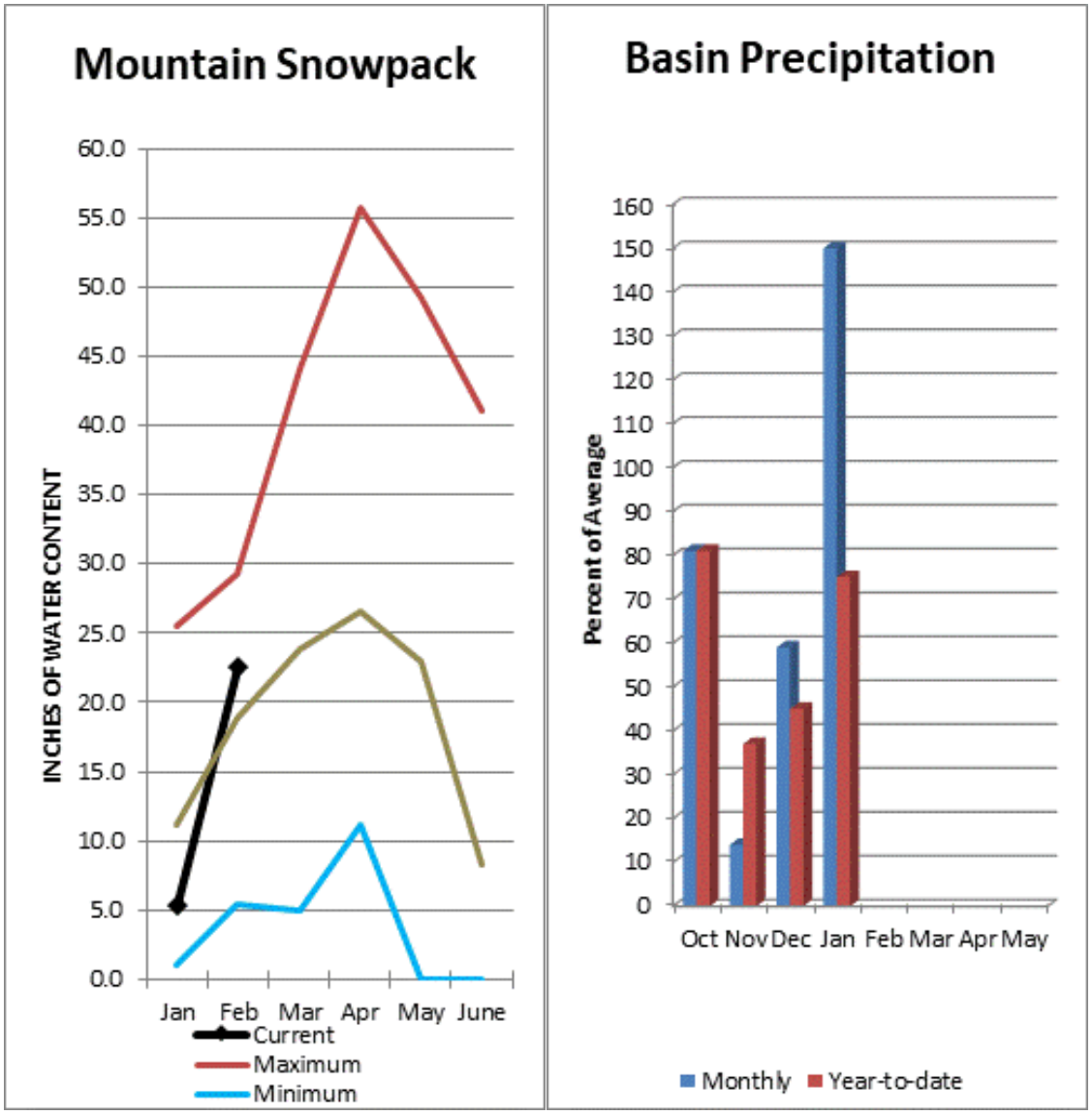
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

North Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Thunder Ck nr Newhalem								
	APR-JUL	205	225	235	100%	245	265	235
	APR-SEP	305	325	335	102%	350	370	330
Skagit R at Newhalem[2]								
	APR-JUL	1670	1810	1900	109%	1990	2130	1750
	APR-SEP	1980	2140	2240	108%	2340	2500	2070
Baker R at Concrete								
	APR-JUL	670	755	810	104%	865	950	780
	APR-SEP	875	970	1030	105%	1090	1180	980

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
3) Median value used in place of average

Reservoir Storage End of January, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	860.2	926.0	996.3	1434.7
Basin-wide Total	860.2	926.0	996.3	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
North Puget Sound Basins	13	97%	83%
Skagit River	11	95%	88%
Baker River	0		
Nooksack River	2	102%	64%



the January runoff in January January Januaey

Dungeness River streamflow was 112% of normal. January precipitation was 150% of average. Precipitation has accumulated at 75% of average for the water year. January precipitation at Quillayute was 30.78", breaking the old record set in 1967. Olympic Peninsula snowpack averaged 119% of normal on February 1.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 2/6/2020 12:52:28 PM

Olympic Penninsula
Streamflow Forecasts - February 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Olympic Penninsula	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Dungeness R nr Sequim								
	APR-JUL	106	118	126	105%	134	146	120
	APR-SEP	127	143	153	106%	163	179	145
Elwha R at McDonald Br nr Port Angeles								
	APR-JUL	360	400	425	106%	455	495	400
	APR-SEP	420	470	505	107%	535	585	470

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
3) Median value used in place of average

Watershed Snowpack Analysis February 1, 2020	# of Sites	% Median	Last Year % Median
Olympic Penninsula	6	119%	76%

Washington Snow Survey Office
2005 E. College Way, Suite 203
Mount Vernon, WA 98273-2873

Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA

Issued by

Matthew J. Lohr
Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Rides-at-the-Door
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada	Snow Survey Network Program – British Columbia Ministry of Environment
	River Forecast Center – British Columbia Ministry of Forests, Lands and Natural Resource Operations
State	Washington State Department of Ecology
	Washington State Department of Natural Resources
Federal	Department of the Army
	Corps of Engineers
	U.S. Department of Agriculture
	Forest Service
	U.S. Department of Commerce
	NOAA, National Weather Service
	U.S. Department of Interior
	Bonneville Power Administration
	Bureau of Reclamation
	Geological Survey
	National Park Service
	Bureau of Indian Affairs
Local	City of Tacoma
	City of Seattle
	City of Bellingham
	Chelan County P.U.D.
	Pacific Power/PacificCorp
	Puget Sound Energy
	Washington Water Power Company
	Snohomish County P.U.D.
	Colville Confederated Tribes
	Spokane County
	Yakama Indian Nation
	Whatcom County
	Pierce County
	Kalispel Tribe of Indians
	Spokane Indian Tribe
	Jamestown S'Klallam Tribe
Private	Okanogan Irrigation District
	Wenatchee Heights Irrigation District
	Newman Lake Homeowners Association
	Whitestone Reclamation District
	Kinross Mining

***Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.**

NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington
Water Supply Outlook Report
March 1, 2020

Photos courtesy: Scott Ladd, Yakama Nation Snow Surveyor

Photos taken in the Status Pass area and show the open south facing slopes. Snowline was with in a mile of snow survey sites. Status Pass snow course was measured at 103% of normal however as is evidenced that does not appear to be fully representative of the area. Lost Horse SNOTEL, on Toppenish Creek, is only 73% of normal.

Water Supply Outlook Reports
and
Federal - State – Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

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or

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(509) 323-2955

How forecasts are made

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. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. 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 uncertain 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.

Washington
Water Supply Outlook

March 2020

General Outlook

February brought an interesting mix of good high mountain snow and record precipitation. Snowpack remains healthy but the big story was the major flooding in the Umatilla River in North East Oregon and on Mill Creek, Walla Walla and Touchet rivers in South East Washington. Catastrophic damage was reported for roads, livestock facilities and farmland. Record precipitation was also recorded in the West Central Cascades however west side rivers have evolved to handle such large flows, so flood damage was minimum and mostly inconvenient. The most recent forecast through mid-March shows a high probability for below normal temperatures and a mixed bag of normal to below normal precipitation. NWS 3-month (MAM) forecast indicates above normal temperatures on the west side and equal chances for above, below or normal temperatures east of the Cascades. Precipitation is forecasted to have equal chances. The US Drought Monitor indicates D0-D1 drought designation shrinking from last month however still persistent North to South in Central Washington, most likely due to the lack of precipitation and low elevation snow through most of the region. (see page 4) http://www.cpc.ncep.noaa.gov/

Snowpack

The March 1 statewide SNOTEL readings were 107% of normal. The lowest readings in the state were at 67% of the 30-year median for March 1 in the Conconully Lake area. The Cowlitz River Basin had the most snow with 130%. Westside medians from SNOTEL, and March 1 snow surveys, included the North Puget Sound river basins with 112% of normal, the Central and South Puget river basins with 106% and 116% respectively, and the Lower Columbia basins with 110% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 108% and the Wenatchee area with 102%. Snowpack in the Spokane River Basin was at 107% and the Upper Columbia river basins had 100% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	107	91
Newman Lake	116	90
Pend Oreille	113	103
Okanogan	115	81
Methow	103	81
Conconully Lake	67	70
Central Columbia	102	93
Upper Yakima	105	88
Lower Yakima	112	99
Ahtanum Creek	90	110
Walla Walla	120	119
Lower Snake	106	115
Cowlitz	130	98
Lewis	91	90
White	127	105
Green	93	78
Puyallup	127	110
Cedar	98	80
Snoqualmie	103	70
Skykomish	116	71
Skagit	113	86
Nooksack	109	71
Olympic Peninsula	113	88

Precipitation

February precipitation from SNOTEL varied greatly with amounts as low as 33% of average at Upper Wheeler SNOTEL to as high as 255% of average in the Walla Walla Basin. Skookum Creek SNOTEL in the Tolt River Basin received the most precipitation with 29.8" or 255% of normal. Sourdough Gulch SNOTEL in Asotin County had the highest percentage at 488% of the long-term average.

RIVER BASIN	FEBRUARY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	89	96
Pend Oreille	120	96
Upper Columbia	102	89
Central Columbia	120	104
Upper Yakima	149	108
Lower Yakima	133	103
Walla Walla	255	121
Lower Snake	142	99
Lower Columbia	137	103
South Puget Sound	217	115
Central Puget Sound	238	127
North Puget Sound	154	104
Olympic Peninsula	109	79

Reservoir

Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. March 1 Reservoir storage in the Yakima Basin was 460,000-acre feet, 102% of average for the Upper Reaches and 166,000-acre feet or 121% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 65,000-acre feet, 49% of average and 27% of capacity; and Ross lake within the Skagit River Basin at 95% of average and 56% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	27	49
Pend Oreille	36	72
Upper Columbia	63	100
Central Columbia	32	77
Upper Yakima	55	102
Lower Yakima	72	121
Lower Snake	66	96
North Puget Sound	56	95

For more information contact your local Natural Resources Conservation Service office.

Streamflow

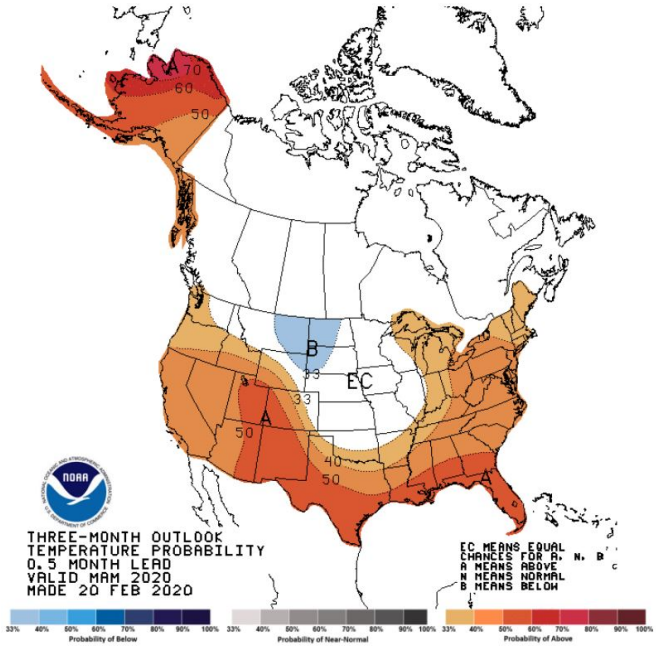
As we near the apex of winter we can see an increase in streamflow forecast accuracy. However late winter and even spring climate conditions may warrant changes as we move forward. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. Caution should be used when using early season forecasts for critical water resource management decisions since governing conditions are likely to change for the better or the worse

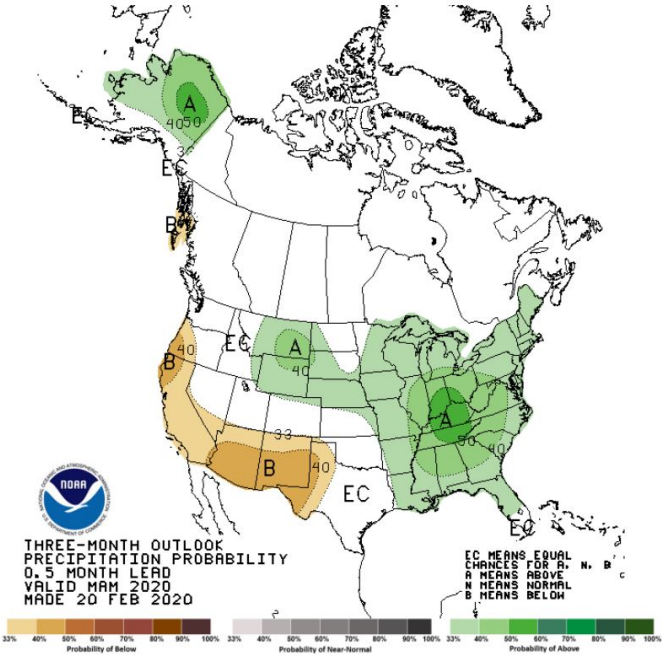
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	115-123
Pend Oreille	112
Upper Columbia	95-125
Central Columbia	104-112
Upper Yakima	99-100
Lower Yakima	100-113
Walla Walla	111-112
Lower Snake	89-124
Lower Columbia	92-120
South Puget Sound	96-119
Central Puget Sound	111-137
North Puget Sound	105-113
Olympic Peninsula	112

STREAM	PERCENT OF AVERAGE FEBRUARY STREAMFLOWS
Pend Oreille at Albeni Fall Dam	92
Kettle at Laurier	127
Columbia at Birchbank	110
Spokane at Spokane	81
Similkameen at Nighthawk	174
Okanogan at Tonasket	169
Methow at Pateros	113
Chelan at Chelan	152
Stehekin near Stehekin	179
Wenatchee at Pashastin	192
Cle Elum near Roslyn	240
Yakima at Parker	194
Naches at Naches	235
Grande Ronde at Troy	165
Snake below Lower Granite Dam	80
Columbia River at The Dalles	94
Lewis at Merwin Dam	125
Cowlitz below Mayfield Dam	189
Skagit at Concrete	146
Dungeness near Sequim	137

Climate

For more information contact your local Natural Resources Conservation Service office.





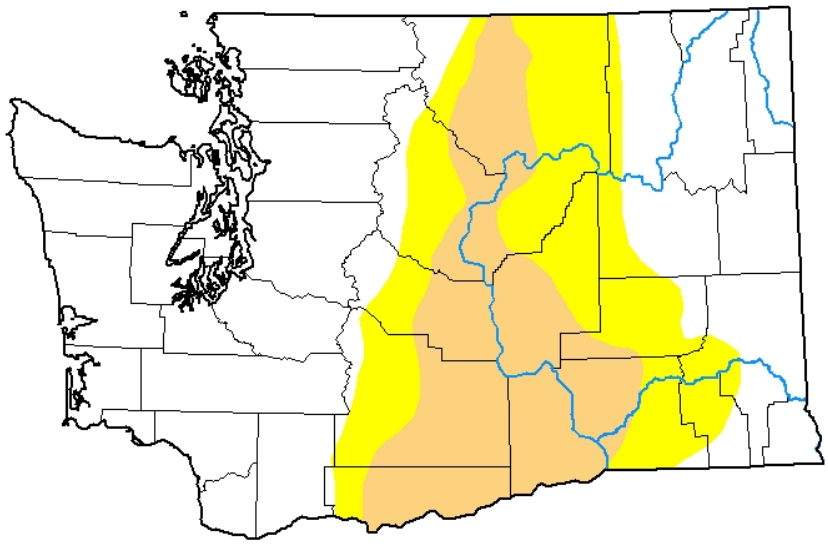
U.S. Drought Monitor

Washington

March 3, 2020

(Released Thursday, Mar. 5, 2020)

Valid 7 a.m. EST



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

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droughtmonitor.unl.edu

Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/wa/snow/

Oregon:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/snow/

Idaho:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

USDA-NRCS Agency Homepages

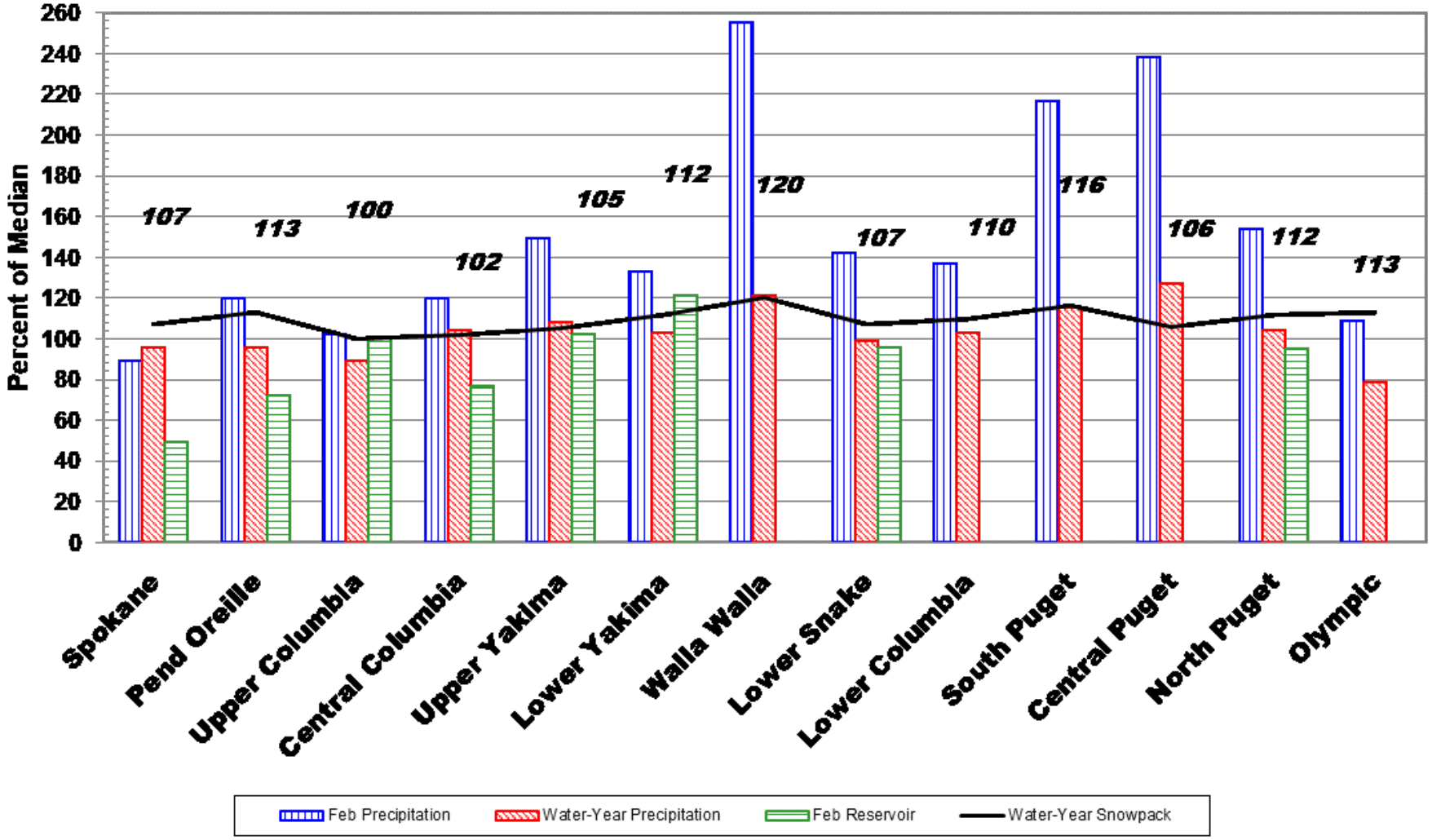
Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/

NRCS National:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

NRCS Natural Resources Conservation Service

March 1, 2020 - Snowpack, Precipitation and Reservoir Conditions at a Glance

(Water Year = October 1 - Current Date)



88th Meeting of the Western Snow Conference

The Western Snow Conference is an annual tradition which started in 1932 as an international forum for individuals and organizations to share scientific, management and socio-political information on snow and runoff. The principal aim of the Western Snow Conference is to advance snow and hydrological sciences. The North Pacific Area Committee is making plans for the 88th Annual Western Snow Conference in 2020.

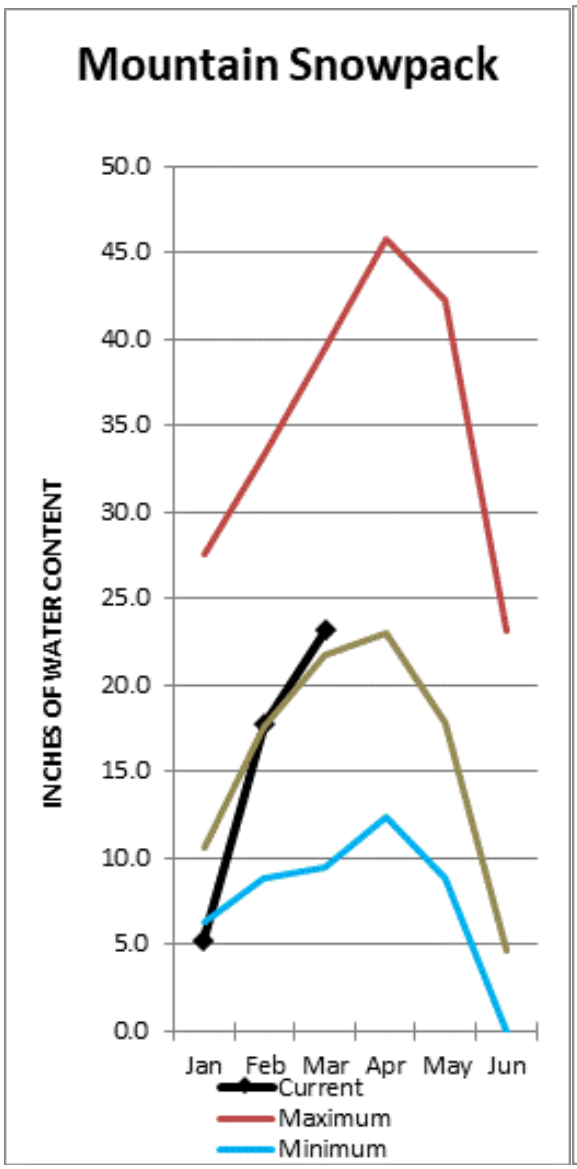
Mark your calendar and start thinking about submitting a paper to attend the 2018 Western Snow Conference:

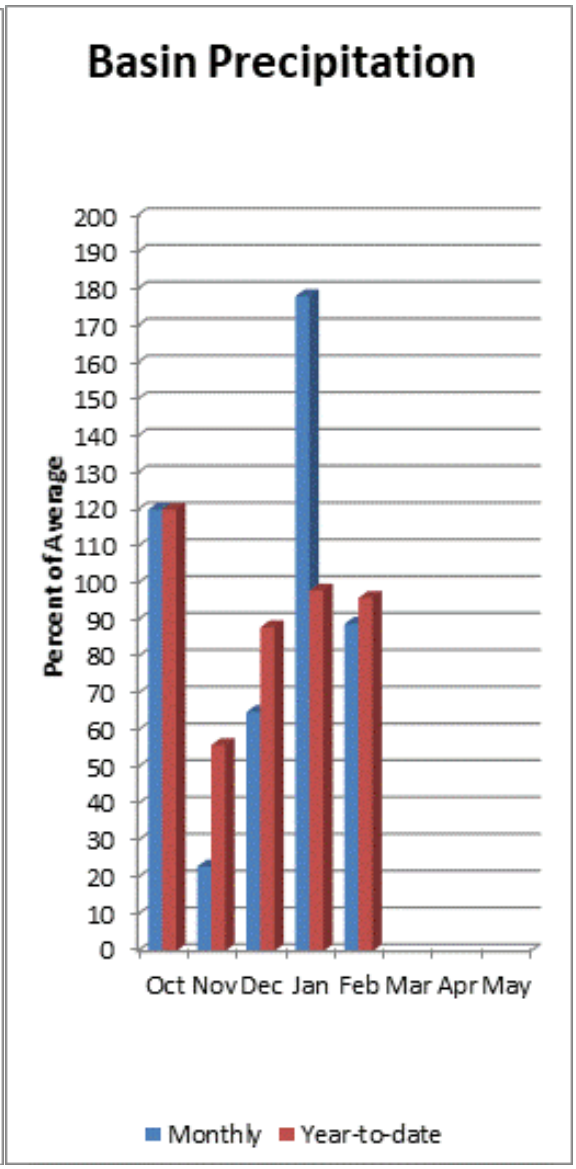
Dates: April 20-23, 2020
Location: Whistler, British Columbia, Canada

The 2020 conference will be held at the Hilton Hotel in Whistler, British Columbia, Canada. The Hilton is in the vibrant Whistler village within close walking distance of restaurants, shopping, and close to the breathtaking Whistler ski areas.

Additional information about the conference and the Call for Papers will be posted on the WSC web page at http://www.westernsnowconference.org/

Also find Western Snow Conference on Facebook.





Basin snowpack is 107% of normal and precipitation is 96% of average for the water year. Precipitation for February was slightly below normal at 89% of average. Streamflow on the Spokane River at Spokane was 81% of average for February. March 1 storage in Coeur d'Alene Lake was 64,800-acre feet, 49% of average and 27% of capacity. Snowpack at Quartz Peak SNOTEL site was 114% of average with 22.2 inches of water content.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 3/5/2020 4:08:02 PM

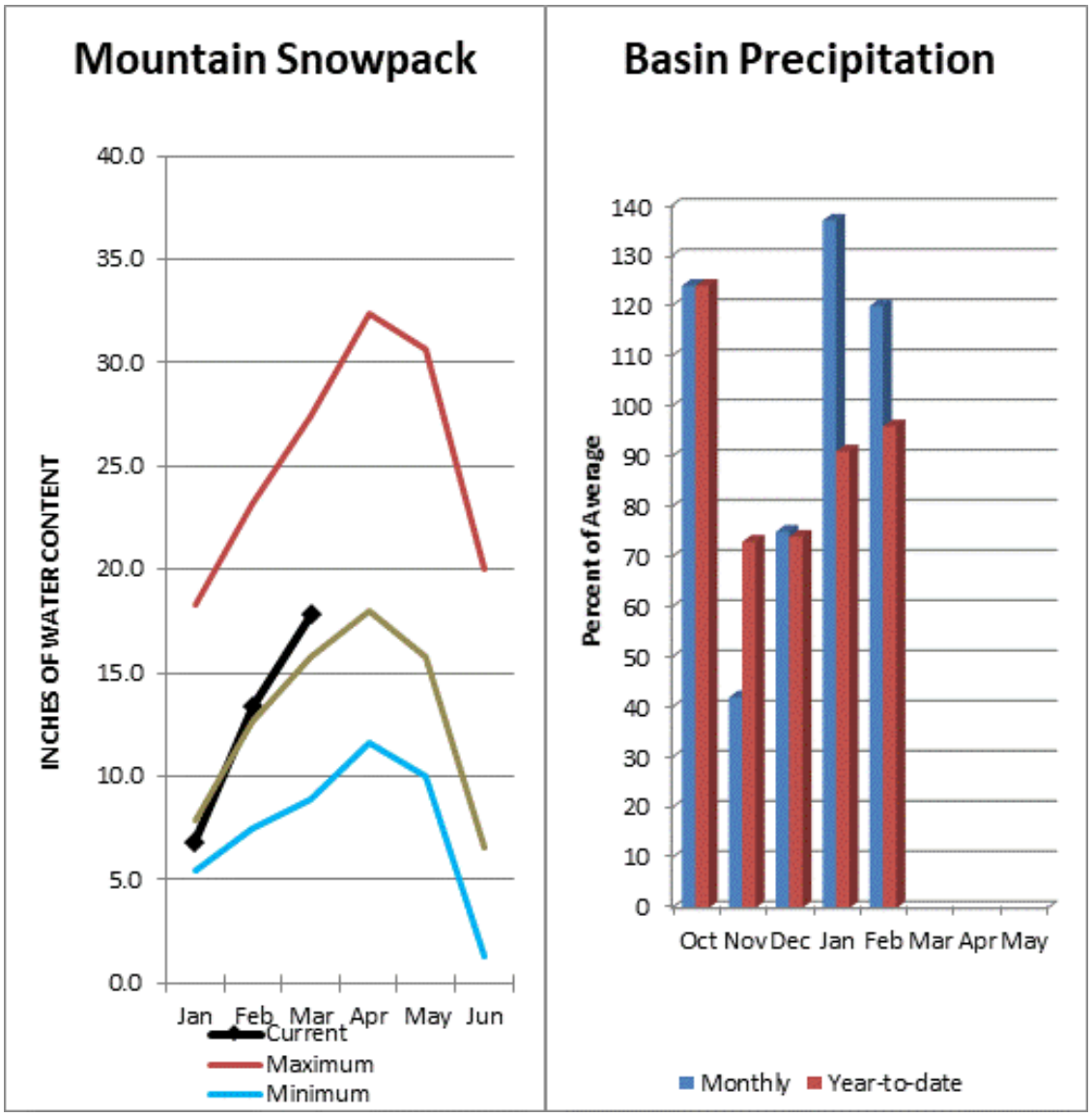
Spokane
Streamflow Forecasts - March 1, 2020

Spokane	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment: Chance that actual volume will exceed forecast — 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Spokane R nr Post Falls[2]								
	APR-JUL	1980	2460	2790	117%	3110	3590	2390
	APR-SEP	2050	2540	2870	116%	3200	3690	2480
Spokane R at Long Lake[2]								
	APR-JUL	2270	2760	3090	118%	3420	3910	2620
	APR-SEP	2450	2950	3290	115%	3630	4130	2850
Chamokane Ck nr Long Lake								
	MAR-JUL	17.9	26	32	123%	39	51	26

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
3) Median value used in place of average

Reservoir Storage End of February, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	64.8	38.6	132.8	238.5
Basin-wide Total	64.8	38.6	132.8	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Spokane	16	107%	91%
Newman Lake	3	116%	90%



February streamflow was 92% of average on the Pend Oreille River and 102% on the Columbia at Birchbank. March 1 snow cover was 113% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 25.8 inches of snow water on the snow pillow which is 115% of normal for March 1. Precipitation during February was 120% of average, the year-to-date precipitation is 96% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 72% of normal.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 3/5/2020 4:08:10 PM

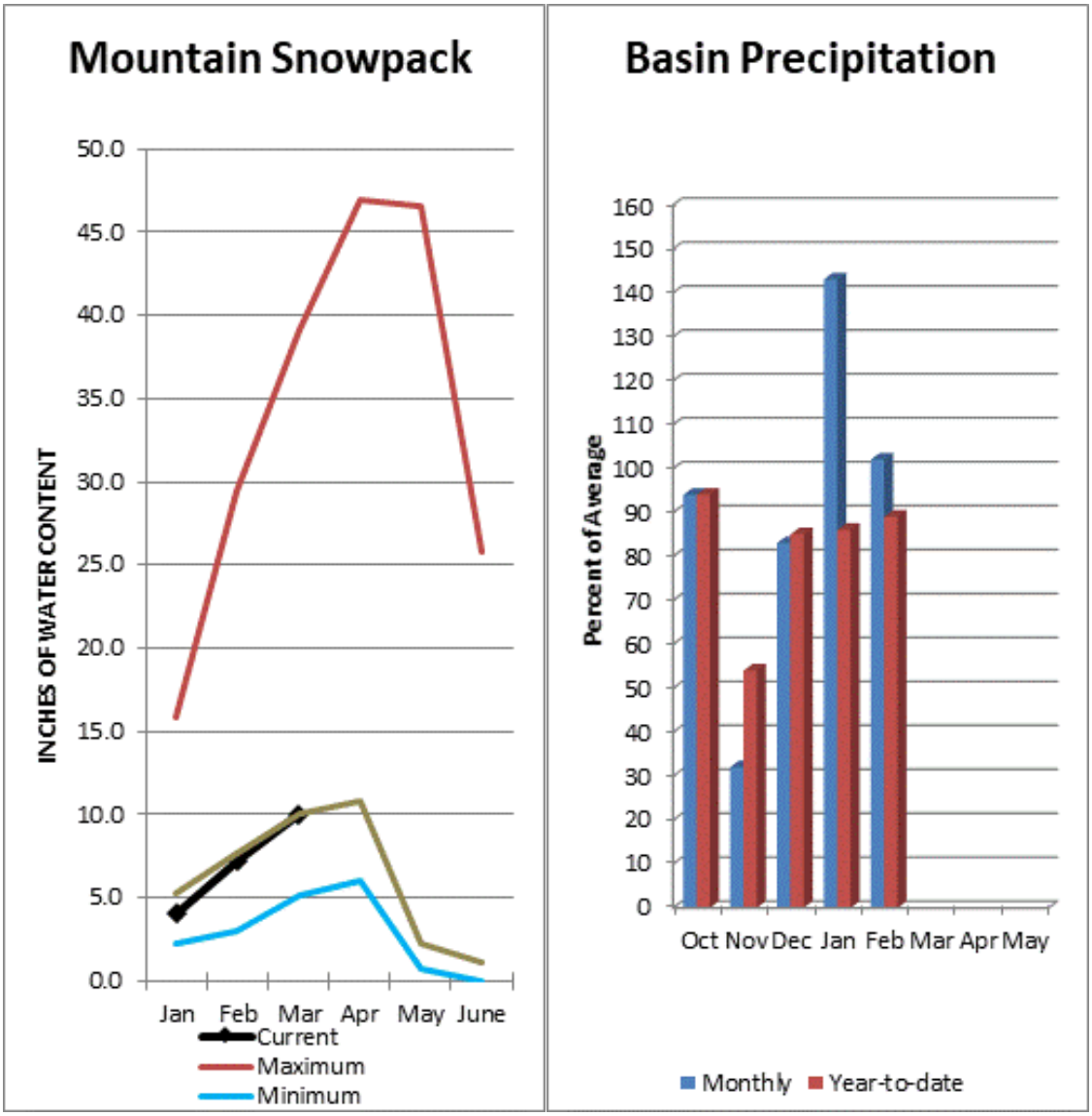
Pend Oreille Basins
Streamflow Forecasts - March 1, 2020

Pend Oreille Basins	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pend Oreille Lake Inflow[2]								
	APR-JUL	10300	12000	13100	111%	14300	16000	11800
	APR-SEP	11300	13100	14300	112%	15600	17400	12800
Priest R nr Priest River[2]								
	APR-JUL	670	795	880	113%	965	1090	780
	APR-SEP	710	840	930	112%	1020	1150	830
Pend Oreille R bl Box Canyon[2]								
	APR-JUL	10500	12100	13200	111%	14400	16000	11900
	APR-SEP	11400	13200	14500	112%	15700	17500	13000

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
3) Median value used in place of average

Reservoir Storage End of February, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	561.3	566.6	792.6	1561.3
Priest Lake	50.6	40.9	57.1	119.3
Basin-wide Total	611.9	607.4	849.7	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Pend Oreille Basins	66	113%	103%
Colville River	1	99%	101%
Kettle River	4	119%	105%



March 1 snow cover on the Okanogan was 115% of normal, Omak Creek was 68% and the Methow was 103%. February mountain precipitation in the Upper Columbia was 102% of average, with precipitation for the water year at 89% of average. Low elevation precipitation in the area was reported at 87% of normal. February streamflow for the Methow River was 113% of average, 169% for the Okanogan River and 174% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 6.4 inches or 74% of normal for March 1. Combined storage in the Conconully Reservoirs was 14,700 acre-feet or 100% of normal.

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Upper Columbia Basins
Streamflow Forecasts - March 1, 2020

Upper Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Kettle R nr Laurier								
	APR-JUL	1790	1990	2120	118%	2260	2460	1800
	APR-SEP	1870	2080	2220	118%	2360	2560	1880
Colville R at Kettle Falls								
	APR-JUL	82	122	149	125%	176	215	119
	APR-SEP	89	133	162	124%	192	235	131
Columbia R at Grand Coulee-NWS[2]								
	APR-JUL	51000		54900	108%		60900	51015
	APR-SEP	59900		64900	108%		70700	60110
Similkameen R nr Nighthawk								
	APR-JUL	1240	1400	1500	125%	1610	1770	1200
	APR-SEP	1310	1480	1600	125%	1720	1890	1280
Okanogan R nr Tonasket								
	APR-JUL	1210	1470	1650	111%	1830	2090	1480
	APR-SEP	1330	1630	1830	111%	2040	2330	1650
Okanogan R at Malott								
	APR-JUL	1230	1500	1680	116%	1860	2130	1450
	APR-SEP	1340	1650	1860	115%	2070	2370	1620
Methow R nr Pateros								
	APR-JUL	560	700	795	95%	885	1020	835
	APR-SEP	605	750	850	95%	950	1100	895

1) 90% and 10% exceedance probabilities are actually 95% and 5%
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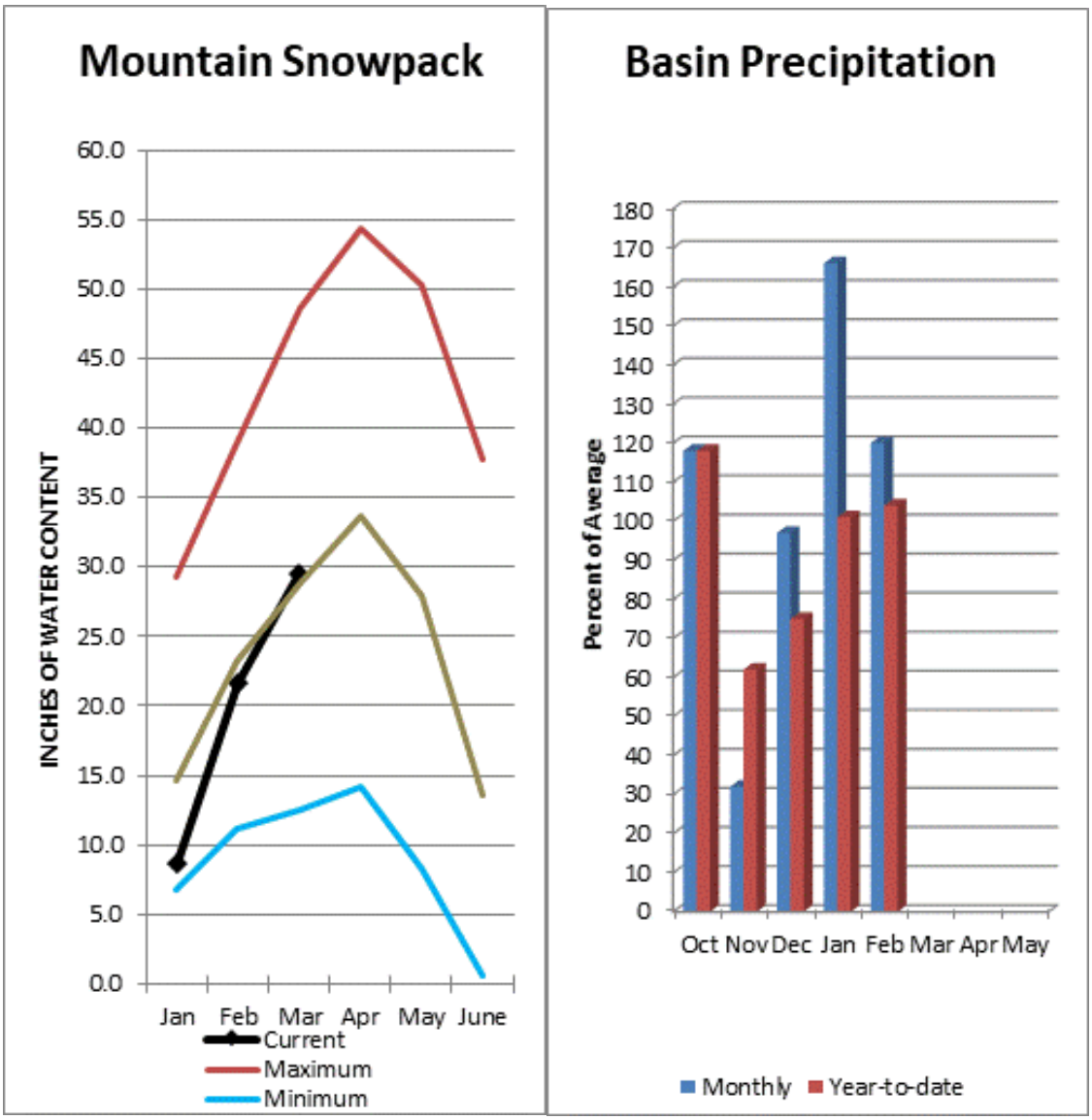
3) Median value used in place of average

Reservoir Storage End of February, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	6.9	7.5	7.3	10.5
Conconully Reservoir	7.8	10.8	7.4	13.0
Basin-wide Total	14.7	18.2	14.7	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Upper Columbia Basins	22	100%	77%
Okanogan River	11	115%	81%
Omak Creek	3	68%	77%
Sanpoil River	1	0%	138%
Similkameen River	5	105%	71%
Toats Coulee Creek	3	112%	72%
Conconully Lake	3	67%	70%
Methow River	4	103%	81%



Precipitation during February was 120% of average in the basin and 104% for the year-to-date. February average streamflow on the Chelan River was 152% and on the Wenatchee River 192%. March 1 snowpack in the Wenatchee River Basin was 102% of normal; the Chelan, 101%; the Entiat, 75%; Stemilt Creek, 68% and Colockum Creek, 80%. Reservoir storage in Lake Chelan was 77% of average. Lyman Lake SNOTEL had the most snow water with 47.6 inches of water. This site would normally have 48.6 inches on March 1.

For more information contact your local Natural Resources Conservation Service office.

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Central Columbia Basins
Streamflow Forecasts - March 1, 2020

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Central Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin								
	APR-JUL	600	675	725	107%	780	855	680
	APR-SEP	705	785	840	106%	900	980	790
Chelan R at Chelan								
	APR-JUL	865	970	1040	104%	1120	1220	1000
	APR-SEP	960	1080	1170	104%	1250	1370	1120
Entiat R nr Ardenvoir								
	APR-JUL	158	184	200	100%	220	245	200
	APR-SEP	171	200	220	100%	240	270	220
Wenatchee R at Plain								
	APR-JUL	830	950	1030	104%	1110	1230	990
	APR-SEP	890	1030	1120	104%	1210	1350	1080
Icicle Ck nr Leavenworth								
	APR-JUL	245	280	305	111%	335	370	275
	APR-SEP	265	305	335	112%	365	405	300
Wenatchee R at Peshastin								
	APR-JUL	1200	1350	1460	107%	1560	1720	1370
	APR-SEP	1300	1470	1590	107%	1710	1880	1490
Columbia R bl Rock Island Dam-NWS[2]								
	APR-JUL	55000		59100	106%		66000	55770
	APR-SEP	64500		69700	107%		76900	65200

1) 90% and 10% exceedance probabilities are actually 95% and 5%
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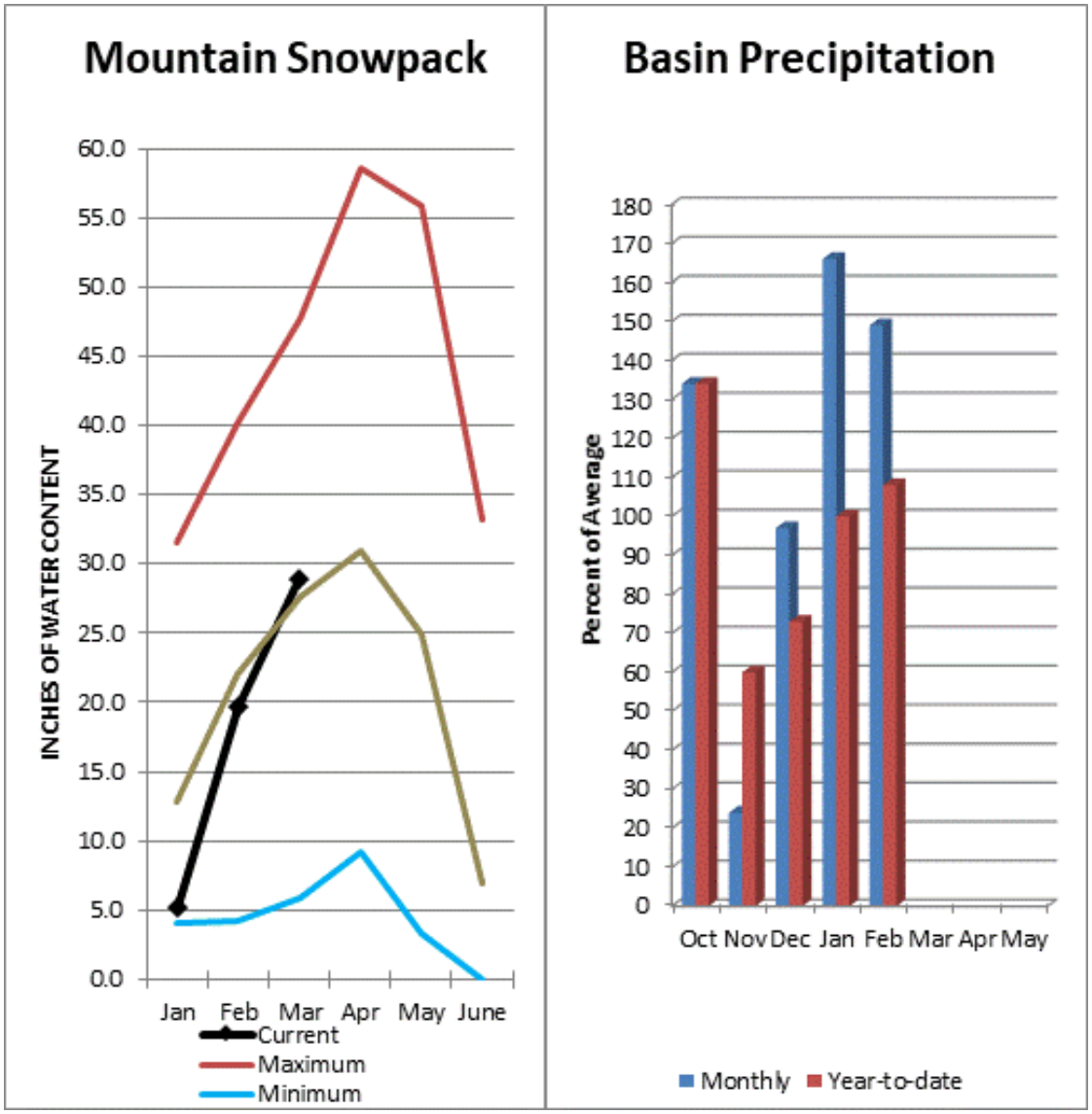
3) Median value used in place of average

Reservoir Storage End of February, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	215.9	206.2	279.8	677.4
Basin-wide Total	215.9	206.2	279.8	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Central Columbia Basins	3	101%	80%
Chelan Lake Basin	3	101%	80%
Entiat River	1	75%	88%
Wenatchee River	7	102%	93%
Stemilt Creek	1	68%	110%
Colockum Creek	1	80%	156%



March 1 reservoir storage for the Upper Yakima reservoirs was 460,000-acre feet, 102% of average. February streamflow within the basin was Cle Elum River near Roslyn at 240%. March 1 snowpack was 105% based upon 8 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 149% of average for February and 108% for the water-year. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

Data Current as of: 3/5/2020 4:08:26 PM

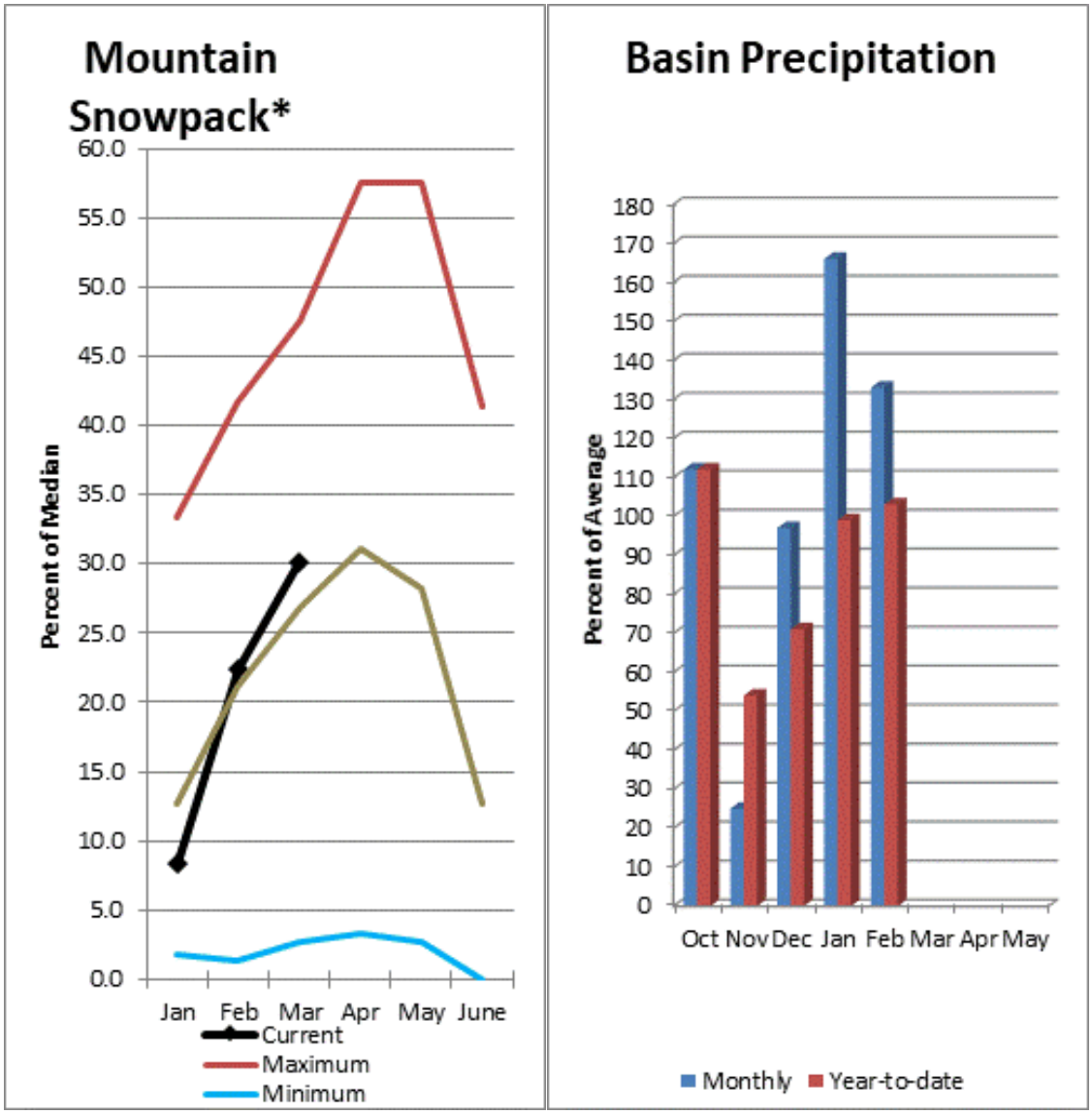
Upper Yakima River
Streamflow Forecasts - March 1, 2020

Upper Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Keechelus Reservoir Inflow[2]								
	APR-JUL	83	103	117	101%	131	151	116
	APR-SEP	90	111	126	100%	141	162	126
Kachess Reservoir Inflow [2]								
	APR-JUL	76	93	104	100%	115	132	104
	APR-SEP	84	101	113	100%	125	142	113
Cle Elum Lake Inflow [2]								
	APR-JUL	305	350	385	100%	415	460	385
	APR-SEP	325	375	410	99%	445	495	415
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	86	112	130	100%	148	174	130
	APR-SEP	88	115	133	100%	151	178	133

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
3) Median value used in place of average

Reservoir Storage End of February, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	113.8	89.7	92.3	157.8
Kachess	133.9	152.1	143.6	239.0
Cle Elum	212.7	164.5	214.4	436.9
Basin-wide Total	460.4	406.3	450.3	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Upper Yakima River	8	105%	88%



February average streamflows within the basin were: Yakima River near Parker, 194% and the Naches River near Naches, 235%. March 1 reservoir storage for Bumping and Rimrock reservoirs was 166,000-acre feet, 121% of average. March 1 snowpack was 112% based upon 7 snow course and SNOTEL readings within the Lower Yakima Basin and Ahtanum Creek reported in at 90% of normal. Precipitation was 133% of average for February and 103% for the water-year. Volume forecasts for Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

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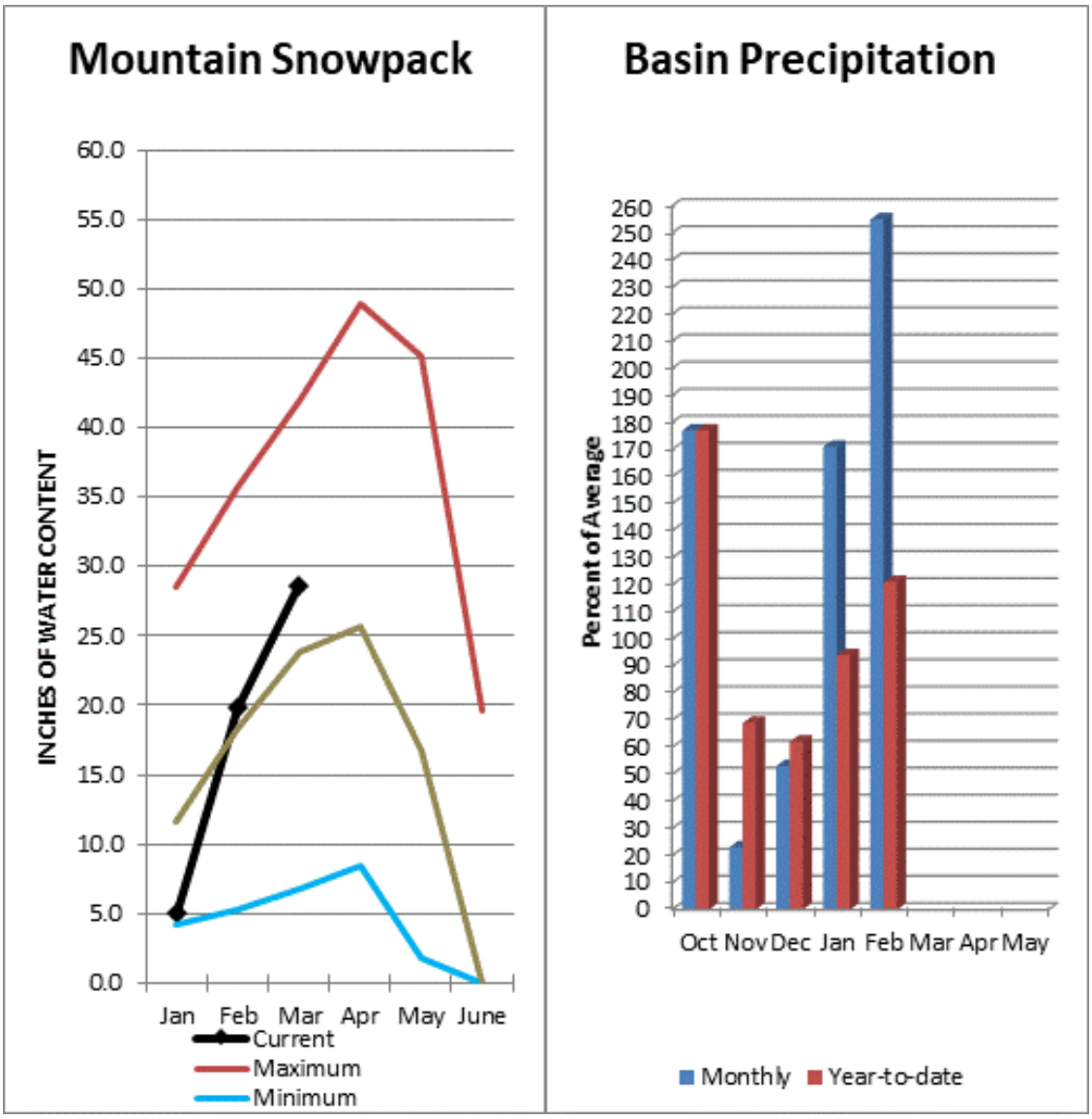
Lower Yakima River
Streamflow Forecasts - March 1, 2020

Lower Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Bumping Lake Inflow [2]								
	APR-JUL	97	113	124	109%	135	151	114
	APR-SEP	106	123	135	110%	147	164	123
American R nr Nile								
	APR-JUL	90	104	113	111%	122	136	102
	APR-SEP	98	114	124	113%	134	150	110
Rimrock Lake Inflow [2]								
	APR-JUL	164	185	200	107%	215	235	187
	APR-SEP	191	215	235	107%	255	280	220
Naches R nr Naches								
	APR-JUL	585	705	790	113%	870	995	700
	APR-SEP	630	770	860	113%	955	1090	760
Ahtanum Ck at Union Gap								
	APR-JUL	12.9	21	27	100%	33	41	27
	APR-SEP	14.5	23	29	100%	35	43	29
Yakima R nr Parker [2]								
	APR-JUL	1280	1560	1740	105%	1930	2210	1660
	APR-SEP	1380	1680	1880	103%	2080	2370	1820
Klickitat R nr Glenwood								
	APR-JUL	95	116	130	103%	144	165	126
	APR-SEP	106	128	143	103%	158	180	139
Klickitat R nr Pitt								
	APR-JUL	350	415	465	107%	510	580	435
	APR-SEP	430	505	560	108%	610	690	520

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
3) Median value used in place of average

Reservoir Storage End of February, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	25.8	10.9	13.3	33.7
Rimrock	140.2	87.0	123.3	198.0
Basin-wide Total	166.0	97.9	136.6	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Lower Yakima River	7	112%	99%
Ahtanum Creek	2	90%	110%



February precipitation was 255% of average, maintaining the year-to-date precipitation at 121% of average. Snowpack in the basin was only 120% of normal. Record precipitation brought record flooding for both the Walla Walla and Touchet rivers. The Umatilla River, just across the border in Oregon, also had record flooding. Rain on snow was certainly a contributor but mostly it was the actual rainfall amounts that caused the flooding since SNOTEL showed little if any loss of snow water content. It could be said that the healthy snowpack actually reduced the amount of flooding by absorbing rainwater and holding it for later release.

For more information contact your local Natural Resources Conservation Service office.

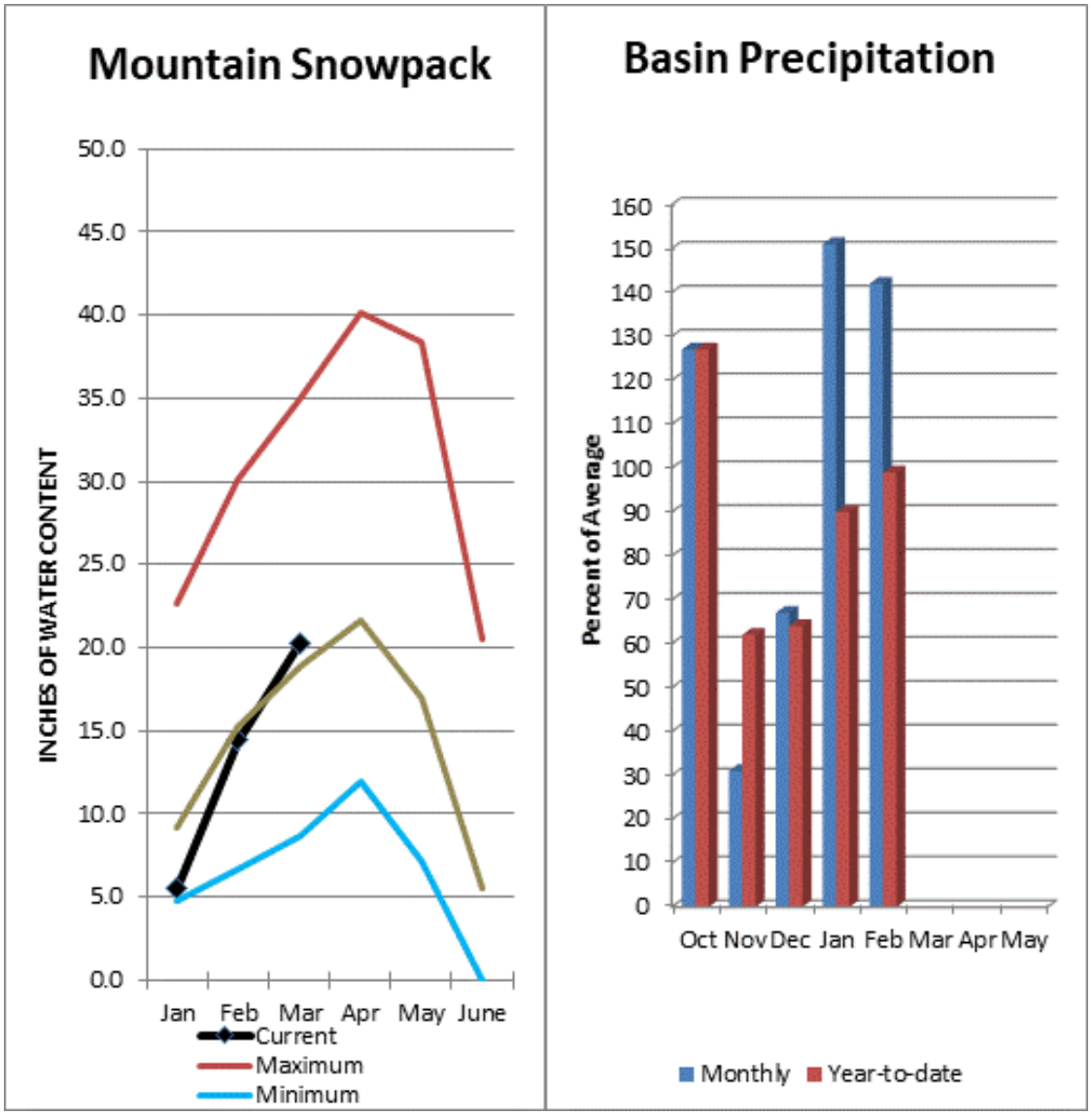
Data Current as of: 3/5/2020 4:08:37 PM

Walla Walla River
Streamflow Forecasts - March 1, 2020

Walla Walla River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
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
Mill Ck nr Walla Walla								
	APR-JUL	20	24	27	113%	30	34	24
	APR-SEP	23	27	30	111%	33	37	27

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
3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Walla Walla River	2	120%	119%



February precipitation was 142% of average, bringing the year-to-date precipitation to 99% of average. March 1 snowpack readings averaged 107% of normal. February streamflow was 80% of average for Snake River below Lower Granite Dam and 165% for Grande Ronde River near Troy. Dworshak Reservoir storage was 96% of average.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 3/5/2020 4:08:43 PM

Lower Snake, Grande Ronde, Clearwater Basins
Streamflow Forecasts - March 1, 2020

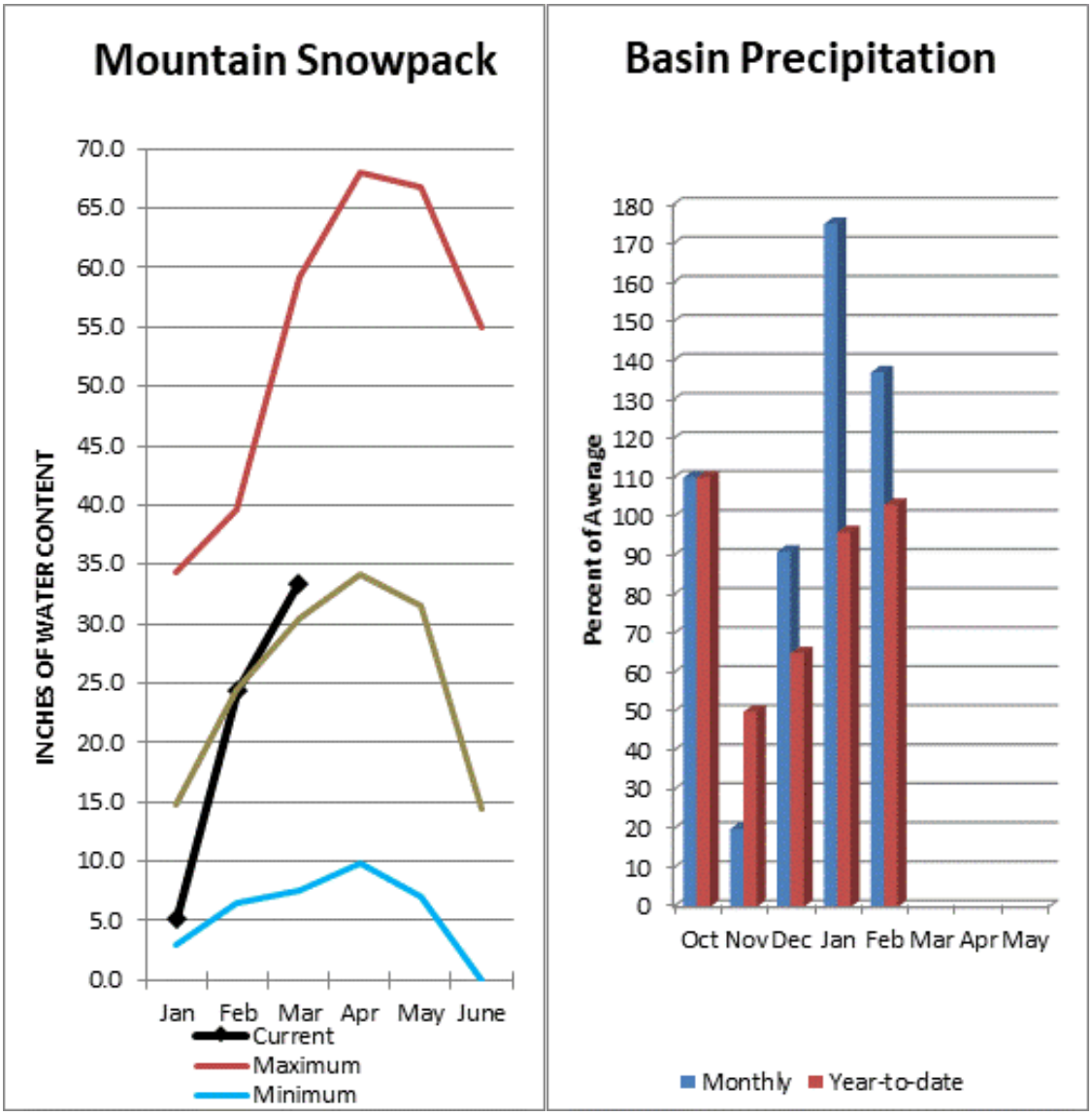
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake, Grande Ronde, Clearwater Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	MAR-JUL	1480	1730	1900	126%	2070	2310	1510
	APR-SEP	1210	1460	1630	124%	1800	2050	1310
Asotin Ck at Asotin								
	APR-JUL	16	24	31	89%	38	50	35
Clearwater R at Spalding[2]								
	APR-JUL	6200	7210	7890	115%	8580	9590	6890
	APR-SEP	6540	7580	8290	114%	9000	10000	7270
Snake R bl Lower Granite Dam-NWS[2]								
	APR-JUL	14600		16800	85%		21300	19848
	APR-SEP	16700		19200	86%		24200	22280

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
3) Median value used in place of average

Reservoir Storage End of February, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2273.7	2293.0	2358.0	3468.0
Basin-wide Total	2273.7	2293.0	2358.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Lower Snake, Grande Ronde, Clearwater Basins	14	107%	115%



February average streamflow for Cowlitz River was 189% and the Columbia River at The Dalles was 98% of average. February precipitation was 137% of average and the water-year average was 103%. March 1 snow cover for Cowlitz River was 130%, and Lewis River was 91% of normal.

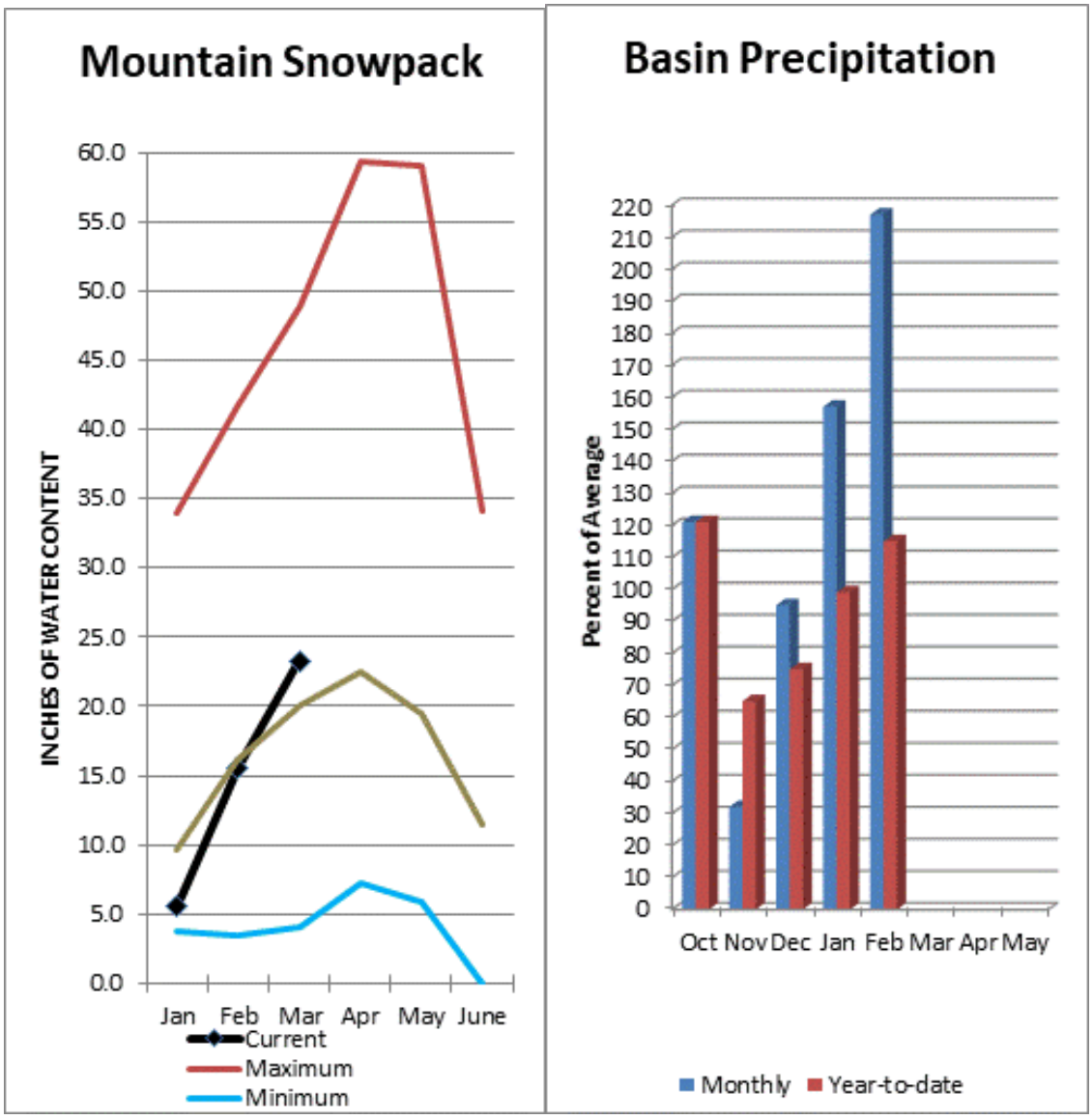
Data Current as of: 3/5/2020 4:08:48 PM

Lower Columbia Basins
Streamflow Forecasts - March 1, 2020

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Lower Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Columbia R at The Dalles-NWS[2]								
	APR-JUL	74700		79300	99%		91300	79855
	APR-SEP	86600		92400	100%		107000	92704
Klickitat R nr Glenwood								
	APR-JUL	95	116	130	103%	144	165	126
	APR-SEP	106	128	143	103%	158	180	139
Klickitat R nr Pitt								
	APR-JUL	350	415	465	107%	510	580	435
	APR-SEP	430	505	560	108%	610	690	520
Lewis R at Ariel[2]								
	APR-JUL	640	810	920	95%	1030	1200	970
	APR-SEP	740	915	1030	92%	1150	1330	1120
Cowlitz R bl Mayfiled[2]								
	APR-JUL	1440	1690	1860	114%	2030	2280	1630
	APR-SEP	1700	2000	2200	120%	2400	2700	1840
Cowlitz R at Castle Rock[2]								
	APR-JUL	2010	2290	2480	111%	2680	2960	2240
	APR-SEP	2340	2650	2850	112%	3060	3370	2540

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
3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Lower Columbia Basins	11	110%	94%
Lewis River	5	91%	90%
Cowlitz River	6	130%	98%



March 1 snowpack was 127% of average for the White River, 127% for Puyallup River and 93% in the Green River Basin. February precipitation was 217% of average, bringing the water year-to-date to 115% of average for the basins.

For more information contact your local Natural Resources Conservation Service office.

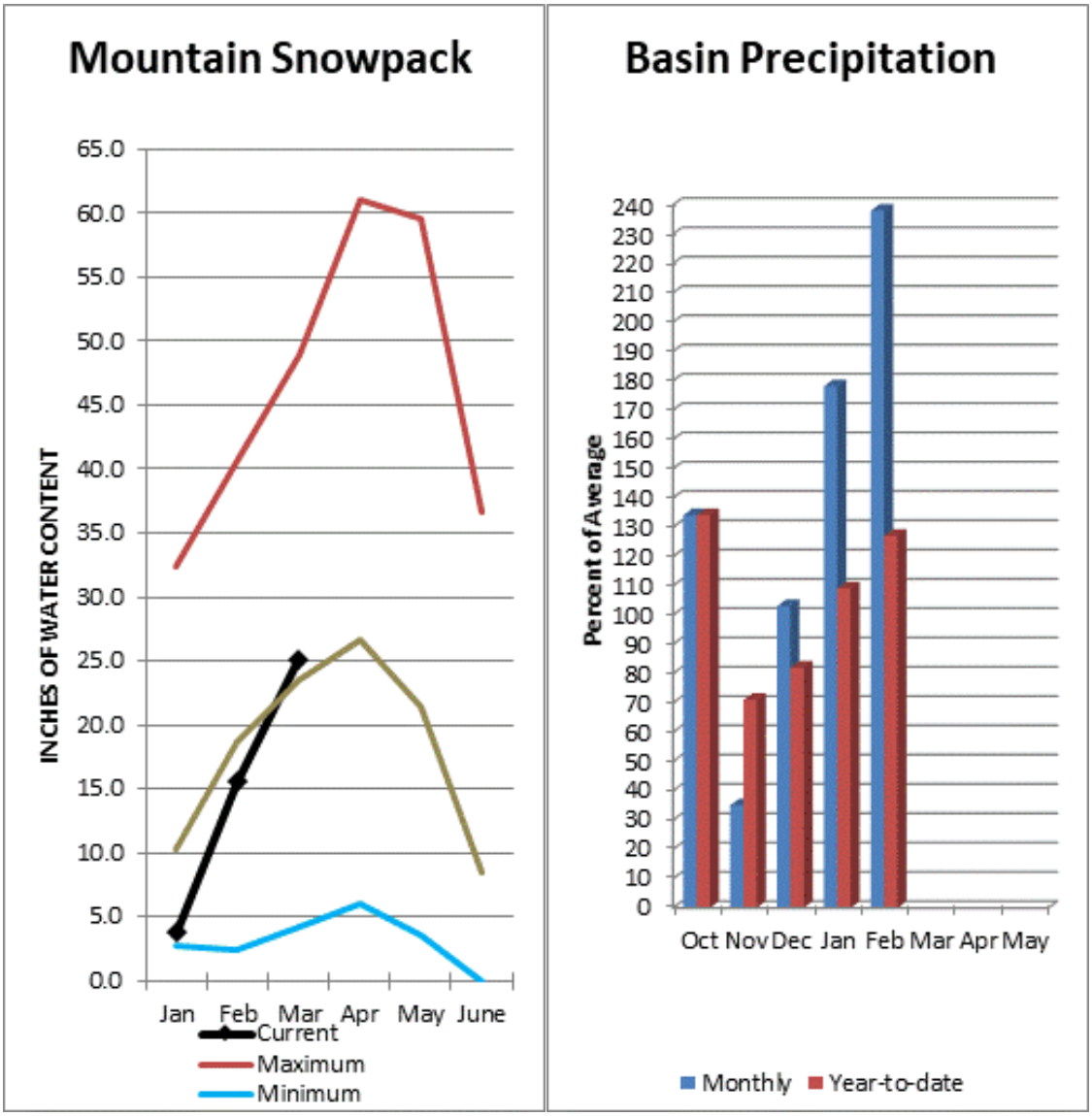
Data Current as of: 3/5/2020 4:08:53 PM

South Puget Sound Basins
Streamflow Forecasts - March 1, 2020

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
South Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
White R nr Buckley[1,2]								
	APR-JUL	405	480	515	120%	550	630	430
	APR-SEP	485	575	615	119%	655	745	515
Green R bl Howard A Hanson Dam[1,2]								
	APR-JUL	129	197	225	96%	260	325	235
	APR-SEP	148	215	250	96%	280	350	260

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
3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
South Puget Sound Basins	12	116%	99%
White River	3	127%	105%
Green River	4	93%	78%



Basin-wide precipitation for February was 238% of average, bringing water-year-to-date to 127% of average. March 1 median snow cover in Cedar River Basin was 98%, Tolt River Basin was 113%, Snoqualmie River Basin was 103%, and Skykomish River Basin was 116%.

For more information contact your local Natural Resources Conservation Service office.

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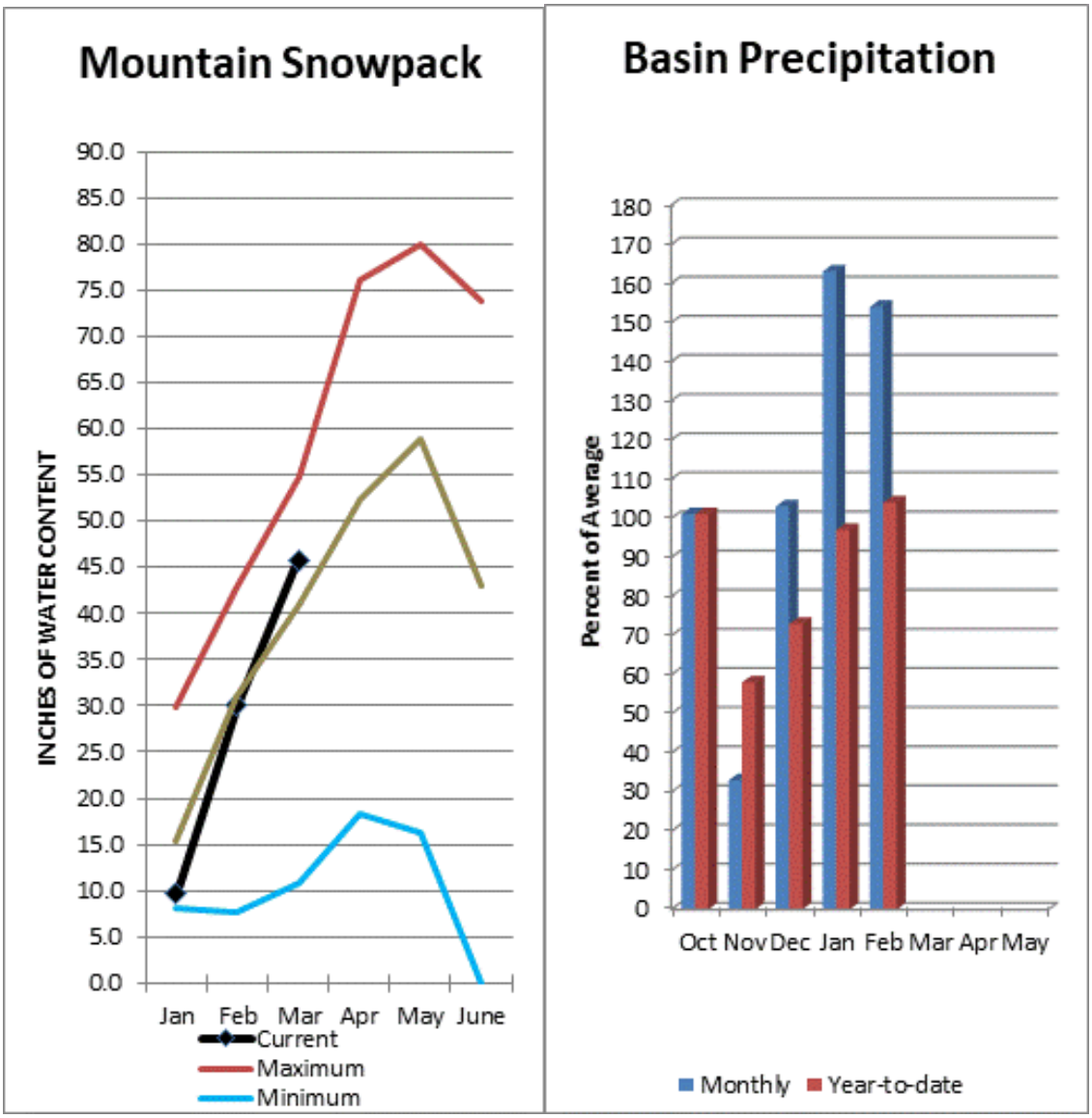
Central Puget Sound Basins
Streamflow Forecasts - March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	APR-JUL	63	74	81	116%	88	98	70
	APR-SEP	69	80	87	114%	94	105	76
Rex R nr Cedar Falls								
	APR-JUL	20	25	28	117%	31	36	24
	APR-SEP	22	27	30	111%	34	39	27
Taylor Ck nr Selleck								
	APR-JUL	16.3	19.7	22	110%	24	28	20
SF Tolt R nr Index	APR-SEP	21	25	27	113%	29	33	24
	APR-JUL	15	17.4	19	134%	21	23	14.2
	APR-SEP	17.5	20	22	137%	24	26	16.1

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
3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Central Puget Sound Basins	15	106%	79%
Puyallup River	5	127%	110%
Cedar River	6	98%	80%
Tolt River	3	113%	68%
Snoqualimie River	5	103%	70%
Skykomish River	3	116%	71%



February streamflow in Skagit River was 146% of average. Basin-wide precipitation for February was 154% of average, bringing water-year-to-date to 104% of average. March 1 average snow cover in Skagit River Basin was 113% and the Nooksack River Basin was 109%. March 1 Skagit River reservoir storage was 95% of average and 56% of capacity.

For more information contact your local Natural Resources Conservation Service office.

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North Puget Sound Basins
Streamflow Forecasts - March 1, 2020

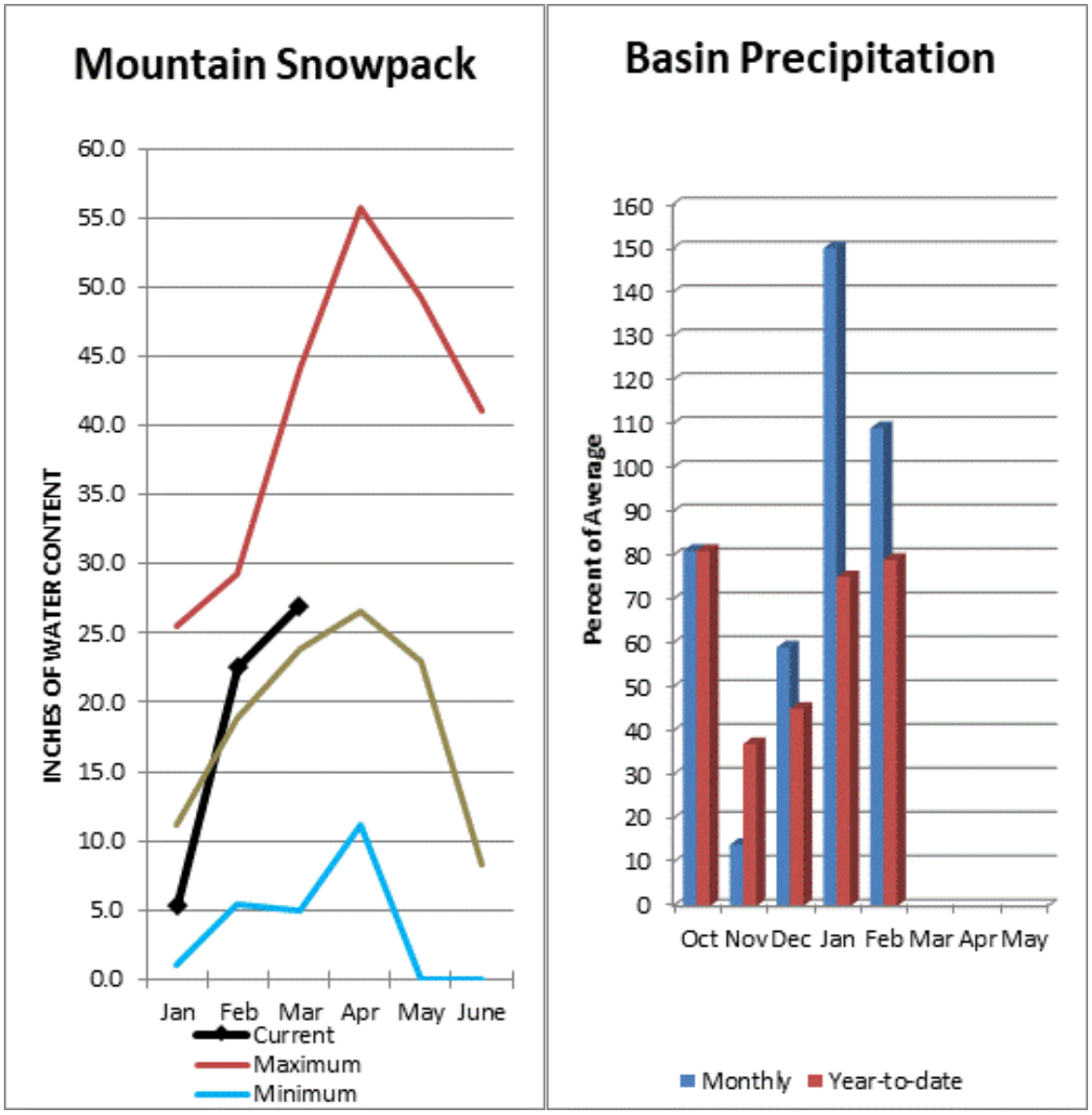
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

North Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Thunder Ck nr Newhalem								
	APR-JUL	210	230	240	102%	255	275	235
	APR-SEP	305	325	345	105%	360	380	330
Skagit R at Newhalem[2]								
	APR-JUL	1720	1870	1980	113%	2080	2230	1750
	APR-SEP	2050	2220	2330	113%	2440	2610	2070
Baker R at Concrete								
	APR-JUL	655	745	810	104%	875	970	780
	APR-SEP	815	945	1030	105%	1120	1250	980

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
3) Median value used in place of average

Reservoir Storage End of February, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	788.4	692.6	832.4	1434.7
Basin-wide Total	788.4	692.6	832.4	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
North Puget Sound Basins	11	112%	81%
Skagit River	8	113%	86%
Baker River	0		
Nooksack River	3	109%	71%



Dungeness River streamflow was 137% of normal. February precipitation was 109% of average. Precipitation has accumulated at 79% of average for the water year. February precipitation at Quillayute was 9.91", Normal for this site is 10.35". Olympic Peninsula snowpack averaged 113% of normal on March 1.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 3/5/2020 4:09:09 PM

Olympic Penninsula
Streamflow Forecasts - March 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Olympic Penninsula	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Dungeness R nr Sequim								
	APR-JUL	115	128	137	114%	146	159	120
	APR-SEP	134	151	162	112%	173	190	145
Elwha R at McDonald Br nr Port Angeles								
	APR-JUL	375	415	445	111%	475	515	400
	APR-SEP	435	490	525	112%	560	615	470

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
3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2020	# of Sites	% Median	Last Year % Median
Olympic Penninsula	6	113%	88%

Issued by

Matthew J. Lohr
Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Rides-at-the-Door
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada	Snow Survey Network Program – British Columbia Ministry of Environment
	River Forecast Center – British Columbia Ministry of Forests, Lands and Natural Resource Operations
State	Washington State Department of Ecology
	Washington State Department of Natural Resources
Federal	Department of the Army
	Corps of Engineers
	U.S. Department of Agriculture
	Forest Service
	U.S. Department of Commerce
	NOAA, National Weather Service
	U.S. Department of Interior
	Bonneville Power Administration
	Bureau of Reclamation
	Geological Survey
	National Park Service
	Bureau of Indian Affairs
Local	City of Tacoma
	City of Seattle
	City of Bellingham
	Chelan County P.U.D.
	Pacific Power/PacificCorp
	Puget Sound Energy
	Washington Water Power Company
	Snohomish County P.U.D.
	Colville Confederated Tribes
	Spokane County
	Yakama Indian Nation
	Whatcom County
	Pierce County
	Kalispel Tribe of Indians
	Spokane Indian Tribe
	Jamestown S'Klallam Tribe
Private	Okanogan Irrigation District
	Wenatchee Heights Irrigation District
	Newman Lake Homeowners Association
	Whitestone Reclamation District
	Kinross Mining

***Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.**

Washington Snow Survey Office
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Mount Vernon, WA 98273-2873

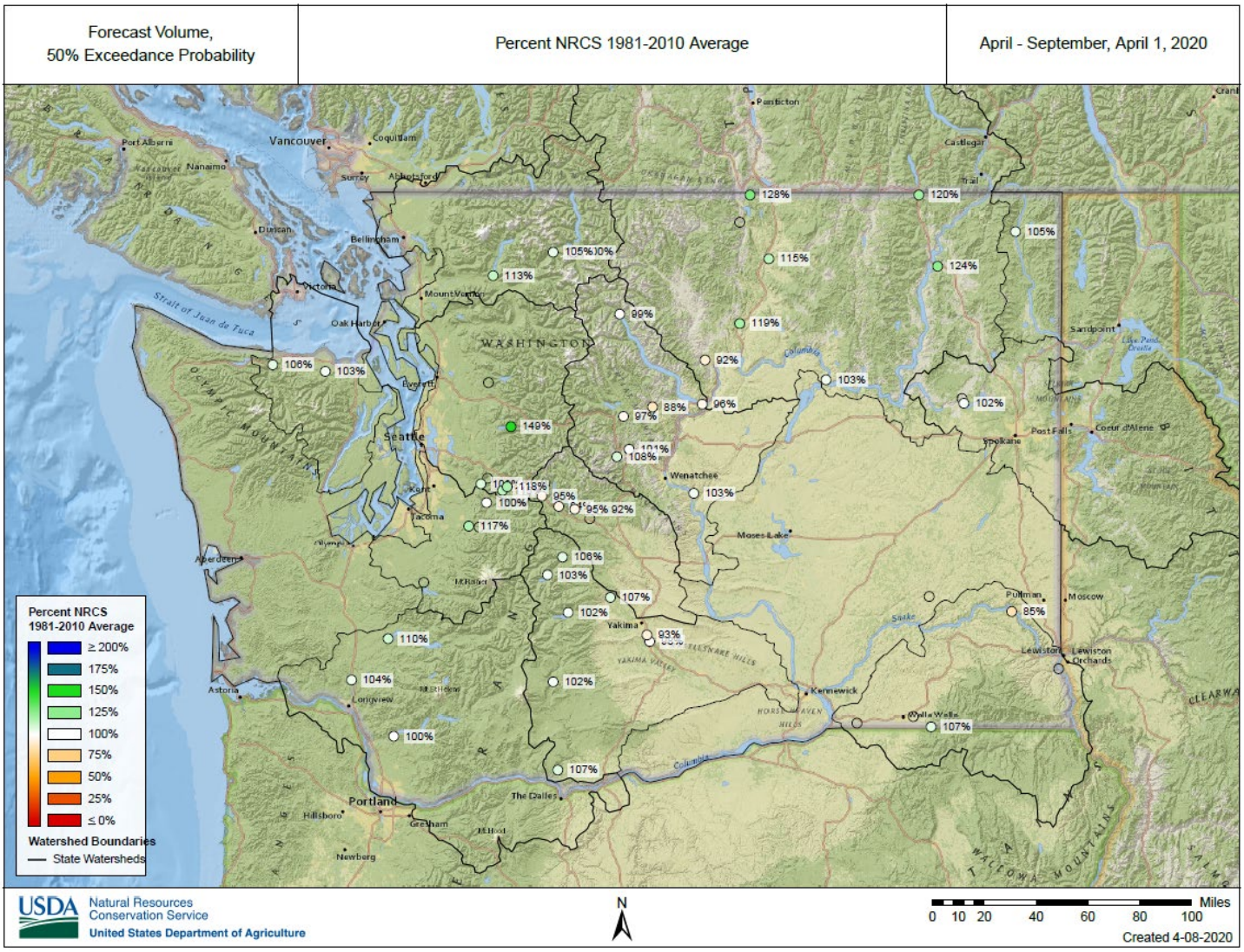
Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA

NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington
Water Supply Outlook Report
April 1, 2020



Map of the April-September Streamflow Forecasts as published in this document, percent of average.

Water Supply Outlook Reports
and
Federal - State – Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

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How forecasts are made

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. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. 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 uncertain 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.

Washington
Water Supply Outlook

April 2020

General Outlook

March brought a mix bag of weather conditions with mostly near average snowfall but below average total mountain precipitation. Average temperatures were slightly below normal with the west-side having the greatest anomaly which helped preserve snowpack through the average peak date of April1. The most recent forecast through mid-April shows a high probability for near to slightly below normal temperatures and precipitation. NWS 3-month (AMJ) forecast indicates above normal temperatures and below normal precipitation. National Inter Agency Fire Center (NIFC) released their latest Significant Wildland Fire Outlook which indicated above normal chance of wildfire for most of Eastern Washington and normal conditions on the west side. The US Drought Monitor continues to indicate D0-D1 drought designation through all Central Washington with an addition of D2 in the South-Central part of the state. (see maps on page 4) http://www.cpc.ncep.noaa.gov/

Snowpack

The April 1 statewide SNOTEL readings were 109% of normal. The lowest readings in the state were at 61% of the 30-year median for April 1 in the Entiat River. The Cowlitz River Basin had the most snow with 132%. Westside medians from SNOTEL, and April 1 snow surveys, included the North Puget Sound river basins with 112% of normal, the Central and South Puget river basins with 113% and 118% respectively, and the Lower Columbia basins with 116% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 96% and the Wenatchee area with 98%. Snowpack in the Spokane River Basin was at 111% and the Upper Columbia river basins had 108% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	111	89
Newman Lake	126	86
Pend Oreille	110	93
Okanogan	119	75
Methow	101	75
Conconully Lake	69	58
Central Columbia	98	80
Upper Yakima	86	70
Lower Yakima	107	90
Ahtanum Creek	90	103
Walla Walla	120	121
Lower Snake	107	108
Cowlitz	132	92
Lewis	100	85
White	118	93
Green	108	62
Puyallup	125	95
Cedar	103	67
Snoqualmie	109	64
Skykomish	120	66
Skagit	109	72
Nooksack	118	63
Olympic Peninsula	105	70

Precipitation

March precipitation from SNOTEL was generally much below normal statewide with amounts as low as 33% of average at Pope Ridge SNOTEL to as high as 109% of average at Skookum Creek SNOTEL. Alpine Meadows SNOTEL in the Tolt River Basin received the most precipitation with 16.8" or 95% of normal. Water year averages remain near to slightly above normal.

RIVER BASIN	MARCH PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	65	92
Pend Oreille	64	91
Upper Columbia	55	84
Central Columbia	60	98
Upper Yakima	54	101
Lower Yakima	61	97
Walla Walla	50	110
Lower Snake	58	93
Lower Columbia	67	98
South Puget Sound	68	109
Central Puget Sound	81	121
North Puget Sound	68	99
Olympic Peninsula	59	77

Reservoir

Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. April 1 Reservoir storage in the Yakima Basin was 498,000-acre feet, 97% of average for the Upper Reaches and 178,000-acre feet or 117% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 89,000-acre feet, 54% of average and 37% of capacity; and Ross lake within the Skagit River Basin at 79% of average and 41% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	37	54
Pend Oreille	37	75
Upper Columbia	61	102
Central Columbia	30	79
Upper Yakima	60	97
Lower Yakima	77	117
Lower Snake	67	97
North Puget Sound	41	79

For more information contact your local Natural Resources Conservation Service office.

Streamflow

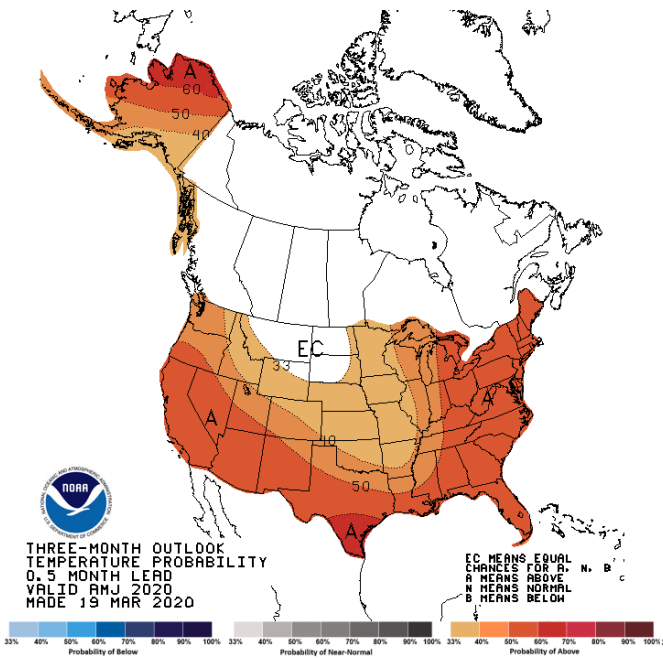
As we near the apex of winter we can see an increase in streamflow forecast accuracy. However late winter and even spring climate conditions may warrant changes as we move forward. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. Caution should be used when using early season forecasts for critical water resource management decisions since governing conditions are likely to change for the better or the worse

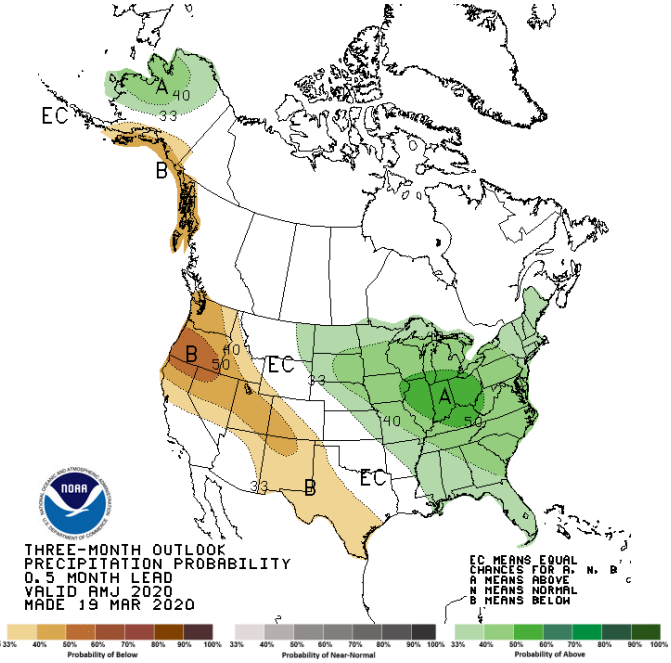
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	101-108
Pend Oreille	105-108
Upper Columbia	92-124
Central Columbia	88-103
Upper Yakima	92-95
Lower Yakima	93-107
Walla Walla	107-108
Lower Snake	85-120
Lower Columbia	96-110
South Puget Sound	100-117
Central Puget Sound	108-149
North Puget Sound	100-113
Olympic Peninsula	103-106

STREAM	PERCENT OF AVERAGE MARCH STREAMFLOWS
Pend Oreille at Albeni Fall Dam	62
Kettle at Laurier	73
Columbia at Birchbank	77
Spokane at Spokane	51
Similkameen at Nighthawk	85
Okanogan at Tonasket	118
Methow at Pateros	90
Chelan at Chelan	71
Stehekin near Stehekin	78
Wenatchee at Pashastin	69
Cle Elum near Roslyn	65
Yakima at Parker	64
Naches at Naches	67
Grande Ronde at Troy	74
Snake below Lower Granite Dam	65
Columbia River at The Dalles	64
Lewis at Merwin Dam	58
Cowlitz below Mayfield Dam	73
Skagit at Concrete	71
Dungeness near Sequim	56

Climate

For more information contact your local Natural Resources Conservation Service office.





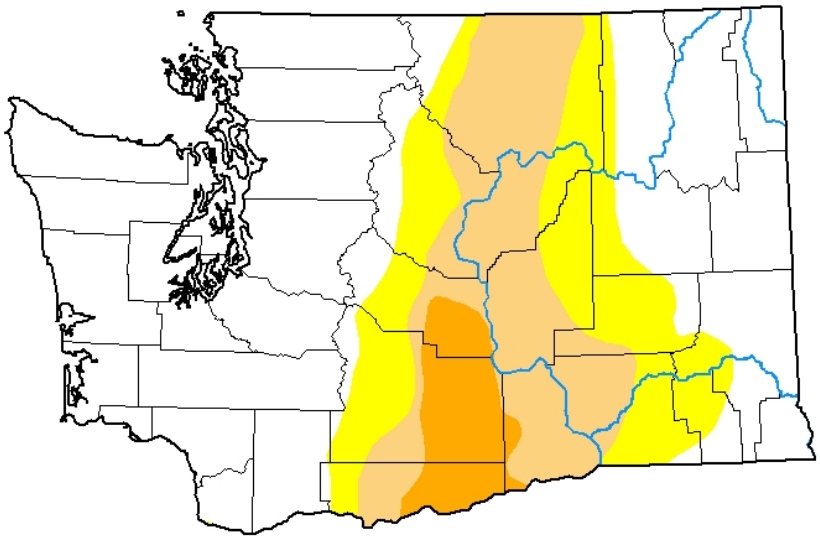
U.S. Drought Monitor

Washington

March 31, 2020

(Released Thursday, Apr. 2, 2020)

Valid 8 a.m. EDT



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

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Western Regional Climate Center

droughtmonitor.unl.edu

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Washington State
Snow, Water and Climate Services

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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/wa/snow/

Oregon:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/snow/

Idaho:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

USDA-NRCS Agency Homepages

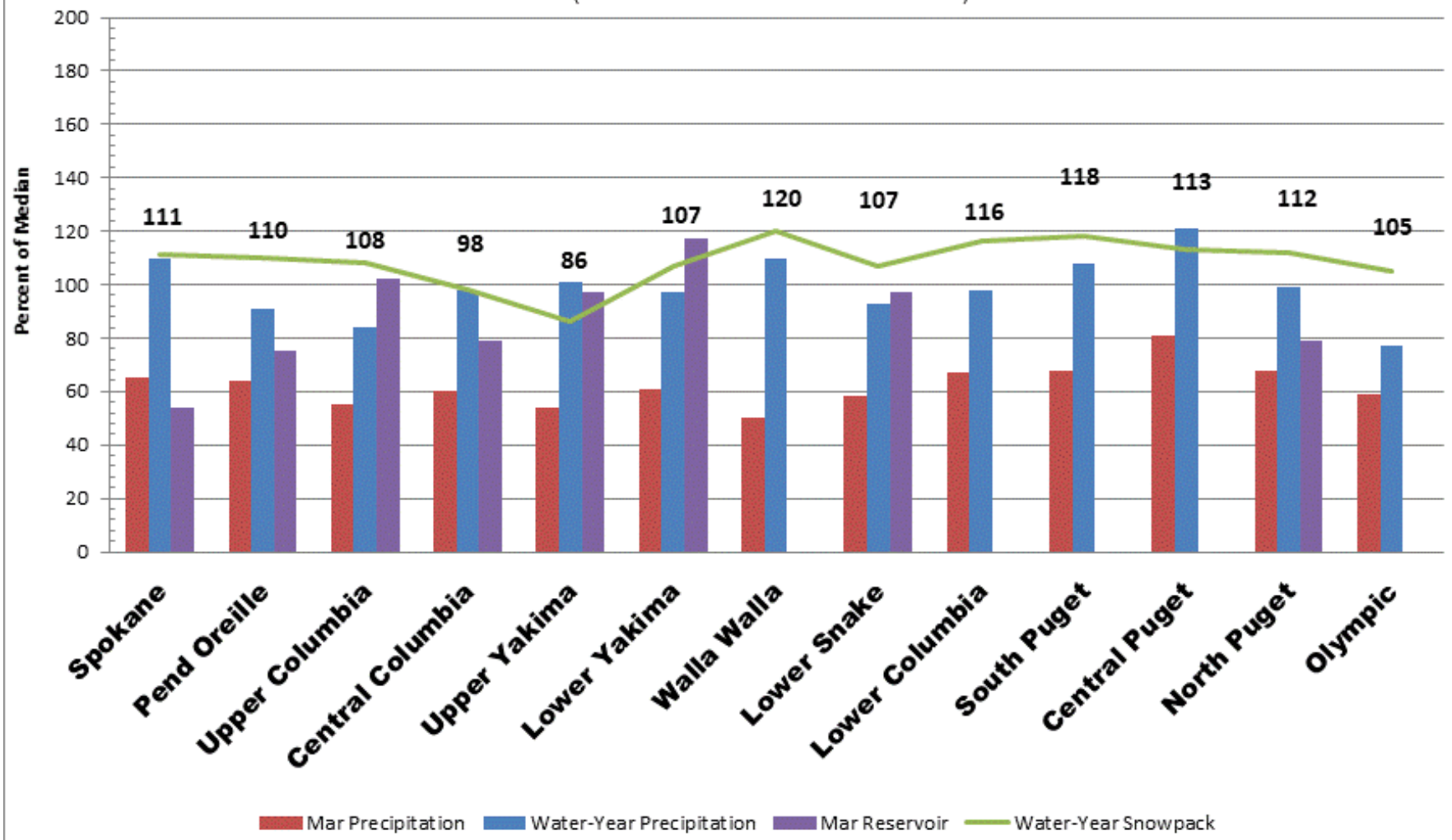
Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/

NRCS National:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

NRCS Natural Resources Conservation Service

April 1, 2020 - Snowpack, Precipitation and Reservoir Conditions at a Glance

(Water Year = October 1 - Current Date)



88th Meeting of the
Western Snow Conference

Dear Members and Friends of the Western Snow Conference:

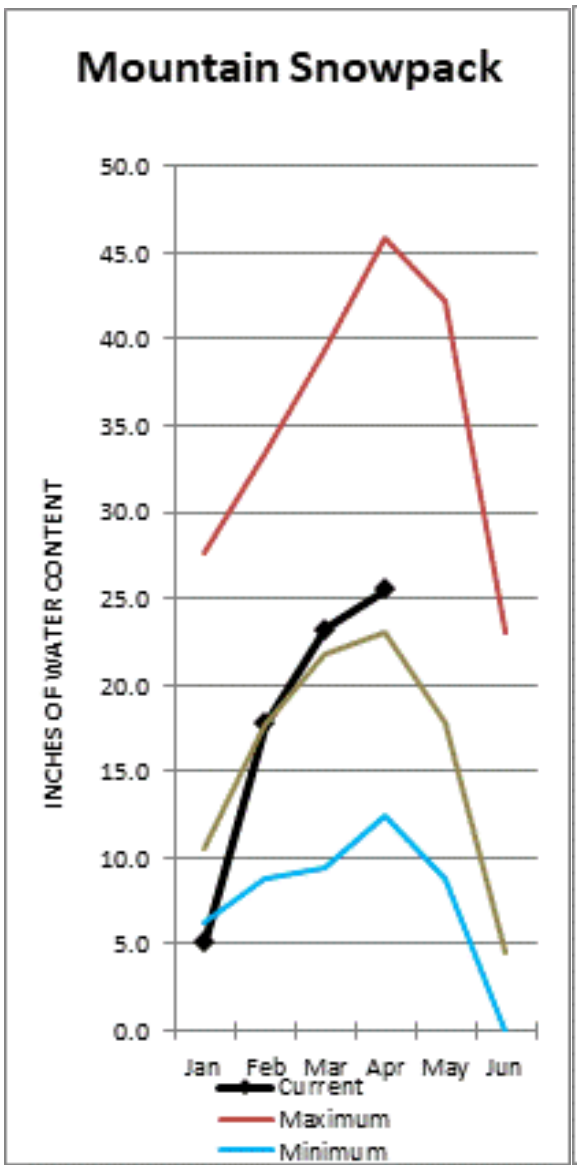
After extensive deliberation and careful consideration, the Western Snow Conference has made the difficult decision to cancel the 88th annual meeting scheduled for April 20-23, 2020 due to health concerns associated with COVID-19.

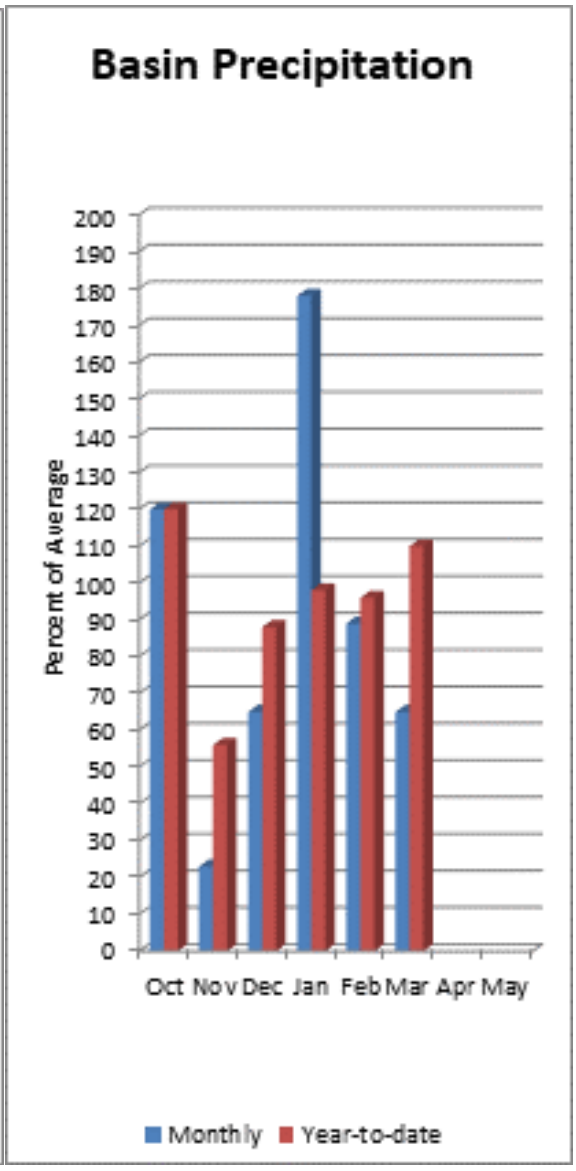
WSC has been closely monitoring updates and recommendations from the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO), as well as state, local, and US/Canadian governments. Over the last few weeks, there has been an increasing number of travel advisories and restrictions which would impact attendance at our conference. Of course, personal health and safety are a priority as well. Based on all these considerations, we have concluded that it is inadvisable to hold this conference at this time.

We are already in the planning stages for the 2021 conference, and we will notify you of the dates and location in the future.

Thank you for your understanding in this complex situation. The health and safety of all our attendees, your families, our board members, and the community at large are of utmost importance to us. If you have any questions, please email us at info@westernsnowconference.org

Spokane River Basin





Basin snowpack is 111% of normal and precipitation is 92% of average for the water year. Precipitation for March was below normal at 65% of average. Streamflow on the Spokane River at Spokane was 51% of average for March. April 1 storage in Coeur d'Alene Lake was 88,700-acre feet, 54% of average and 37% of capacity. Snowpack at Quartz Peak SNOTEL site was 126% of average with 23.9 inches of water content.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 4/7/2020 8:58:39 AM

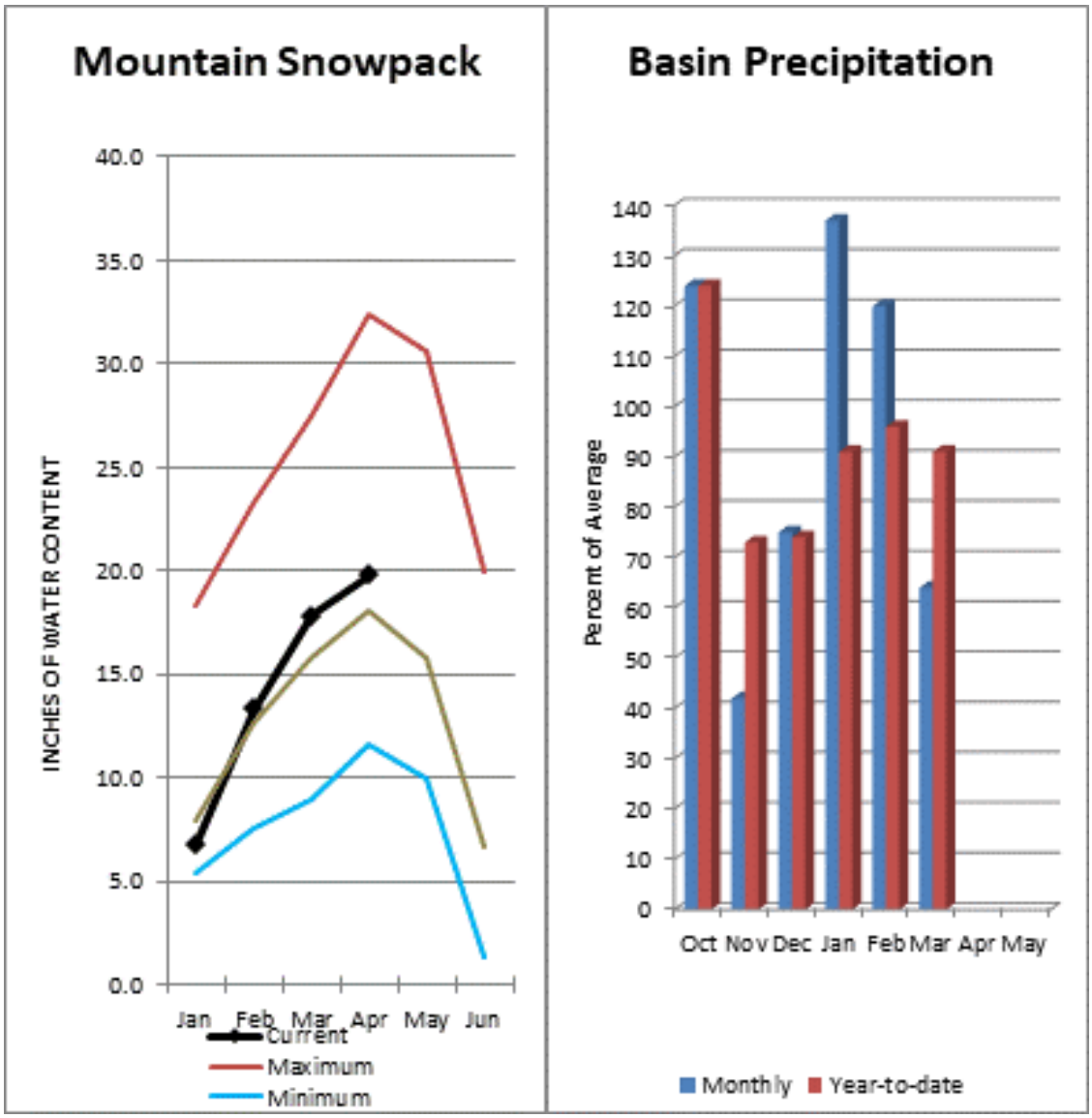
Spokane
Streamflow Forecasts - April 1, 2020

Spokane	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment: Chance that actual volume will exceed forecast — 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Spokane R nr Post Falls[2]								
	APR-JUL	1860	2200	2440	102%	2680	3020	2390
	APR-SEP	1920	2270	2510	101%	2760	3110	2480
Spokane R at Long Lake[2]								
	APR-JUL	2110	2470	2720	104%	2970	3330	2620
	APR-SEP	2270	2650	2900	102%	3160	3530	2850
Chamokane Ck nr Long Lake								
	APR-JUL	8.9	12.9	16	108%	19.4	25	14.8

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
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	88.7	133.1	165.5	238.5
Basin-wide Total	88.7	133.1	165.5	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Spokane	15	111%	89%
Newman Lake	1	126%	86%



March streamflow was 62% of average on the Pend Oreille River and 77% on the Columbia at Birchbank. April 1 snow cover was 110% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 29.2 inches of snow water on the snow pillow which is 111% of normal for April 1. Precipitation during March was 64% of average, the year-to-date precipitation is 91% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 72% of normal.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 4/7/2020 8:58:50 AM

Pend Oreille Basins
Streamflow Forecasts - April 1, 2020

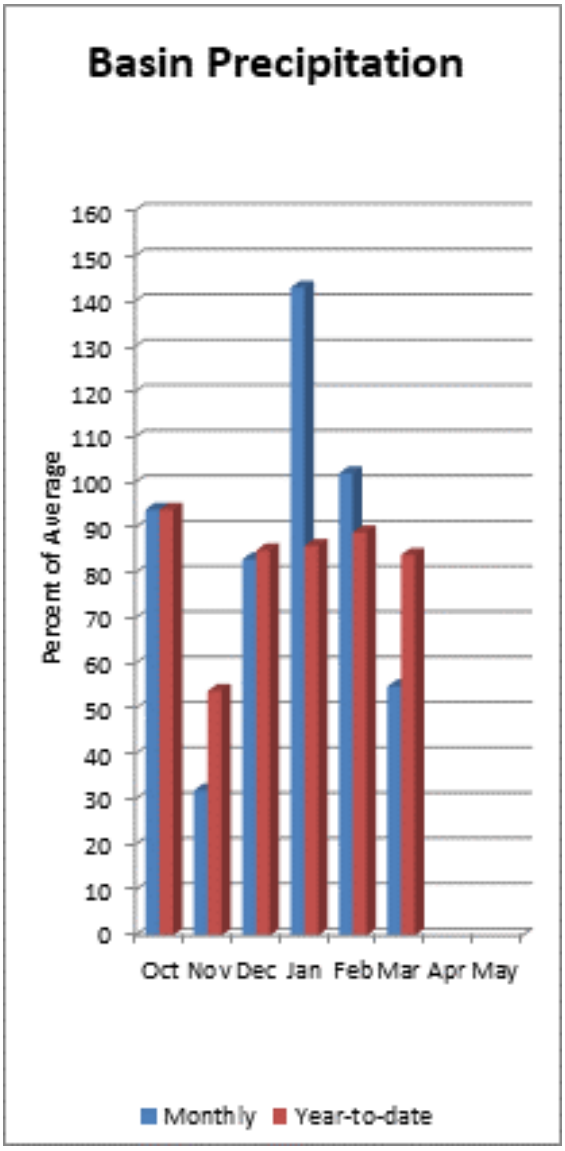
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Pend Oreille Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pend Oreille Lake Inflow[2]								
	APR-JUL	10500	11700	12500	106%	13300	14500	11800
	APR-SEP	11200	12600	13500	105%	14400	15700	12800
Priest R nr Priest River[2]								
	APR-JUL	675	775	845	108%	915	1020	780
	APR-SEP	715	820	895	108%	970	1080	830
Pend Oreille R bl Box Canyon[2]								
	APR-JUL	10600	11800	12600	106%	13400	14600	11900
	APR-SEP	11400	12700	13700	105%	14600	15900	13000

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
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	578.8	594.5	773.0	1561.3
Priest Lake	48.7	46.1	67.6	119.3
Basin-wide Total	627.5	640.6	840.6	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Pend Oreille Basins	61	110%	93%
Colville River	0		
Kettle River	6	128%	79%



April 1 snow cover on the Okanogan was 119% of normal, Omak Creek was 73% and the Methow was 101%. March mountain precipitation in the Upper Columbia was 55% of average, with precipitation for the water year at 84% of average. The lack of low elevation snow and precipitation has residents concerned. March streamflow for the Methow River was 90% of average, 118% for the Okanogan River and 85% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 6.4 inches or 69% of normal for April 1. Combined storage in the Conconully Reservoirs was 16,300 acre-feet or 108% of normal.

Data Current as of: 4/7/2020 8:59:00 AM

Upper Columbia Basins
Streamflow Forecasts - April 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kettle R nr Laurier								
	APR-JUL	1830	2030	2160	120%	2290	2490	1800
	APR-SEP	1890	2100	2250	120%	2400	2610	1880
Colville R at Kettle Falls								
	APR-JUL	82	122	149	125%	176	215	119
	APR-SEP	90	133	162	124%	192	235	131
Columbia R at Grand Coulee-NWS[2]								
	APR-JUL	47400		51700	101%		57900	51015
	APR-SEP	58000		61700	103%		67400	60110
Similkameen R nr Nighthawk								
	APR-JUL	1300	1440	1530	128%	1630	1770	1200
	APR-SEP	1380	1530	1640	128%	1740	1890	1280
Okanogan R nr Tonasket								
	APR-JUL	1380	1580	1710	116%	1850	2040	1480
	APR-SEP	1510	1740	1900	115%	2050	2280	1650
Okanogan R at Malott								
	APR-JUL	1400	1600	1740	120%	1880	2080	1450
	APR-SEP	1530	1770	1930	119%	2090	2320	1620
Methow R nr Pateros								
	APR-JUL	600	700	765	92%	835	935	835
	APR-SEP	645	750	825	92%	895	1000	895

1) 90% and 10% exceedance probabilities are actually 95% and 5%
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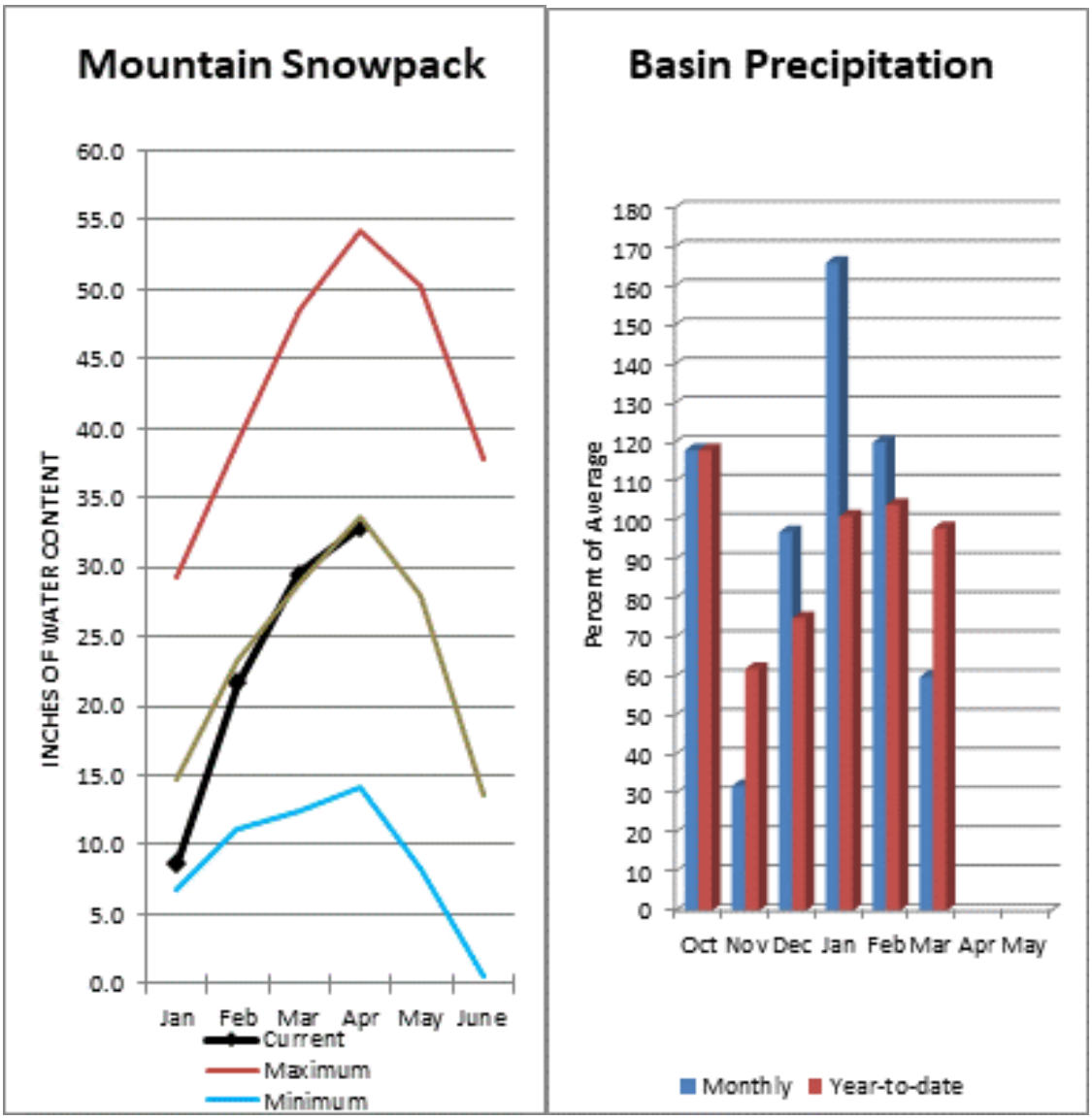
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)		7.5	7.3	10.5
Conconully Reservoir	8.0	11.3	7.8	13.0
Basin-wide Total	8.0	11.3	7.8	13.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Upper Columbia Basins	13	108%	70%
Okanogan River	11	119%	75%
Omak Creek	1	73%	71%
Sanpoil River	0		
Similkameen River	5	108%	64%
Toats Coulee Creek	0		
Conconully Lake	1	69%	58%
Methow River	3	101%	75%



Precipitation during March was 60% of average in the basin and 98% for the year-to-date. March average streamflow on the Chelan River was 71% and on the Wenatchee River 69%. April 1 snowpack in the Wenatchee River Basin was 98% of normal; the Chelan, 94%; the Entiat, 61%; Stemilt Creek, 80% and Colockum Creek, 120%. Reservoir storage in Lake Chelan was 79% of average. Lyman Lake SNOTEL had the most snow water with 47.6 inches of water. This site would normally have 57.6 inches on April 1.

For more information contact your local Natural Resources Conservation Service office.

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Central Columbia Basins
Streamflow Forecasts - April 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin								
	APR-JUL	585	640	680	100%	720	775	680
	APR-SEP	690	750	785	99%	825	885	790
Chelan R at Chelan								
	APR-JUL	840	915	965	97%	1010	1090	1000
	APR-SEP	935	1020	1070	96%	1130	1210	1120
Entiat R nr Ardenvoir								
	APR-JUL	143	164	178	89%	192	215	200
	APR-SEP	154	178	193	88%	210	235	220
Wenatchee R at Plain								
	APR-JUL	830	910	965	97%	1020	1100	990
	APR-SEP	895	985	1050	97%	1110	1210	1080
Icicle Ck nr Leavenworth								
	APR-JUL	245	275	295	107%	315	345	275
	APR-SEP	270	305	325	108%	345	380	300
Wenatchee R at Peshastin								
	APR-JUL	1220	1320	1390	101%	1460	1560	1370
	APR-SEP	1320	1430	1510	101%	1590	1710	1490
Columbia R bl Rock Island Dam-NWS[2]								
	APR-JUL	51700		56000	100%		62700	55770
	APR-SEP	62500		67200	103%		73100	65200

1) 90% and 10% exceedance probabilities are actually 95% and 5%
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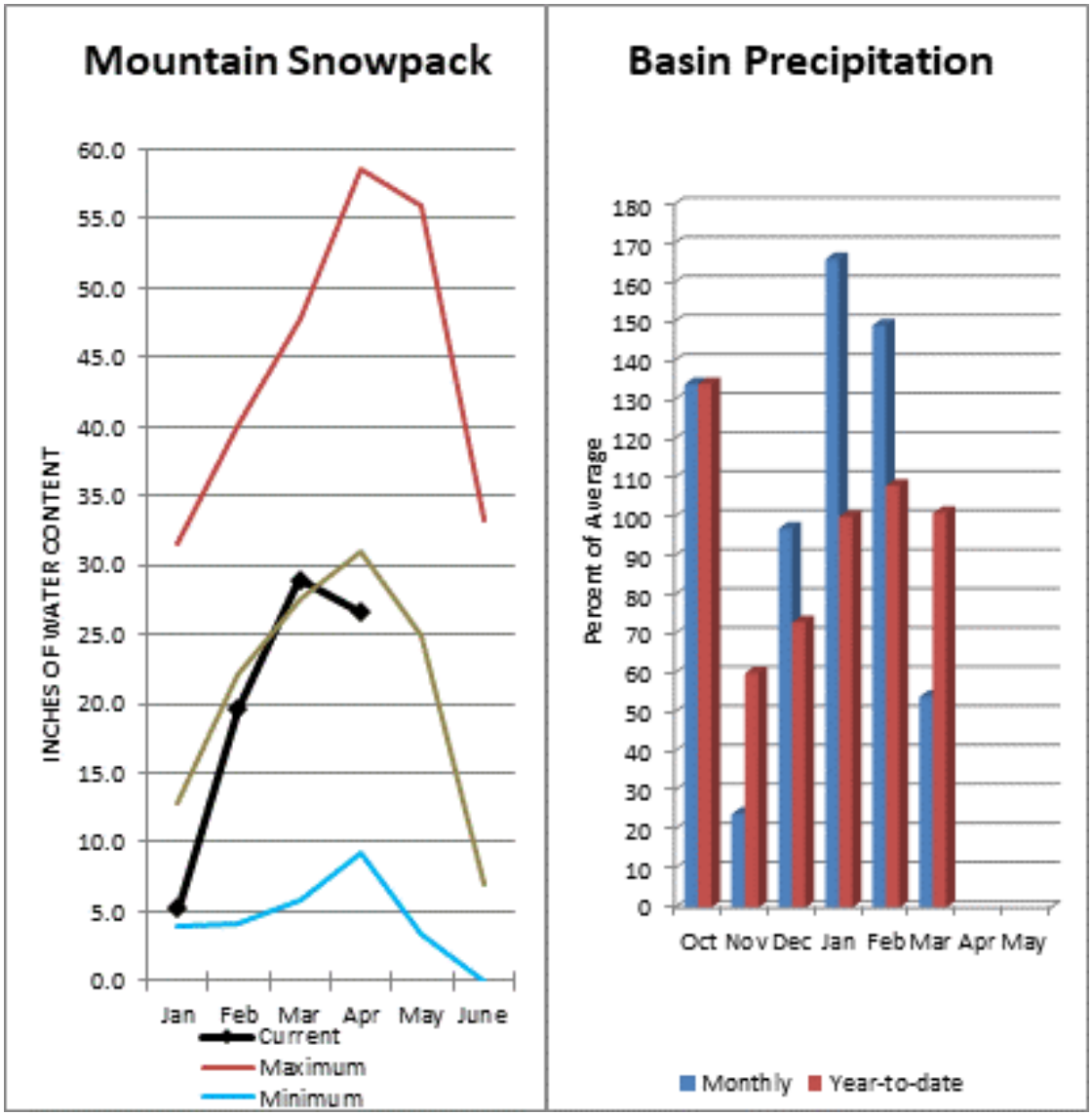
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	203.0	187.1	256.1	677.4
Basin-wide Total	203.0	187.1	256.1	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Central Columbia Basins	3	94%	68%
Chelan Lake Basin	3	94%	68%
Entiat River	1	61%	75%
Wenatchee River	6	98%	80%
Stemilt Creek	1	80%	99%
Colockum Creek	1	120%	177%



April 1 reservoir storage for the Upper Yakima reservoirs was 497,000-acre feet, 97% of average. March streamflow within the basin was Cle Elum River near Roslyn at 65%. April 1 snowpack was 86% based upon 5 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 54% of average for March and 101% for the water-year. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

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Upper Yakima River
Streamflow Forecasts - April 1, 2020

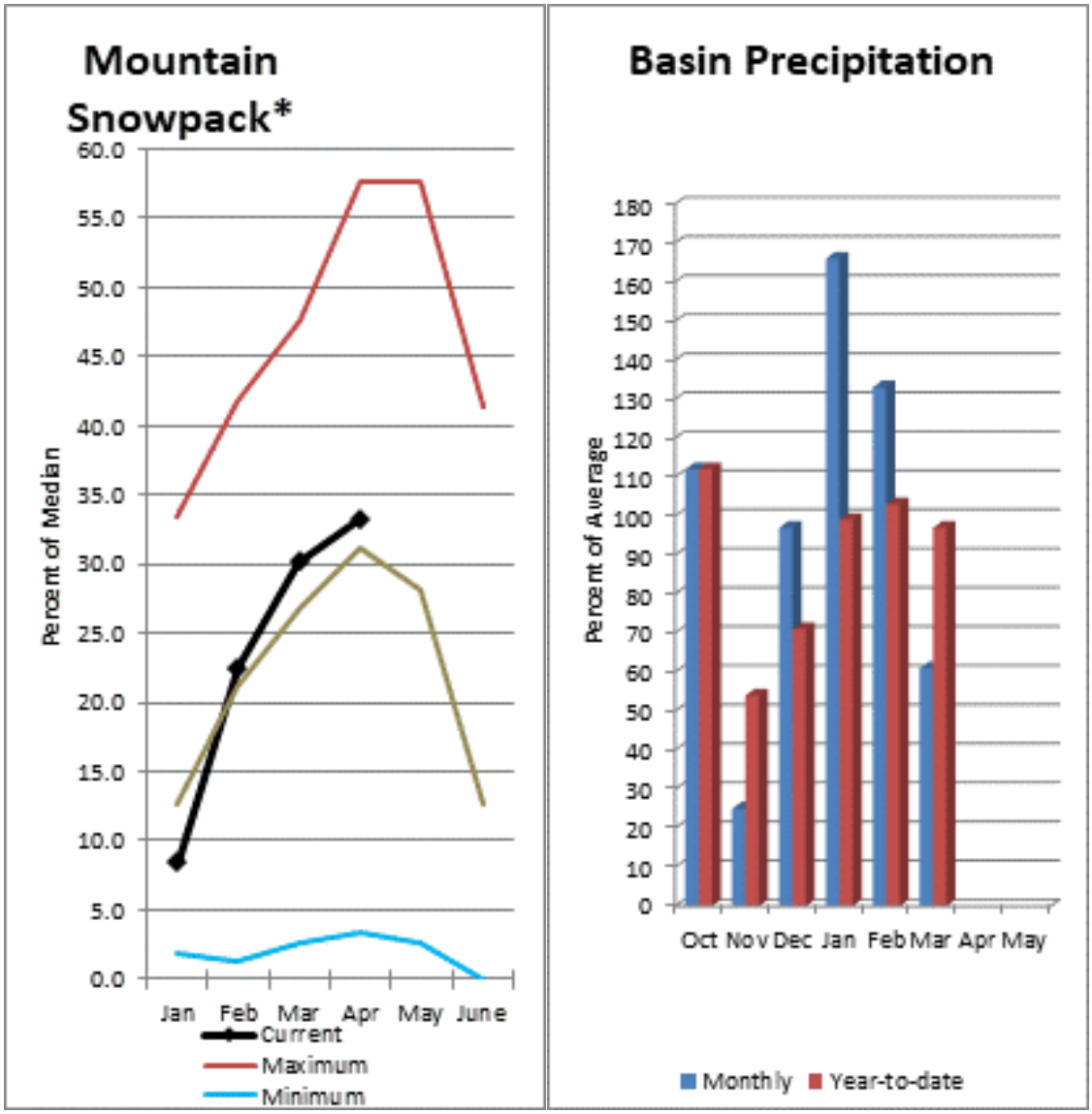
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Keechelus Reservoir Inflow[2]								
	APR-JUL	89	102	111	96%	120	133	116
	APR-SEP	96	110	120	95%	130	144	126
Kachess Reservoir Inflow [2]								
	APR-JUL	82	91	98	94%	105	114	104
	APR-SEP	89	99	106	94%	113	123	113
Cle Elum Lake Inflow [2]								
	APR-JUL	320	345	365	95%	380	410	385
	APR-SEP	345	375	395	95%	415	445	415
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	87	107	120	92%	133	153	130
	APR-SEP	89	109	123	92%	137	157	133

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
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	122.5	88.5	106.3	157.8
Kachess	144.9	157.2	159.8	239.0
Cle Elum	230.3	170.8	246.3	436.9
Basin-wide Total	497.6	416.5	512.4	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Upper Yakima River	5	86%	70%



March average streamflows within the basin were: Yakima River near Parker, 64% and the Naches River near Naches, 67%. April 1 reservoir storage for Bumping and Rimrock reservoirs was 178,000-acre feet, 117% of average. April 1 snowpack was 107% based upon 7 snow course and SNOTEL readings within the Lower Yakima Basin and Ahtanum Creek reported in at 90% of normal. Precipitation was 61% of average for March and 97% for the water-year. Volume forecasts for Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 4/7/2020 8:59:29 AM

Lower Yakima River
Streamflow Forecasts - April 1, 2020

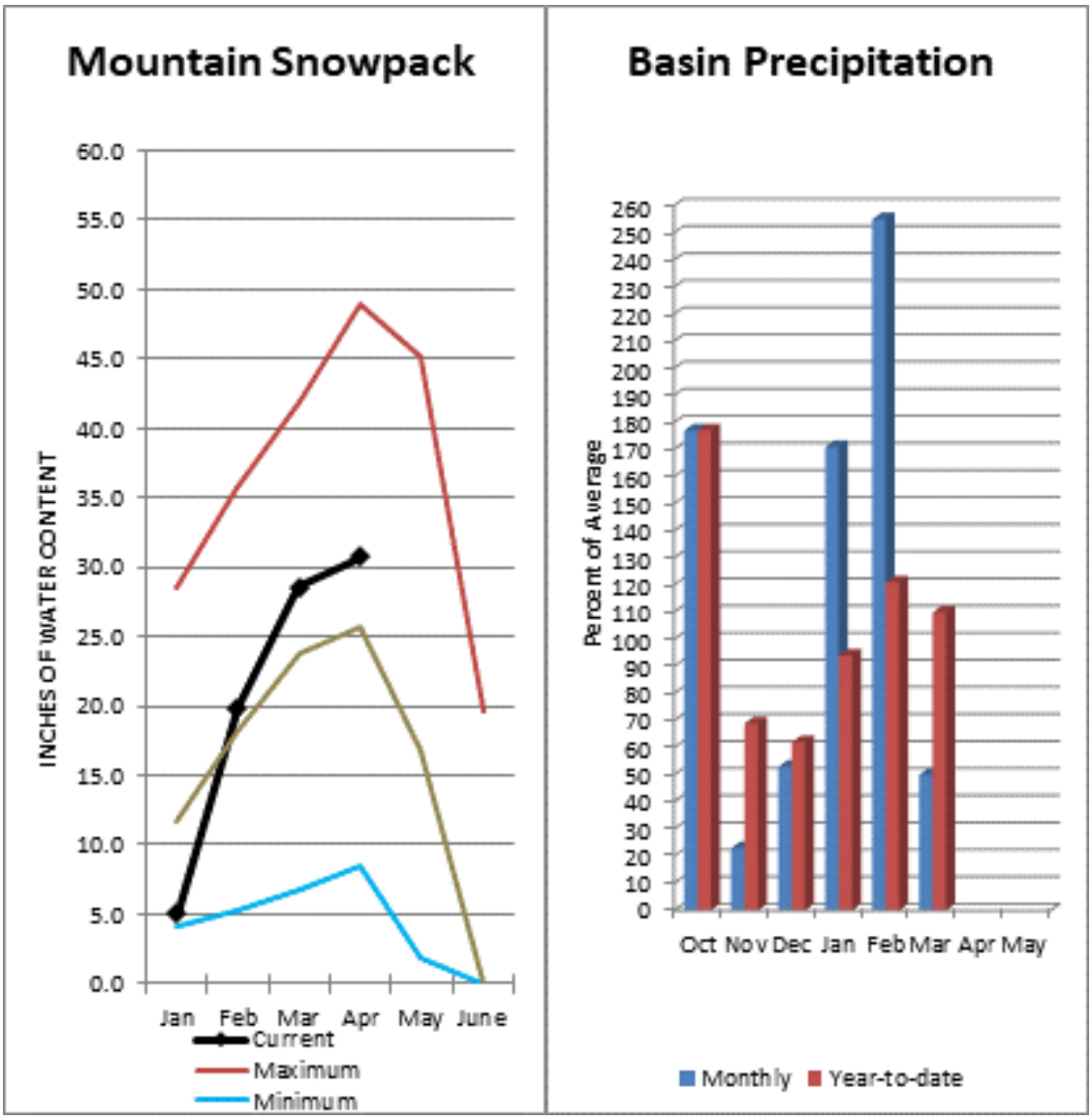
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Bumping Lake Inflow [2]								
	APR-JUL	99	110	118	104%	126	137	114
	APR-SEP	106	119	127	103%	135	148	123
American R nr Nile								
	APR-JUL	91	101	108	106%	115	125	102
	APR-SEP	97	109	117	106%	125	137	110
Rimrock Lake Inflow [2]								
	APR-JUL	168	182	192	103%	200	215	187
	APR-SEP	196	215	225	102%	235	255	220
Naches R nr Naches								
	APR-JUL	600	685	750	107%	810	900	700
	APR-SEP	645	745	815	107%	885	990	760
Ahtanum Ck at Union Gap								
	APR-JUL	13	20	25	93%	30	37	27
	APR-SEP	14.6	22	27	93%	32	39	29
Yakima R nr Parker [2]								
	APR-JUL	1360	1520	1640	99%	1750	1920	1660
	APR-SEP	1480	1660	1780	98%	1900	2080	1820
Klickitat R nr Glenwood								
	APR-JUL	104	119	129	102%	139	154	126
	APR-SEP	115	131	142	102%	153	169	139
Klickitat R nr Pitt								
	APR-JUL	370	425	460	106%	495	550	435
	APR-SEP	450	510	555	107%	595	660	520

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
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	24.8	7.3	14.6	33.7
Rimrock	152.7	91.9	136.6	198.0
Basin-wide Total	177.6	99.2	151.2	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Lower Yakima River	7	107%	90%
Ahtanum Creek	2	90%	103%



March precipitation was 50% of average, maintaining the year-to-date precipitation at 110% of average. Snowpack in the basin remained steady at 120% of normal.

For more information contact your local Natural Resources Conservation Service office.

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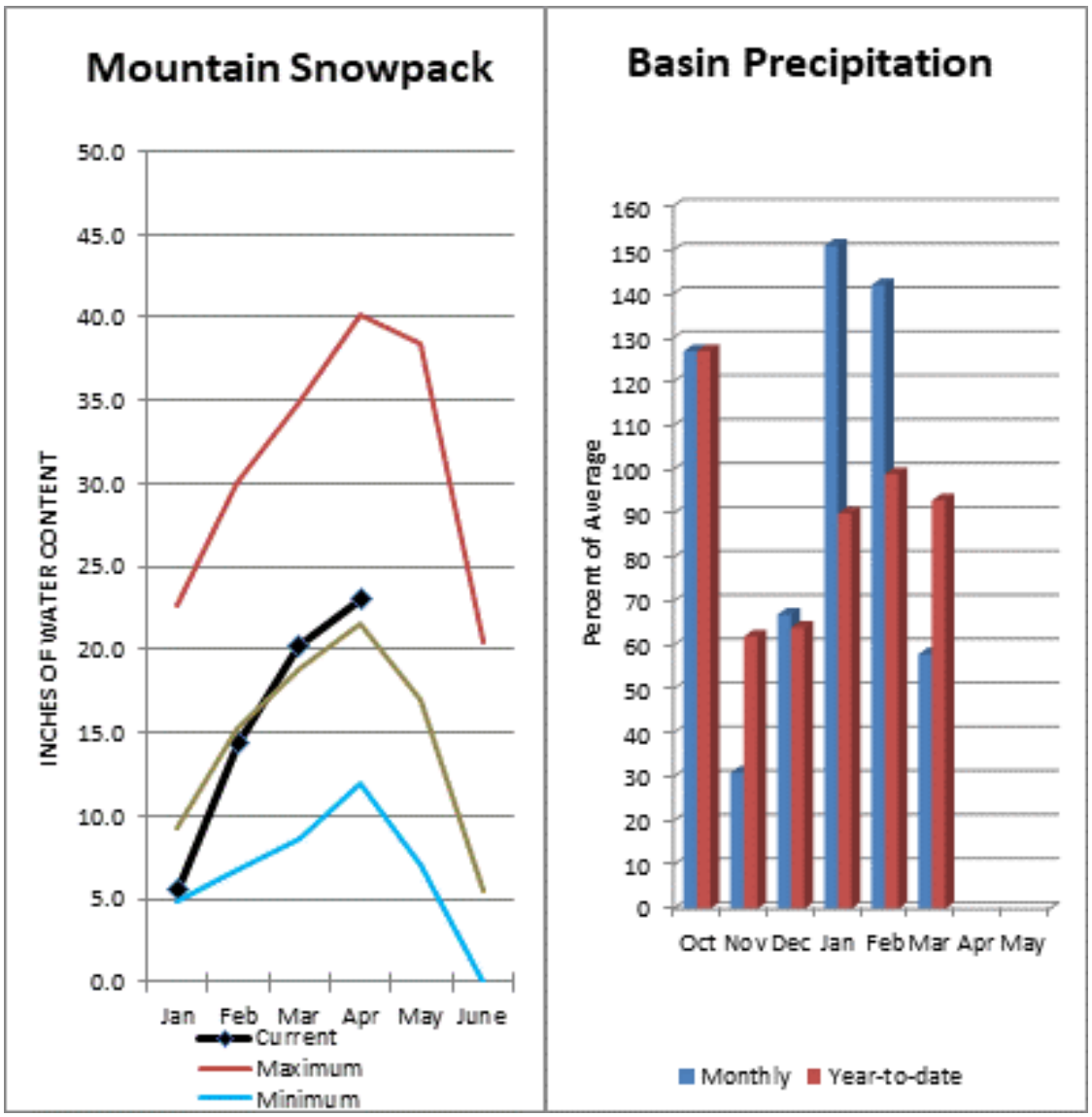
Walla Walla River
Streamflow Forecasts - April 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Walla Walla River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
SF Walla Walla R nr Milton-Freewater								
	APR-JUL	46	53	58	107%	63	70	54
	APR-SEP	58	66	71	108%	76	84	66
Mill Ck nr Walla Walla								
	APR-JUL	20	23	26	108%	28	31	24
	APR-SEP	23	27	29	107%	32	35	27

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
3) Median value used in place of average

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Walla Walla River	2	120%	121%



March precipitation was 58% of average, bringing the year-to-date precipitation to 93% of average. April 1 snowpack readings averaged 109% of normal. March streamflow was 65% of average for Snake River below Lower Granite Dam and 74% for Grande Ronde River near Troy. Dworshak Reservoir storage was 96% of average.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 4/7/2020 8:59:49 AM

Lower Snake, Grande Ronde, Clearwater Basins
Streamflow Forecasts - April 1, 2020

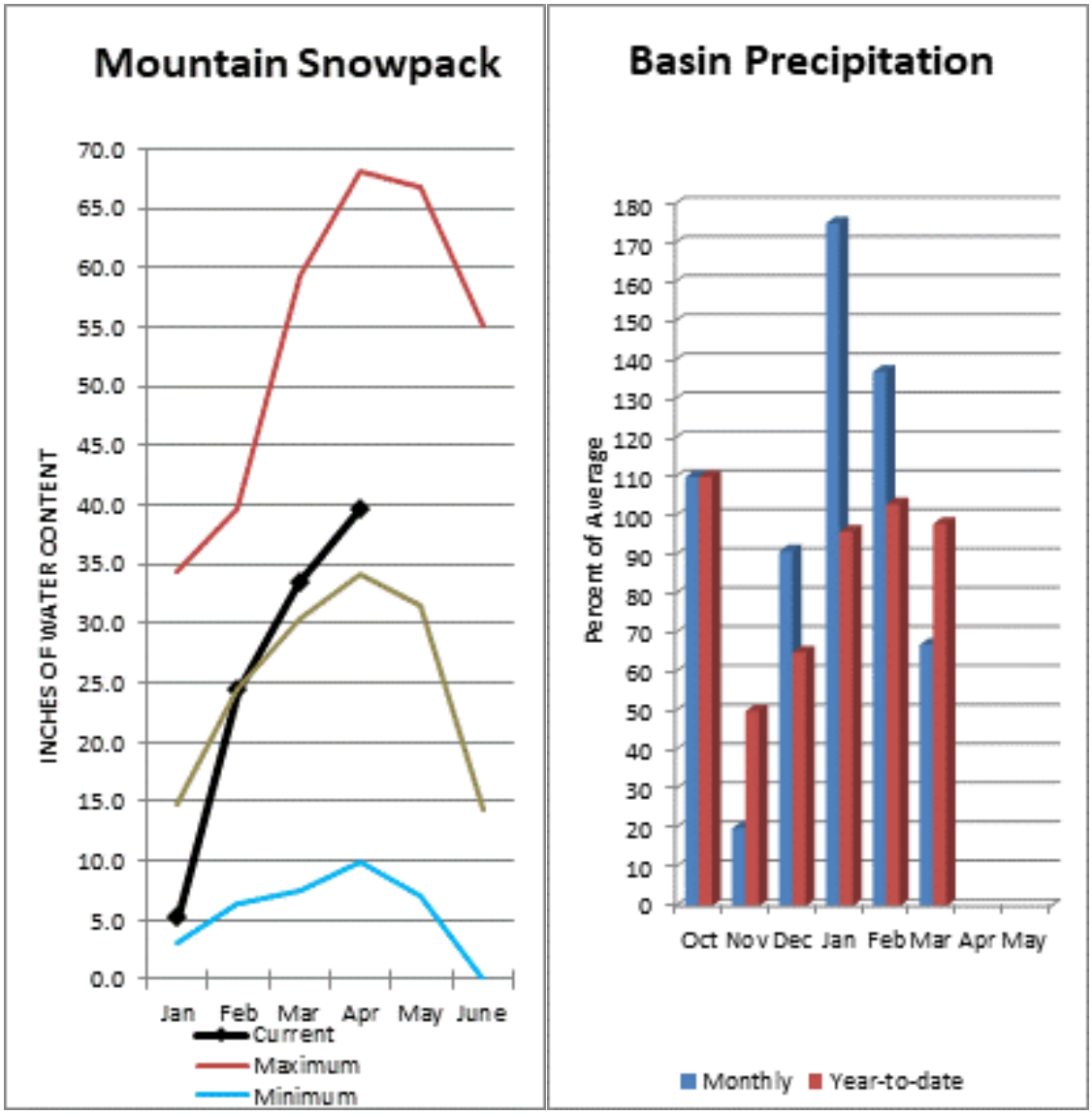
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake, Grande Ronde, Clearwater Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	APR-JUL	1150	1340	1460	120%	1590	1780	1220
	APR-SEP	1250	1440	1570	120%	1700	1890	1310
Asotin Ck at Asotin								
	APR-JUL	22	28	32	91%	37	45	35
Clearwater R at Spalding[2]								
	APR-JUL	6160	6960	7500	109%	8040	8830	6890
	APR-SEP	6450	7290	7860	108%	8430	9270	7270
Snake R bl Lower Granite Dam-NWS[2]								
	APR-JUL	14700		16200	82%		19900	19848
	APR-SEP	17000		18900	85%		22500	22280

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
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2338.3	2387.0	2417.0	3468.0
Basin-wide Total	2338.3	2387.0	2417.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Lower Snake, Grande Ronde, Clearwater Basins	15	109%	107%



March average streamflow for Cowlitz River was 73% and the Columbia River at The Dalles was 64% of average. March precipitation was 67% of average and the water-year average was 98%. April 1 snow cover for Cowlitz River was 132%, and Lewis River was 100% of normal.

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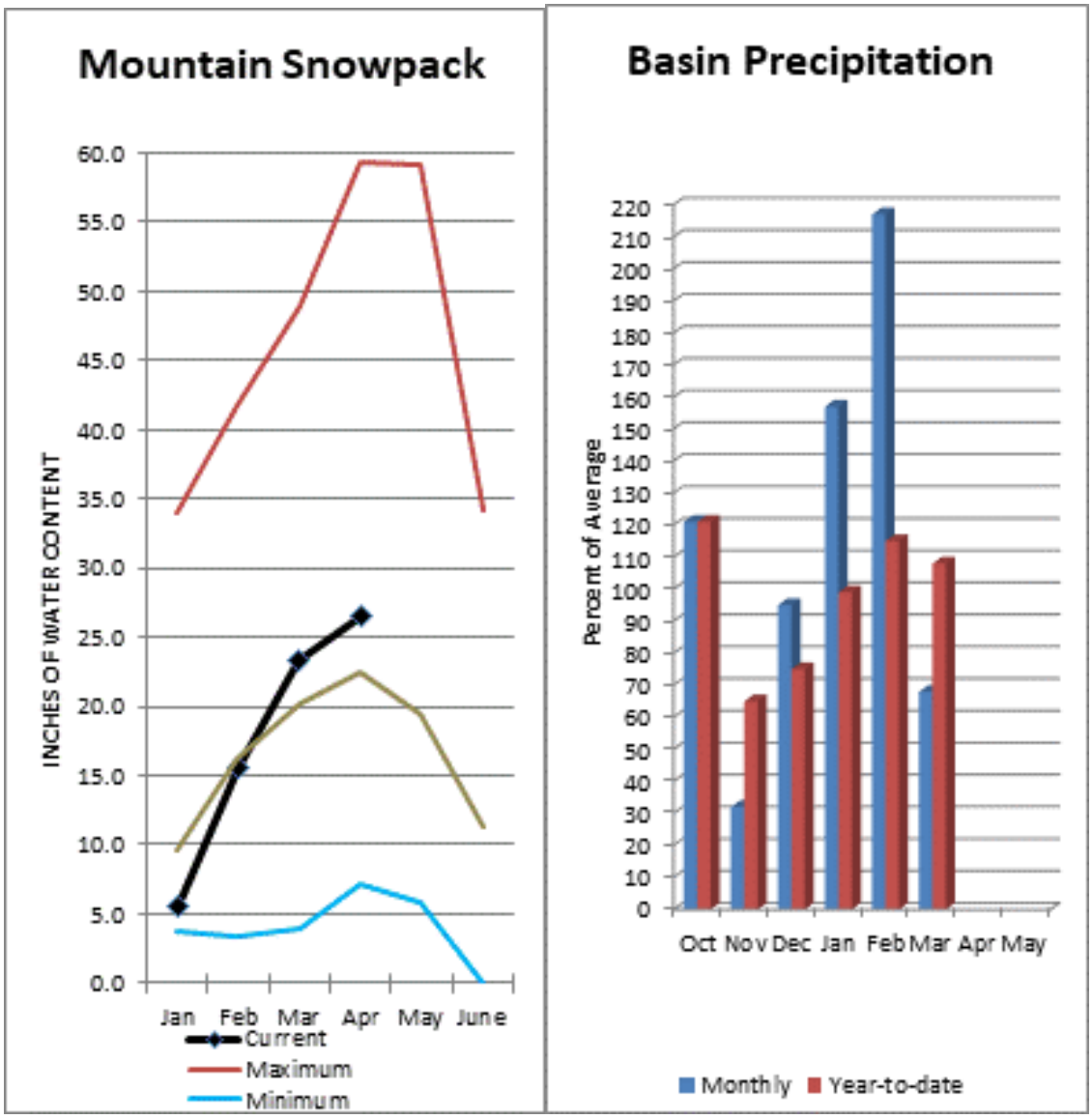
Lower Columbia Basins
Streamflow Forecasts - April 1, 2020

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Lower Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Columbia R at The Dalles-NWS[2]								
	APR-JUL	70600		76300	96%		85500	79855
	APR-SEP	83400		89200	96%		99500	92704
Klickitat R nr Glenwood								
	APR-JUL	104	119	129	102%	139	154	126
	APR-SEP	115	131	142	102%	153	169	139
Klickitat R nr Pitt								
	APR-JUL	370	425	460	106%	495	550	435
	APR-SEP	450	510	555	107%	595	660	520
Lewis R at Ariel[2]								
	APR-JUL	705	875	990	102%	1110	1280	970
	APR-SEP	825	1000	1120	100%	1240	1420	1120
Cowlitz R bl Mayfiled[2]								
	APR-JUL	1440	1650	1790	110%	1930	2140	1630
	APR-SEP	1640	1870	2020	110%	2170	2400	1840
Cowlitz R at Castle Rock[2]								
	APR-JUL	1860	2150	2350	105%	2550	2850	2240
	APR-SEP	2120	2430	2640	104%	2860	3170	2540

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
3) Median value used in place of average

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Lower Columbia Basins	11	116%	89%
Lewis River	5	100%	85%
Cowlitz River	6	132%	92%



April 1 snowpack was 118% of average for the White River, 125% for Puyallup River and 108% in the Green River Basin. March precipitation was 68% of average, bringing the water year-to-date to 108% of average for the basins.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 4/7/2020 9:00:08 AM

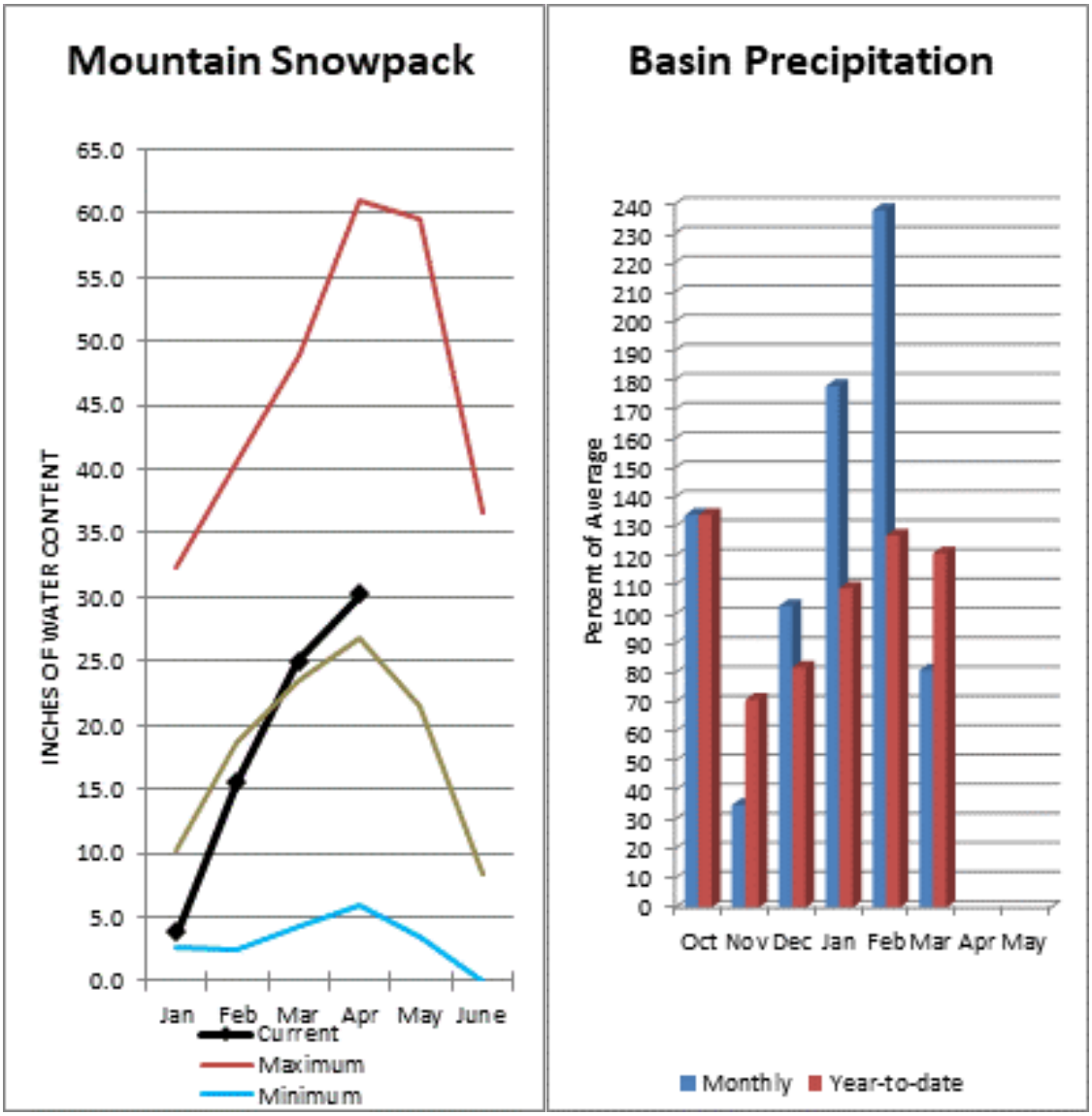
South Puget Sound Basins
Streamflow Forecasts - April 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

South Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
White R nr Buckley[1,2]								
	APR-JUL	400	470	505	117%	540	610	430
	APR-SEP	480	565	605	117%	640	725	515
Green R bl Howard A Hanson Dam[1,2]								
	APR-JUL	164	215	235	100%	255	305	235
	APR-SEP	184	235	260	100%	285	335	260

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
3) Median value used in place of average

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
South Puget Sound Basins	11	118%	85%
White River	3	118%	93%
Green River	3	108%	62%



Basin-wide precipitation for March was 81% of average, bringing water-year-to-date to 121% of average. April 1 median snow cover in Cedar River Basin was 103%, Tolt River Basin was 131%, Snoqualmie River Basin was 109%, and Skykomish River Basin was 120%.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 4/7/2020 9:00:18 AM

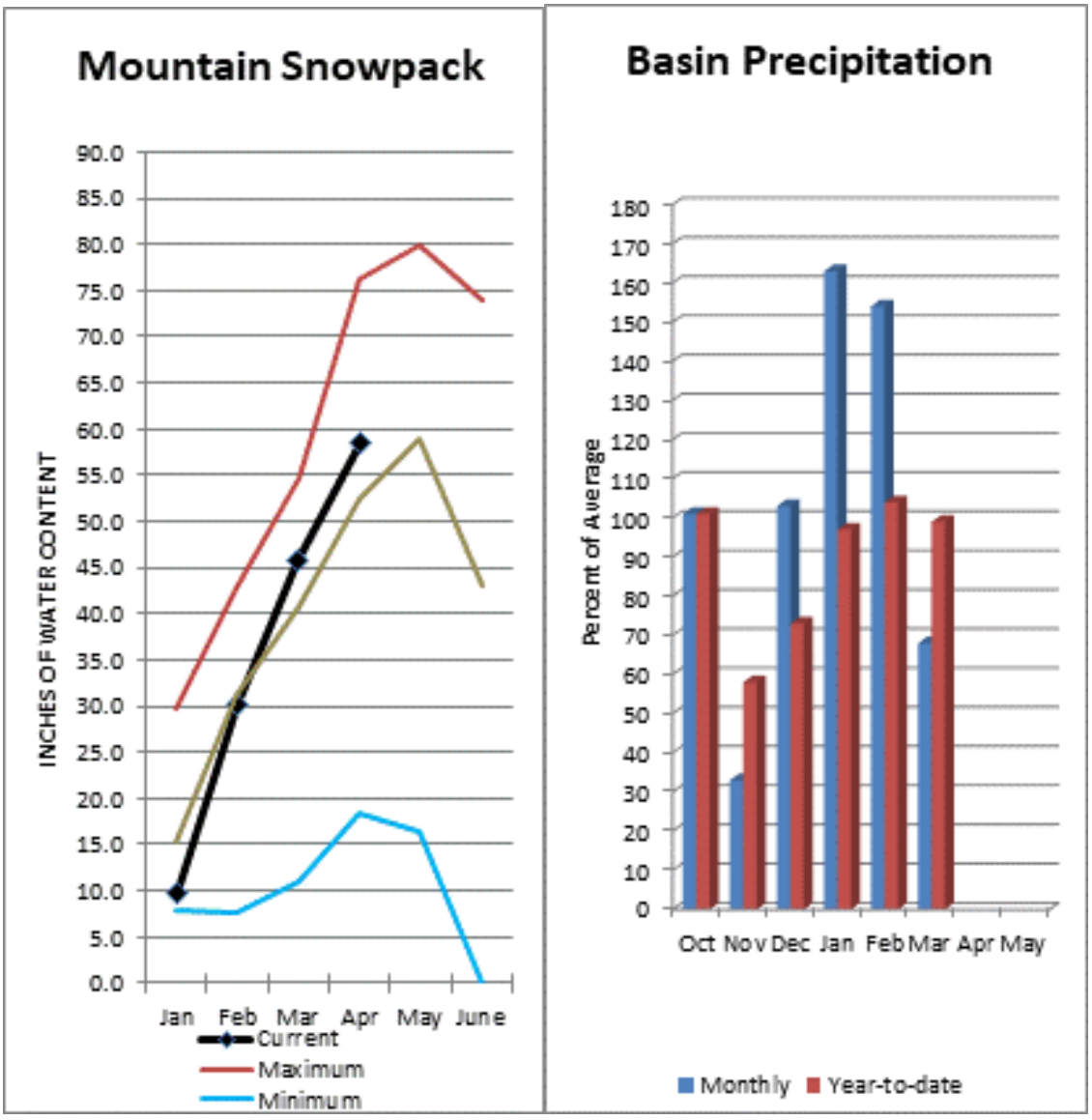
Central Puget Sound Basins
Streamflow Forecasts - April 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	APR-JUL	70	78	83	119%	89	97	70
	APR-SEP	75	84	90	118%	96	105	76
Rex R nr Cedar Falls								
	APR-JUL	22	26	29	121%	31	35	24
	APR-SEP	24	28	31	115%	34	38	27
Taylor Ck nr Selleck								
	APR-JUL	18.5	21	23	115%	25	27	20
	APR-SEP	22	24	26	108%	28	31	24
SF Tolt R nr Index								
	APR-JUL	18.1	20	22	155%	23	25	14.2
	APR-SEP	19.9	22	24	149%	26	28	16.1

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
3) Median value used in place of average

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Central Puget Sound Basins	12	113%	68%
Puyallup River	5	125%	95%
Cedar River	4	103%	67%
Tolt River	2	131%	64%
Snoqualimie River	4	109%	64%
Skykomish River	2	120%	66%



March streamflow in Skagit River was 71% of average. Basin-wide precipitation for March was 68% of average, bringing water-year-to-date to 99% of average. April 1 average snow cover in Skagit River Basin was 111% and the Nooksack River Basin was 118%. April 1 Skagit River reservoir storage was 79% of average and 41% of capacity.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 4/7/2020 9:00:29 AM

North Puget Sound Basins
Streamflow Forecasts - April 1, 2020

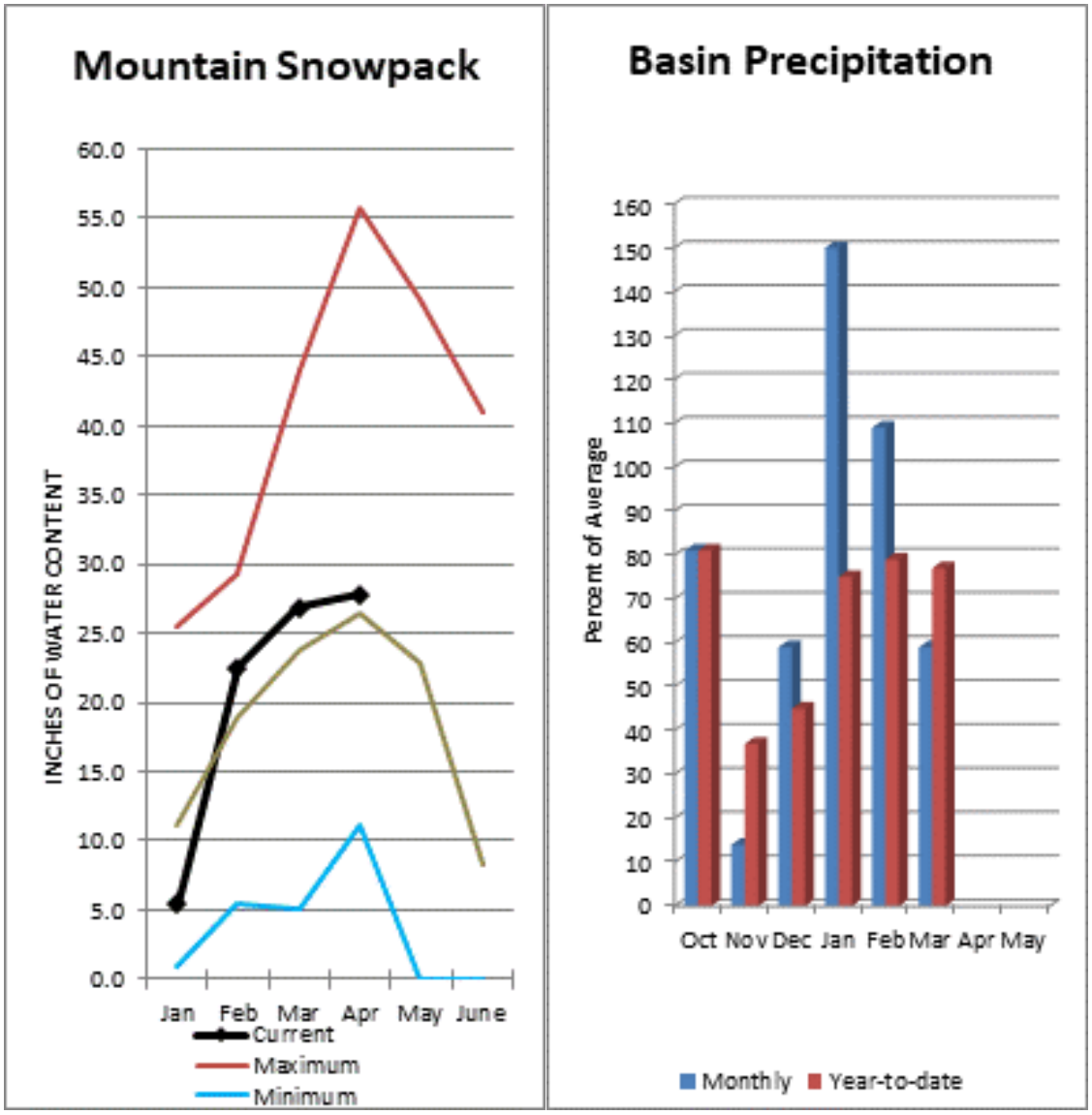
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

North Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Thunder Ck nr Newhalem								
	APR-JUL	205	225	235	100%	250	265	235
	APR-SEP	295	315	330	100%	345	365	330
Skagit R at Newhalem[2]								
	APR-JUL	1660	1770	1840	105%	1920	2020	1750
	APR-SEP	1960	2090	2170	105%	2260	2380	2070
Baker R at Concrete								
	APR-JUL	715	800	860	110%	915	1000	780
	APR-SEP	895	1020	1110	113%	1190	1320	980

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
3) Median value used in place of average

Reservoir Storage End of March, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	579.2	504.6	730.5	1434.7
Basin-wide Total	579.2	504.6	730.5	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
North Puget Sound Basins	11	114%	68%
Skagit River	8	111%	70%
Baker River	0		
Nooksack River	3	118%	63%



Dungeness River streamflow was 56% of normal. March precipitation was 59% of average. Precipitation has accumulated at 77% of average for the water year. March precipitation at Quillayute was 7.42 inches, Normal for this site is 10.83 inches. Olympic Peninsula snowpack averaged 105% of normal on April 1.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 4/7/2020 9:00:40 AM

Olympic Penninsula
Streamflow Forecasts - April 1, 2020

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Olympic Penninsula	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Dungeness R nr Sequim								
	APR-JUL	102	116	125	104%	134	148	120
	APR-SEP	121	138	150	103%	162	179	145
Elwha R at McDonald Br nr Port Angeles								
	APR-JUL	360	400	425	106%	450	490	400
	APR-SEP	420	465	500	106%	530	580	470

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
3) Median value used in place of average

Watershed Snowpack Analysis April 1, 2020	# of Sites	% Median	Last Year % Median
Olympic Penninsula	6	105%	70%

Issued by

Matthew J. Lohr
Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Rides-at-the-Door
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada	Snow Survey Network Program – British Columbia Ministry of Environment
	River Forecast Center – British Columbia Ministry of Forests, Lands and Natural Resource Operations
State	Washington State Department of Ecology
	Washington State Department of Natural Resources
	Washington State Fish and Wildlife
Federal	Department of the Army, Corps of Engineers
	U.S. Department of Agriculture, Forest Service
	U.S. Department of Commerce, NOAA, National Weather Service
	U.S. Department of Interior
	Bonneville Power Administration
	Bureau of Reclamation
	Geological Survey
	National Park Service
	Bureau of Indian Affairs
	U.S. Fish and Wildlife Service
Local	City of Tacoma
	City of Seattle
	City of Bellingham
	Chelan County P.U.D.
	Pacific Power/PacificCorp
	Puget Sound Energy
	Washington Water Power Company
	Snohomish County P.U.D.
	Colville Confederated Tribes
	Spokane County
	Yakama Indian Nation
	Whatcom County
	Pierce County
	Kalispel Tribe of Indians
	Spokane Indian Tribe
	Jamestown S'Klallam Tribe
	Sauk-Suiattle Tribe of Indians
	Stillaguamish Tribe
Private	Okanogan Irrigation District
	Wenatchee Heights Irrigation District
	Newman Lake Homeowners Association
	Whitestone Reclamation District
	Kinross Mining

***Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.**

Washington Snow Survey Office
2005 E. College Way, Suite 203
Mount Vernon, WA 98273-2873

Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA

NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington
Water Supply Outlook Report
May 1, 2020

Olympic National Park employees practicing safe social distancing while measuring snow at Deer Park snow course, April 28, 2020. Three sections of Federal Snow Sampler are 90 inches.

Water Supply Outlook Reports
and
Federal - State – Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

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Natural Resources Conservation Service
11707 E. Sprague Ave., Suite 301
Spokane Valley, WA 99206
(509) 323-2955

How forecasts are made

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. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. 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 uncertain 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.

Washington
Water Supply Outlook

May 2020

General Outlook

April precipitation was much below normal and most all basins showed a sizable decrease in snowpack from last month. Average April temperatures were slightly above normal for most of the state. The most recent forecast through May shows a high probability for above normal temperatures with equal chances for precipitation. NWS 3-month (MJJ) forecast indicates above normal temperatures and below normal precipitation. National Inter Agency Fire Center (NIFC) released their latest Significant Wildland Fire Outlook, for July and August, which indicates above normal chance of wildfire for most of Eastern Washington and normal conditions on the west side. The US Drought Monitor continues to indicate D0-D1 drought designation through all Central and South West Washington with an expansion of D2 border to border in the Central part of the state. (see maps on page 4)
http://www.cpc.ncep.noaa.gov/

Snowpack

The May 1 statewide SNOTEL readings were 96% of normal. The lowest readings in the state were at 36% of the 30-year median for May 1 in the Stemilt Creek Basin. The Tolt River Basin had the most snow with 136%. Westside medians from SNOTEL, and May 1 snow surveys, included the North Puget Sound river basins with 103% of normal, the Central and South Puget river basins with 109% and 96% respectively, and the Lower Columbia basins with 104% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 75% and the Wenatchee area with 86%. Snowpack in the Spokane River Basin was at 102% and the Upper Columbia river basins had 106% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	102	83
Newman Lake	55	4
Pend Oreille	111	100
Okanogan	117	74
Methow	101	74
Conconully Lake	0	0
Central Columbia	86	68
Upper Yakima	71	61
Lower Yakima	80	79
Ahtanum Creek	45	70
Walla Walla	104	159
Lower Snake	83	112
Cowlitz	119	91
Lewis	88	79
White	93	92
Green	90	57
Puyallup	101	96
Cedar	103	62
Snoqualmie	102	60
Skykomish	115	57
Skagit	100	68
Nooksack	107	54
Olympic Peninsula	97	61

Precipitation

April precipitation from SNOTEL was much below normal statewide with amounts as low as 24% of average at Moses Mtn. SNOTEL to as high as 86% of average at Rex River SNOTEL. Both SNOTEL sites in the Tolt River Basin received the most precipitation with 8" or 76% of normal. Water year averages remain near to slightly above normal. Valley rain fall was equally dismal and ranged from only 4% of average at Wenatchee to 34% at Walla Walla airport.

RIVER BASIN	APRIL PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	70	90
Pend Oreille	78	90
Upper Columbia	52	81
Central Columbia	56	95
Upper Yakima	54	97
Lower Yakima	37	92
Walla Walla	48	104
Lower Snake	63	89
Lower Columbia	41	93
South Puget Sound	44	102
Central Puget Sound	70	116
North Puget Sound	64	86
Olympic Peninsula	29	73

Reservoir

Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. May 1 Reservoir storage in the Yakima Basin was 582,000-acre feet, 96% of average for the Upper Reaches and 182,000-acre feet or 102% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 219,000-acre feet, 96% of average and 92% of capacity; and Ross lake within the Skagit River Basin at 79% of average and 42% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	92	96
Pend Oreille	59	96
Upper Columbia	64	93
Central Columbia	41	92
Upper Yakima	70	96
Lower Yakima	79	102
Lower Snake	74	98
North Puget Sound	42	79

For more information contact your local Natural Resources Conservation Service office.

Streamflow

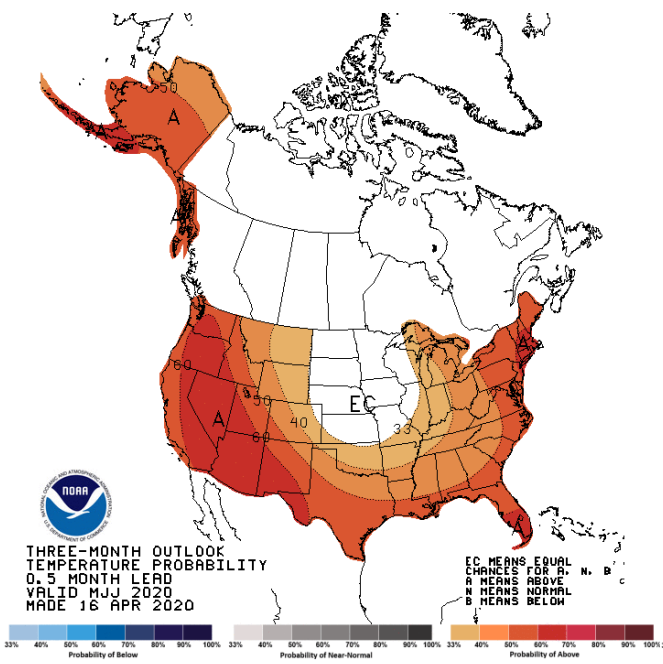
As we enter the melt phase of winter/spring, we begin tracking snow melt rates and watching rivers and streams for peak spring runoff. Water resources are carefully managed throughout the state to allow for adequate water supplies for fish migration, irrigation, municipal needs and recreation. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS.

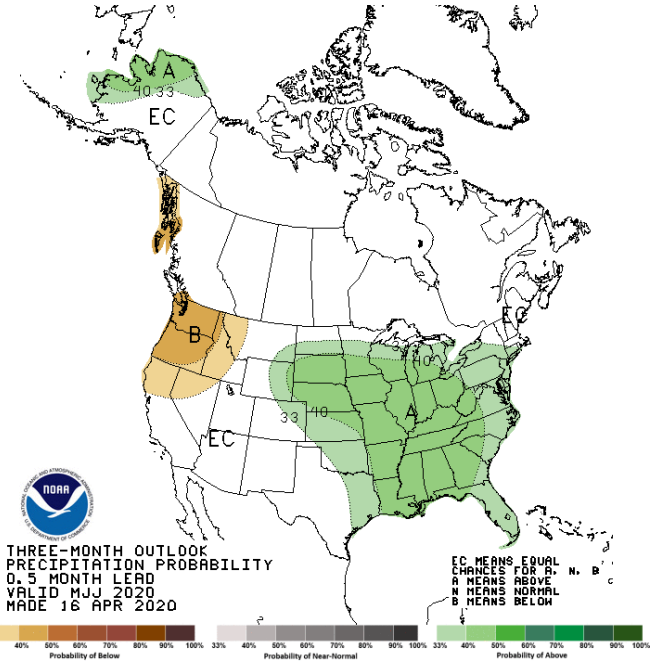
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	81-105
Pend Oreille	97-104
Upper Columbia	75-112
Central Columbia	83-109
Upper Yakima	74-84
Lower Yakima	78-96
Walla Walla	88-100
Lower Snake	55-105
Lower Columbia	90-104
South Puget Sound	97-100
Central Puget Sound	103-122
North Puget Sound	100-108
Olympic Peninsula	97-98

STREAM	PERCENT OF AVERAGE APRIL STREAMFLOWS
Pend Oreille at Albeni Fall Dam	74
Kettle at Laurier	98
Columbia at Birchbank	105
Spokane at Spokane	81
Similkameen at Nighthawk	121
Okanogan at Tonasket	125
Methow at Pateros	114
Chelan at Chelan	94
Stehekin near Stehekin	101
Wenatchee at Pashastin	91
Cle Elum near Roslyn	104
Yakima at Parker	92
Naches at Naches	121
Grande Ronde at Troy	92
Snake below Lower Granite Dam	80
Columbia River at The Dalles	76
Lewis at Merwin Dam	66
Cowlitz below Mayfield Dam	83
Skagit at Concrete	92
Dungeness near Sequim	78

For more information contact your local Natural Resources Conservation Service office.

Climate and Soil Moisture





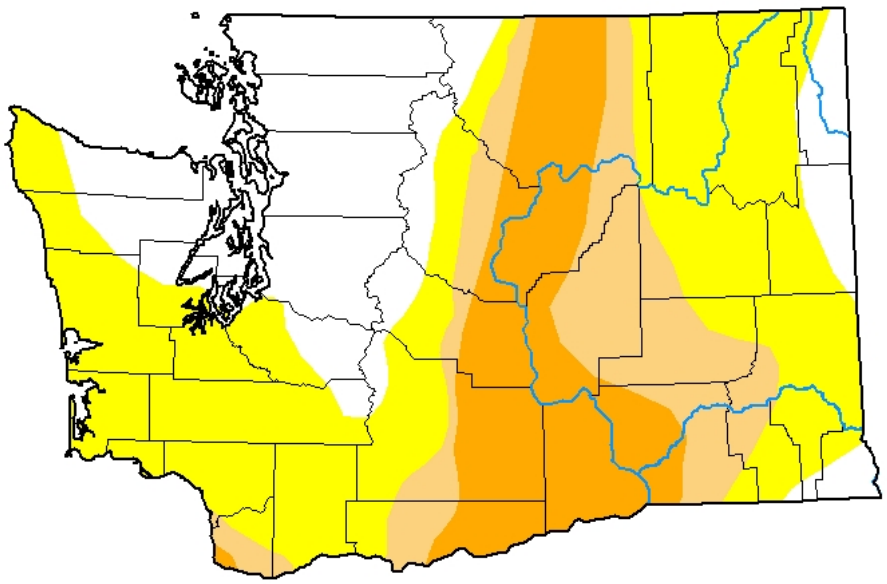
U.S. Drought Monitor

Washington

May 5, 2020

(Released Thursday, May. 7, 2020)

Valid 8 a.m. EDT



Intensity:

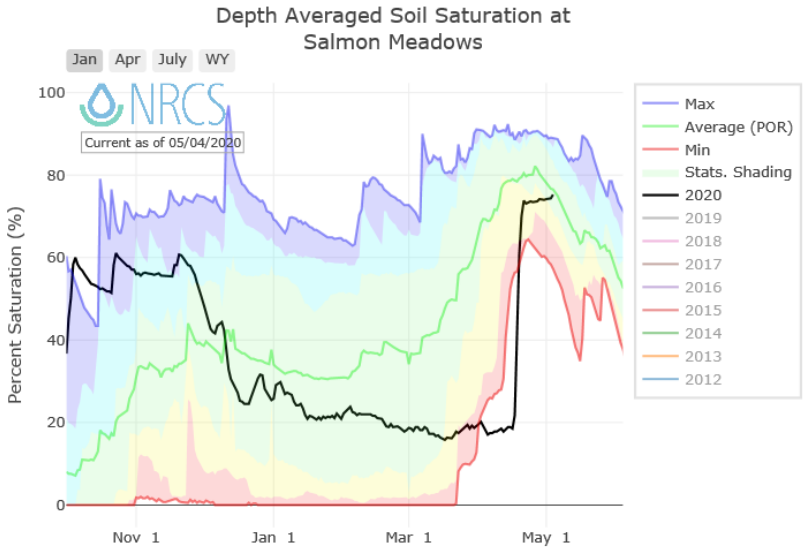
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

Brad Pugh
CPC/NOAA

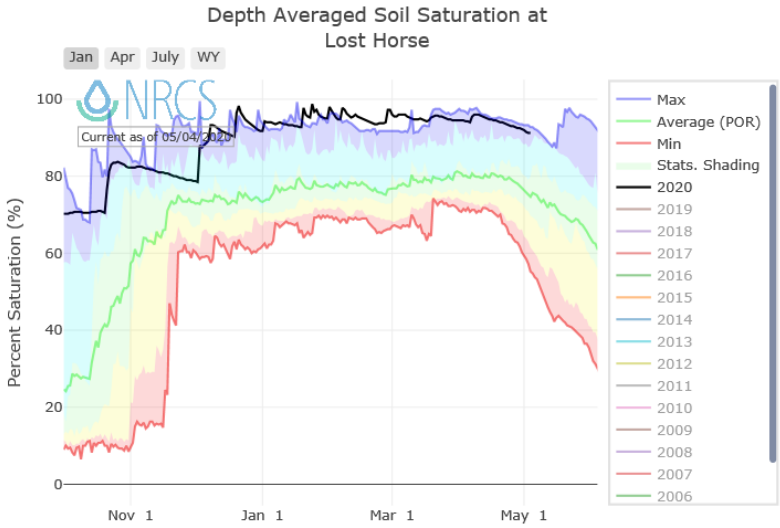
droughtmonitor.unl.edu

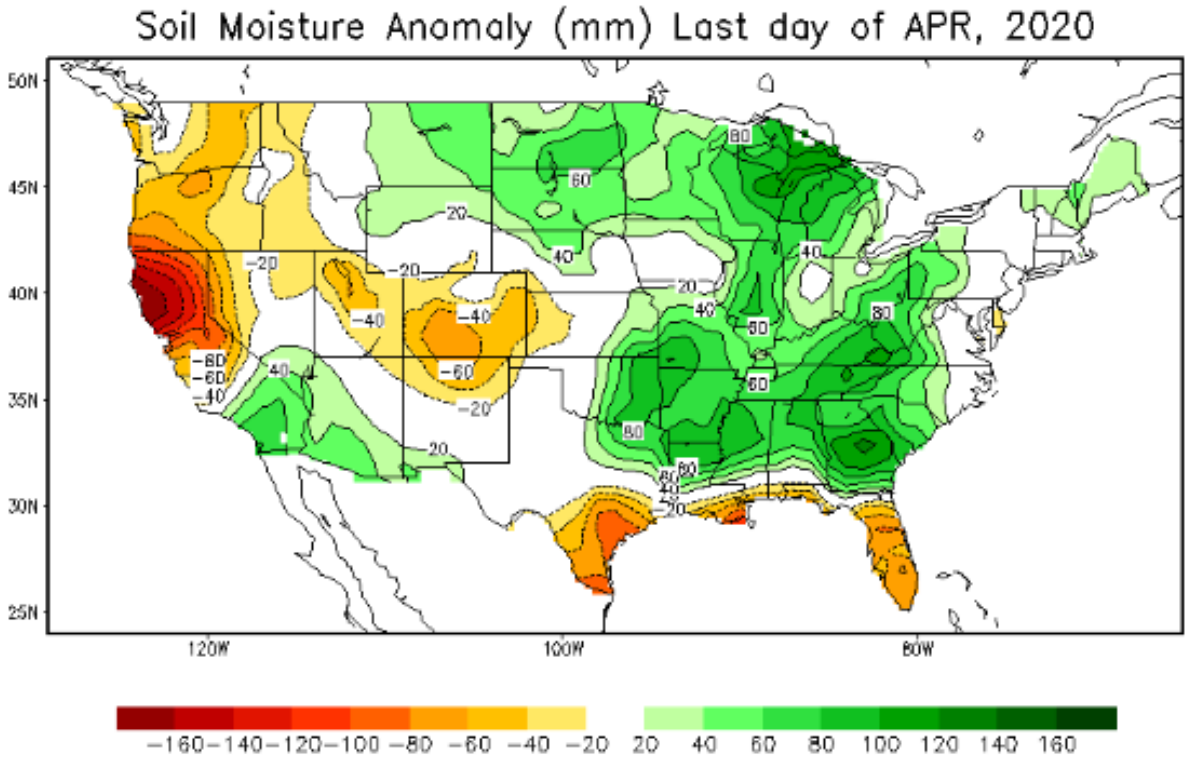


Soil Moisture at Salmon Meadows SNOTEL site, near Conconully, indicated near normal conditions. However, this year's below normal snowpack melted weeks early.

Lost Horse SNOTEL is holding soil moisture to the point of saturation which will be beneficial for runoff and plant growth on the Yakama Reservation.

The graphic displayed below is a modeled soil moisture product from the National Weather Service and mostly follows the patter in the US Drought Monitor shown on the pervious page, orange colors indicating below normal conditions.





Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/wa/snow/

Oregon:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/snow/

Idaho:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

USDA-NRCS Agency Homepages

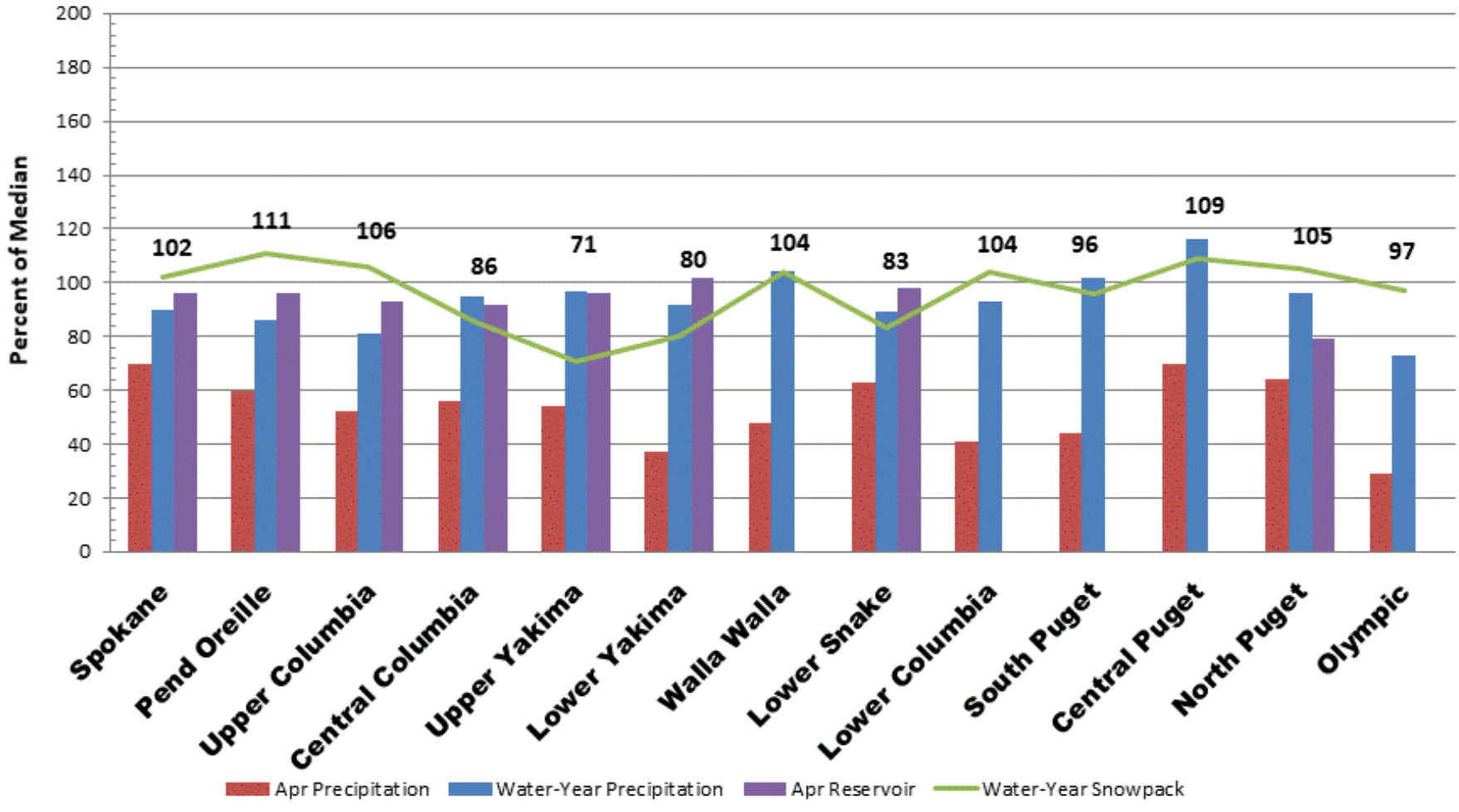
Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/

NRCS National:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

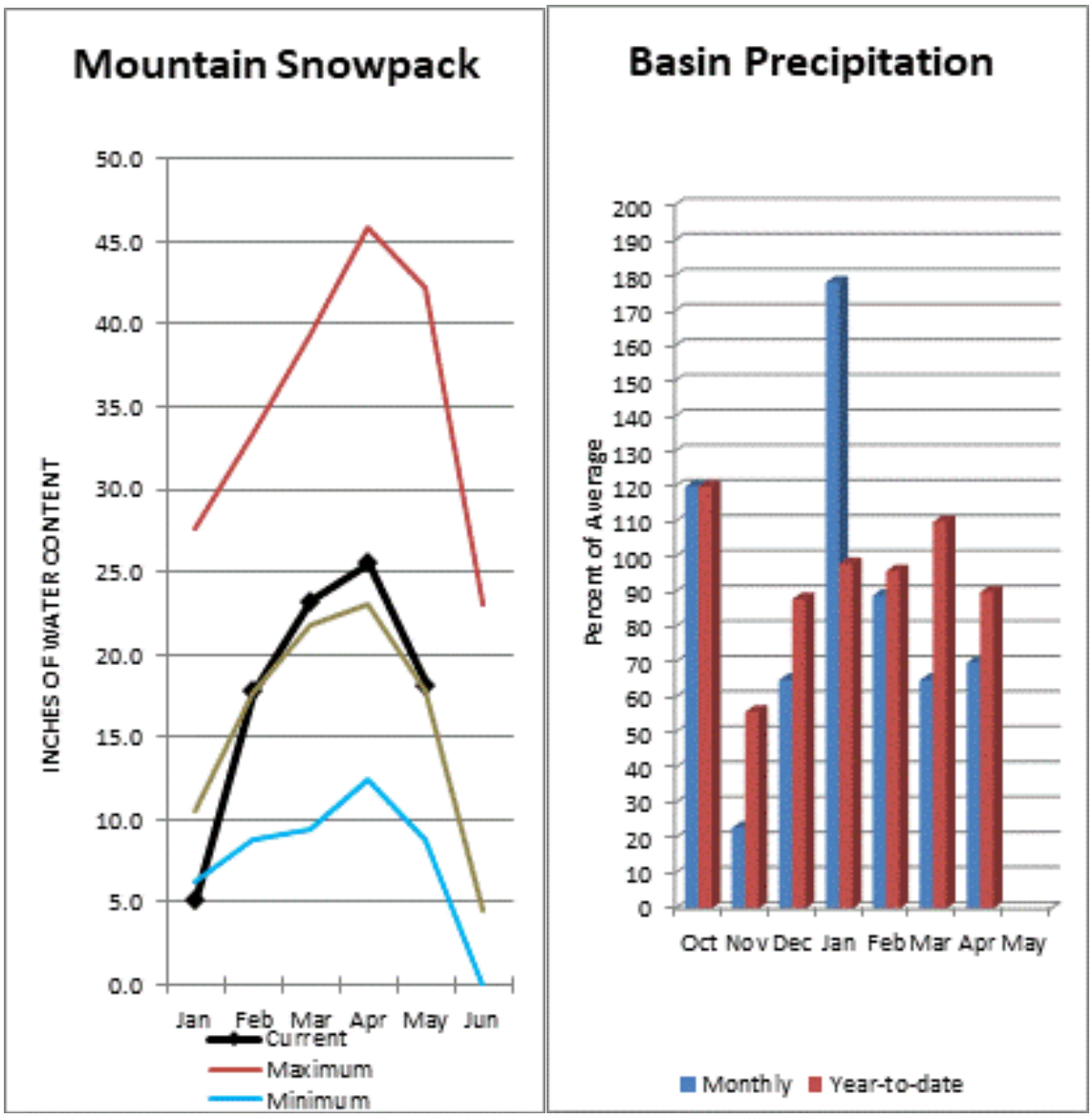
NRCS Natural Resources Conservation Service

May 1, 2020 - Snowpack, Precipitation and Reservoir Conditions at a Glance

(Water Year = October 1 - Current Date)



Spokane River Basin



Basin snowpack is 108% of normal and precipitation is 90% of average for the water year. Precipitation for April was below normal at 70% of average. Streamflow on the Spokane River at Spokane was 81% of average for April. May 1 storage in Coeur d'Alene Lake was 281,800-acre feet, 96% of average and 92% of capacity. Snowpack at Quartz Peak SNOTEL site was 55% of average with 7.9 inches of water content left on May 1.

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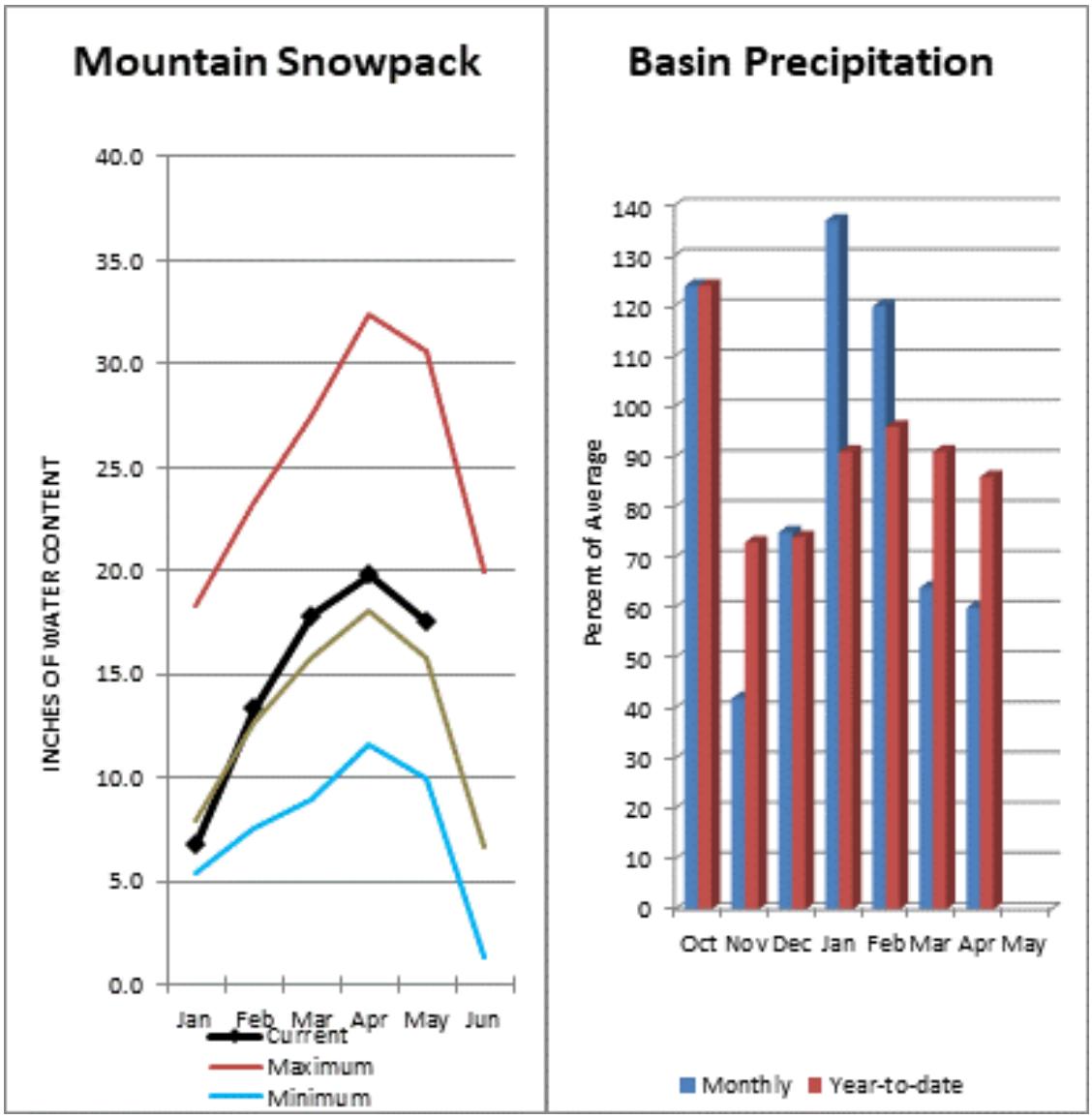
Spokane
Streamflow Forecasts - May 1, 2020

Spokane	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment: Chance that actual volume will exceed forecast — 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Spokane R nr Post Falls[2]								
	MAY-JUL	1230	1460	1620	106%	1770	2000	1530
	MAY-SEP	1300	1540	1700	105%	1860	2100	1620
Spokane R at Long Lake[2]								
	MAY-JUL	1440	1670	1830	107%	1990	2230	1710
	MAY-SEP	1610	1860	2030	104%	2200	2450	1950
Chamokane Ck nr Long Lake								
	MAY-JUL	3.5	5.1	6.2	81%	7.6	9.7	7.7

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
3) Median value used in place of average

Reservoir Storage End of April, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	218.8	209.9	228.0	238.5
Basin-wide Total	218.8	209.9	228.0	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Spokane	11	108%	83%
Newman Lake	1	55%	4%



April streamflow was 75% of average on the Pend Oreille River and 105% on the Columbia at Birchbank. May 1 snow cover was 115% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 23.8 inches of snow water on the snow pillow which is 101% of normal for May 1. Precipitation during April was 78% of average, the year-to-date precipitation is 90% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 96% of normal.

For more information contact your local Natural Resources Conservation Service office.

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Pend Oreille Basins
Streamflow Forecasts - May 1, 2020

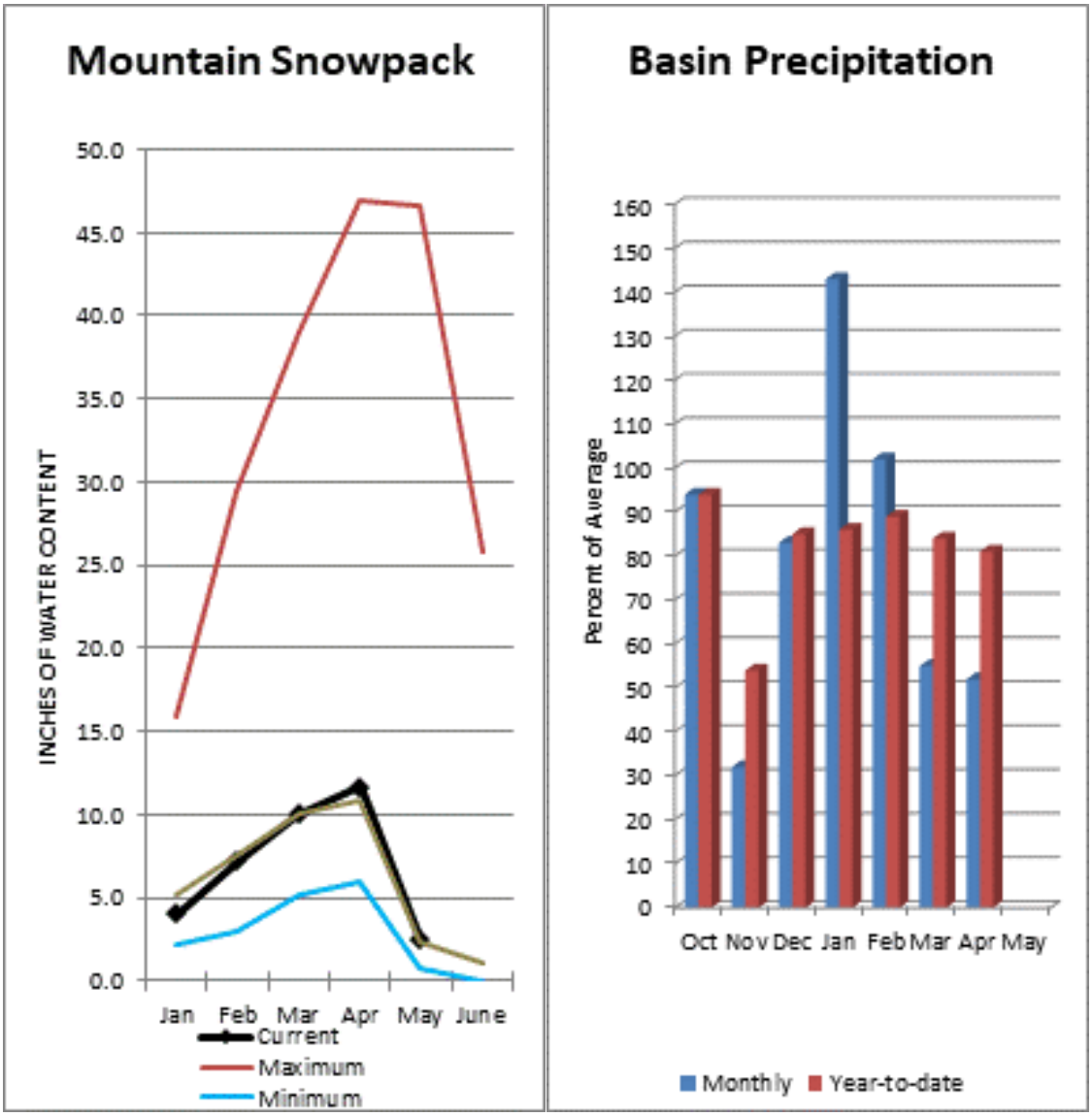
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Pend Oreille Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pend Oreille Lake Inflow[2]								
	MAY-JUL	8770	9620	10200	105%	10800	11600	9690
	MAY-SEP	9540	10500	11200	105%	11900	12900	10700
Priest R nr Priest River[2]								
	MAY-JUL	435	510	565	97%	620	695	580
	MAY-SEP	470	555	610	97%	665	750	630
Pend Oreille R bl Box Canyon[2]								
	MAY-JUL	8830	9700	10300	106%	10900	11800	9750
	MAY-SEP	9540	10600	11300	105%	12000	13000	10800

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
3) Median value used in place of average

Reservoir Storage End of April, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	908.5	947.1	931.7	1561.3
Priest Lake	84.6	91.2	101.9	119.3
Basin-wide Total	993.0	1038.3	1033.6	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Pend Oreille Basins	55	111%	100%
Colville River	0		
Kettle River	5	100%	63%



May 1 snow cover on the Okanogan was 118% of normal, Omak Creek was 39% and the Methow was 101%. April mountain precipitation in the Upper Columbia was 52% of average, with precipitation for the water year at 81% of average. The lack of low elevation snow and precipitation has residents concerned. April streamflow for the Methow River was 114% of average, 125% for the Okanogan River and 121% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was melted out by May 1. Combined storage in the Conconully Reservoirs was 16,900 acre-feet or 103% of normal.

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Upper Columbia Basins
Streamflow Forecasts - May 1, 2020

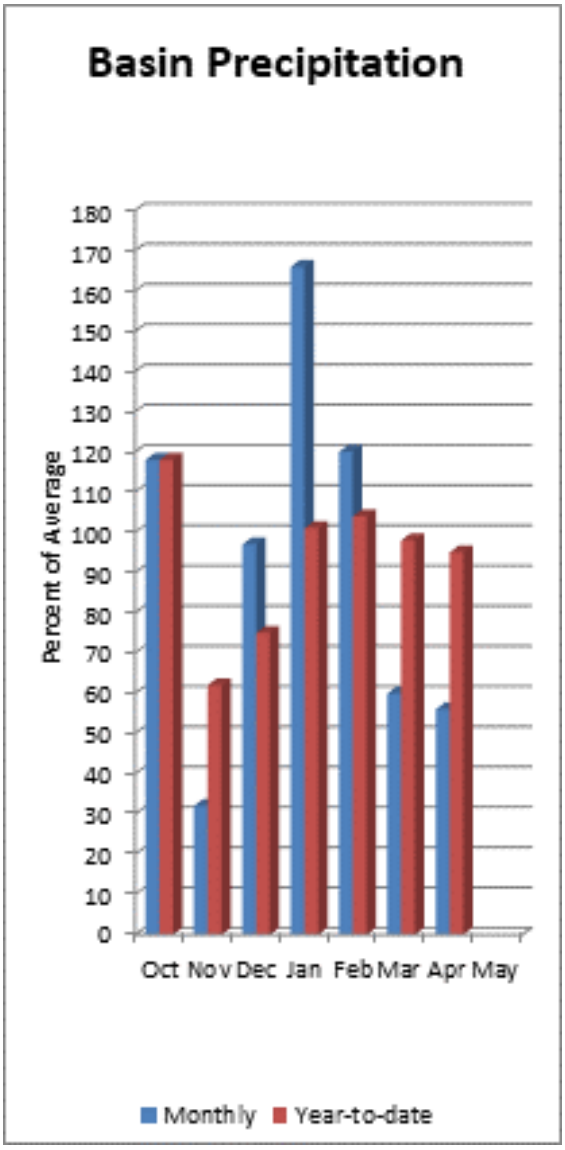
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kettle R nr Laurier								
	MAY-JUL	1280	1490	1640	113%	1780	1990	1450
	MAY-SEP	1330	1560	1710	112%	1870	2100	1530
Colville R at Kettle Falls								
	MAY-JUL	12.4	37	54	75%	71	96	72
	MAY-SEP	16.4	44	63	75%	82	110	84
Columbia R at Grand Coulee-NWS[2]								
	MAY-JUL	42700		47900	109%		55600	43870
	MAY-SEP	50800		58000	109%		67900	52970
Similkameen R nr Nighthawk								
	MAY-JUL	1030	1150	1230	116%	1310	1430	1060
	MAY-SEP	1100	1230	1320	116%	1410	1540	1140
Okanogan R nr Tonasket								
	MAY-JUL	1000	1190	1320	102%	1450	1650	1300
	MAY-SEP	1090	1330	1490	101%	1640	1880	1470
Okanogan R at Malott								
	MAY-JUL	1010	1210	1340	106%	1480	1680	1270
	MAY-SEP	1100	1340	1510	105%	1670	1910	1440
Methow R nr Pateros								
	MAY-JUL	480	580	640	88%	705	800	730
	MAY-SEP	525	625	695	88%	765	870	790

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
3) Median value used in place of average

Reservoir Storage End of April, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	7.5	8.2	7.6	10.5
Conconully Reservoir	9.4	11.5	8.9	13.0
Basin-wide Total	16.9	19.7	16.5	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Upper Columbia Basins	11	107%	68%
Okanogan River	8	118%	74%
Omak Creek	1	39%	67%
Sanpoil River	0		
Similkameen River	4	105%	49%
Toats Coulee Creek	0		
Conconully Lake	1		
Methow River	3	101%	74%



Precipitation during April was 56% of average in the basin and 95% for the year-to-date. April average streamflow on the Chelan River was 94% and on the Wenatchee River 91%. May 1 snowpack in the Wenatchee River Basin was 86% of normal; the Chelan, 88%; the Entiat, 0%; Stemilt Creek, 36% and Colockum Creek, 0%. Reservoir storage in Lake Chelan was 92% of average. Lyman Lake SNOTEL had the most snow water with 49.9 inches of water. This site would normally have 61.2 inches on May 1.

For more information contact your local Natural Resources Conservation Service office.

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Central Columbia Basins
Streamflow Forecasts - May 1, 2020

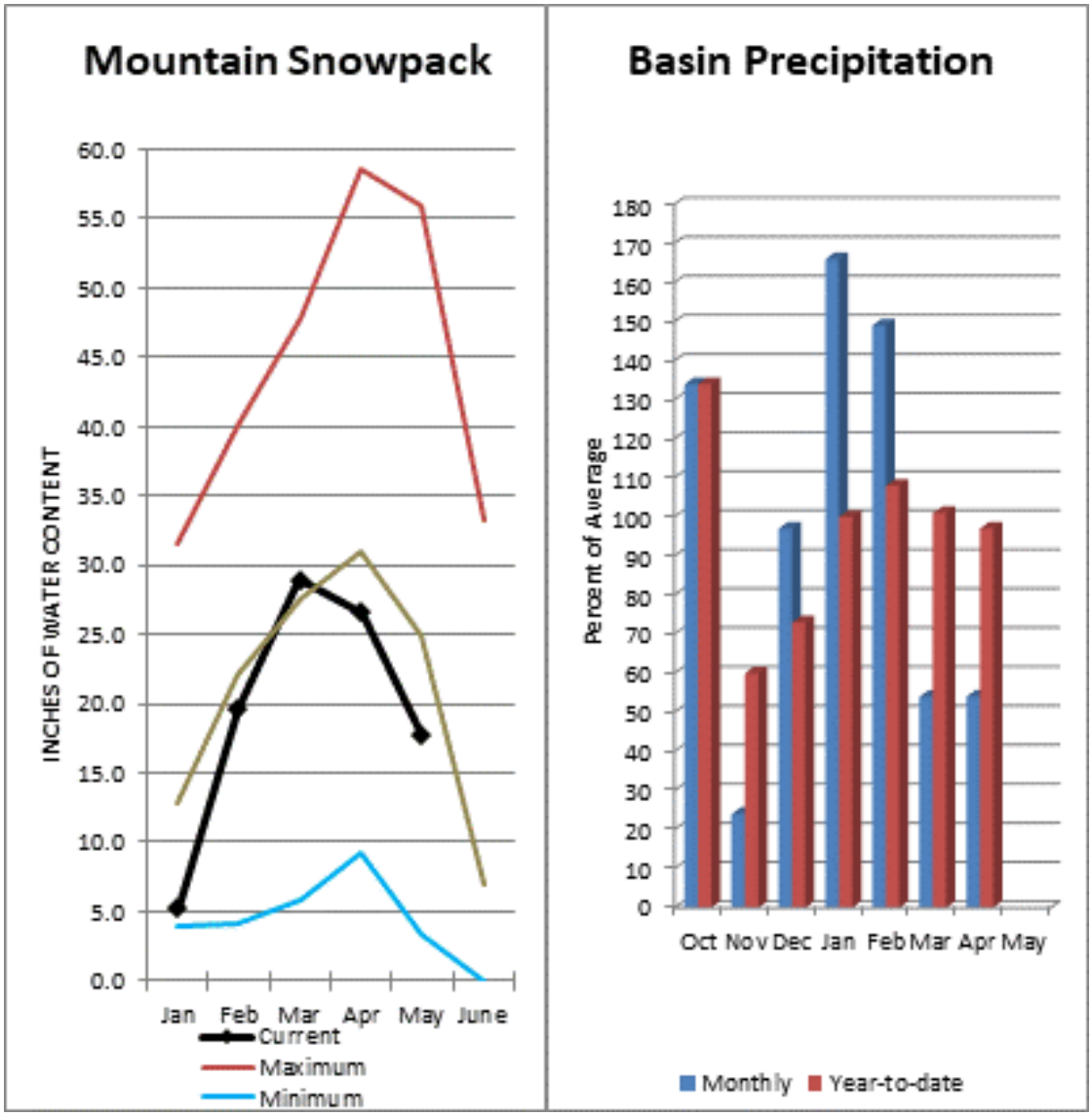
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin								
	MAY-JUL	475	530	565	95%	605	660	595
	MAY-SEP	575	630	670	95%	705	760	705
Chelan R at Chelan								
	MAY-JUL	680	745	790	92%	835	900	860
	MAY-SEP	775	845	895	92%	945	1020	975
Entiat R nr Ardenvoir								
	MAY-JUL	117	136	148	83%	161	180	178
	MAY-SEP	127	148	163	83%	177	198	196
Wenatchee R at Plain								
	MAY-JUL	630	700	750	91%	800	870	825
	MAY-SEP	715	795	850	92%	905	985	920
Icicle Ck nr Leavenworth								
	MAY-JUL	188	215	235	100%	255	280	235
	MAY-SEP	210	240	260	100%	280	310	260
Wenatchee R at Peshastin								
	MAY-JUL	925	1020	1080	95%	1150	1240	1140
	MAY-SEP	1030	1140	1210	96%	1280	1390	1260
Columbia R bl Rock Island Dam-NWS[2]								
	MAY-JUL	46400		52100	109%		59600	47930
	MAY-SEP	54900		62500	109%		72400	57360

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
3) Median value used in place of average

Reservoir Storage End of April, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	277.2	309.4	300.7	677.4
Basin-wide Total	277.2	309.4	300.7	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Central Columbia Basins	3	88%	61%
Chelan Lake Basin	3	88%	61%
Entiat River	1	0%	0%
Wenatchee River	6	86%	68%
Stemilt Creek	1	36%	97%
Colockum Creek	1	0%	428%



May 1 reservoir storage for the Upper Yakima reservoirs was 582,000-acre feet, 96% of average. April streamflow within the basin was Cle Elum River near Roslyn at 104%. May 1 snowpack was 71% based upon 5 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 54% of average for April and 97% for the water-year. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

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Upper Yakima River
Streamflow Forecasts - May 1, 2020

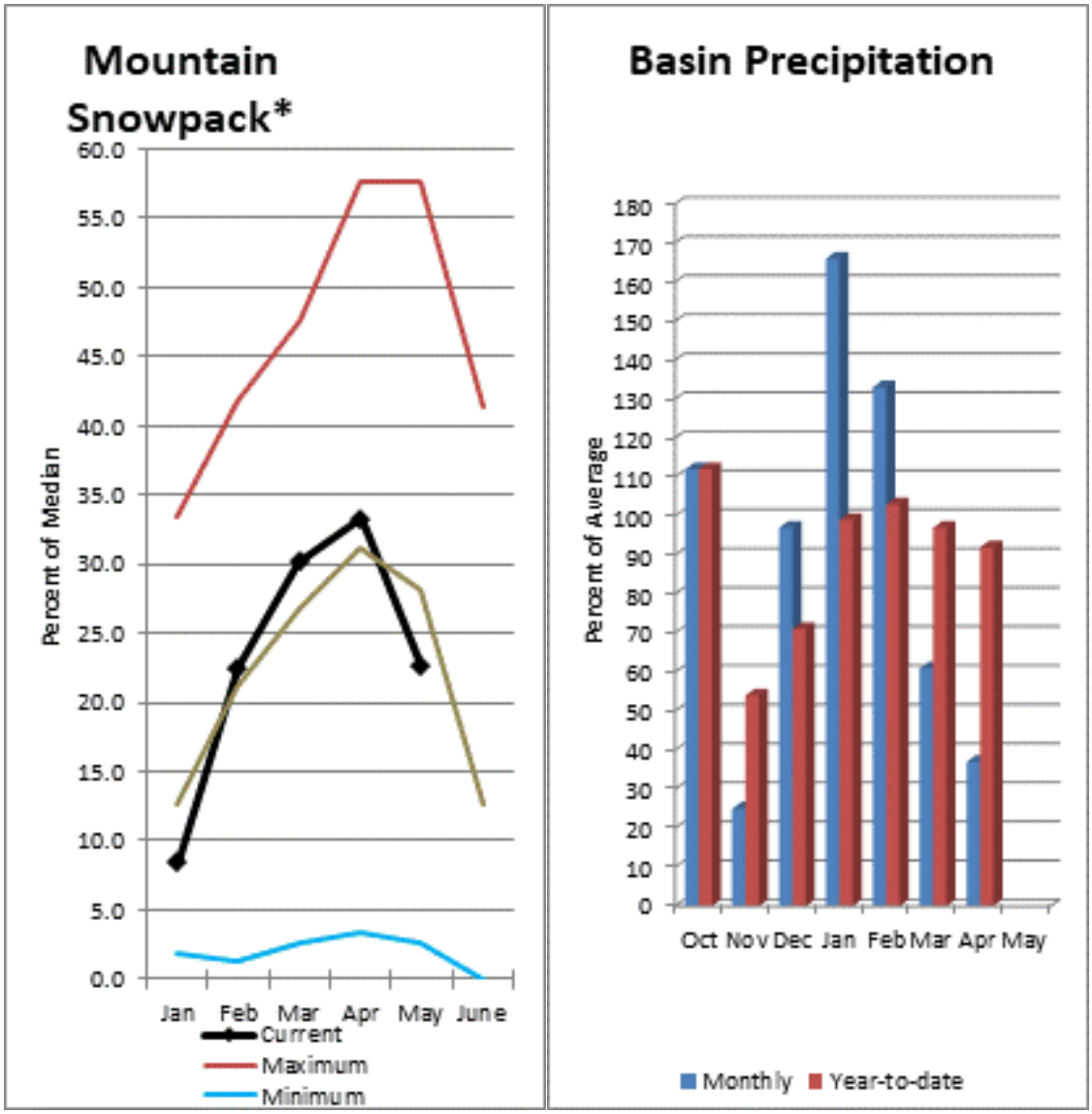
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Keechelus Reservoir Inflow[2]								
	MAY-JUL	51	62	70	82%	78	89	85
	MAY-SEP	58	70	79	82%	88	100	96
Kachess Reservoir Inflow [2]								
	MAY-JUL	48	55	61	80%	65	72	76
	MAY-SEP	53	61	67	80%	73	81	84
Cle Elum Lake Inflow [2]								
	MAY-JUL	230	245	260	85%	275	290	305
	MAY-SEP	250	270	285	84%	300	325	340
Teanaway R bl Forks nr Cle Elum								
	MAY-JUL	35	49	59	75%	69	83	79
	MAY-SEP	36	51	61	74%	71	86	82

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
3) Median value used in place of average

Reservoir Storage End of April, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	125.1	118.4	122.1	157.8
Kachess	170.9	187.5	183.7	239.0
Cle Elum	285.6	238.5	302.6	436.9
Basin-wide Total	581.6	544.4	608.4	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Upper Yakima River	5	71%	61%



April average streamflows within the basin were: Yakima River near Parker, 92% and the Naches River near Naches, 121%. May 1 reservoir storage for Bumping and Rimrock reservoirs was 182,000-acre feet, 102% of average. May 1 snowpack was 80% based upon 7 snow course and SNOTEL readings within the Lower Yakima Basin and Ahtanum Creek reported in at 45% of normal. Precipitation was 37% of average for April and 92% for the water-year. Volume forecasts for Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

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Lower Yakima River
Streamflow Forecasts - May 1, 2020

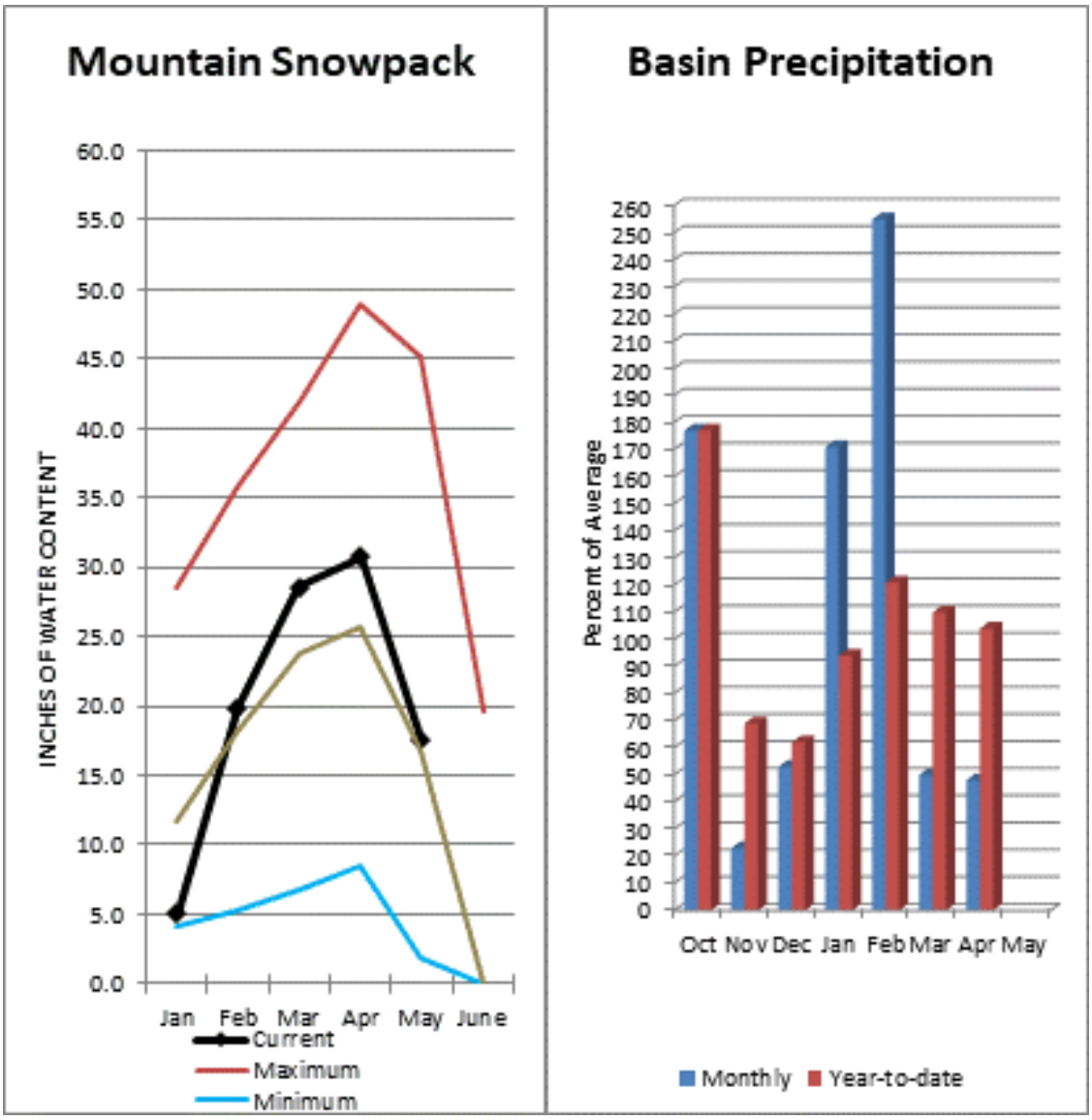
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Bumping Lake Inflow [2]								
	MAY-JUL	73	80	85	91%	90	97	93
	MAY-SEP	81	89	94	91%	100	108	103
American R nr Nile								
	MAY-JUL	62	71	77	92%	83	92	84
	MAY-SEP	66	77	84	91%	91	102	92
Rimrock Lake Inflow [2]								
	MAY-JUL	117	128	134	89%	141	152	151
	MAY-SEP	143	156	166	90%	175	188	185
Naches R nr Naches								
	MAY-JUL	370	440	490	91%	540	610	540
	MAY-SEP	410	490	550	92%	605	690	600
Ahtanum Ck at Union Gap								
	MAY-JUL	5.1	10.5	14.2	74%	17.9	23	19.3
	MAY-SEP	6.8	12.5	16.3	78%	20	26	21
Yakima R nr Parker [2]								
	MAY-JUL	850	955	1030	84%	1100	1210	1230
	MAY-SEP	970	1080	1160	83%	1230	1340	1390
Klickitat R nr Glenwood								
	MAY-JUL	65	78	87	90%	96	109	97
	MAY-SEP	75	89	99	90%	109	123	110
Klickitat R nr Pitt								
	MAY-JUL	235	270	295	97%	320	355	305
	MAY-SEP	310	355	380	96%	410	455	395

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
3) Median value used in place of average

Reservoir Storage End of April, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	23.0	19.5	21.7	33.7
Rimrock	159.3	113.5	156.9	198.0
Basin-wide Total	182.2	133.0	178.6	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Lower Yakima River	7	80%	79%
Ahtanum Creek	2	45%	70%



April precipitation was 48% of average, maintaining the year-to-date precipitation at 104% of average. Snowpack in the basin remained steady at 104% of normal.

For more information contact your local Natural Resources Conservation Service office.

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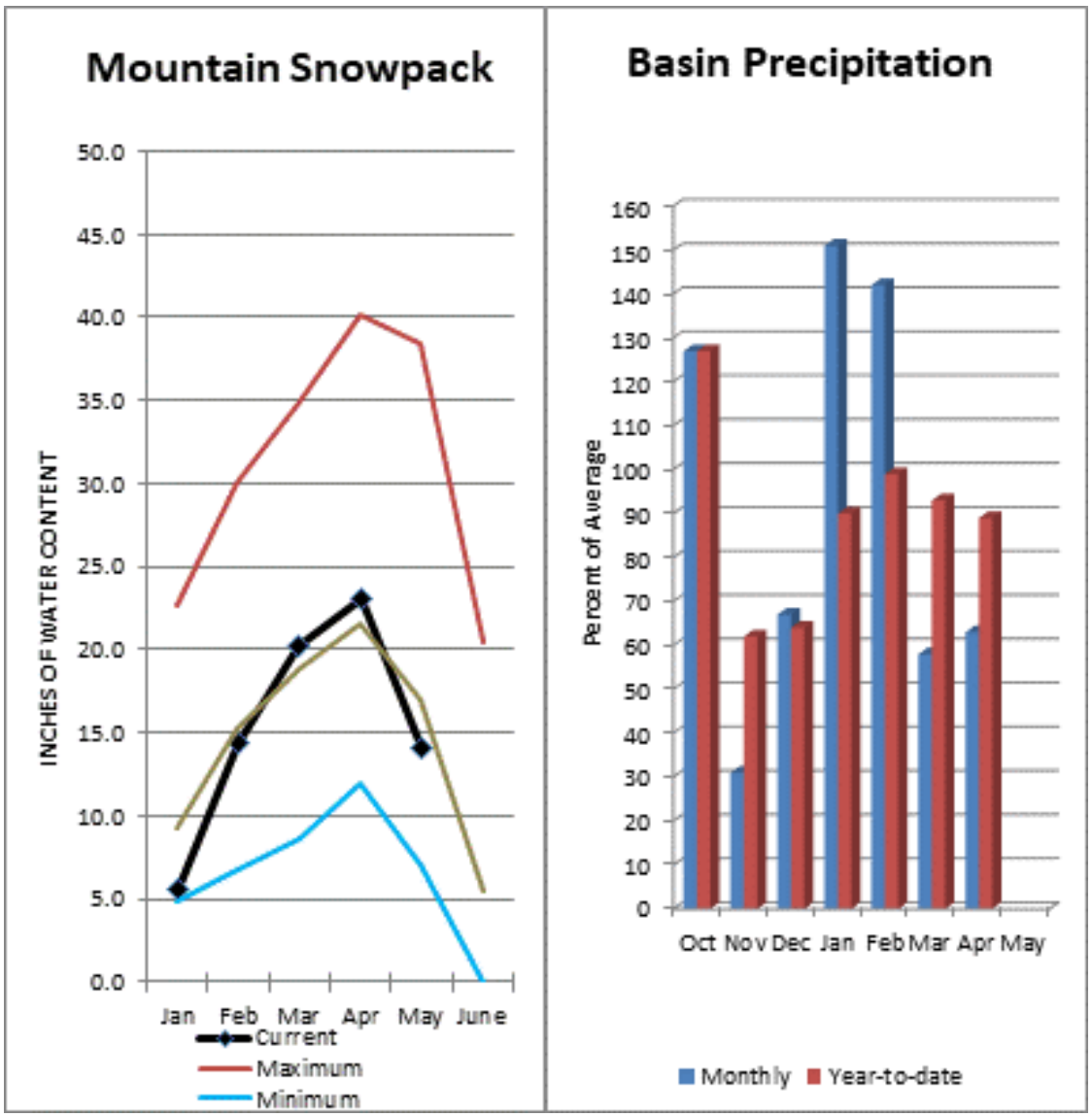
Walla Walla River
Streamflow Forecasts - May 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Walla Walla River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
SF Walla Walla R nr Milton-Freewater								
	MAY-JUL	27	32	36	97%	40	46	37
	MAY-SEP	39	45	49	100%	53	58	49
Mill Ck nr Walla Walla								
	MAY-JUL	9.8	12.1	13.7	99%	15.2	17.5	13.9
	MAY-SEP	13.1	15.5	17.2	99%	18.8	21	17.3

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
3) Median value used in place of average

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Walla Walla River	2	104%	159%



April precipitation was 63% of average, bringing the year-to-date precipitation to 89% of average. May 1 snowpack readings averaged 83% of normal. April streamflow was 80% of average for Snake River below Lower Granite Dam and 92% for Grande Ronde River near Troy. Dworshak Reservoir storage was 98% of average.

For more information contact your local Natural Resources Conservation Service office.

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Lower Snake, Grande Ronde, Clearwater Basins
Streamflow Forecasts - May 1, 2020

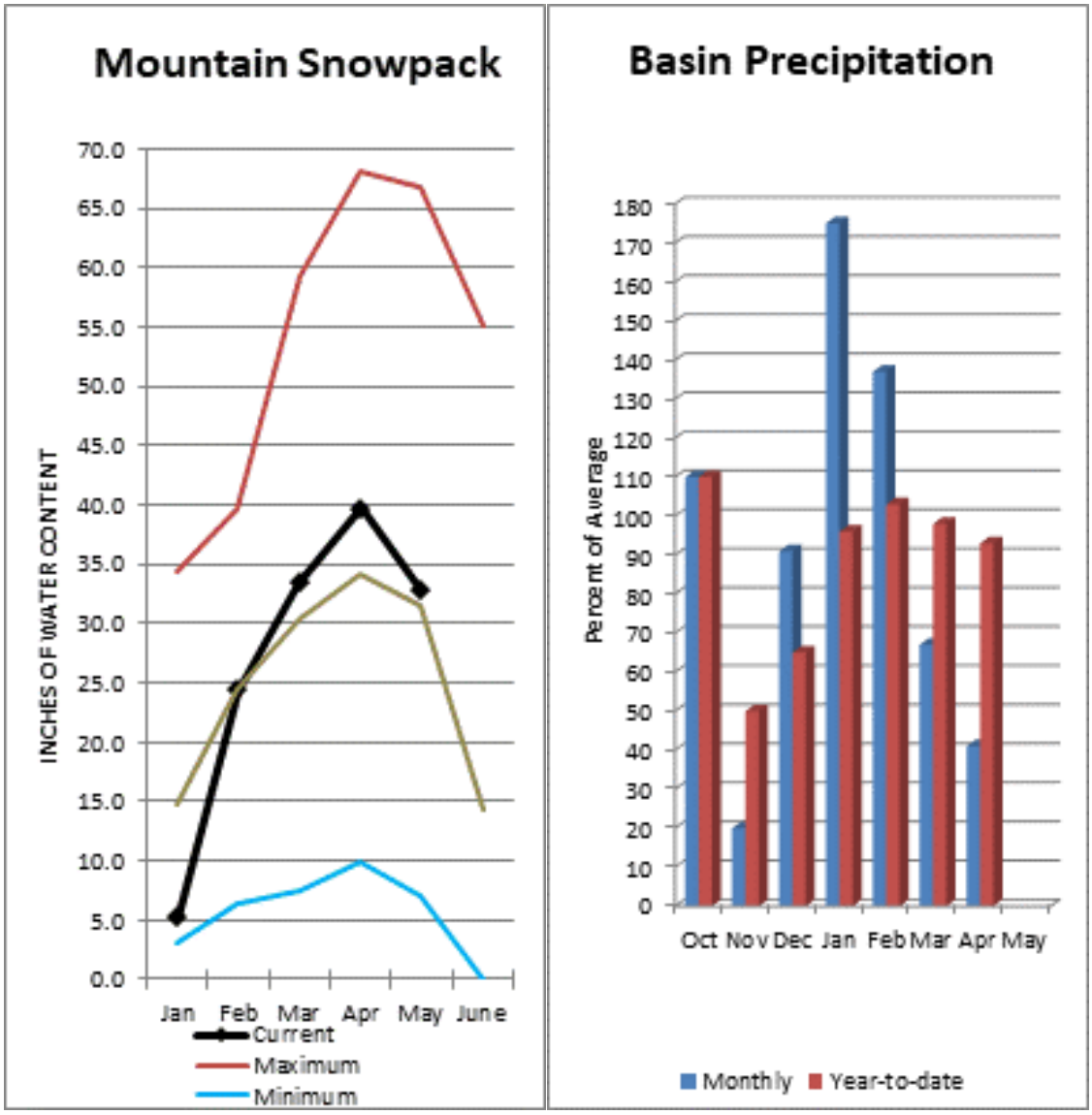
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake, Grande Ronde, Clearwater Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	MAY-JUL	660	805	905	105%	1000	1150	860
	MAY-SEP	745	895	995	105%	1090	1240	945
Asotin Ck at Asotin								
	MAY-JUL	7.9	10.8	13.1	55%	15.5	19.5	24
Clearwater R at Spalding[2]								
	MAY-JUL	4380	4970	5370	102%	5770	6370	5260
	MAY-SEP	4550	5200	5650	100%	6090	6740	5640
Snake R bl Lower Granite Dam-NWS[2]								
	MAY-JUL	12100		13300	87%		16000	15280
	MAY-SEP	14300		15600	88%		18700	17715

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
3) Median value used in place of average

Reservoir Storage End of April, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2581.6	2921.0	2646.0	3468.0
Basin-wide Total	2581.6	2921.0	2646.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Lower Snake, Grande Ronde, Clearwater Basins	14	83%	112%



April average streamflow for Cowlitz River was 83% and the Columbia River at The Dalles was 76% of average. April precipitation was 41% of average and the water-year average was 93%. May 1 snow cover for Cowlitz River was 119%, and Lewis River was 88% of normal.

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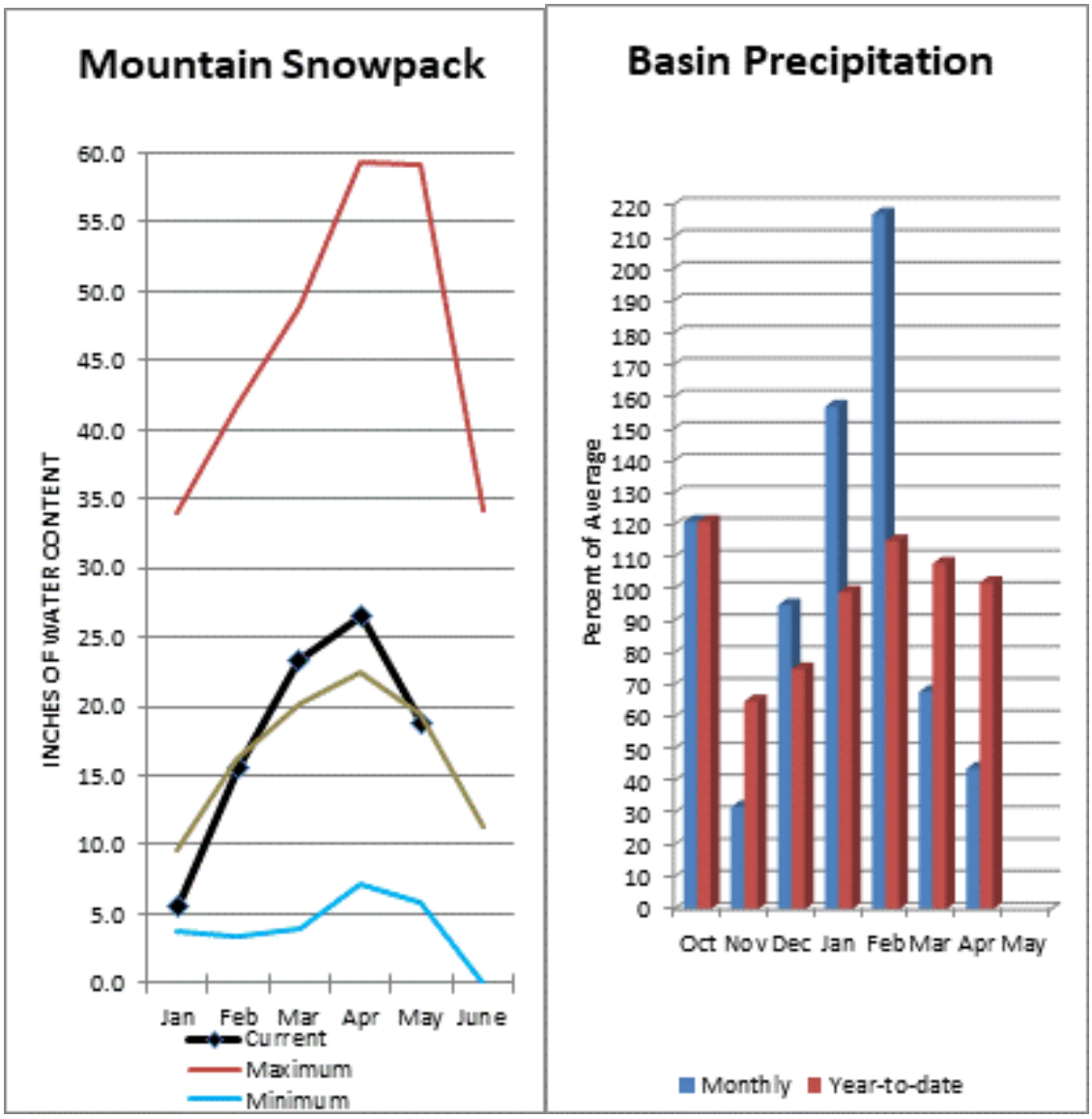
Lower Columbia Basins
Streamflow Forecasts - May 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Columbia R at The Dalles-NWS[2]								
	MAY-JUL	61500		68300	103%		77000	66050
	MAY-SEP	72800		81800	104%		93200	78900
Klickitat R nr Glenwood								
	MAY-JUL	65	78	87	90%	96	109	97
	MAY-SEP	75	89	99	90%	109	123	110
Klickitat R nr Pitt								
	MAY-JUL	235	270	295	97%	320	355	305
	MAY-SEP	310	355	380	96%	410	455	395
Lewis R at Ariel[2]								
	MAY-JUL	405	490	550	89%	610	700	615
	MAY-SEP	510	605	670	87%	735	830	770
Cowlitz R bl Mayfiled[2]								
	MAY-JUL	835	1010	1130	96%	1250	1420	1180
	MAY-SEP	975	1200	1360	98%	1520	1750	1390
Cowlitz R at Castle Rock[2]								
	MAY-JUL	1120	1320	1440	90%	1570	1760	1600
	MAY-SEP	1400	1630	1800	95%	1960	2200	1890

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
3) Median value used in place of average

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Lower Columbia Basins	11	104%	85%
Lewis River	5	88%	79%
Cowlitz River	6	119%	91%



May 1 snowpack was 93% of average for the White River, 101% for Puyallup River and 90% in the Green River Basin. April precipitation was 41% of average, bringing the water year-to-date to 93% of average for the basins.

For more information contact your local Natural Resources Conservation Service office.

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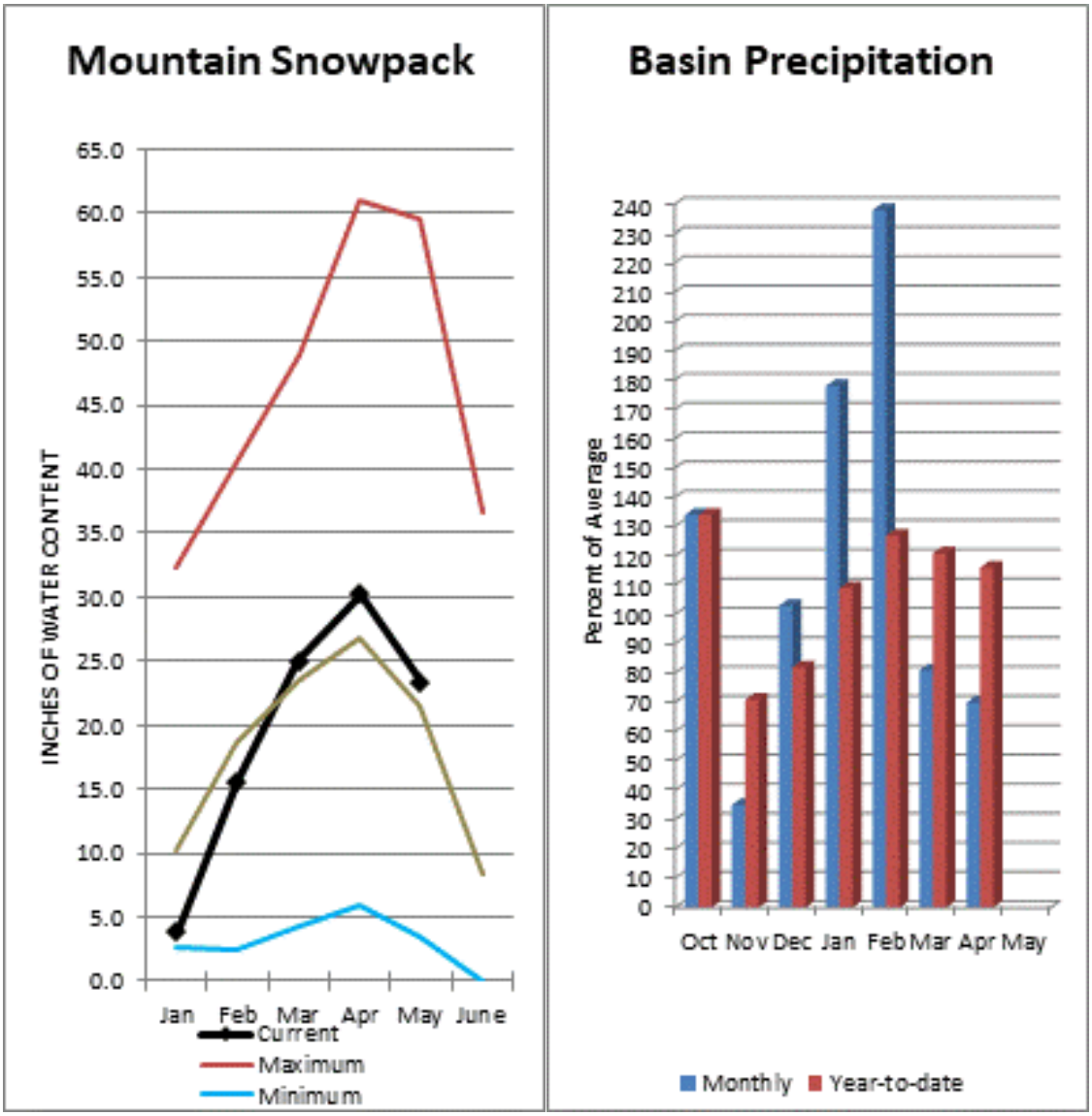
South Puget Sound Basins
Streamflow Forecasts - May 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

South Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
White R nr Buckley[1,2]								
	MAY-JUL	230	295	325	98%	355	420	330
	MAY-SEP	305	385	420	100%	455	535	420
Green R bl Howard A Hanson Dam[1,2]								
	MAY-JUL	95	129	145	95%	161	195	152
	MAY-SEP	112	152	170	97%	188	230	175

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
3) Median value used in place of average

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
South Puget Sound Basins	11	96%	85%
White River	3	93%	92%
Green River	3	90%	57%



Basin-wide precipitation for April was 44% of average, bringing water-year-to-date to 102% of average. May 1 median snow cover in Cedar River Basin was 103%, Tolt River Basin was 136%, Snoqualmie River Basin was 102%, and Skykomish River Basin was 115%. Reservoirs were last reported to have adequate storage for the upcoming season.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 5/6/2020 6:05:39 PM

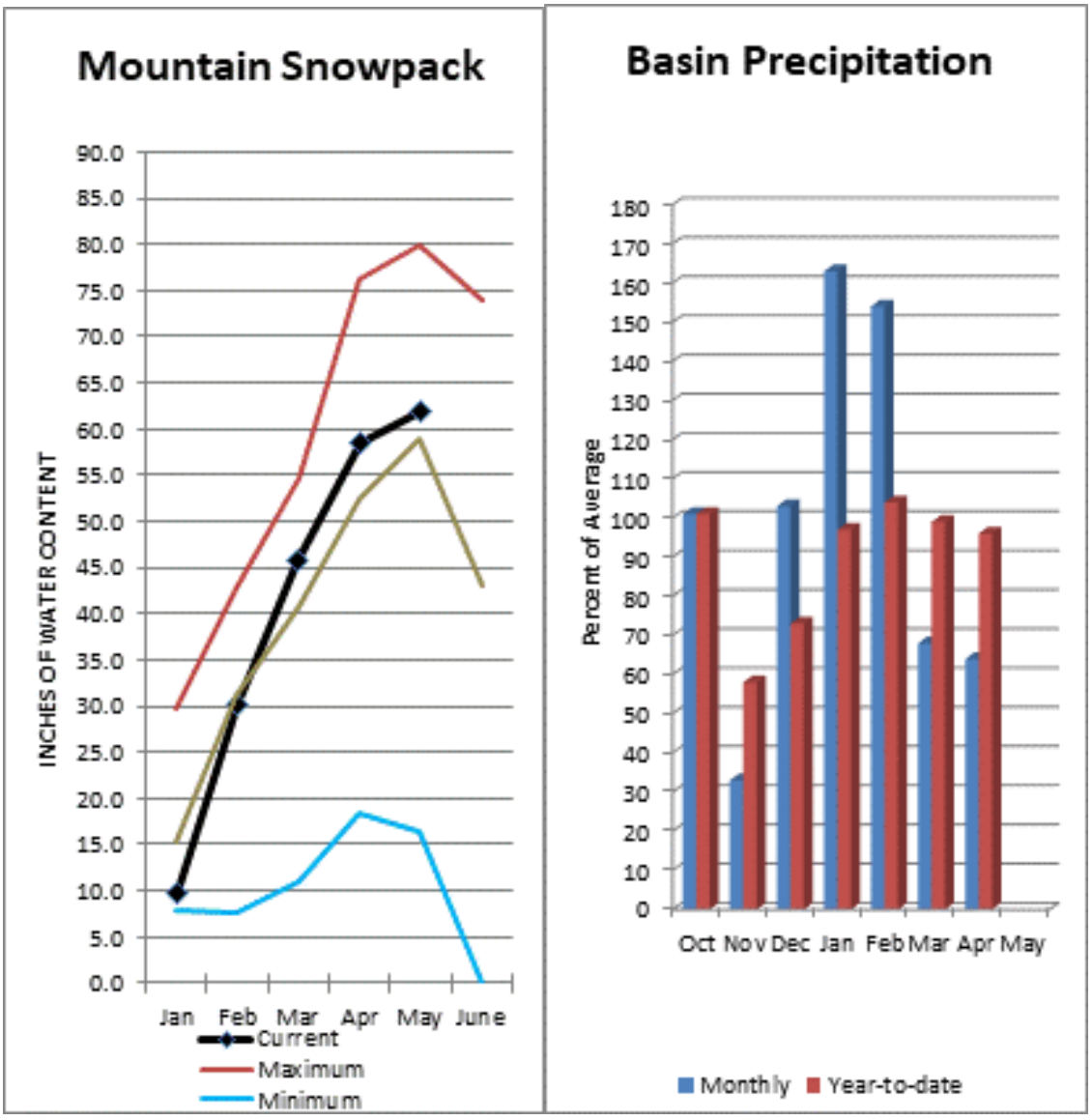
Central Puget Sound Basins
Streamflow Forecasts - May 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	MAY-JUL	44	50	54	110%	58	64	49
	MAY-SEP	48	55	60	107%	65	72	56
Rex R nr Cedar Falls								
	MAY-JUL	12.5	15.2	17	105%	18.8	22	16.2
	MAY-SEP	13.6	16.8	19	103%	21	24	18.5
Taylor Ck nr Selleck								
	MAY-JUL	11.6	13	14	105%	15	16.4	13.3
	MAY-SEP	14.9	16.8	18	107%	19.2	21	16.9
SF Tolt R nr Index								
	MAY-JUL	9.6	11.6	13	125%	14.4	16.4	10.4
	MAY-SEP	10.6	13.2	15	122%	16.8	19.4	12.3

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
3) Median value used in place of average

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Central Puget Sound Basins	12	109%	63%
Puyallup River	5	101%	96%
Cedar River	4	103%	62%
Tolt River	2	136%	61%
Snoqualimie River	4	102%	60%
Skykomish River	2	115%	57%



April streamflow in Skagit River was 92% of average. Basin-wide precipitation for April was 63% of average, bringing water-year-to-date to 96% of average. May 1 average snow cover in Skagit River Basin was 100% and the Nooksack River Basin was 111%. May 1 Skagit River reservoir storage was 79% of average and 42% of capacity.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 5/6/2020 6:05:45 PM

North Puget Sound Basins
Streamflow Forecasts - May 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

North Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Thunder Ck nr Newhalem								
	MAY-JUL	179	197	210	100%	225	240	210
	MAY-SEP	270	290	305	100%	320	340	305
Skagit R at Newhalem[2]								
	MAY-JUL	1340	1450	1530	103%	1610	1720	1490
	MAY-SEP	1620	1760	1850	102%	1950	2090	1810
Baker R at Concrete								
	MAY-JUL	550	620	670	106%	720	790	635
	MAY-SEP	705	825	905	108%	985	1100	835

1) 90% and 10% exceedance probabilities are actually 95% and 5%
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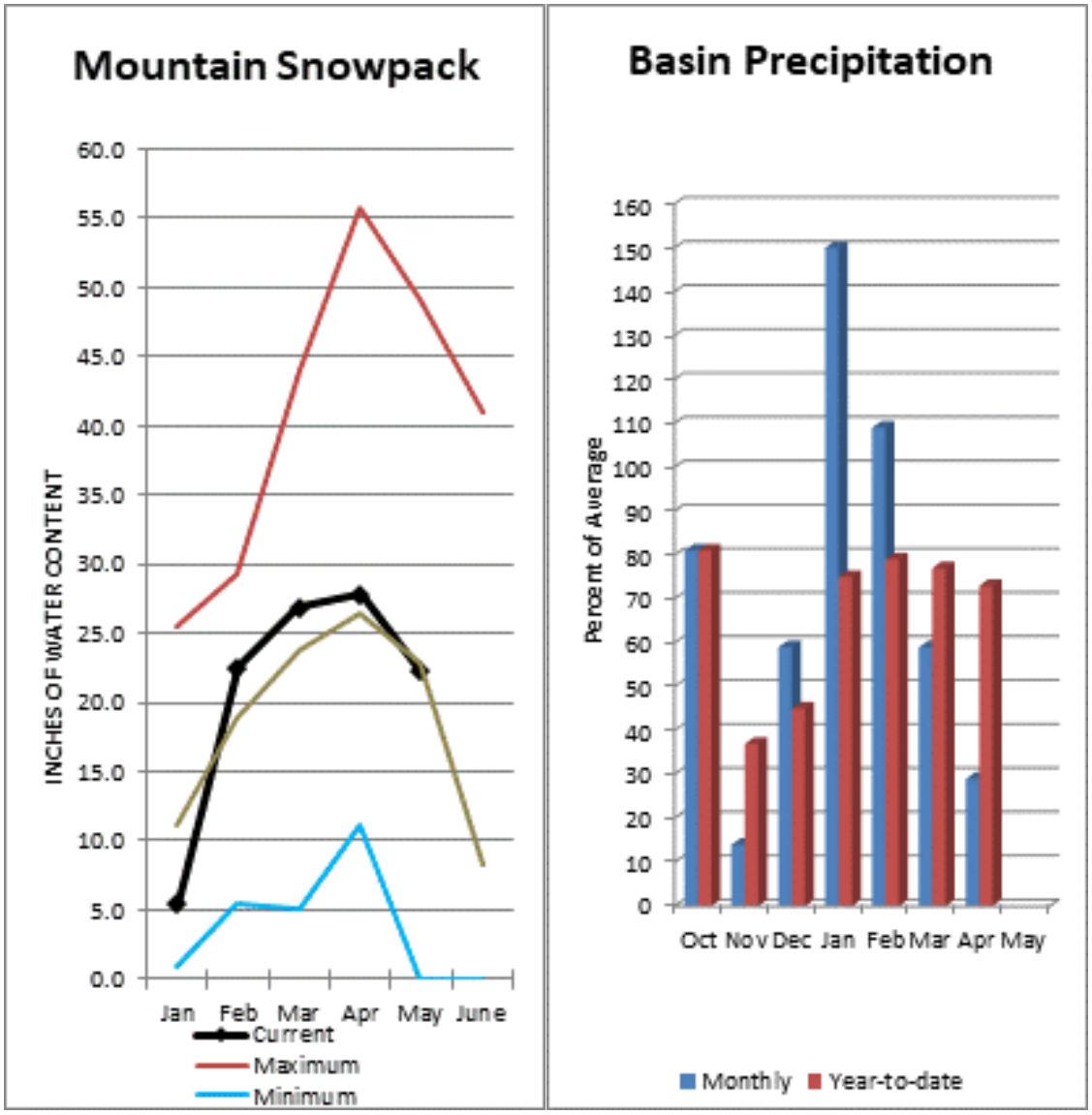
Reservoir Storage End of April, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	593.0	545.0	754.4	1434.7
Basin-wide Total	593.0	545.0	754.4	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
North Puget Sound Basins	10	105%	63%
Skagit River	7	100%	68%
Baker River	0		
Nooksack River	3	111%	54%



Dungeness River streamflow was 78% of normal. April precipitation was only 29% of average. Precipitation has accumulated at 73% of average for the water year. April precipitation at Quillayute was 3.56 inches or 45% of average. Olympic Peninsula snowpack averaged 97% of normal on May 1.

For more information contact your local Natural Resources Conservation Service office.

Data Current as of: 5/6/2020 6:05:50 PM

Olympic Penninsula
Streamflow Forecasts - May 1, 2020

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Olympic Penninsula	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Dungeness R nr Sequim								
	MAY-JUL	80	90	97	96%	105	115	101
	MAY-SEP	99	113	122	98%	131	144	125
Elwha R at McDonald Br nr Port Angeles								
	MAY-JUL	265	290	310	97%	330	355	320
	MAY-SEP	320	355	380	97%	400	435	390

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
3) Median value used in place of average

Watershed Snowpack Analysis May 1, 2020	# of Sites	% Median	Last Year % Median
Olympic Penninsula	6	97%	61%

Issued by

Matthew J. Lohr
Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Comes At Night
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

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	River Forecast Center – British Columbia Ministry of Forests, Lands and Natural Resource Operations
State	Washington State Department of Ecology
	Washington State Department of Natural Resources
	Washington State Fish and Wildlife
Federal	Department of the Army, Corps of Engineers
	U.S. Department of Agriculture, Forest Service
	U.S. Department of Commerce, NOAA, National Weather Service
	U.S. Department of Interior
	Bonneville Power Administration
	Bureau of Reclamation
	Geological Survey
	National Park Service
	Bureau of Indian Affairs
	U.S. Fish and Wildlife Service
Local	City of Tacoma
	City of Seattle
	City of Bellingham
	Chelan County P.U.D.
	Pacific Power/PacificCorp
	Puget Sound Energy
	Washington Water Power Company
	Snohomish County P.U.D.
	Colville Confederated Tribes
	Spokane County
	Yakama Indian Nation
	Whatcom County
	Pierce County
	Kalispel Tribe of Indians
	Spokane Indian Tribe
	Jamestown S'Klallam Tribe
	Sauk-Suiattle Tribe of Indians
	Stillaguamish Tribe
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	Wenatchee Heights Irrigation District
	Newman Lake Homeowners Association
	Whitestone Reclamation District
	Kinross Mining

***Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.**

Washington Snow Survey Office
2005 E. College Way, Suite 203
Mount Vernon, WA 98273-2873

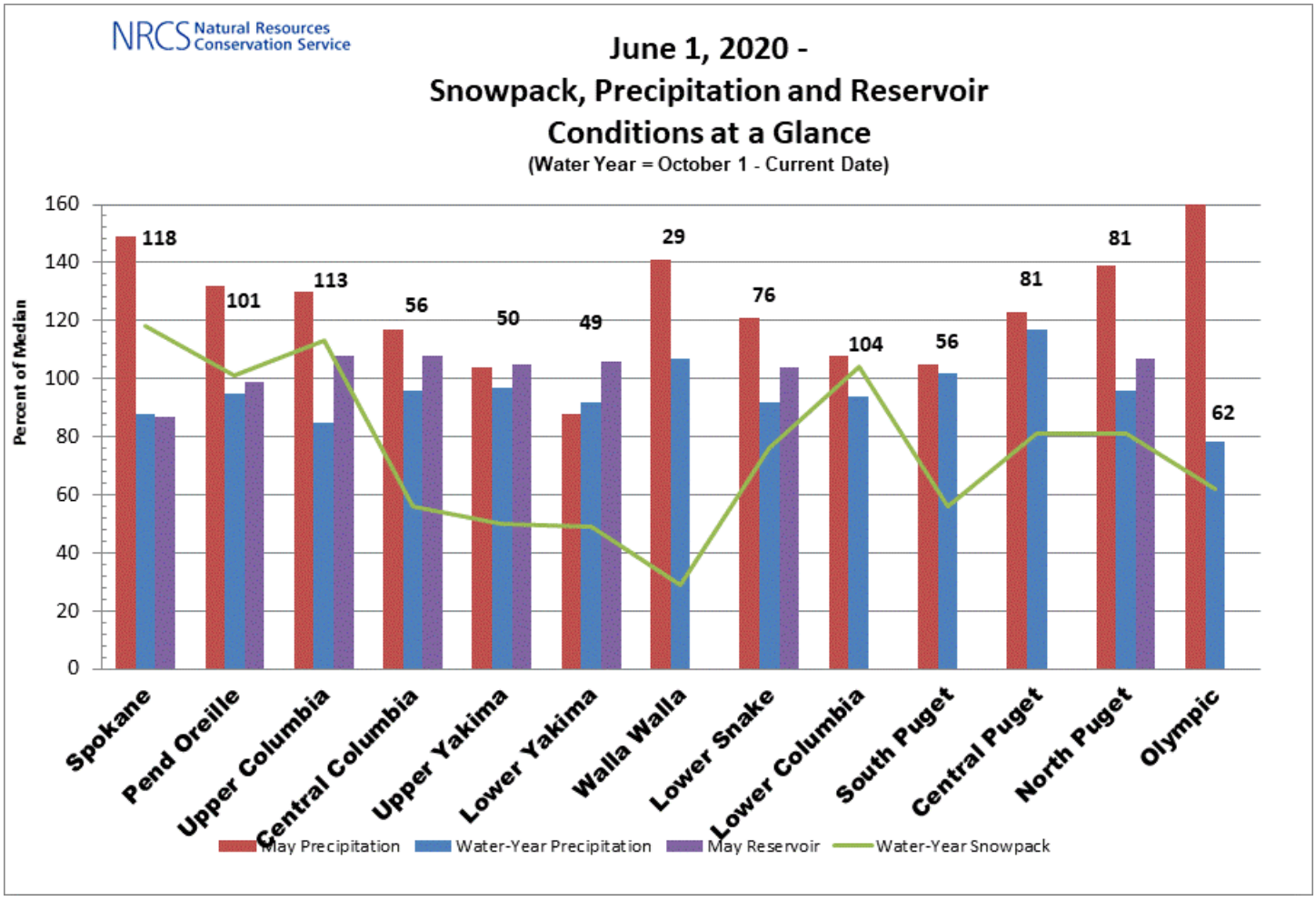
Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA

NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington
Water Supply Outlook Report
May 1, 2020



This will be the final Outlook Report for this year. We will return in January. Have a safe and healthy summer. Always practice cold water safety when around mountain fed streams.

Water Supply Outlook Reports
and
Federal - State – Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

Local Natural Resources Conservation Service Field Office

or

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How forecasts are made

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. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. 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 uncertain 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.

Washington
Water Supply Outlook

June 2020

General Outlook

Above normal precipitation led to bank full runoff in many streams and rivers around the state, however near normal temperatures through the month helped preserve snowpack to normal melt rates. The most recent forecast through June shows a chance for near to below normal temperatures with above normal precipitation. NWS 3-month (JJA) forecast indicates above normal temperatures and below normal precipitation. National Inter Agency Fire Center (NIFC) released their latest Significant Wildland Fire Outlook, for July and August, which indicates above normal chance of wildfire for most of Eastern Washington and normal conditions on the west side. The US Drought Monitor continues to indicate D0-D1 drought designation through all Central and South West Washington with a continuation of D2 border to border in the Central part of the state. (see maps on page 4)
http://www.cpc.ncep.noaa.gov/

Snowpack

The June 1 statewide SNOTEL readings were 81% of normal. 60 percent of our SNOTEL sites have melted out for the season, only leaving snow at the highest elevations, mostly above 4000 feet. The upper reaches of the Spokane River Basin had the most snow with 118%. Westside medians from SNOTEL, and June 1 snow surveys, included the North Puget Sound river basins with 81% of normal, the Central and South Puget river basins with 81% and 56% respectively, and the Lower Columbia basins with 104% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 40% and the Wenatchee area with 56%. Snowpack in the Upper Columbia river basins had 113% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	102	83
Newman Lake	55	4
Pend Oreille	111	100
Okanogan	117	74
Methow	101	74
Conconully Lake	0	0
Central Columbia	86	68
Upper Yakima	71	61
Lower Yakima	80	79
Ahtanum Creek	45	70
Walla Walla	104	159
Lower Snake	83	112
Cowlitz	119	91
Lewis	88	79
White	93	92
Green	90	57
Puyallup	101	96
Cedar	103	62
Snoqualmie	102	60
Skykomish	115	57
Skagit	100	68
Nooksack	107	54
Olympic Peninsula	97	61

Precipitation

May precipitation from SNOTEL was near to above normal statewide except for a few isolated sites that were just missed by the storm cycles. Amounts as low as 60% of average at Pope Ridge SNOTEL to as high as 270% of average at Sentinel Butte SNOTEL. Alpine Meadows SNOTEL in the Tolt River Basin received the most precipitation with 13.1" or 134% of normal. Water year averages remain near to slightly above normal. Valley rain fall was equally represented at slightly above normal amounts.

RIVER BASIN	MAY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	149	95
Pend Oreille	132	95
Upper Columbia	130	85
Central Columbia	117	96
Upper Yakima	104	97
Lower Yakima	88	92
Walla Walla	141	107
Lower Snake	121	92
Lower Columbia	108	94
South Puget Sound	105	102
Central Puget Sound	123	117
North Puget Sound	135	98
Olympic Peninsula	162	78

Reservoir

Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. June 1 Reservoir storage in the Yakima Basin was 759,000-acre feet, 105% of average for the Upper Reaches and 228,000-acre feet or 106% of average for Rimrock and Bumping Lakes. The power generation reservoirs included Coeur d'Alene Lake, 231,000-acre feet, 87% of average and 97% of capacity; and Ross lake within the Skagit River Basin at 107% of average and 80% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	97	87
Pend Oreille	66	99
Upper Columbia	86	111
Central Columbia	78	108
Upper Yakima	91	105
Lower Yakima	98	106
Lower Snake	93	104
North Puget Sound	80	107

For more information contact your local Natural Resources Conservation Service office.

Streamflow

As we enter the melt phase of winter/spring, we begin tracking snow melt rates and watching rivers and streams for peak spring runoff. Water resources are carefully managed throughout the state to allow for adequate water supplies for fish migration, irrigation, municipal needs and recreation. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS.

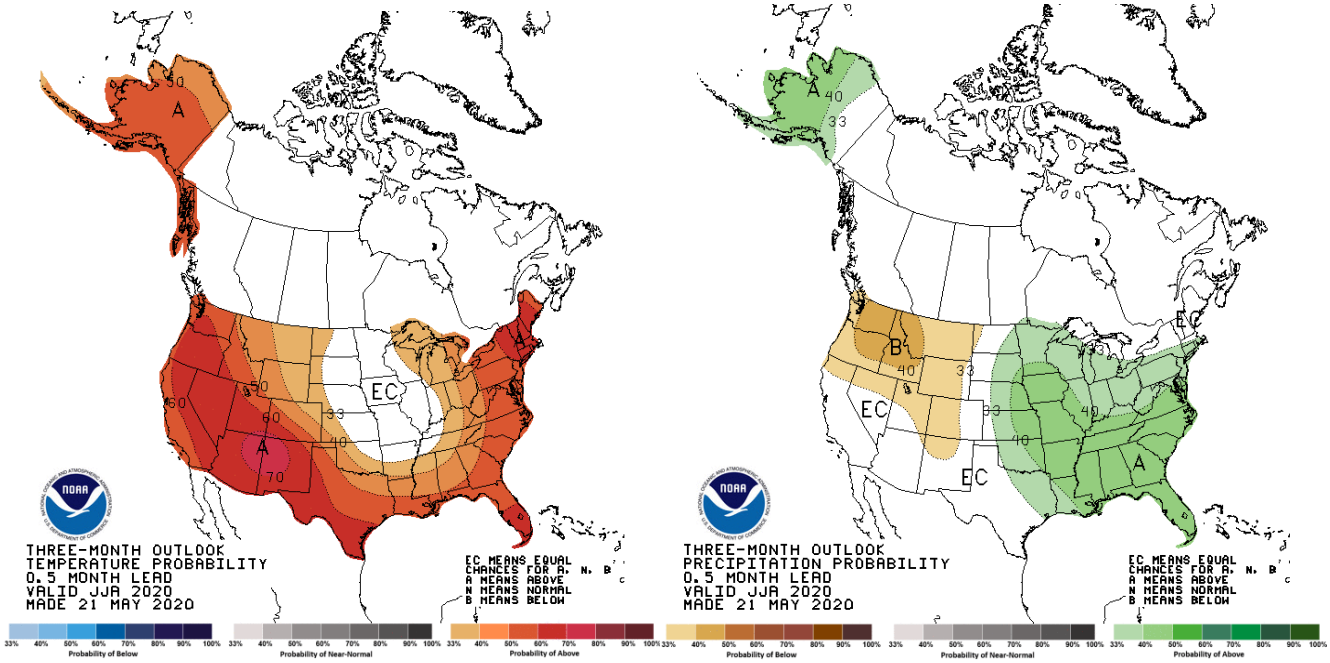
Streamflow forecasts by basin can be found at this link: https://www.wcc.nrcs.usda.gov/basin.html

BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	84-114
Pend Oreille	95-102
Upper Columbia	76-135
Central Columbia	70-120
Upper Yakima	69-81
Lower Yakima	72-84
Walla Walla	97-98
Lower Snake	93-117
Lower Columbia	72-112
South Puget Sound	102
Central Puget Sound	108-120
North Puget Sound	98-111
Olympic Peninsula	95-96

STREAM	PERCENT OF AVERAGE MAY STREAMFLOWS
Pend Oreille at Albeni Fall Dam	123
Kettle at Laurier	149
Columbia at Birchbank	111
Spokane at Spokane	122
Similkameen at Nighthawk	155
Okanogan at Tonasket	178
Methow at Pateros	130
Chelan at Chelan	113
Stehekin near Stehekin	119
Wenatchee at Pashastin	114
Cle Elum near Roslyn	111
Yakima at Parker	102
Naches at Naches	100
Grande Ronde at Troy	128
Snake below Lower Granite Dam	111
Columbia River at The Dalles	113
Lewis at Merwin Dam	84
Cowlitz below Mayfield Dam	103
Skagit at Concrete	148
Dungeness near Sequim	110

For more information contact your local Natural Resources Conservation Service office.

Climate and Soil Moisture



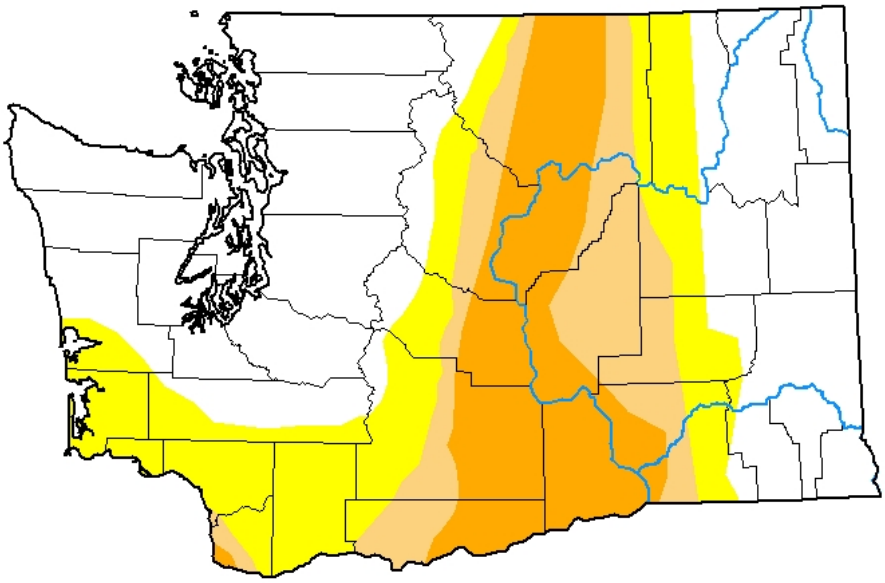
U.S. Drought Monitor

Washington

June 2, 2020

(Released Thursday, Jun. 4, 2020)

Valid 8 a.m. EDT



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

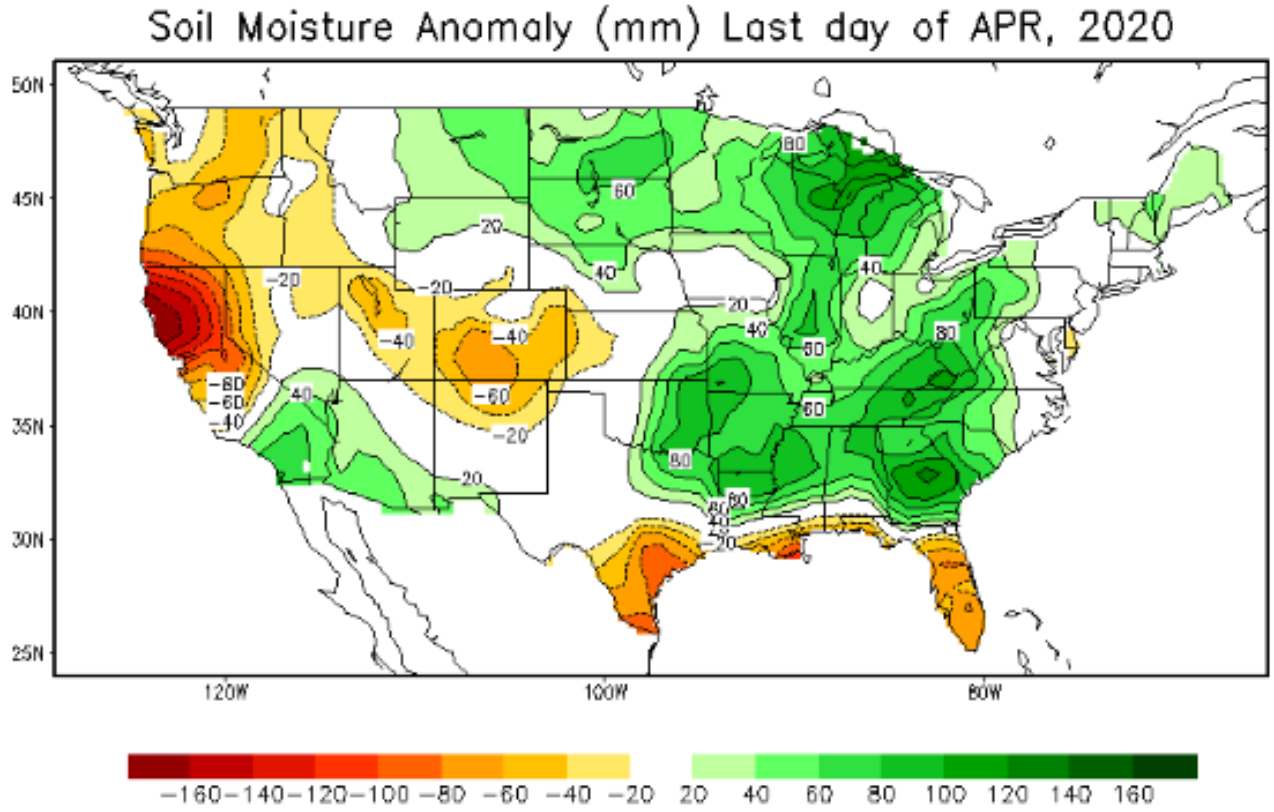
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

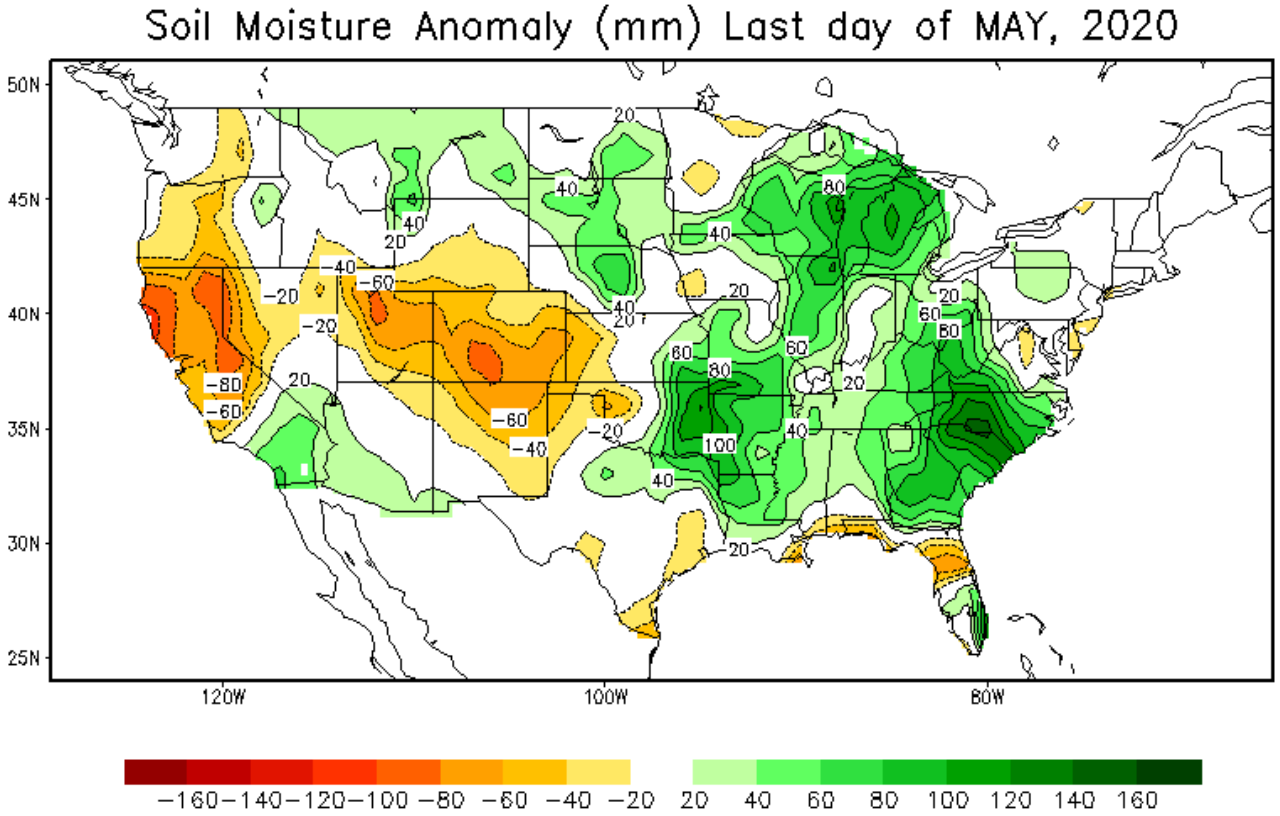
Author:

Curtis Riganti
National Drought Mitigation Center

droughtmonitor.unl.edu

May precipitation made apparent improvements to Soil Moisture conditions in the state as represented by the following graphics for the last two months.





Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

Program Contacts

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jolyne.lea@usda.gov

Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/wa/snow/

Oregon:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/snow/

Idaho:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

USDA-NRCS Agency Homepages

Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/

NRCS National:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

Issued by

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Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Rides-at-the-Door
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Spokane, Washington

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