NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington
Water Supply Outlook Report
January 1, 2021

Picture of Mt. St. Helens from Spirit Lake SNOTEL on December 3, 2020
Taken by Zoe Wellschlager, Hydrologist with Oregon Snow Survey
Zoe and fellow Hydrologist Matt Warbritton made a monumental snowshoe trip from Johnson Ridge Observatory to repair the site

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

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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 2021

General Outlook

Snow fall started in earnest early this year in Washington which brought opportunities for early winter recreation. Most all ski areas were open by or before Thanksgiving weekend, providing a welcome reprieve from the pandemic restrictions affecting most everyone in the country. 2021 started off with a bang with much above normal precipitation, causing some minor flooding and land slide concerns. All statistics reported on the following pages are indicative of January 1 conditions and do not reflect the most recent snow and/or rain fall.

The most recent forecast through late-January shows a high probability for above normal temperatures and below normal precipitation. NWS 3-month (JFM) forecast indicates below normal temperatures and above normal precipitation which is indicative of the forecasted Enso La Nina. The US Drought Monitor indicates the continuation D0-D3 drought designation from last year in the central part of the state. (see maps on page 4)
http://www.cpc.ncep.noaa.gov/

Snowpack

The January 1 statewide SNOTEL readings were 108% of normal. The lowest readings in the state were at 64% of the 30-year median for January 1 in the Asotin River Basin. The Nooksack River Basin had the most snow with 132%. Westside medians from SNOTEL, and January 1 snow surveys, included the North Puget Sound river basins with 114% of normal, the Central and South Puget river basins with 115% and 109% respectively, and the Lower Columbia basins with 109% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 102% and the Wenatchee area with 95%. Snowpack in the Spokane River Basin was at 83% and the Upper Columbia river basins had 110% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	83	50
Newman Lake	90	55
Lower Pend Oreille	79	78
Kettle	125	134
Okanogan	109	73
Methow	119	69
Conconully Lake	87	38
Central Columbia	95	56
Upper Yakima	103	43
Lower Yakima	102	61
Ahtanum Creek	102	61
Walla Walla	86	41
Lower Snake	90	59
Cowlitz	109	45
Lewis	110	24
White	105	71
Green	108	37
Puyallup	118	76
Cedar	112	40
Snoqualmie	126	35
Skykomish	119	31
Skagit	116	67
Nooksack	132	60
Olympic Peninsula	113	48

Precipitation

Precipitation accumulation was relatively normal across the state except in a few select basins. Statewide average was 102% of average as of January 1. Week one January SNOTEL precipitation continues to set new record high accumulation at more than a hand full of sites around the state, with Omak and Sanpoil basins both measuring 307% of their normal accumulation so far. All basins have received well over 100% normal accumulation. SNOTEL collects all form of precipitation including, rain, snow, sleet and hail.

RIVER BASIN	DECEMBER PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	81	95
Lower Pend Oreille	79	86
Upper Columbia	88	108
Central Columbia	88	107
Upper Yakima	85	101
Naches	86	99
Lower Yakima	62	79
Klickitat	68	82
Walla Walla	87	108
Lower Snake	80	94
Lower Columbia	87	96
South Puget Sound	97	109
Central Puget Sound	110	114
North Puget Sound	92	103
Olympic Peninsula	86	82

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. January 1 Reservoir storage in the Yakima Basin was 377,500-acre feet, 109% of average for the Upper Reaches and 115,000-acre feet or 111% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 60,000-acre feet, 64% of average and 25% of capacity; and Ross lake within the Skagit River Basin at 105% of average and 83% 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	25	64
Lower Pend Oreille	36	79
Upper Columbia	53	90
Central Columbia	61	100
Upper Yakima	45	109
Lower Yakima	50	111
Lower Snake	44	64
North Puget Sound	83	105

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

Streamflow

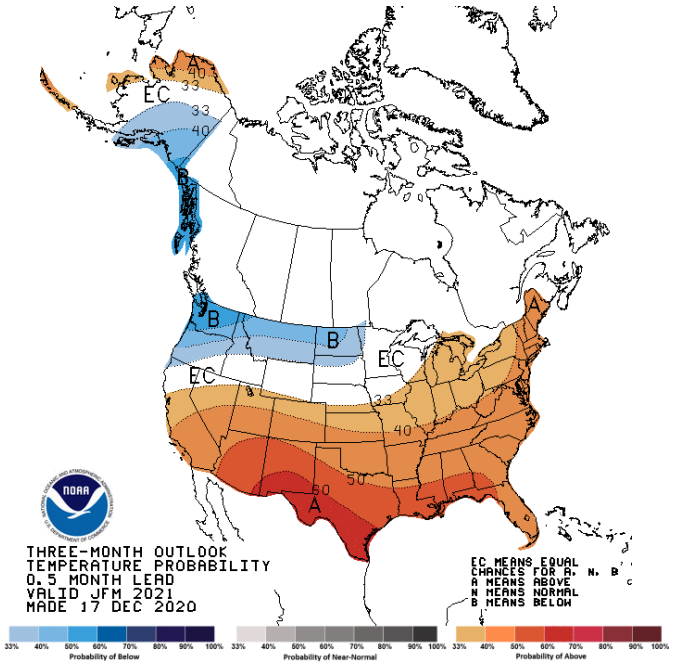
Early winter forecasts for April-September stream flows are never quite as robust as they are later in the season when we know more about the winter climatology. At times only a few degrees warmer or cooler than forecasted can make or break stream flow predictions. Volumetric forecasts are developed 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. Please refer to this guide for interpreting streamflow forecasts: https://www.wcc.nrcs.usda.gov/factpub/intrpret.html

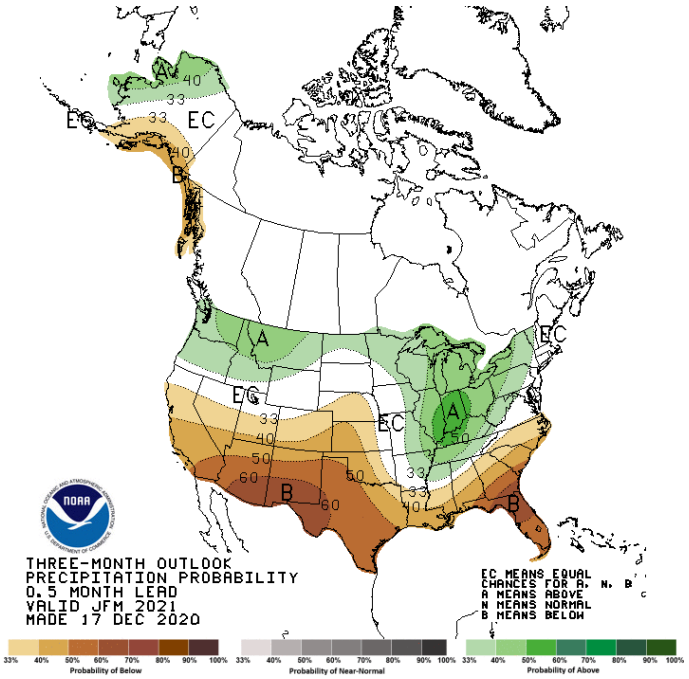
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	88-103
Pend Oreille	90-103
Upper Columbia	87-104
Central Columbia	93-99
Upper Yakima	101-103
Lower Yakima	98-101
Walla Walla	96-97
Lower Snake	83-98
Lower Columbia	94-104
South Puget Sound	96-99
Central Puget Sound	108-117
North Puget Sound	100-110
Olympic Peninsula	88-97

STREAM	PERCENT OF AVERAGE DECEMBER STREAMFLOWS
Pend Oreille at Albeni Fall Dam	93
Kettle at Laurier	72
Columbia at Birchbank	100
Spokane at Spokane	67
Similkameen at Nighthawk	122
Okanogan at Tonasket	119
Methow at Pateros	130
Chelan at Chelan	107
Stehekin near Stehekin	113
Wenatchee at Pashastin	98
Cle Elum near Roslyn	98
Yakima at Parker	94
Naches at Naches	78
Grande Ronde at Troy	78
Snake below Lower Granite Dam	74
Columbia River at The Dalles	81
Lewis at Merwin Dam	91
Cowlitz below Mayfield Dam	82
Skagit at Concrete	109
Dungeness near Sequim	77

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

Climate





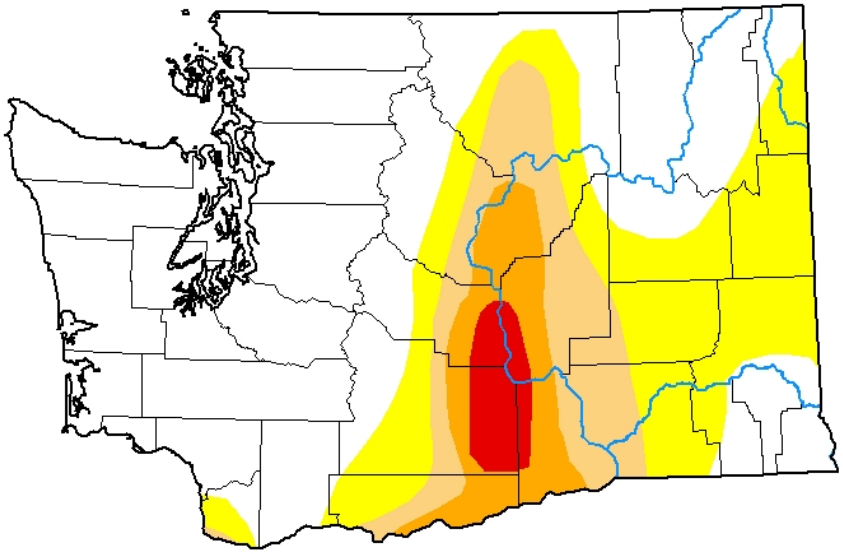
U.S. Drought Monitor

Washington

December 29, 2020

(Released Thursday, Dec. 31, 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/

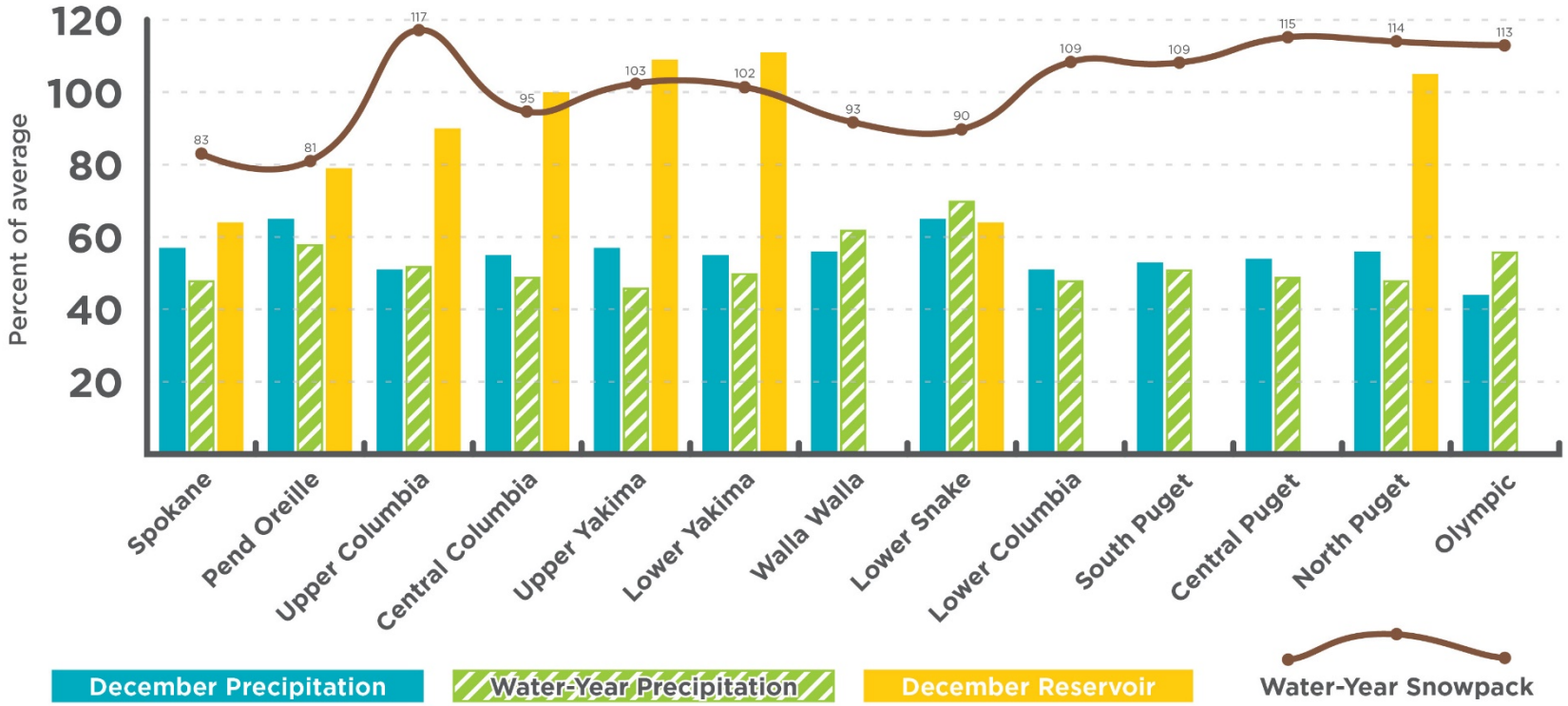
NRCS National:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

USDA
United States Department of Agriculture

Snowpack, precipitation, and reservoir

Conditions at a Glance

Water year = **October 1, 2020 - January 1, 2021**



88th Annual Western Snow Conference
April 12-15, 2021
Virtual Meeting
Bridging the Gap between Research and Operations

For public safety and health reasons, the 88th Annual Meeting of the Western Snow Conference will be held in a virtual format. The virtual format this year provides a unique opportunity to increase participation, particularly among those who would otherwise be unable to attend due to financial, geographic, or time constraints. You are invited to submit an abstract of 150 – 300 words for either oral or poster presentation by January 31, 2021. Those who submitted successful abstracts last year will be given preference as we prepare the 2021 conference agenda.

Abstracts can be submitted online **HERE**. Please see the **Call for Papers** for additional information.

Details of this unique conference are still being finalized, including formats, platforms, and opportunity for vendor participation. Please check back here for updated information.

We are looking forward to "seeing" you online in April as we move ahead in this new world!

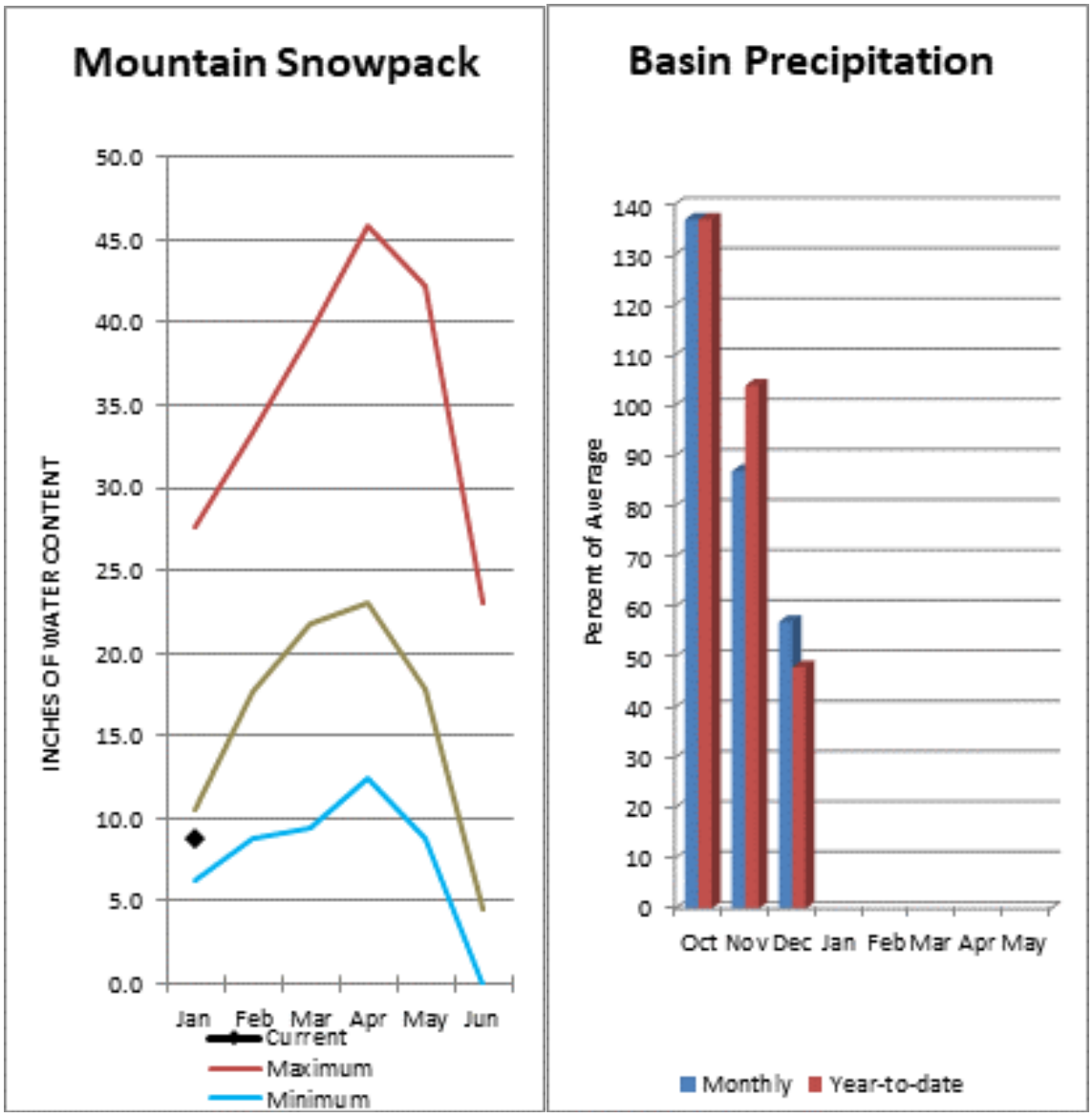
Noah Molotch — General Chair, WSC

Lucas Zukiewicz — Conference Chair

Additional information about the conference 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 83% of normal and precipitation is 95% of average for the water year. Precipitation for December was slightly below normal at 81% of average. Streamflow on the Spokane River at Spokane was 67% of average for December. January 1 storage in Coeur d'Alene Lake was 60,000-acre feet, 64% of average and 25% of capacity. Snowpack at Quartz Peak SNOTEL site was 107% of average with 10.4 inches of water content. Average temperatures in the Spokane basin were much warmer than normal for December and slightly above normal for the water year.

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

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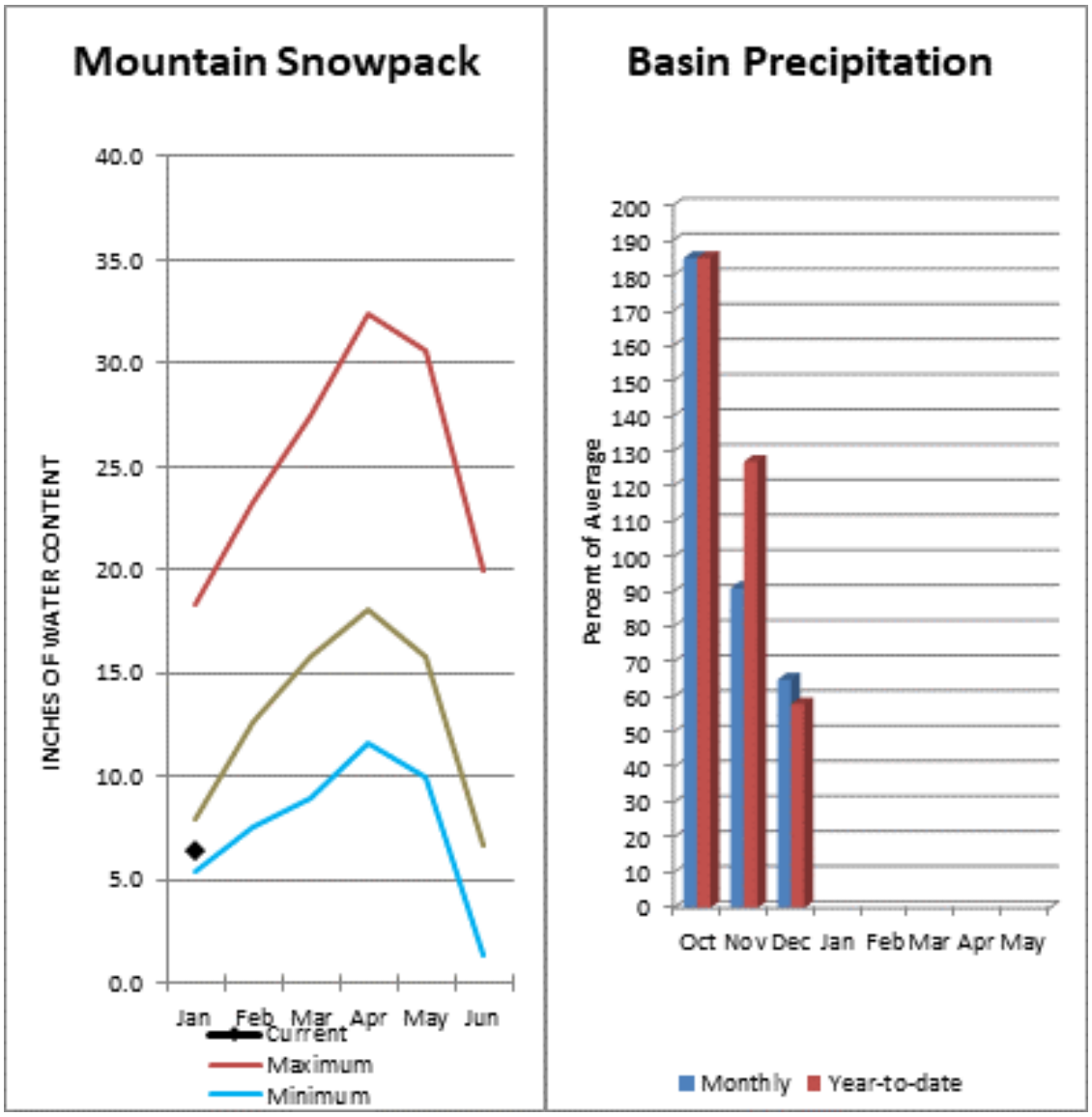
Spokane
Streamflow Forecasts - January 1, 2021

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	1350	2000	2450	103%	2900	3550	2390
	APR-SEP	1410	2080	2530	102%	2980	3650	2480
Spokane R at Long Lake[2]								
	APR-JUL	1580	2260	2730	104%	3200	3880	2620
	APR-SEP	1750	2450	2930	103%	3410	4110	2850
Chamokane Ck nr Long Lake								
	MAR-JUL	9.9	17.1	23	88%	30	41	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, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	60.0	37.5	93.7	238.5
Basin-wide Total	60.0	37.5	93.7	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
Spokane	12	83%	50%
Newman Lake	2	90%	55%



December streamflow was 93% of average on the Pend Oreille River and 100% on the Columbia at Birchbank. January 1 snow cover was 79% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 9.5 inches of snow water on the snow pillow which is normal for January 1. Precipitation during December was 79% of average, dropping the year-to-date precipitation at 86% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 79% of normal. Average temperatures were much above normal for December slightly above normal for the water year.

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

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Lower Pend Oreille
Streamflow Forecasts - January 1, 2021

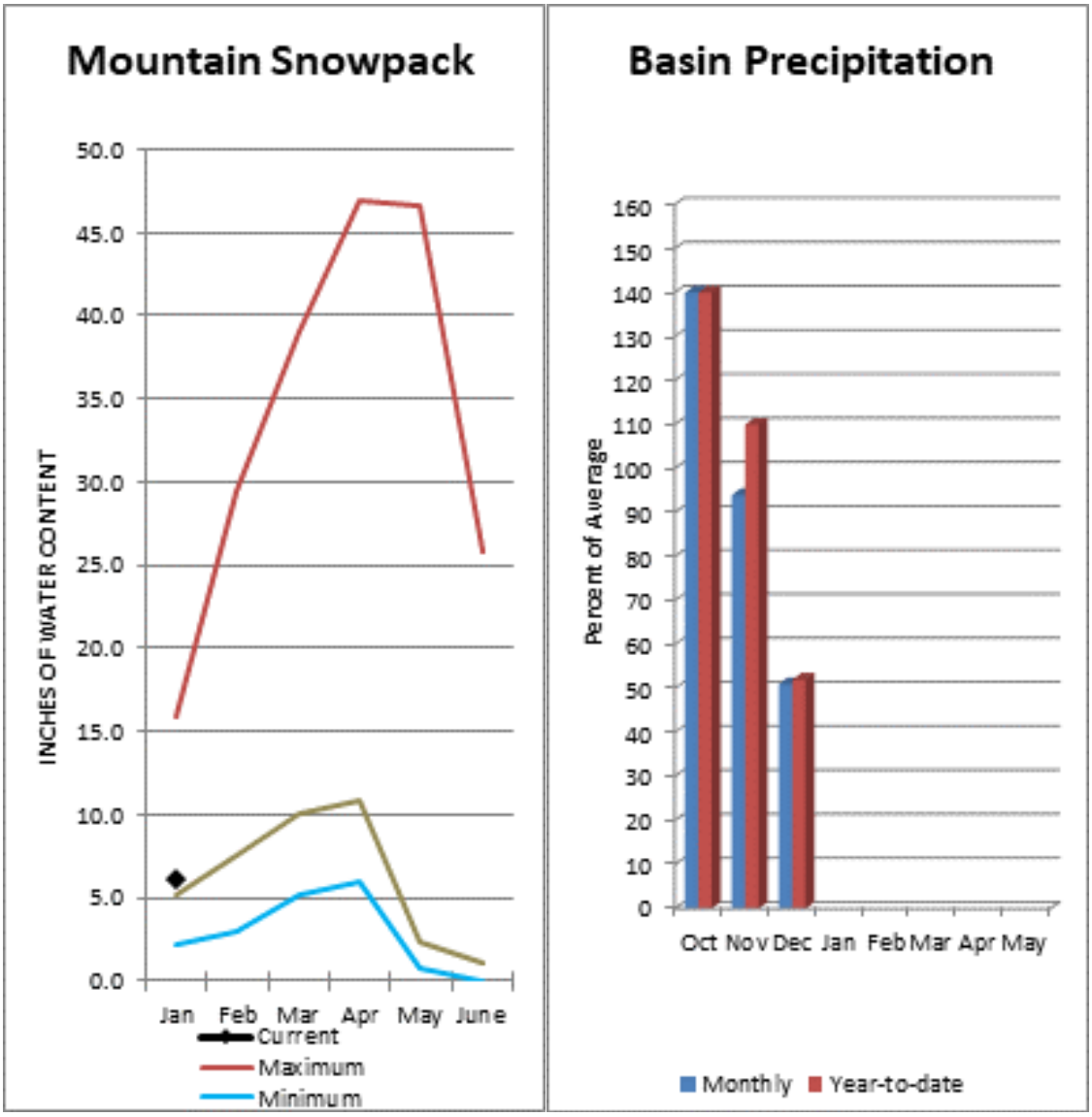
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Pend Oreille	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pend Oreille Lake Inflow[2]								
	APR-JUL	7310	10200	12200	103%	14200	17100	11800
	APR-SEP	7890	11100	13200	103%	15300	18500	12800
Priest R nr Priest River[2]								
	APR-JUL	405	585	705	90%	825	1000	780
	APR-SEP	435	620	745	90%	870	1060	830
Pend Oreille R bl Box Canyon[2]								
	APR-JUL	7570	10400	12300	103%	14200	17000	11900
	APR-SEP	8160	11300	13400	103%	15500	18600	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 December, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	557.8	547.4	708.2	1561.3
Priest Lake	42.5	56.8	56.5	119.3
Basin-wide Total	600.3	604.2	764.7	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
Lower Pend Oreille	10	79%	78%
Sullivan	1	82%	91%



January 1 snow cover on the Okanogan was 109% of normal, Omak Creek was 90% and the Methow was 119%. December precipitation in the Upper Columbia was 88% of average, with precipitation for the water year at 108% of average. December streamflow for the Methow River was 130% of average, 119% for the Okanogan River and 122% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 2.9 inches or 87% of normal for January 1. Combined storage in the Conconully Reservoirs was 12,400 acre-feet or 90% of normal. Temperatures were much above normal for December slightly above normal for the water year.

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Upper Columbia
Streamflow Forecasts - January 1, 2021

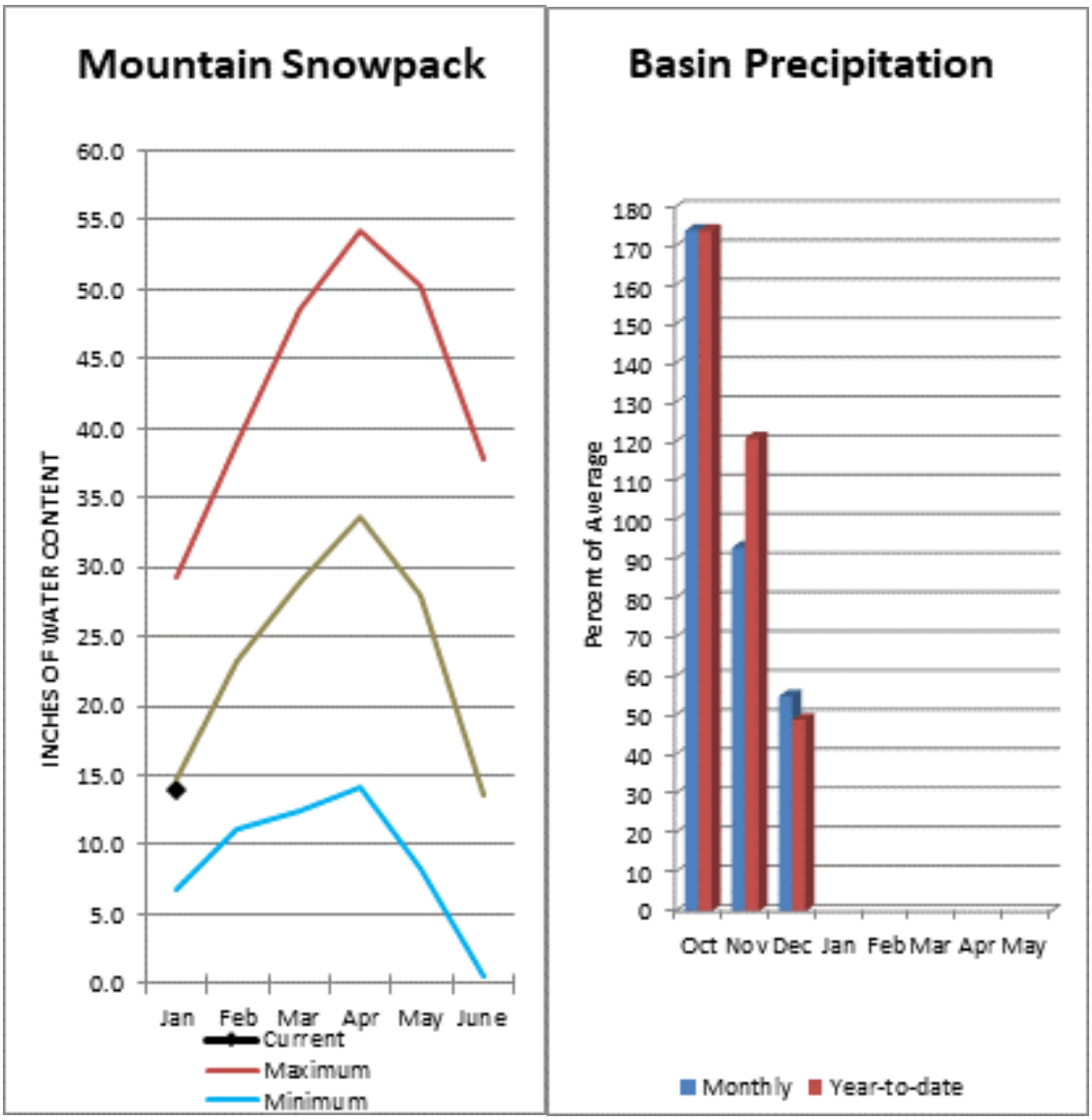
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kettle R nr Laurier								
	APR-JUL	1320	1650	1870	104%	2100	2430	1800
	APR-SEP	1370	1720	1950	104%	2190	2540	1880
Colville R at Kettle Falls								
	APR-JUL	27	73	104	87%	135	181	119
	APR-SEP	29	80	114	87%	148	199	131
Columbia R at Grand Coulee-NWS[2]								
	APR-JUL	41200		49500	97%		60200	51015
	APR-SEP	49900		58600	97%		69700	60110
Similkameen R nr Nighthawk								
	APR-JUL	925	1150	1310	109%	1470	1700	1200
	APR-SEP	990	1230	1400	109%	1570	1810	1280
Okanogan R nr Tonasket								
	APR-JUL	900	1230	1460	99%	1680	2020	1480
	APR-SEP	1000	1370	1620	98%	1870	2240	1650
Okanogan R at Malott								
	APR-JUL	905	1250	1490	103%	1720	2070	1450
	APR-SEP	1010	1390	1650	102%	1910	2290	1620
Methow R nr Pateros								
	APR-JUL	540	735	865	104%	995	1190	835
	APR-SEP	580	785	925	103%	1060	1270	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, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	6.1	6.9	7.3	10.5
Conconully Reservoir	6.3	6.6	6.5	13.0
Basin-wide Total	12.4	13.5	13.8	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
Upper Columbia	14	110%	88%
Colville	0		
Kettle	4	125%	134%
Okanogan	5	109%	73%
Omak	1	90%	46%
Sanpoil	1	90%	46%
Similkameen	4	108%	69%
Toats Coulee	14	110%	88%
Conconully Lake	1	87%	38%
Methow	4	119%	69%



Precipitation during December was 88% of average in the basin and 107% for the year-to-date. December average streamflow on the Chelan River was 107% and on the Wenatchee River 98%. January 1 snowpack in the Wenatchee River Basin was 91% of normal; the Chelan, 93%; the Entiat, 109%; Stemilt Creek, 84% and Colockum Creek, 81%. Reservoir storage in Lake Chelan was 100% of average. Lyman Lake SNOTEL had the most snow water with 21.5 inches of water. This site would normally have 26.4 inches on January 1. Temperatures were above normal for both December and the water year.

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

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Central Columbia
Streamflow Forecasts - January 1, 2021

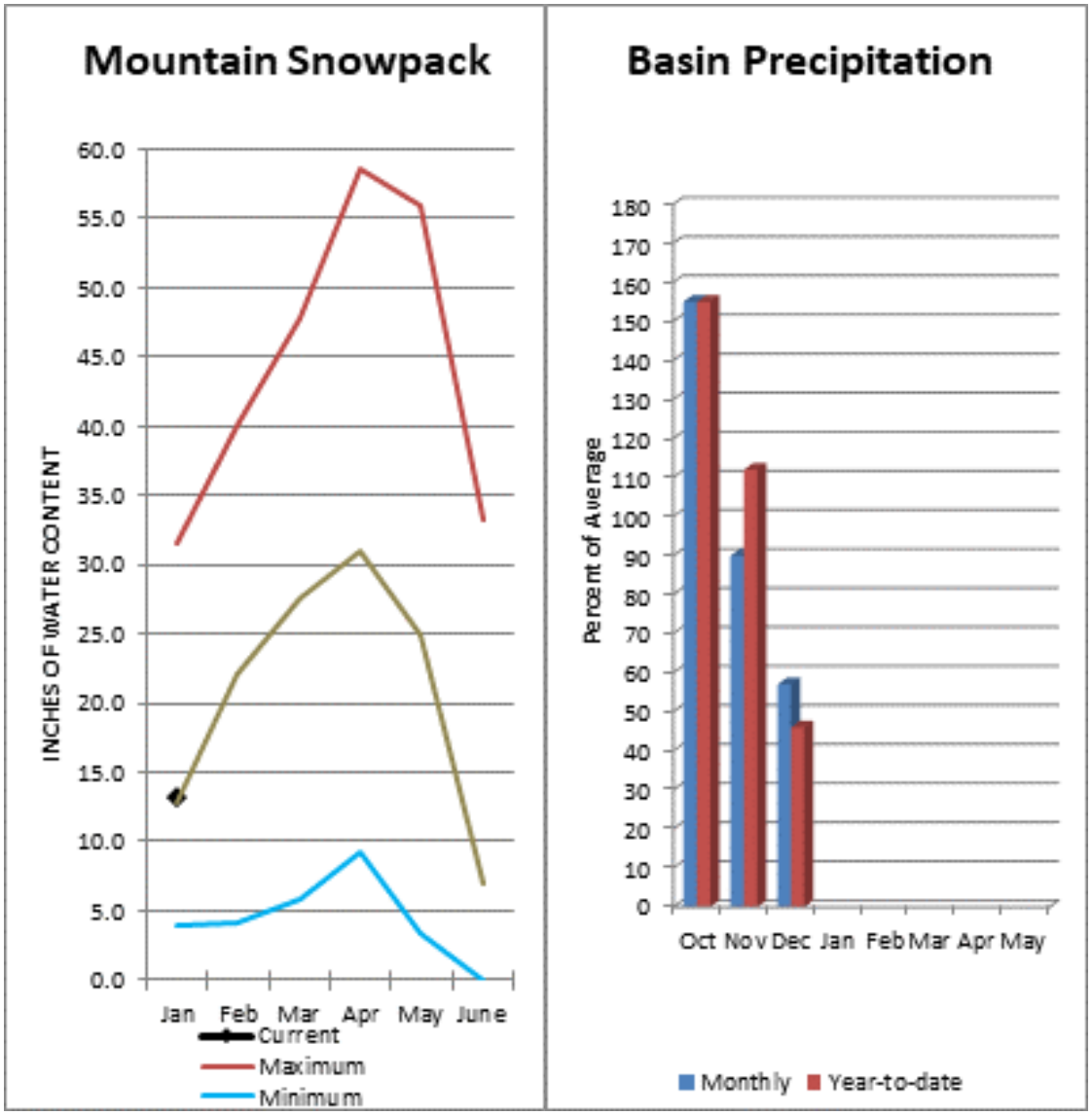
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin								
	APR-JUL	515	610	675	99%	740	835	680
	APR-SEP	600	710	780	99%	850	960	790
Chelan R at Chelan								
	APR-JUL	750	895	995	100%	1090	1240	1000
	APR-SEP	830	995	1110	99%	1220	1390	1120
Entiat R nr Ardenvoir								
	APR-JUL	125	164	190	95%	215	255	200
	APR-SEP	133	176	205	93%	235	275	220
Wenatchee R at Plain								
	APR-JUL	695	865	980	99%	1100	1270	990
	APR-SEP	750	940	1070	99%	1200	1390	1080
Icicle Ck nr Leavenworth								
	APR-JUL	184	230	265	96%	300	345	275
	APR-SEP	200	255	290	97%	325	380	300
Wenatchee R at Peshastin								
	APR-JUL	950	1170	1320	96%	1470	1690	1370
	APR-SEP	1070	1310	1480	99%	1650	1890	1490
Columbia R bl Rock Island Dam-NWS[2]								
	APR-JUL	45700		54400	98%		66500	55770
	APR-SEP	54800		64300	99%		77100	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, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	412.6	309.4	411.3	677.4
Basin-wide Total	412.6	309.4	411.3	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
Central Columbia	9	95%	56%
Lake Chelan	3	93%	59%
Entiat	1	109%	47%
Wenatchee	5	91%	56%
Stemilt	1	84%	74%
Colockum	1	81%	71%



January 1 reservoir storage for the Upper Yakima reservoirs was 377,500-acre feet, 109% of average. December streamflow on the Cle Elum River near Roslyn was 98%. January 1 snowpack was 103% based upon 6 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 85% of average for December 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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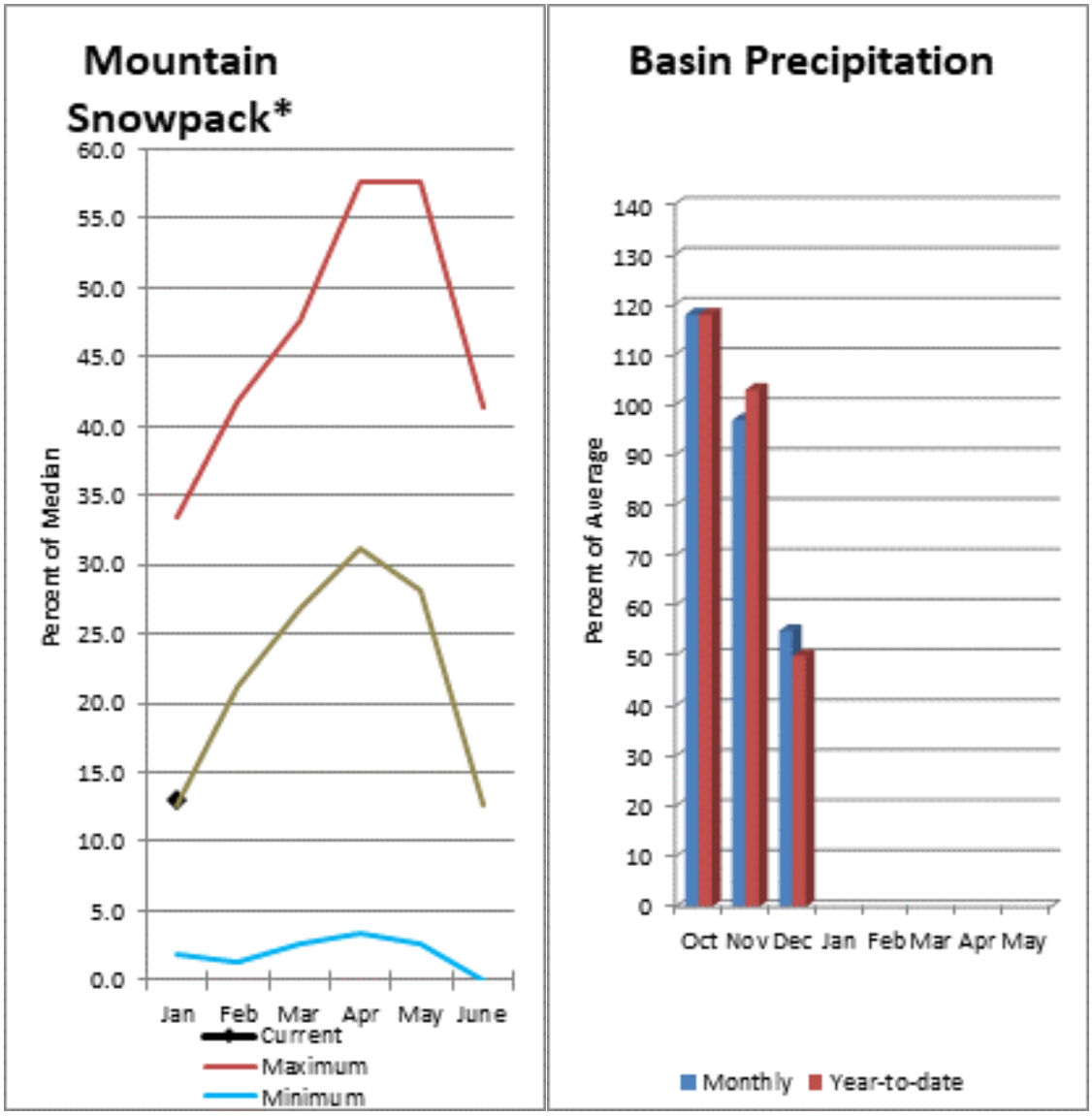
Upper Yakima
Streamflow Forecasts - January 1, 2021

Upper Yakima	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	75	101	119	103%	137	163	116
	APR-SEP	85	112	130	103%	148	175	126
Kachess Reservoir Inflow [2]								
	APR-JUL	67	90	106	102%	122	145	104
	APR-SEP	75	98	114	101%	130	153	113
Cle Elum Lake Inflow [2]								
	APR-JUL	265	335	385	100%	435	505	385
	APR-SEP	290	370	420	101%	470	550	415
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	68	106	132	102%	158	196	130
	APR-SEP	71	109	135	102%	161	199	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, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	75.9	44.8	68.5	157.8
Kachess	134.2	65.2	113.4	239.0
Cle Elum	167.4	80.0	164.0	436.9
Basin-wide Total	377.5	190.0	345.9	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
Upper Yakima	6	103%	43%



December average streamflows within the basin were: Yakima River near Parker, 94% and the Naches River near Naches, 78%. January 1 reservoir storage for Bumping and Rimrock reservoirs was 115,000-acre feet, 111% of average. January 1 snowpack was 103% within the Lower Yakima Basin, 103% in the Naches and Ahtanum Creek reported in at 102% of normal. December precipitation was 86% of average and 99% for the water-year in the Naches River Basin. The Lower Yakima recorded 62% of average for December and 79% for the water-year. Temperatures were above normal for December and 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
Streamflow Forecasts - January 1, 2021

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

Lower Yakima	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Ahtanum Ck at Union Gap								
	APR-JUL	6.9	17.7	25	93%	32	43	27
	APR-SEP	8.5	19.5	27	93%	34	46	29
Yakima R nr Parker [2]								
	APR-JUL	1000	1390	1650	99%	1910	2300	1660
	APR-SEP	1110	1530	1810	99%	2090	2510	1820

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, 2021	# of Sites	% Median	Last Year % Median
Lower Yakima	2	102%	61%
Ahtanum	2	102%	61%
Simcoe-Toppenish	1	101%	44%
Satus	0		

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Naches
Streamflow Forecasts - January 1, 2021

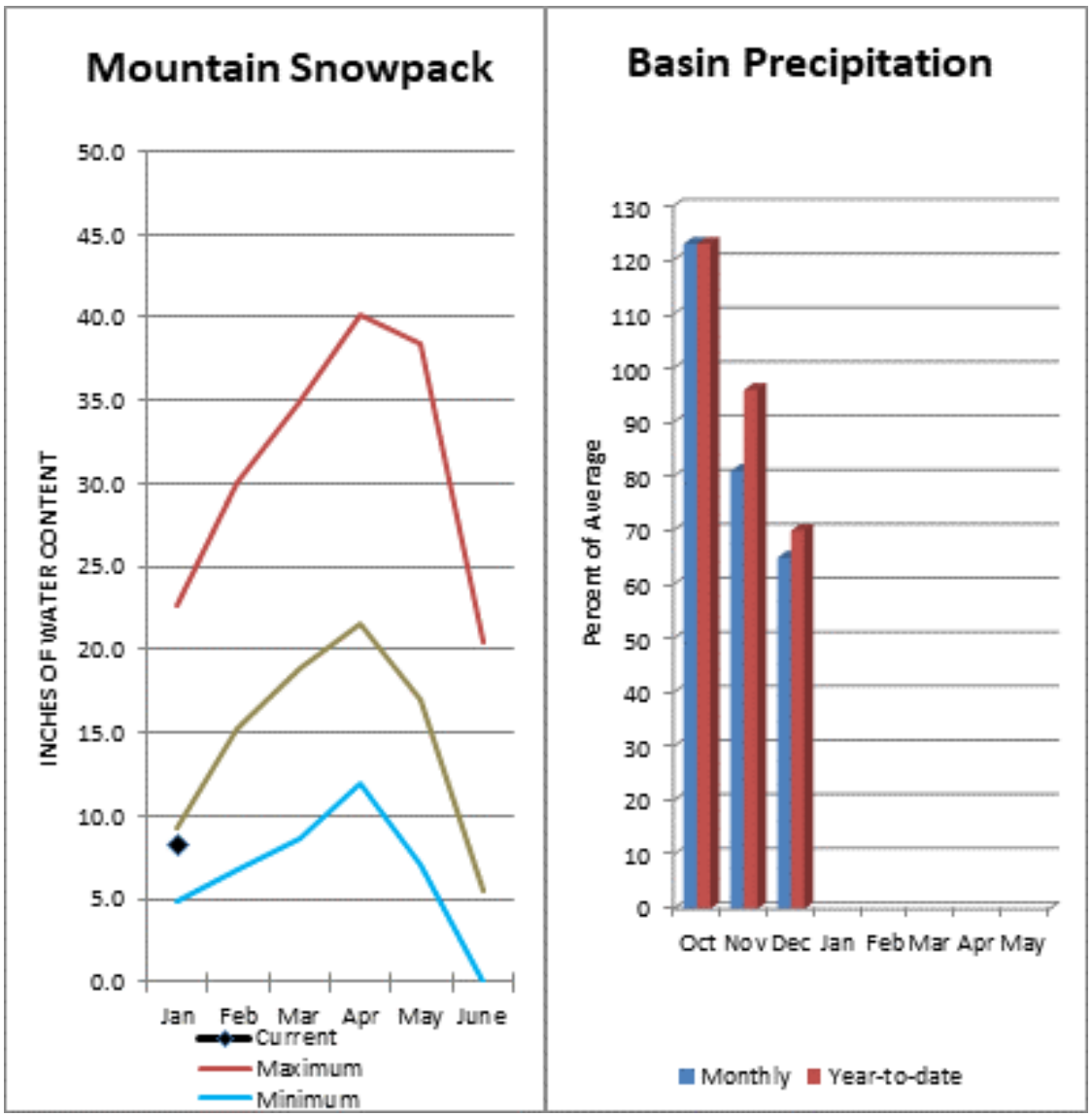
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Naches	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Bumping Lake Inflow [2]								
	APR-JUL	74	97	112	98%	127	150	114
	APR-SEP	81	105	122	99%	139	163	123
American R nr Nile								
	APR-JUL	67	87	101	99%	115	135	102
	APR-SEP	71	94	109	99%	124	147	110
Rimrock Lake Inflow [2]								
	APR-JUL	130	162	184	98%	205	240	187
	APR-SEP	152	189	215	98%	240	280	220
Naches R nr Naches								
	APR-JUL	420	585	700	100%	815	980	700
	APR-SEP	455	640	765	101%	890	1070	760

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, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	16.8	10.3	11.5	33.7
Rimrock	98.2	79.6	92.4	198.0
Basin-wide Total	115.0	89.9	103.9	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
Naches	7	103%	65%



December precipitation was 80% of average, bringing the year-to-date precipitation to 94% of average. January 1 snowpack readings averaged 90% of normal. December streamflow was 74% of average for Snake River below Lower Granite Dam and 78% for Grande Ronde River near Troy. Dworshak Reservoir storage was 64% of average. Average temperatures were above normal for December and slightly above normal for the water year.

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

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Lower Snake-Walla Walla
Streamflow Forecasts - January 1, 2021

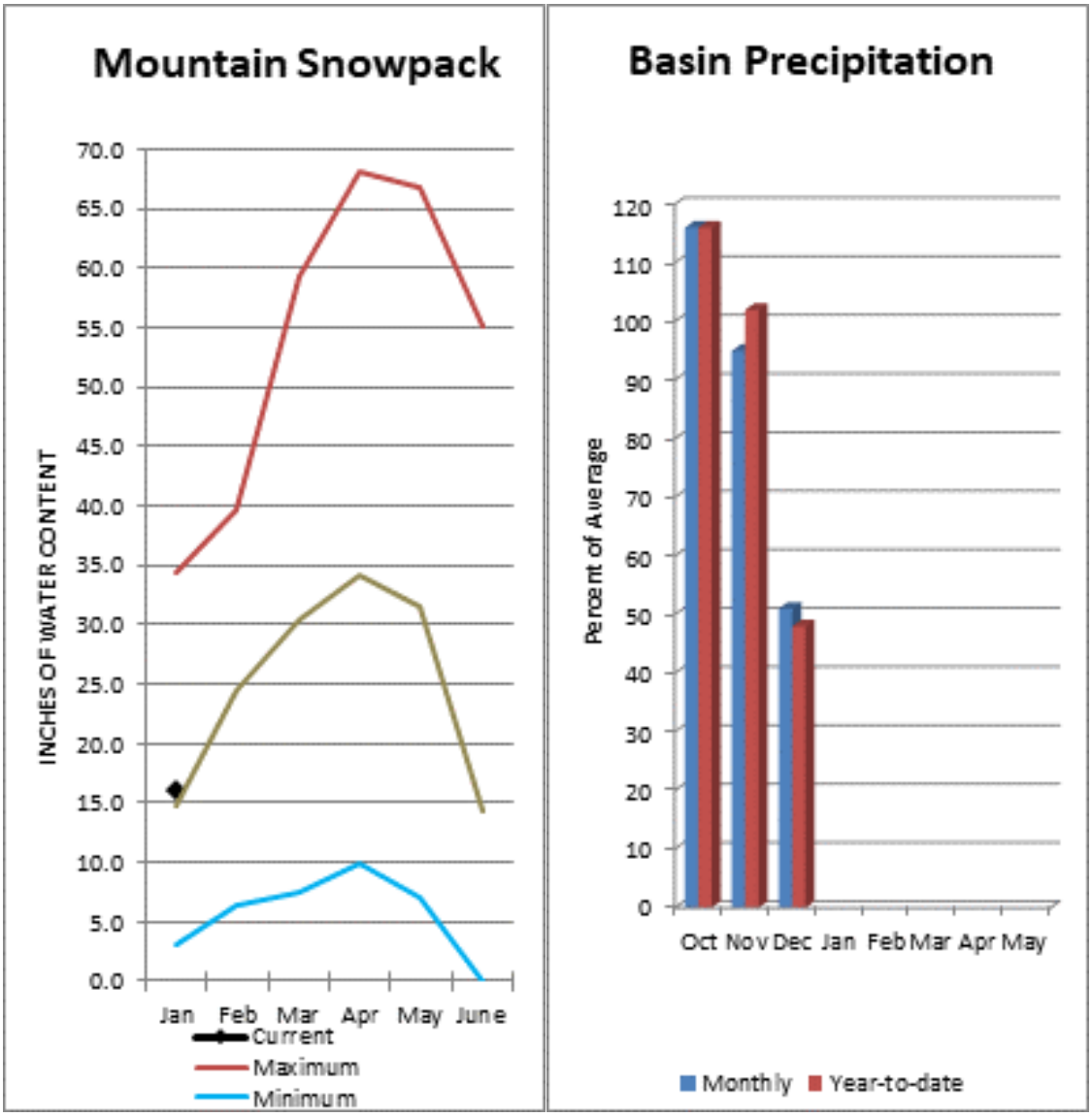
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake-Walla Walla	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	MAR-JUL	905	1190	1390	92%	1590	1880	1510
	APR-SEP	740	1010	1190	91%	1370	1640	1310
Asotin Ck at Asotin								
	APR-JUL	13.5	22	29	83%	37	50	35
Clearwater R at Spalding[2]								
	APR-JUL	4340	5790	6770	98%	7750	9200	6890
	APR-SEP	4660	6130	7130	98%	8130	9600	7270
Snake R bl Lower Granite Dam-NWS[2]								
	APR-JUL	12100		16900	85%		20900	19848
	APR-SEP	23600		19300	87%		14100	22280
SF Walla Walla R nr Milton-Freewater								
	MAR-JUL	49	59	66	97%	73	83	68
	APR-SEP	48	57	64	97%	71	80	66
Mill Ck nr Walla Walla								
	APR-JUL	16.2	20	23	96%	26	30	24
	APR-SEP	18.8	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

Reservoir Storage End of December, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	1527.9	2178.0	2403.0	3468.0
Basin-wide Total	1527.9	2178.0	2403.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
Lower Snake-Walla Walla	13	90%	59%
Asotin	2	64%	38%
Grande Ronde	12	90%	57%
Walla Walla	4	86%	41%



Forecasts for April – September streamflows within the basin are slightly below normal. The Columbia at The Dalles is forecasted to have 91% of average flows this summer according to the River Forecast Center. December average streamflow for Cowlitz River was 92% and the Columbia River at The Dalles was 81% of average. December precipitation was 87% of average and the water-year average was 96%. January 1 snow cover for Cowlitz River was 109%, and Lewis River was 110% of normal. Temperatures were slightly above normal during December and for the water year.

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Lower Columbia
Streamflow Forecasts - January 1, 2021

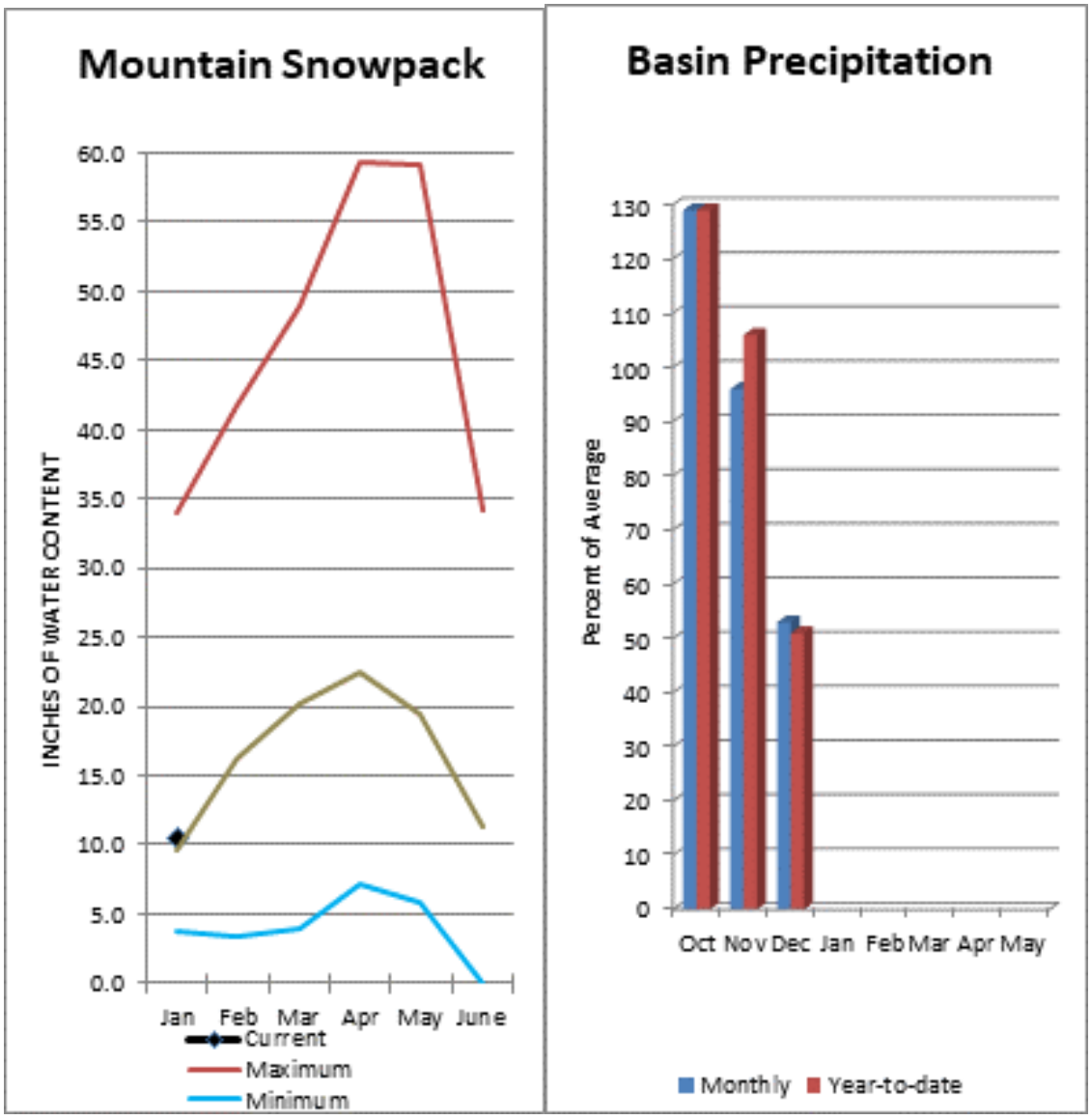
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Columbia	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	61600		73600	92%		91000	79855
	APR-SEP	73200		87100	94%		104000	92704
Klickitat R nr Glenwood								
	APR-JUL	67	98	119	94%	140	171	126
	APR-SEP	75	108	131	94%	154	187	139
Klickitat R nr Pitt								
	APR-JUL	275	365	430	99%	495	585	435
	APR-SEP	340	445	520	100%	595	700	520
Lewis R at Ariel[2]								
	APR-JUL	660	865	1000	103%	1140	1350	970
	APR-SEP	780	995	1140	102%	1280	1500	1120
Cowlitz R bl Mayfiled[2]								
	APR-JUL	1140	1460	1680	103%	1890	2210	1630
	APR-SEP	1320	1660	1890	103%	2120	2460	1840
Cowlitz R at Castle Rock[2]								
	APR-JUL	1520	2010	2340	104%	2680	3170	2240
	APR-SEP	1780	2290	2640	104%	2980	3490	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

Reservoir Storage End of December, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Yale				0.0
Swift			634.1	0.0
Mossyrock Dam (Riffe Lk)		798.2	1203.0	0.0
Merwin			400.1	0.0
Basin-wide Total		0.0	0.0	
# of reservoirs	0	0	0	0

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
Lower Columbia	12	109%	38%
Lewis	6	110%	24%
Cowlitz	8	109%	45%



January 1 snowpack was 105% of average for the White River, 118% for Puyallup River and 108% in the Green River Basin. December precipitation was 97% of average, bringing the water year-to-date to 109% of average for the basins. Average temperatures in the area were slightly above normal for December and for the water-year.

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

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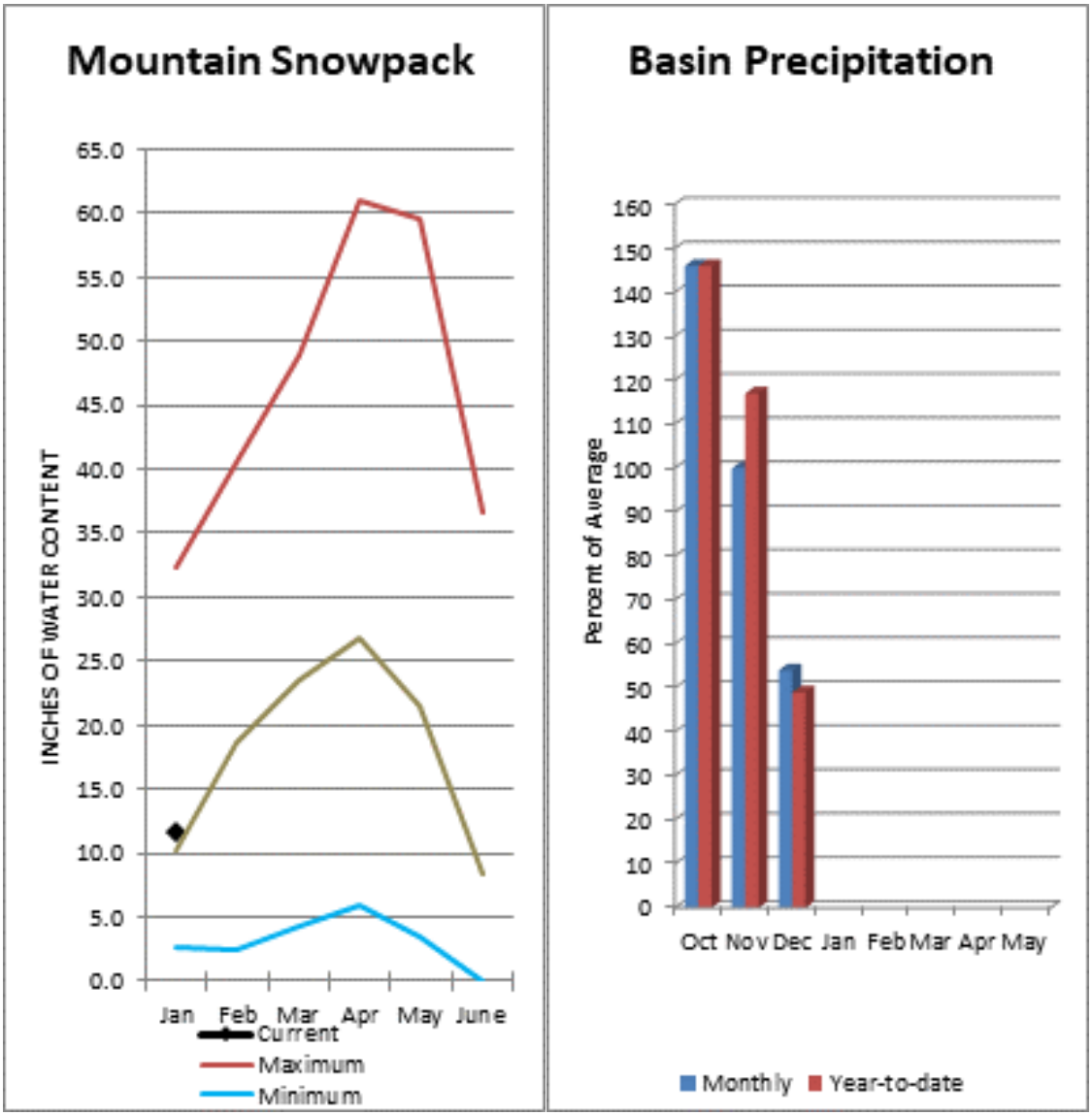
South Puget Sound
Streamflow Forecasts - January 1, 2021

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

South Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
White R nr Buckley[1,2]								
	APR-JUL	310	390	425	99%	460	540	430
	APR-SEP	380	470	510	99%	550	645	515
Green R bl Howard A Hanson Dam[1,2]								
	APR-JUL	140	200	225	96%	255	315	235
	APR-SEP	163	225	250	96%	275	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 January 1, 2021	# of Sites	% Median	Last Year % Median
South Puget Sound	10	109%	51%
White	3	105%	71%
Puyallup	2	118%	76%
Green	4	108%	37%



Basin-wide precipitation for December was 110% of average, bringing water-year-to-date to 114% of average. January 1 median snow cover in Cedar River Basin was 112%, Tolt River Basin was 127%, Snoqualmie River Basin was 126%, and Skykomish River Basin was 119%. Temperatures were above normal for December and for the water-year.

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

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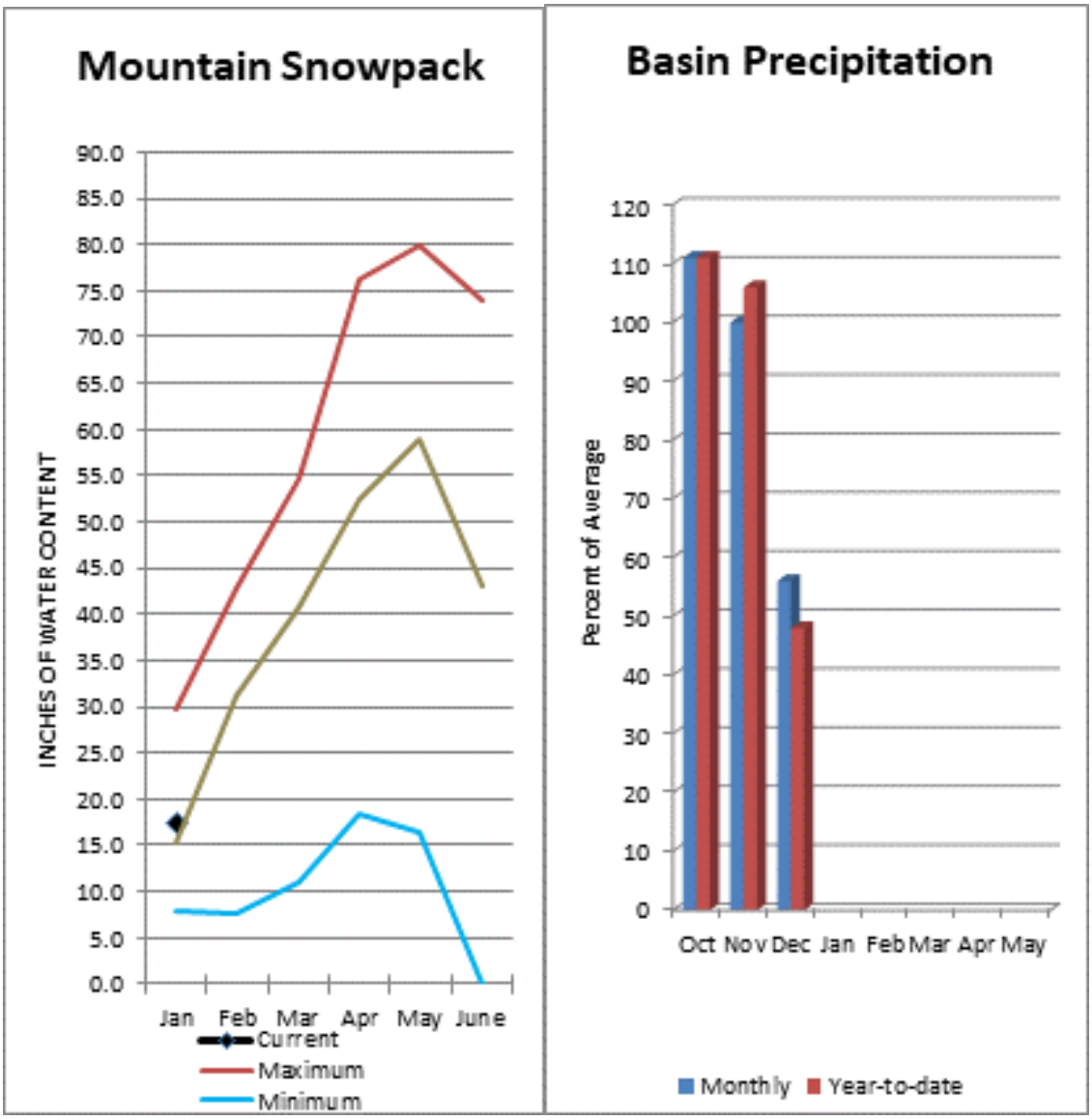
Central Puget Sound
Streamflow Forecasts - January 1, 2021

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

Central Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	APR-JUL	48	65	77	110%	89	107	70
	APR-SEP	52	70	82	108%	94	112	76
Rex R nr Cedar Falls								
	APR-JUL	21	26	29	121%	32	37	24
	APR-SEP	23	28	31	115%	34	39	27
Taylor Ck nr Selleck								
	APR-JUL	15.7	19.5	22	110%	25	29	20
	APR-SEP	19	23	26	108%	28	33	24
SF Tolt R nr Index								
	APR-JUL	11.5	14.7	16.9	119%	19	22	14.2
	APR-SEP	13.4	16.7	18.9	117%	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 January 1, 2021	# of Sites	% Median	Last Year % Median
Central Puget Sound	9	115%	36%
Cedar	6	112%	40%
Tolt	2	127%	18%
Snoqualimie	4	126%	35%
Skykomish	3	119%	31%



Runoff is forecasted to be near to slightly above average for the 3 major basins represented. December streamflow in Skagit River was 109% of average. Basin-wide precipitation for December was 92% of average, bringing water-year-to-date to 103% of average. January 1 average snow cover in Skagit River Basin was 116% and the Nooksack River Basin was 132%. January 1 Skagit River reservoir storage was 105% of average and 83% of capacity. Average temperatures have remained above normal for the water year.

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

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North Puget Sound
Streamflow Forecasts - January 1, 2021

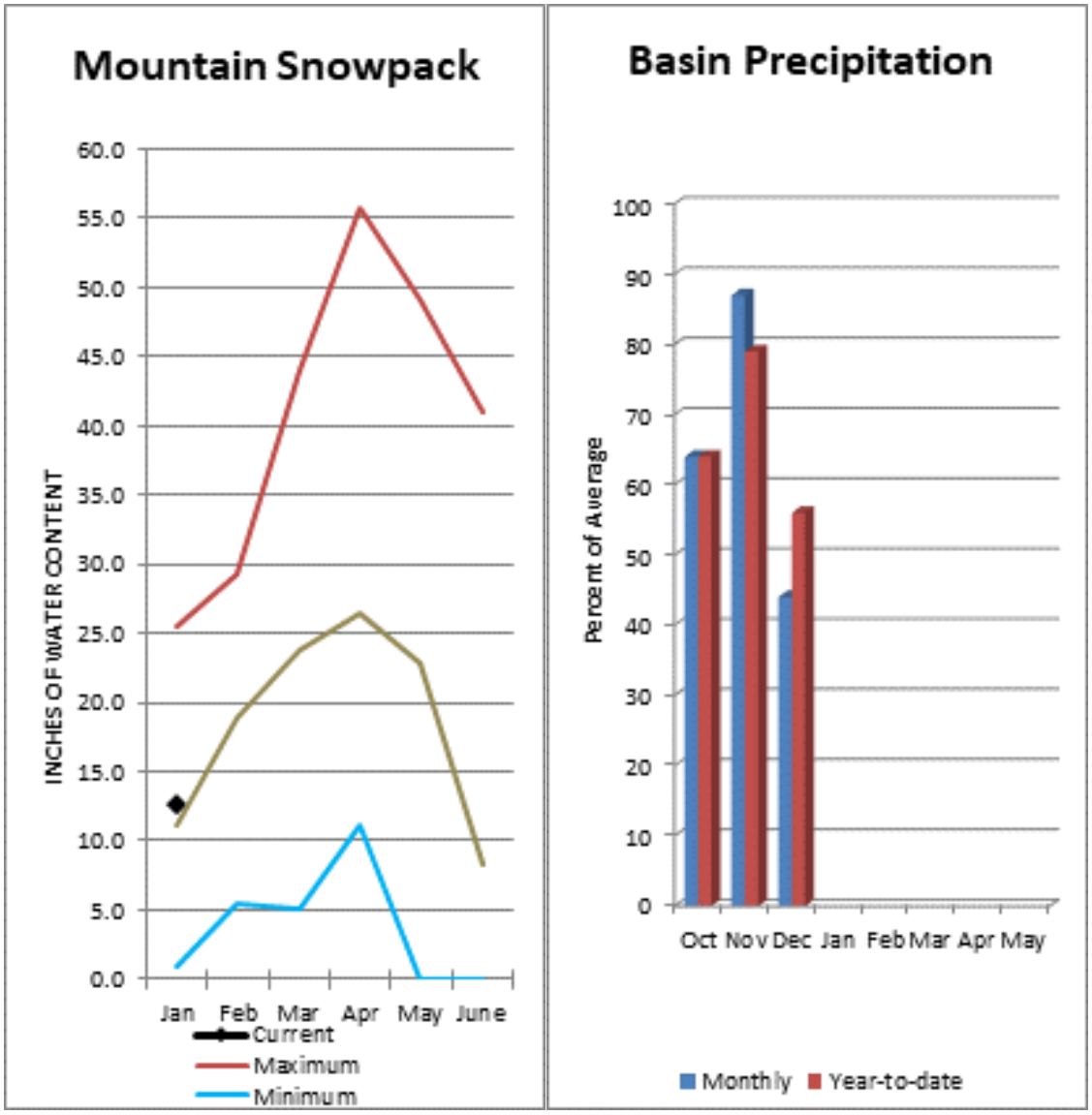
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

North Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Thunder Ck nr Newhalem								
	APR-JUL	199	220	235	100%	250	275	235
	APR-SEP	290	315	330	100%	345	370	330
Skagit R at Newhalem[2]								
	APR-JUL	1450	1690	1850	106%	2010	2240	1750
	APR-SEP	1760	2010	2180	105%	2360	2610	2070
Baker R at Concrete								
	APR-JUL	675	785	855	110%	930	1040	780
	APR-SEP	890	1010	1080	110%	1160	1280	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, 2020	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	1193.4	832.2	1135.0	1434.7
Diablo Reservoir			85.8	90.6
Basin-wide Total	1193.4	832.2	1135.0	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis January 1, 2021	# of Sites	% Median	Last Year % Median
North Puget Sound	10	114%	63%
Skagit	5	116%	67%
Baker	0		
Nooksack	3	132%	60%



December runoff in the Dungeness River was 77% of normal. December precipitation was 86% of average. Precipitation has accumulated at 82% of average for the water year. December precipitation at Quillayute was 136 % of normal brining water-year precipitation to near normal. Olympic Peninsula snowpack averaged 113% of normal on January 1. Temperatures were above average for December and for the water year.

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

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Olympic
Streamflow Forecasts - January 1, 2021

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

Olympic	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Dungeness R nr Sequim								
	APR-JUL	70	92	107	89%	122	144	120
	APR-SEP	82	109	127	88%	145	172	145
Elwha R at McDonald Br nr Port Angeles								
	APR-JUL	270	340	385	96%	430	500	400
	APR-SEP	325	400	455	97%	505	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 January 1, 2021	# of Sites	% Median	Last Year % Median
Olympic	3	113%	48%

Issued by

Terry Cosby
Acting Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Comes-At-Night
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

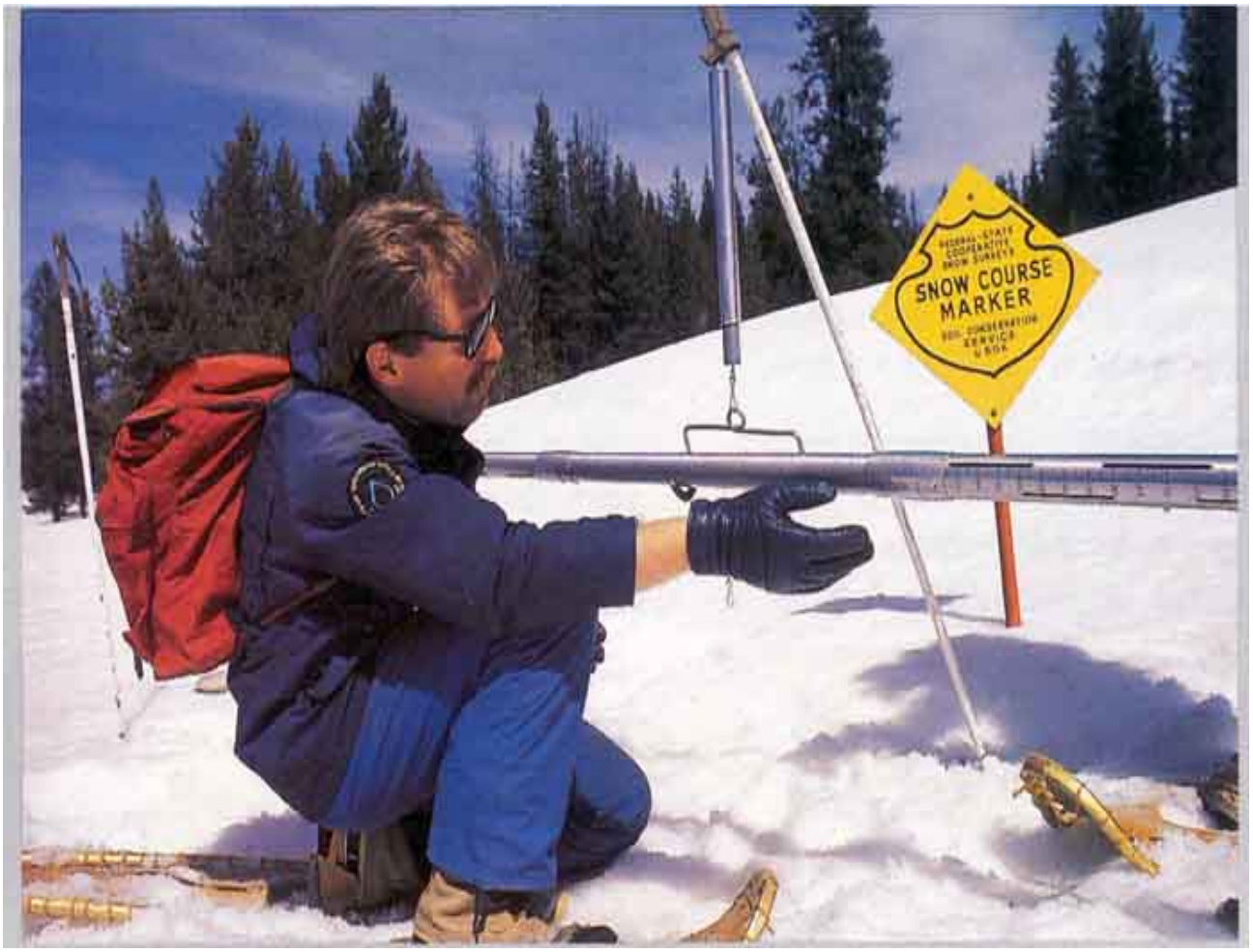
Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA

NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington
Water Supply Outlook Report
February 1, 2021



Manual snow courses and SNOTEL sites are scattered all throughout the woods in Washington. The sign shown above is marking one end of a snow survey transect line of up to 10 data points. We ask that if you encounter this sign (or one similar) to please avoid the area. Too much traffic can destroy the sample area or damage valuable sensors buried under the snow.

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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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

February 2021

General Outlook

For a La Nina year January snowfall was a tad disappointing. The freezing level was the primary culprit pushing snowline above 4000 feet elevation. Sites above that line received near to above normal snow whereas below 4000 feet accumulated very little snow and, in some cases, lost ground since February 1. Precipitation was a mixed bag ranging from 200% of normal in the Okanogan to only 51% at Stevens Pass. February temperatures trended warmer than normal on the east side and near normal west of the mountains.

The most recent forecast through mid-February shows a high probability for below normal temperatures and below normal precipitation, with a return to normal conditions later in the month. NWS 3-month (FMA) forecast indicates below normal temperatures and above normal precipitation which is indicative of the continuation of Enso La Nina. The US Drought Monitor indicates D0-D2 drought designation in the central part of the state, which is a slight improvement from last month. (see maps on page 4)

Snowpack

The February 1 statewide SNOTEL readings were 100% of normal, down slightly from last month. The lowest readings in the state were 58% of the 30-year median for February 1 in the Asotin River Basin. The Omak River Basin had the most snow with 143%. Westside medians from SNOTEL and February 1 snow surveys, included the North Puget Sound river basins with 108% of normal, the Central and South Puget river basins with 86% and 89% respectively, and the Lower Columbia basins with 97% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 97% and the Wenatchee area with 101%. Snowpack in the Spokane River Basin was at 74% and the Upper Columbia river basins had 114% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	74	102
Newman Lake	93	123
Lower Pend Oreille	91	123
Kettle	118	132
Okanogan	119	115
Methow	113	98
Conconully Lake	109	96
Central Columbia	101	94
Upper Yakima	101	89
Lower Yakima	91	93
Ahtanum Creek	95	87
Walla Walla	83	102
Lower Snake	89	99
Cowlitz	99	106
Lewis	92	95
White	88	101
Green	79	71
Puyallup	68	108
Cedar	84	75
Snoqualmie	91	79
Skykomish	89	93
Skagit	114	109
Nooksack	104	100
Olympic Peninsula	119	119

Precipitation

February precipitation accumulation varied greatly across the state. Ranging from 138% of normal in the Upper Columbia to 75% in the Spokane Basin. Individual stations ranged from 200% to a low of 51%. Statewide water-year average was 102% as of February 1. SNOTEL collects all form of precipitation including, rain, snow or sleet and hail.

RIVER BASIN	FEBRUARY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	75	89
Lower Pend Oreille	103	91
Upper Columbia	138	112
Central Columbia	86	104
Upper Yakima	102	102
Naches	99	99
Lower Yakima	122	91
Klickitat	112	91
Walla Walla	82	100
Lower Snake	89	91
Lower Columbia	109	100
South Puget Sound	92	104
Central Puget Sound	85	106
North Puget Sound	96	101
Olympic Peninsula	109	90

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 438,200-acre feet, 108% of average for the Upper Reaches and 147,500-acre feet or 121% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 71,800-acre feet, 75% of average and 30% of capacity; and Ross lake within the Skagit River Basin at 105% of average and 73% 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	30	75
Lower Pend Oreille	37	77
Upper Columbia	50	82
Central Columbia	48	94
Upper Yakima	53	108
Lower Yakima	64	121
Lower Snake	69	103
North Puget Sound	73	105

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

Streamflow

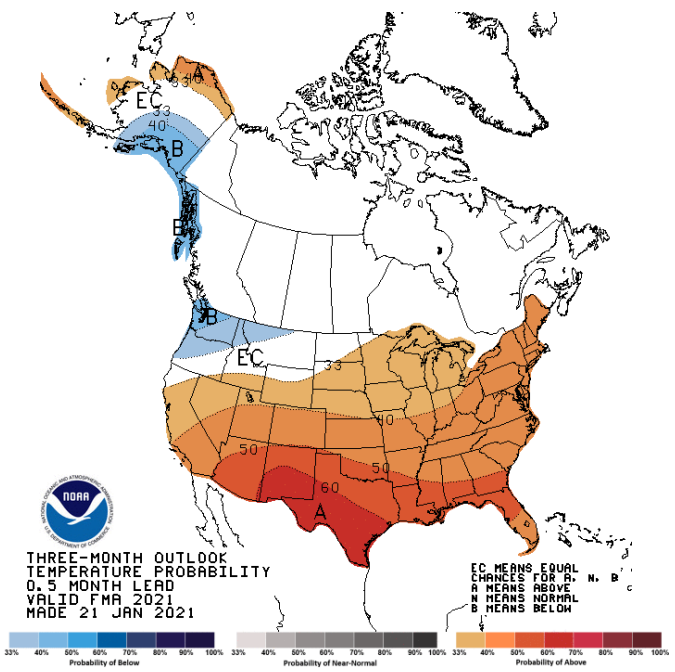
Early winter forecasts for April-September stream flows are never quite as robust as they are later in the season when we know more about the winter climatology. At times only a few degrees warmer or cooler than forecasted can make or break stream flow predictions. Volumetric forecasts are developed 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

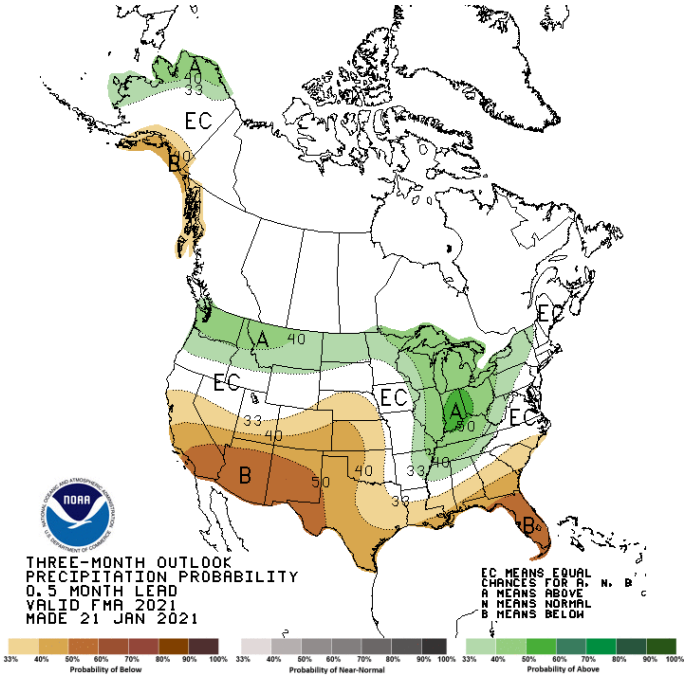
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	89-100
Pend Oreille	92-98
Upper Columbia	101-125
Central Columbia	93-106
Upper Yakima	102-104
Lower Yakima	98-101
Lower Snake-Walla Walla	80-98
Lower Columbia	95-103
South Puget Sound	85-93
Central Puget Sound	103-108
North Puget Sound	102-109
Olympic Peninsula	107-112

STREAM	PERCENT OF AVERAGE FEBRUARY STREAMFLOWS
Pend Oreille at Albeni Fall Dam	102
Kettle at Laurier	97
Columbia at Birchbank	108
Spokane at Spokane	118
Similkameen at Nighthawk	109
Okanogan at Tonasket	116
Methow at Pateros	129
Chelan at Chelan	110
Stehekin near Stehekin	84
Wenatchee at Pashastin	110
Cle Elum near Roslyn	114
Yakima at Parker	114
Naches at Naches	126
Grande Ronde at Troy	100
Snake below Lower Granite Dam	78
Columbia River at The Dalles	94
Lewis at Merwin Dam	143
Cowlitz below Mayfield Dam	137
Skagit at Concrete	130
Dungeness near Sequim	130

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

Climate





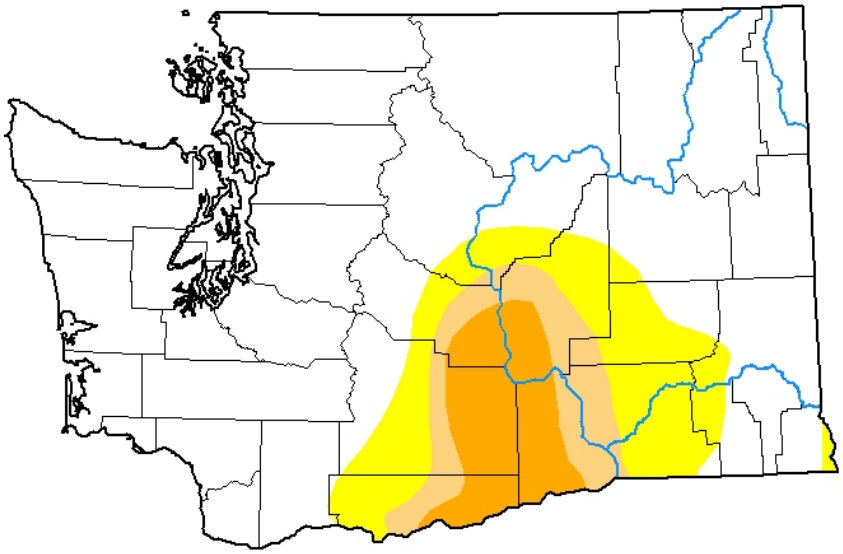
U.S. Drought Monitor

Washington

February 2, 2021

(Released Thursday, Feb. 4, 2021)

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

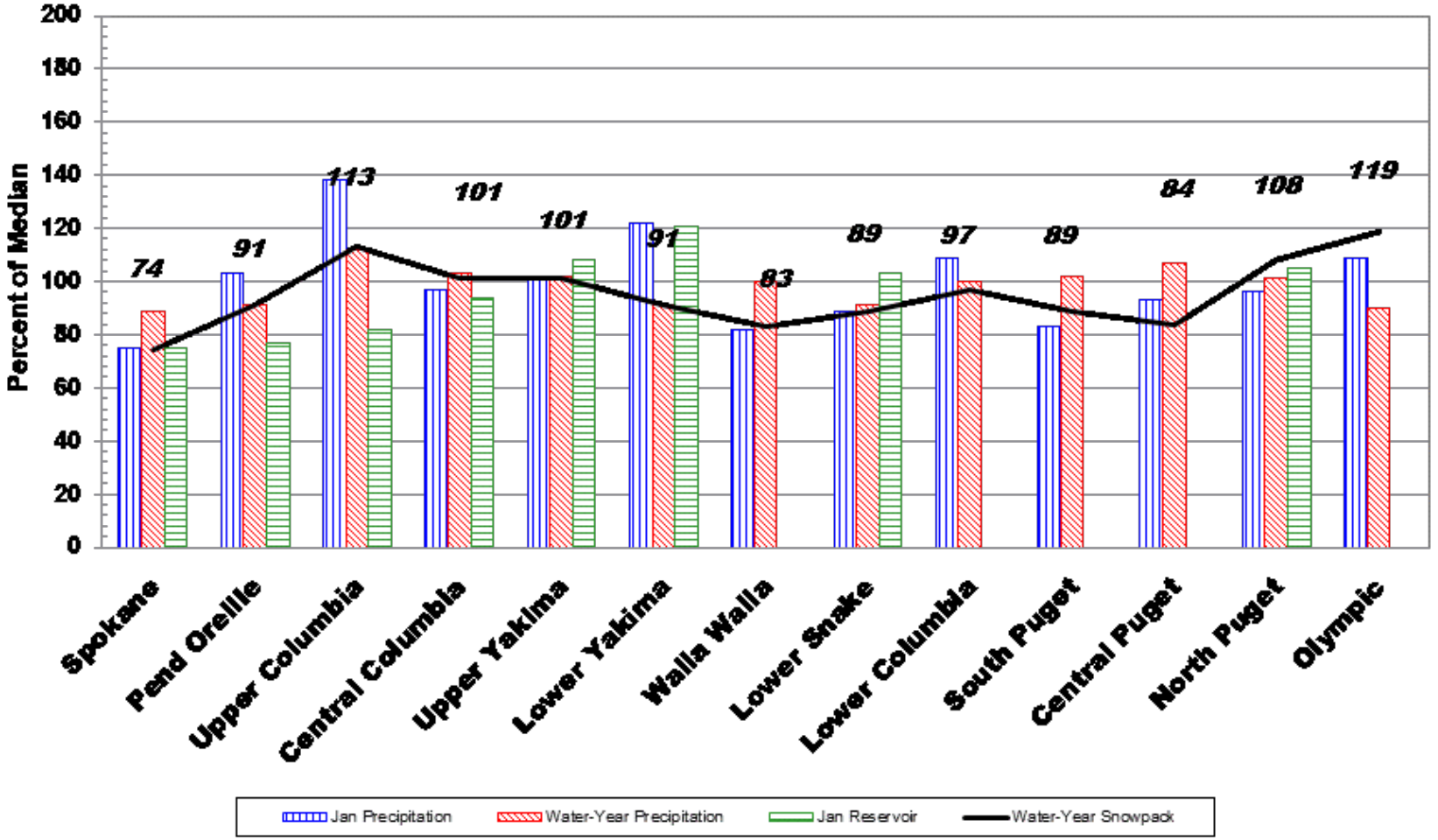
Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/

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 Annual Western Snow Conference
April 12-15, 2021
Virtual Meeting
Bridging the Gap between Research and Operations

For public safety and health reasons, the 88th Annual Meeting of the Western Snow Conference will be held in a virtual format. The virtual format this year provides a unique opportunity to increase participation, particularly among those who would otherwise be unable to attend due to financial, geographic, or time constraints. You are invited to submit an abstract of 150 – 300 words for either oral or poster presentation by February 31, 2021. Those who submitted successful abstracts last year will be given preference as we prepare the 2021 conference agenda.

Abstracts can be submitted online **HERE**. Please see the **Call for Papers** for additional information.

Details of this unique conference are still being finalized, including formats, platforms, and opportunity for vendor participation. Please check back here for updated information.

We are looking forward to "seeing" you online in April as we move ahead in this new world!

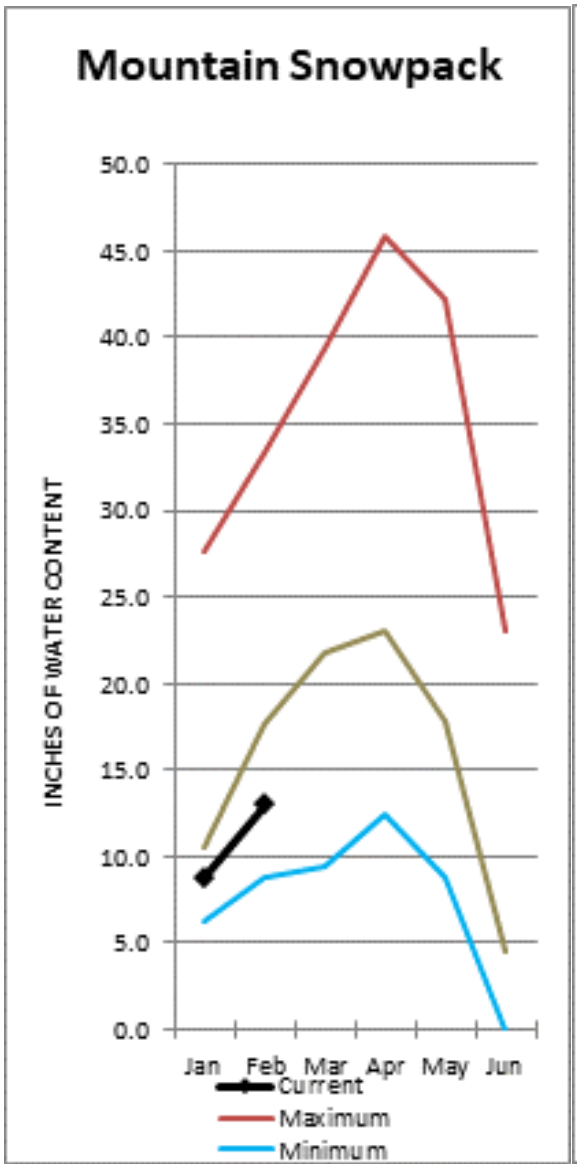
Noah Molotch — General Chair, WSC

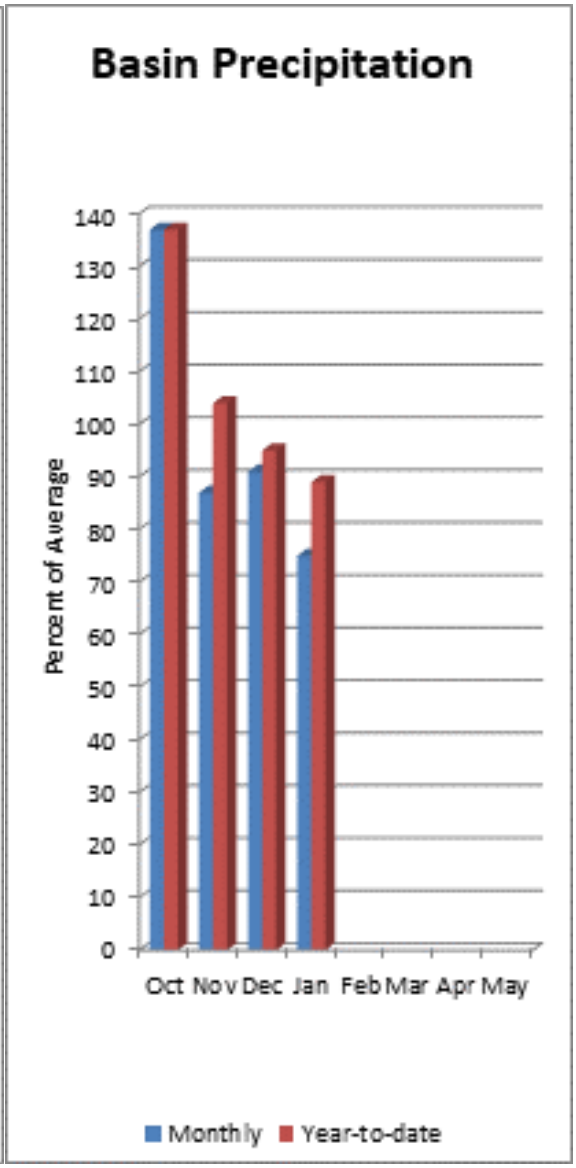
Lucas Zukiewicz — Conference Chair

Additional information about the conference 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 74% of normal and precipitation is 89% of average for the water year. Precipitation for February was slightly below normal at 75% of average. Streamflow on the Spokane River at Spokane was 118% of average for February. February 1 storage in Coeur d'Alene Lake was 71,800-acre feet, 75% of average and 30% of capacity. Snowpack at Quartz Peak SNOTEL site was 111% of average with 16.4 inches of water content.

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

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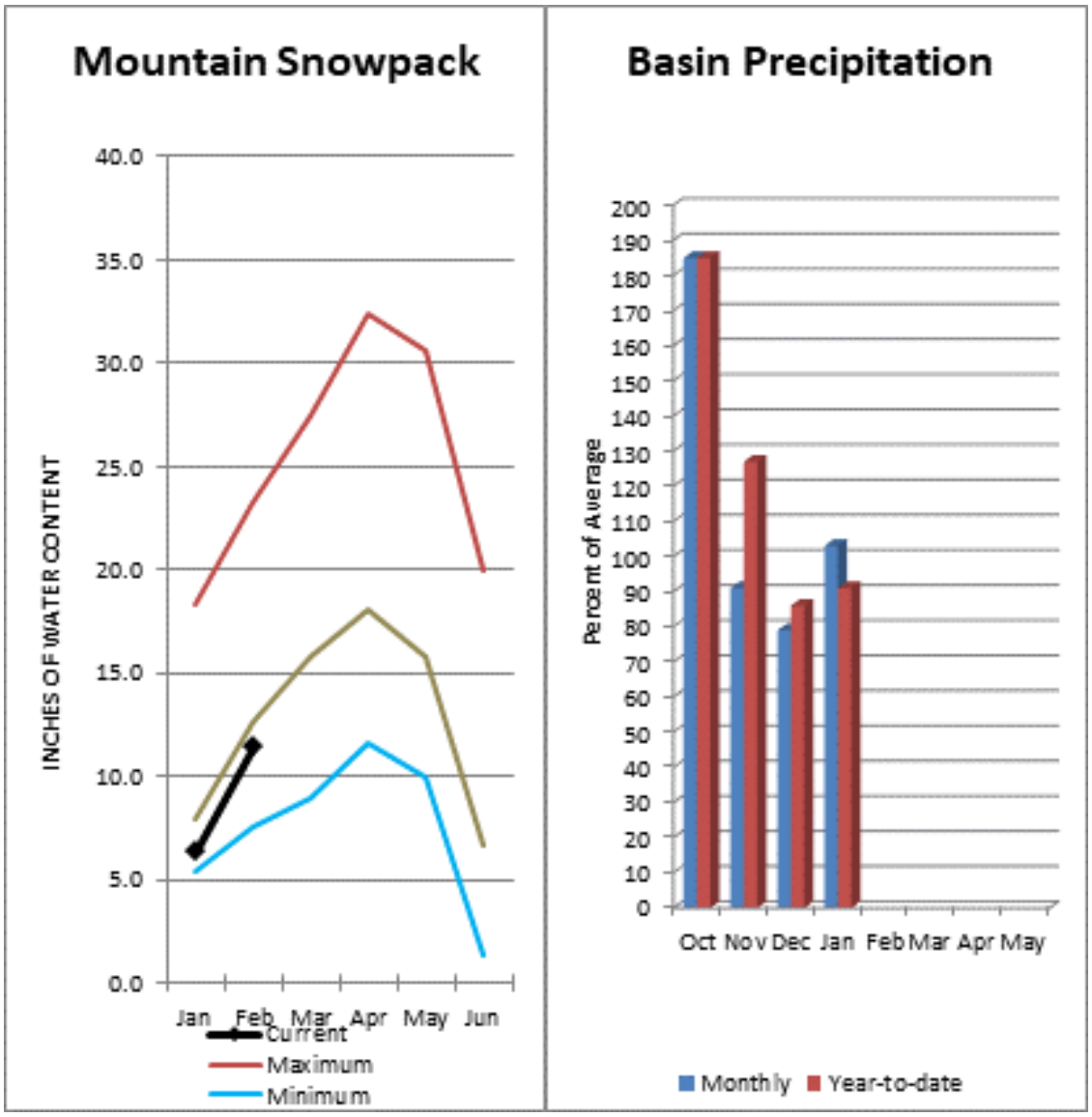
Spokane
Streamflow Forecasts - February 1, 2021

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	1190	1750	2140	90%	2520	3090	2390
	APR-SEP	1250	1820	2210	89%	2600	3170	2480
Spokane R at Long Lake[2]								
	APR-JUL	1430	2010	2400	92%	2800	3380	2620
	APR-SEP	1580	2180	2580	91%	2980	3580	2850
Chamokane Ck nr Long Lake								
	MAR-JUL	11.7	19.6	26	100%	34	47	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	71.8	129.1	96.3	238.5
Basin-wide Total	71.8	129.1	96.3	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Spokane	14	74%	102%
Newman Lake	4	93%	123%



February streamflow was 102% of average on the Pend Oreille River and 108% on the Columbia at Birchbank. February 1 snow cover was 91% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 17.7 inches of snow water on the snow pillow which is slightly below normal for February 1. Precipitation during February was 103% of average, bringing the year-to-date precipitation to 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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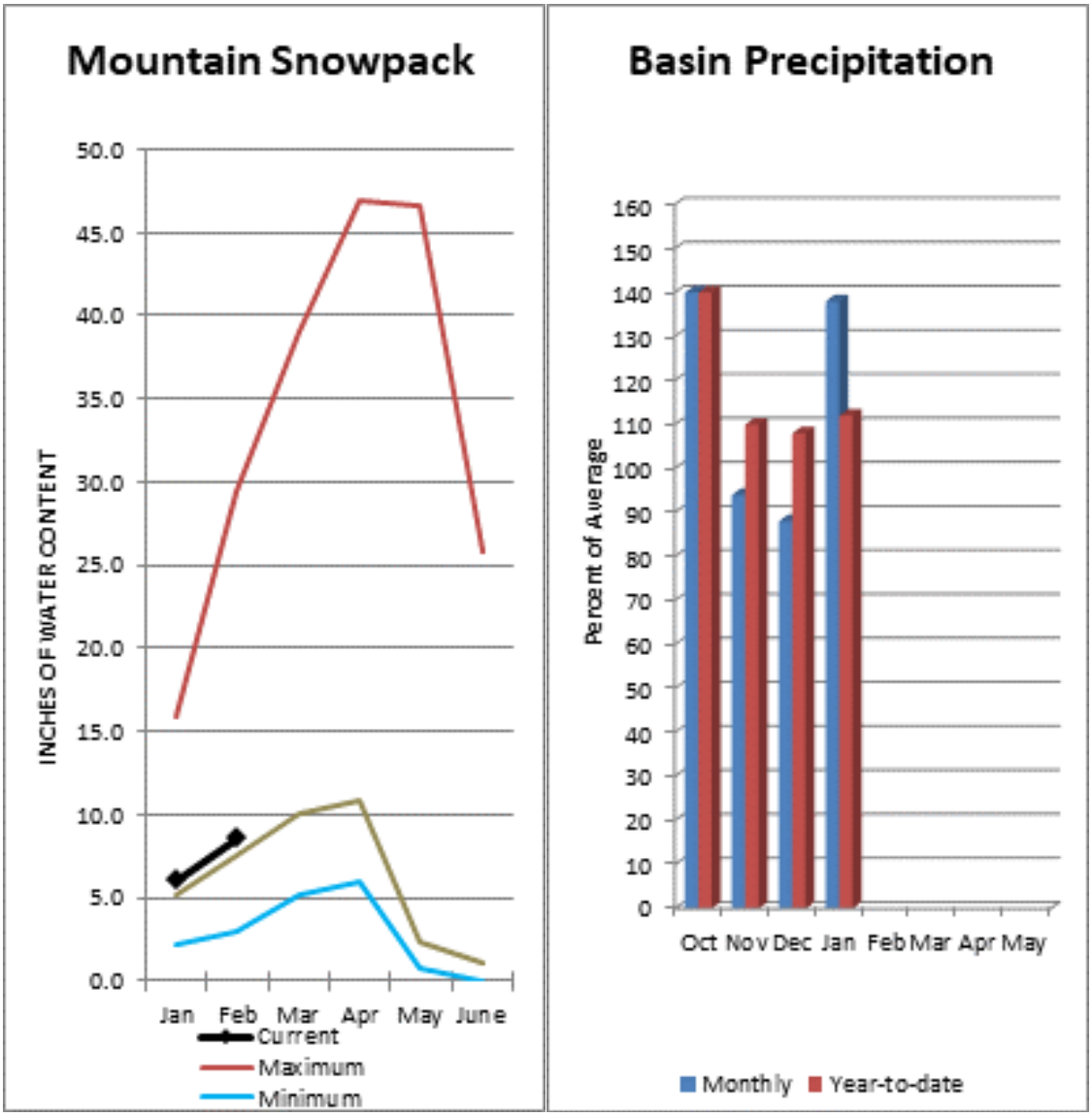
Lower Pend Oreille
Streamflow Forecasts - February 1, 2021

Lower Pend Oreille	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	7610	9620	11000	93%	12400	14400	11800
	APR-SEP	8280	10400	11800	92%	13200	15300	12800
Priest R nr Priest River[2]								
	APR-JUL	515	675	785	101%	895	1060	780
	APR-SEP	530	695	810	98%	920	1090	830
Pend Oreille R bl Box Canyon[2]								
	APR-JUL	7800	9790	11100	93%	12500	14500	11900
	APR-SEP	8420	10500	11900	92%	13400	15500	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	577.0	572.7	753.9	1561.3
Priest Lake	46.6	54.6	56.7	119.3
Basin-wide Total	623.6	627.3	810.6	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Lower Pend Oreille	11	91%	123%
Sullivan	1	98%	131%



February 1 snow cover on the Okanogan was 117% of normal, Omak Creek was 143% and the Methow was 113%. January precipitation in the Upper Columbia was 138% of average, with precipitation for the water year at 112% of average. January streamflow for the Methow River was 129% of average, 116% for the Okanogan River and 109% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 9.1 inches or 138% of normal for February 1. Combined storage in the Conconully Reservoirs was 11,800 acre-feet or 82% of normal.

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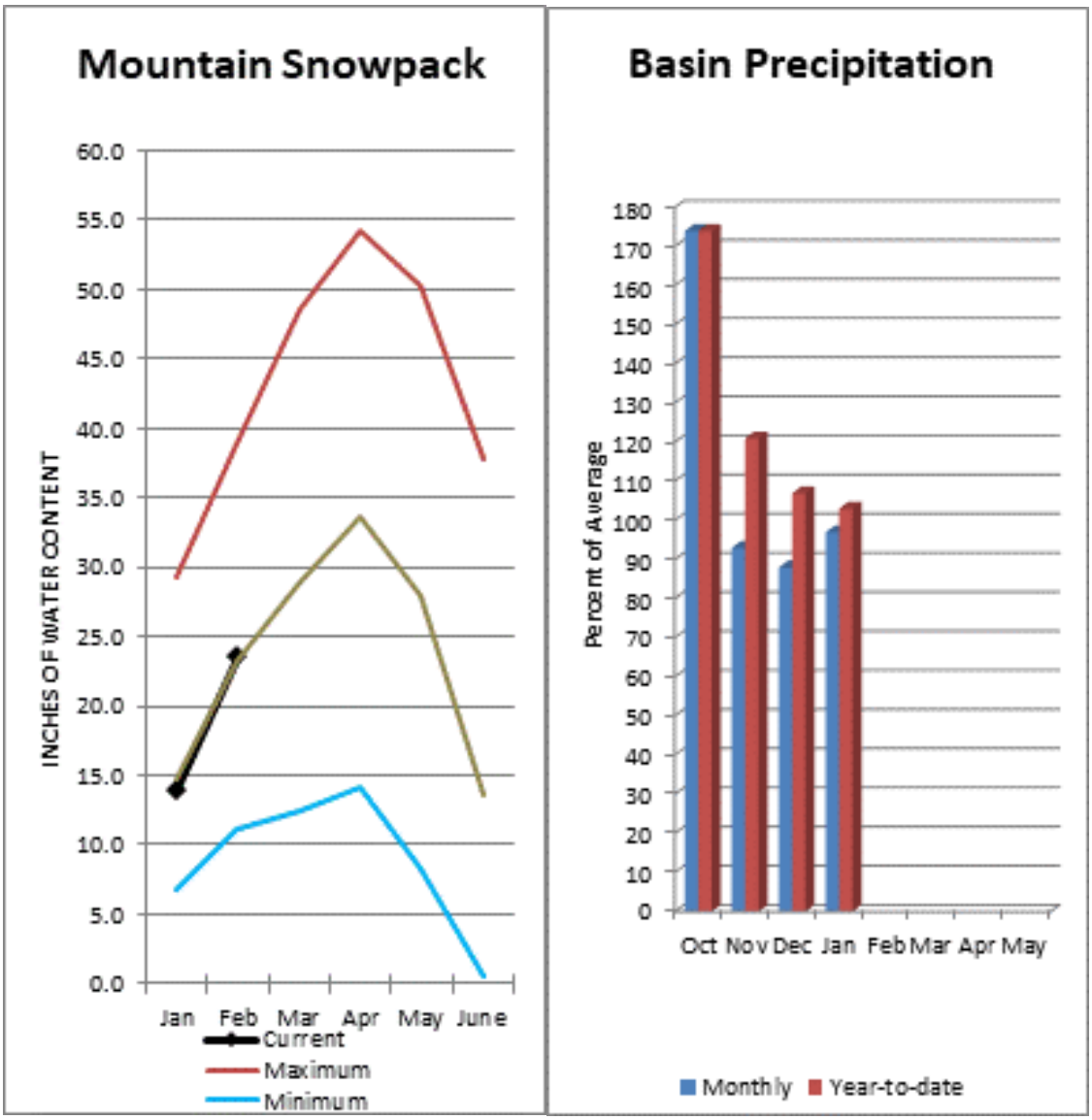
Upper Columbia
Streamflow Forecasts - February 1, 2021

Upper Columbia	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	1420	1680	1850	103%	2020	2280	1800
	APR-SEP	1480	1740	1920	102%	2100	2370	1880
Colville R at Kettle Falls								
	APR-JUL	59	102	131	110%	160	205	119
	APR-SEP	64	112	144	110%	176	225	131
Columbia R at Grand Coulee-NWS[2]								
	APR-JUL	43500		51400	101%		58100	51015
	APR-SEP	52800		60900	101%		68600	60110
Similkameen R nr Nighthawk								
	APR-JUL	1060	1260	1390	116%	1520	1720	1200
	APR-SEP	1140	1340	1480	116%	1620	1820	1280
Okanogan R nr Tonasket								
	APR-JUL	1230	1510	1710	116%	1900	2190	1480
	APR-SEP	1370	1690	1910	116%	2120	2450	1650
Okanogan R at Malott								
	APR-JUL	1260	1550	1740	120%	1940	2230	1450
	APR-SEP	1380	1710	1930	119%	2150	2470	1620
Methow R nr Pateros								
	APR-JUL	775	935	1040	125%	1150	1320	835
	APR-SEP	830	1000	1120	125%	1240	1410	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	6.2	6.9	7.3	10.5
Conconully Reservoir	5.6	7.3	7.0	13.0
Basin-wide Total	11.8	14.2	14.3	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Upper Columbia	31	113%	109%
Colville	1	90%	107%
Kettle	5	114%	132%
Okanogan	15	117%	115%
Omak	1	143%	83%
Sanpoil	2	135%	74%
Similkameen	13	113%	99%
Toats Coulee	31	113%	109%
Conconully Lake	3	109%	76%
Methow	7	113%	98%



Precipitation during January was 97% of average in the basin and 103% for the year-to-date. January average streamflow on the Chelan River was 110% and on the Wenatchee River 110%. February 1 snowpack in the Wenatchee River Basin was 95% of normal; the Chelan, 99%; the Entiat, 118%; Stemilt Creek, 87% and Colockum Creek, 123%. Reservoir storage in Lake Chelan was 94% of average. Lyman Lake SNOTEL had the most snow water with 36 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.

Data Current as of: 2/4/2021 1:00:43 PM

Central Columbia
Streamflow Forecasts - February 1, 2021

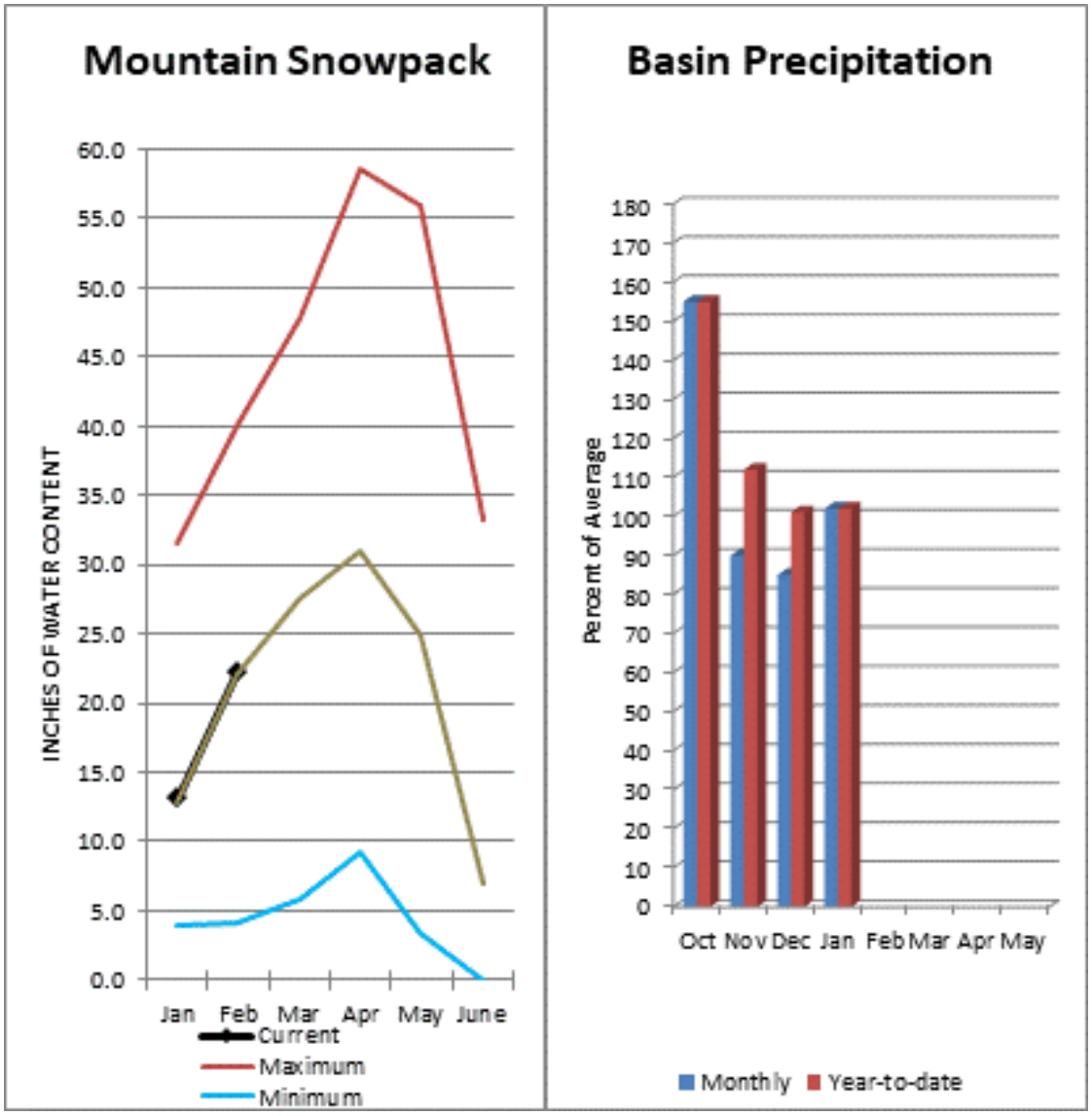
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Columbia	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	750	815	103%	880	970	790
Chelan R at Chelan								
	APR-JUL	855	975	1060	106%	1140	1260	1000
	APR-SEP	945	1090	1190	106%	1290	1430	1120
Entiat R nr Ardenvoir								
	APR-JUL	141	173	195	98%	215	250	200
	APR-SEP	149	185	210	95%	235	270	220
Wenatchee R at Plain								
	APR-JUL	715	855	950	96%	1050	1190	990
	APR-SEP	760	920	1030	95%	1140	1300	1080
Icicle Ck nr Leavenworth								
	APR-JUL	191	230	260	95%	290	330	275
	APR-SEP	200	250	280	93%	310	360	300
Wenatchee R at Peshastin								
	APR-JUL	995	1170	1290	94%	1410	1590	1370
	APR-SEP	1070	1270	1410	95%	1550	1750	1490
Columbia R bl Rock Island Dam-NWS[2]								
	APR-JUL	47700		56700	102%		64200	55770
	APR-SEP	56900		66500	102%		76100	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	322.3	251.4	343.1	677.4
Basin-wide Total	322.3	251.4	343.1	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Central Columbia	9	101%	94%
Lake Chelan	2	99%	91%
Entiat	1	118%	82%
Wenatchee	6	95%	93%
Stemilt	1	87%	76%
Colockum	1	123%	89%



February 1 reservoir storage for the Upper Yakima reservoirs was 438,200-acre feet, 108% of average. January streamflow on the Cle Elum River near Roslyn was 114%. February 1 snowpack was 101% based upon 9 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 102% of average for January and 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: 2/4/2021 1:00:55 PM

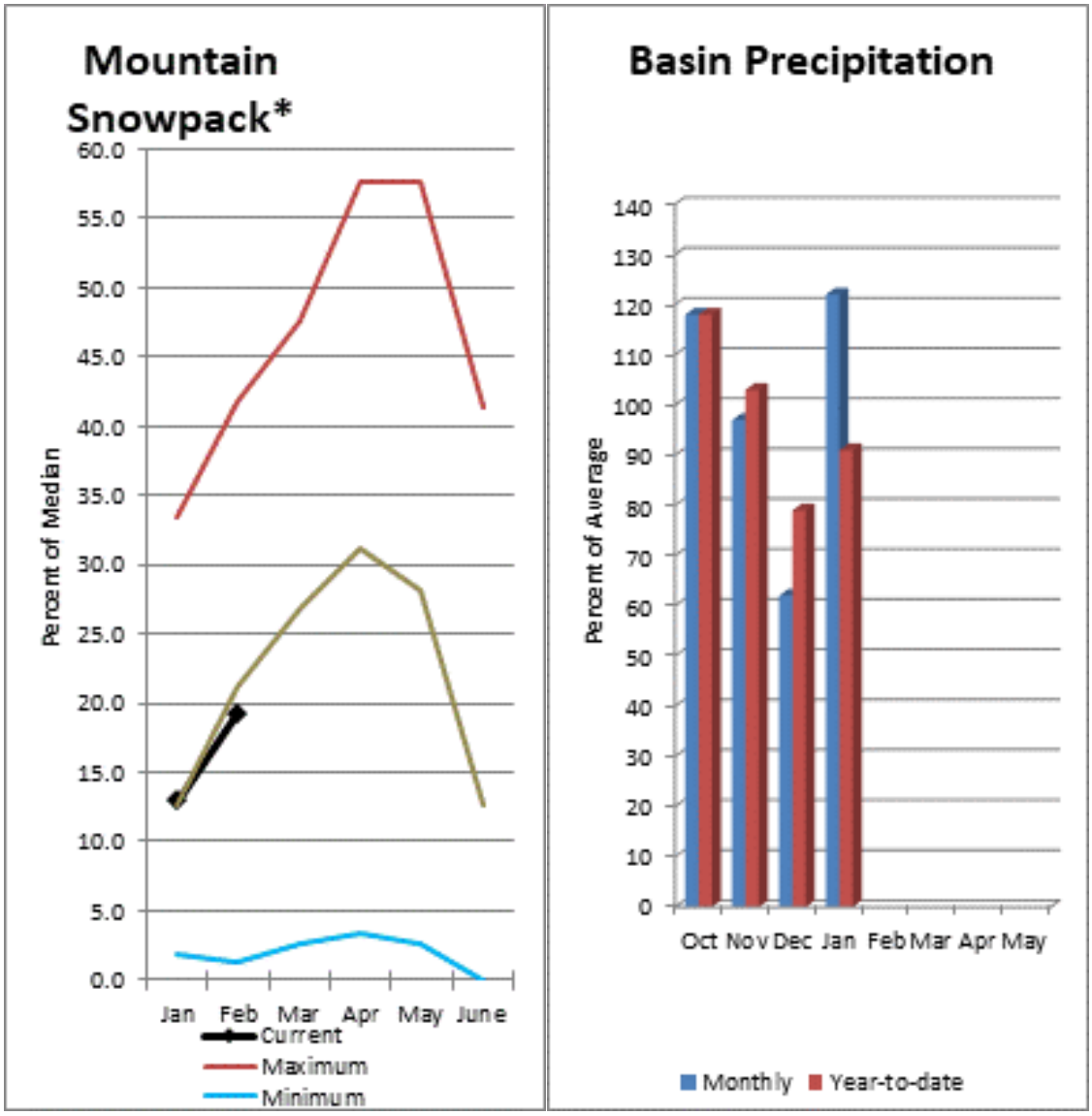
Upper Yakima
Streamflow Forecasts - February 1, 2021

Upper Yakima	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	81	104	120	103%	136	159	116
	APR-SEP	90	114	131	104%	147	172	126
Kachess Reservoir Inflow [2]								
	APR-JUL	74	93	107	103%	120	139	104
	APR-SEP	81	101	115	102%	129	149	113
Cle Elum Lake Inflow [2]								
	APR-JUL	295	350	390	101%	430	485	385
	APR-SEP	320	380	425	102%	465	525	415
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	81	113	134	103%	155	186	130
	APR-SEP	83	115	137	103%	158	190	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	90.0	77.3	82.1	157.8
Kachess	151.7	96.1	130.8	239.0
Cle Elum	196.5	138.0	191.5	436.9
Basin-wide Total	438.2	311.5	404.4	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Upper Yakima	9	101%	89%



January average streamflows within the basin were: Yakima River near Parker, 114% and the Naches River near Naches, 126%. February 1 reservoir storage for Bumping and Rimrock reservoirs was 147,500-acre feet, 121% of average. February 1 snowpack was 91% within the Lower Yakima Basin, 98% in the Naches and Ahtanum Creek reported in at 85% of normal. January precipitation was 99% of average and 99% for the water-year in the Naches River Basin. The Lower Yakima recorded 122% of average for January and 91% 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
Streamflow Forecasts - February 1, 2021

Lower Yakima	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						
Ahtanum Ck at Union Gap								
	APR-JUL	12.3	21	27	100%	33	42	27
	APR-SEP	14.1	23	29	100%	35	44	29
Yakima R nr Parker [2]								
	APR-JUL	1180	1480	1680	101%	1880	2180	1660
	APR-SEP	1300	1620	1840	101%	2060	2380	1820

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, 2021	# of Sites	% Median	Last Year % Median
Lower Yakima	3	91%	93%
Ahtanum	2	95%	87%
Simcoe-Toppenish	1	84%	67%
Satus	1	78%	113%

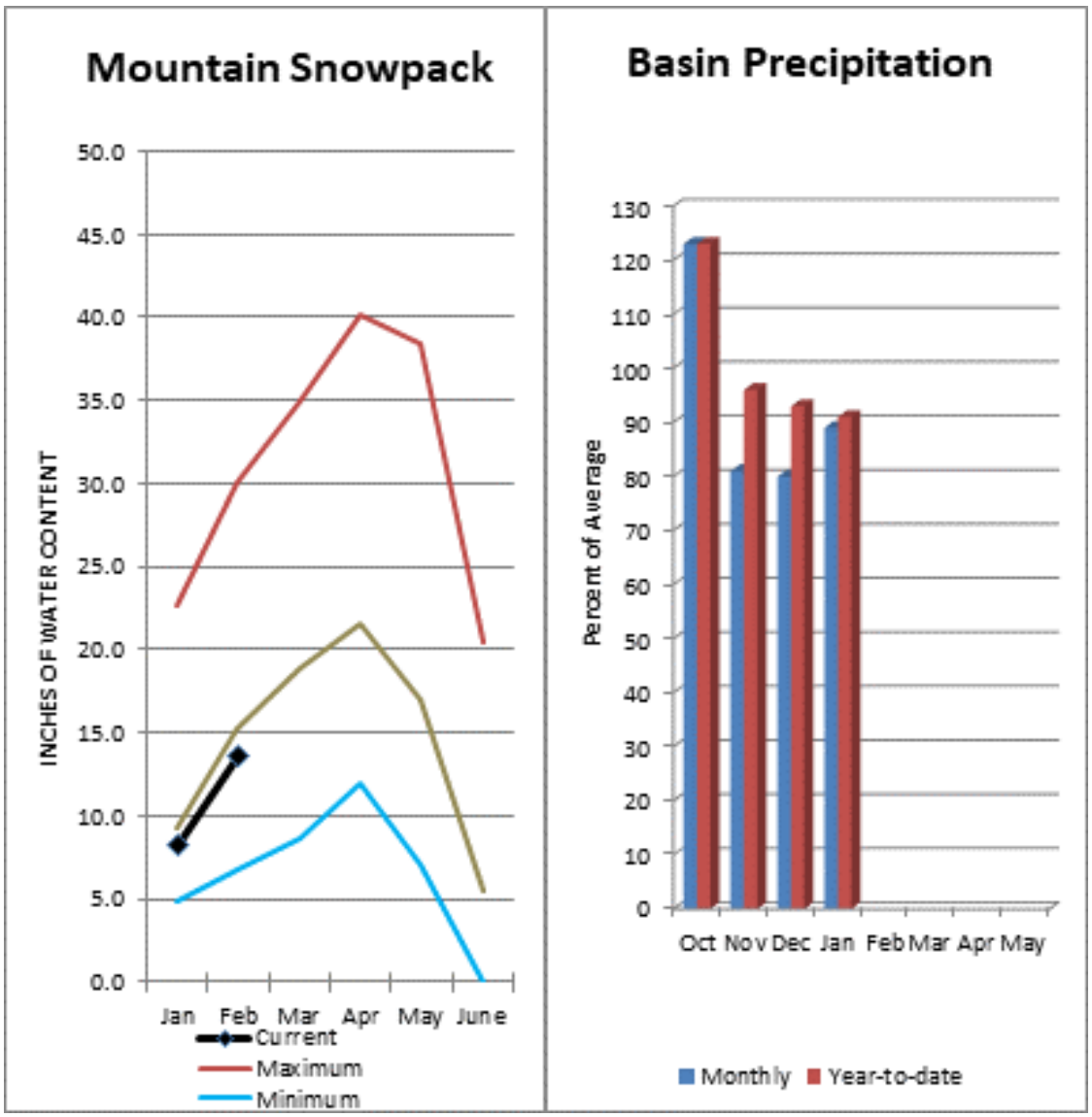
Naches
Streamflow Forecasts - February 1, 2021

Naches	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	82	100	112	98%	123	141	114
	APR-SEP	88	108	121	98%	134	154	123
American R nr Nile								
	APR-JUL	75	90	100	98%	110	125	102
	APR-SEP	79	96	108	98%	120	138	110
Rimrock Lake Inflow [2]								
	APR-JUL	144	168	185	99%	200	225	187
	APR-SEP	168	198	220	100%	240	270	220
Naches R nr Naches								
	APR-JUL	480	610	700	100%	790	920	700
	APR-SEP	515	665	765	101%	865	1010	760

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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	21.9	17.3	12.7	33.7
Rimrock	125.7	99.1	109.6	198.0
Basin-wide Total	147.5	116.3	122.3	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Naches	7	98%	108%



January precipitation was 89% of average, bringing the year-to-date precipitation to 91% of average. February 1 snowpack readings averaged 89% of normal. January streamflow was 78% of average for Snake River below Lower Granite Dam and 100% for Grande Ronde River near Troy. Dworshak Reservoir storage was 103% of average.

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

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Lower Snake-Walla Walla
Streamflow Forecasts - February 1, 2021

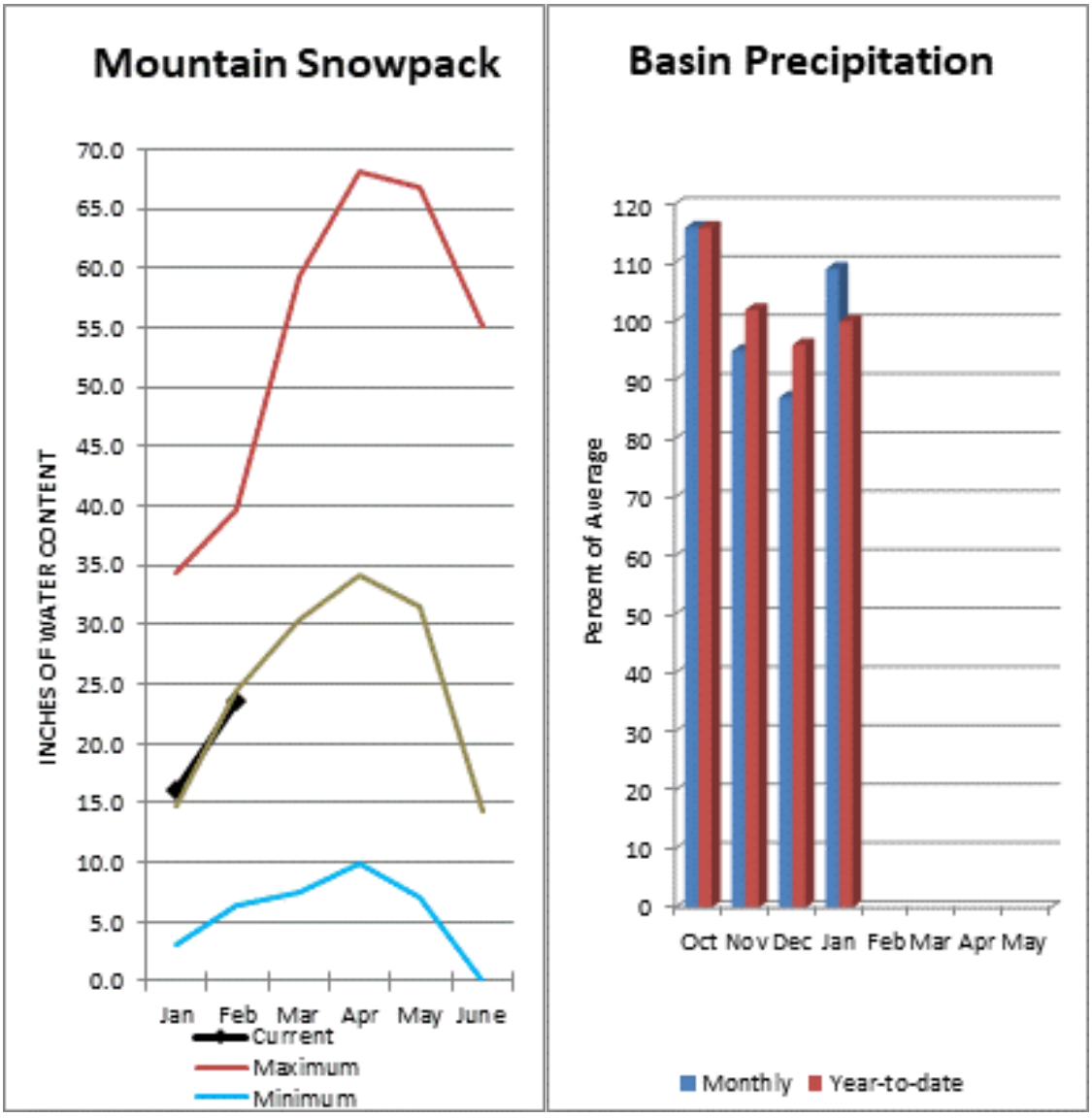
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake-Walla Walla	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	MAR-JUL	905	1150	1320	87%	1490	1730	1510
	APR-SEP	740	975	1130	86%	1290	1520	1310
Asotin Ck at Asotin								
	APR-JUL	13.6	21	28	80%	35	47	35
Clearwater R at Spalding[2]								
	APR-JUL	3900	5040	5820	84%	6590	7730	6890
	APR-SEP	4180	5340	6130	84%	6930	8090	7270
Snake R bl Lower Granite Dam-NWS[2]								
	APR-JUL	12400		16000	81%		19200	19848
	APR-SEP	14400		18200	82%		22000	22280
SF Walla Walla R nr Milton-Freewater								
	MAR-JUL	52	61	67	99%	73	83	68
	APR-SEP	50	59	65	98%	71	80	66
Mill Ck nr Walla Walla								
	APR-JUL	15.5	19.2	22	92%	24	28	24
	APR-SEP	18.6	23	25	93%	28	32	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

Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2393.8	2203.0	2335.0	3468.0
Basin-wide Total	2393.8	2203.0	2335.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Lower Snake-Walla Walla	21	89%	99%
Asotin	2	58%	84%
Grande Ronde	19	88%	101%
Walla Walla	4	83%	102%



Near normal streamflow is forecasted for April – September runoff. The Columbia at The Dalles is forecasted to have 96% of average flows this summer according to the River Forecast Center. January average streamflow for Cowlitz River was 137% and the Columbia River at The Dalles was 94% of average. January precipitation was 109% of average and the water-year average was 100%. February 1 snow cover for Cowlitz River was 99%, and Lewis River was 92% of normal.

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Lower Columbia
Streamflow Forecasts - February 1, 2021

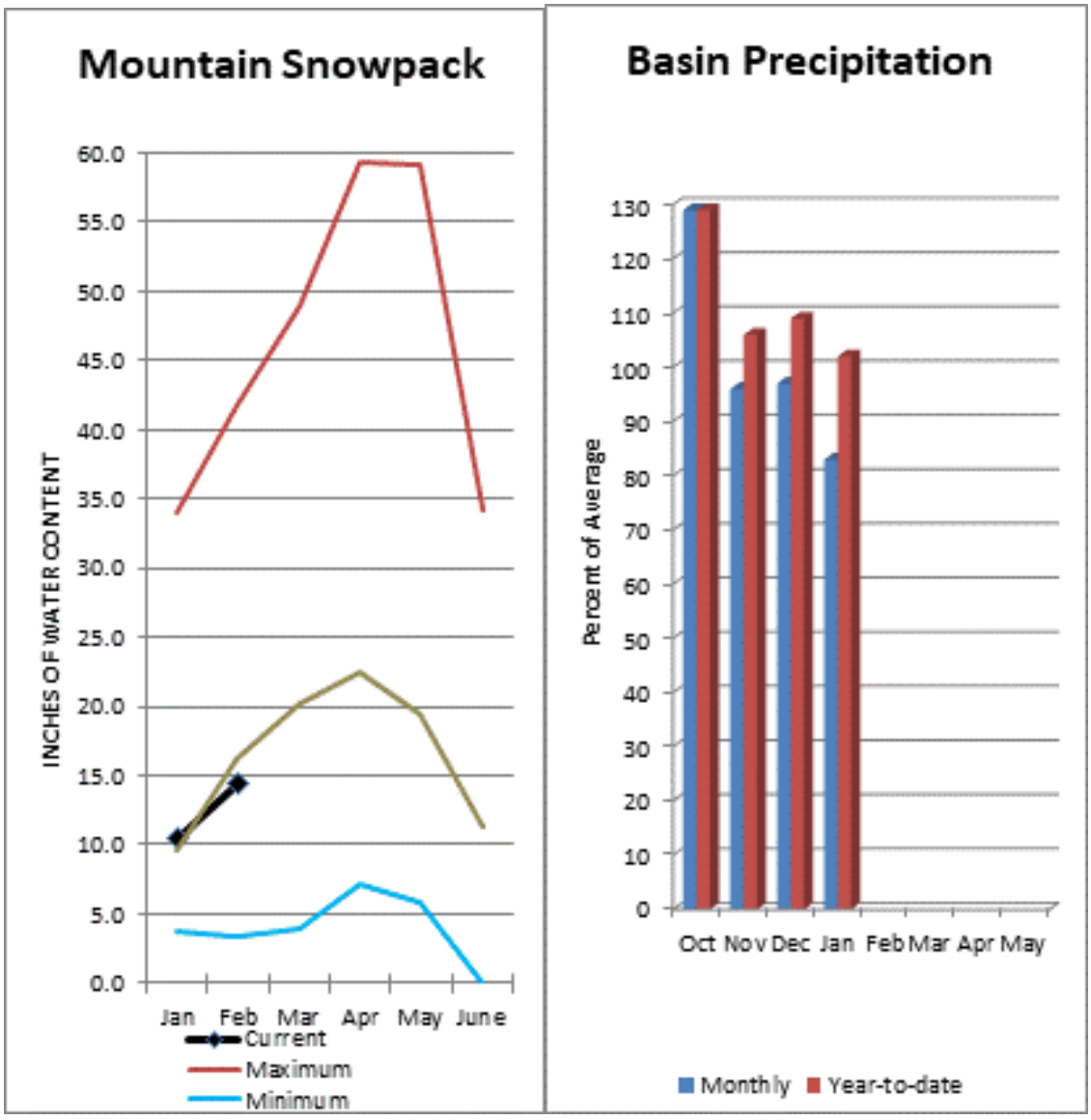
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Columbia	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	63500		74700	94%		86600	79855
	APR-SEP	76000		88700	96%		101000	92704
Klickitat R nr Glenwood								
	APR-JUL	80	104	120	95%	136	160	126
	APR-SEP	89	115	132	95%	150	176	139
Klickitat R nr Pitt								
	APR-JUL	310	380	435	100%	485	560	435
	APR-SEP	375	460	520	100%	580	665	520
Lewis R at Ariel[2]								
	APR-JUL	620	810	940	97%	1070	1260	970
	APR-SEP	735	935	1070	96%	1200	1400	1120
Cowlitz R bl Mayfiled[2]								
	APR-JUL	1140	1440	1640	101%	1840	2140	1630
	APR-SEP	1310	1630	1850	101%	2060	2380	1840
Cowlitz R at Castle Rock[2]								
	APR-JUL	1540	2010	2320	104%	2640	3100	2240
	APR-SEP	1800	2290	2620	103%	2940	3430	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

Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Yale				0.0
Swift			624.9	0.0
Mossyrock Dam (Riffe Lk)		901.1	1206.0	0.0
Merwin			400.4	0.0
Basin-wide Total		0.0	0.0	
# of reservoirs	0	0	0	0

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Lower Columbia	12	97%	101%
Lewis	6	92%	95%
Cowlitz	8	99%	106%



February 1 snowpack was 88% of average for the White River, 68% for Puyallup River and 79% in the Green River Basin. January precipitation was 92% of average, bringing the water year-to-date to 104% of average for the basins.

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

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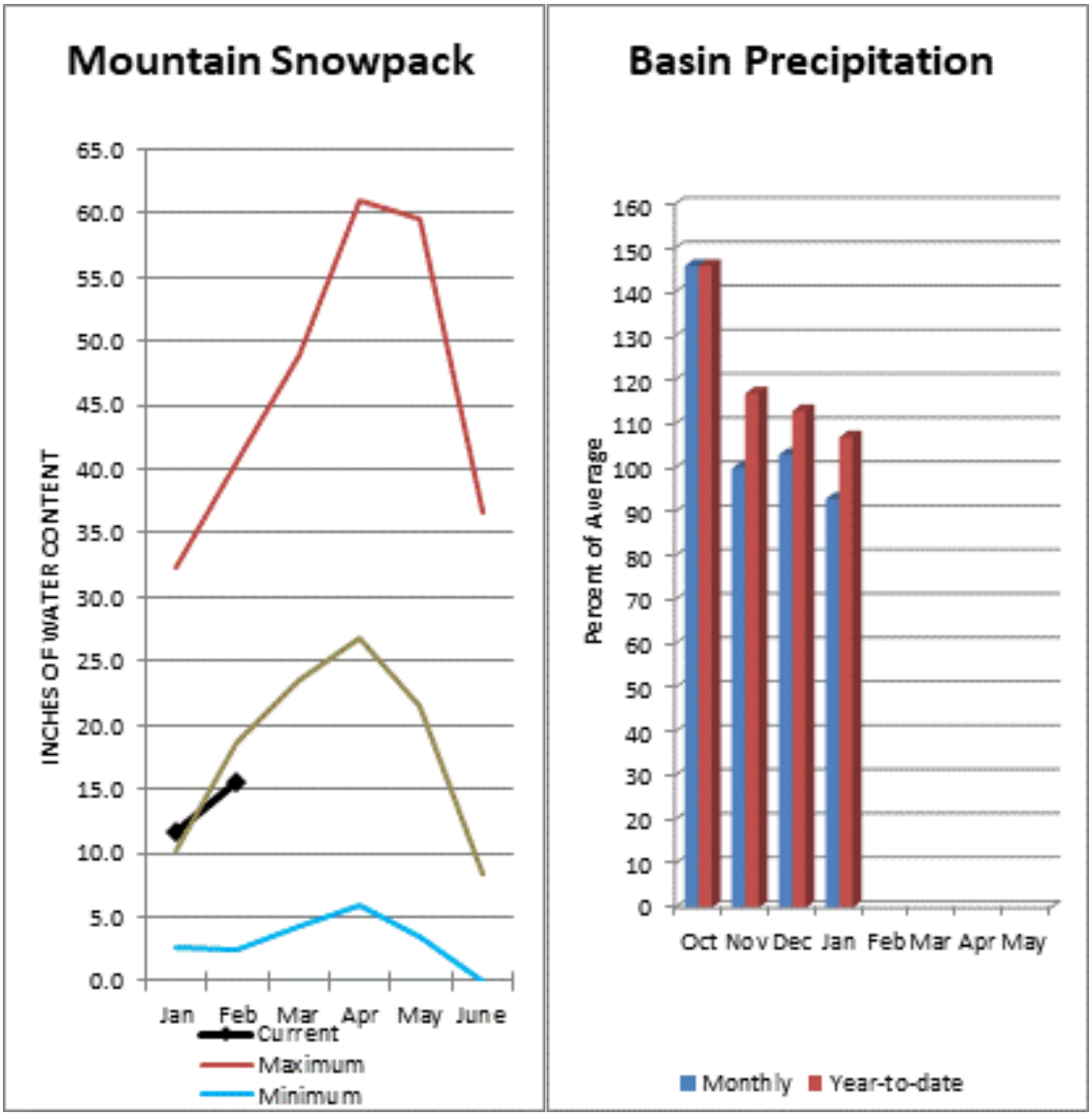
South Puget Sound
Streamflow Forecasts - February 1, 2021

South Puget Sound	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						
White R nr Buckley[1,2]								
	APR-JUL	290	365	400	93%	435	510	430
	APR-SEP	350	440	480	93%	520	610	515
Green R bl Howard A Hanson Dam[1,2]								
	APR-JUL	102	168	198	84%	230	295	235
	APR-SEP	123	190	220	85%	250	315	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, 2021	# of Sites	% Median	Last Year % Median
South Puget Sound	12	89%	92%
White	5	88%	101%
Puyallup	2	68%	108%
Green	6	79%	71%



Basin-wide precipitation for January was 85% of average, bringing water-year-to-date to 106% of average. February 1 median snow cover in Cedar River Basin was 84%, Tolt River Basin was 84%, Snoqualmie River Basin was 91%, and Skykomish River Basin was 89%.

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

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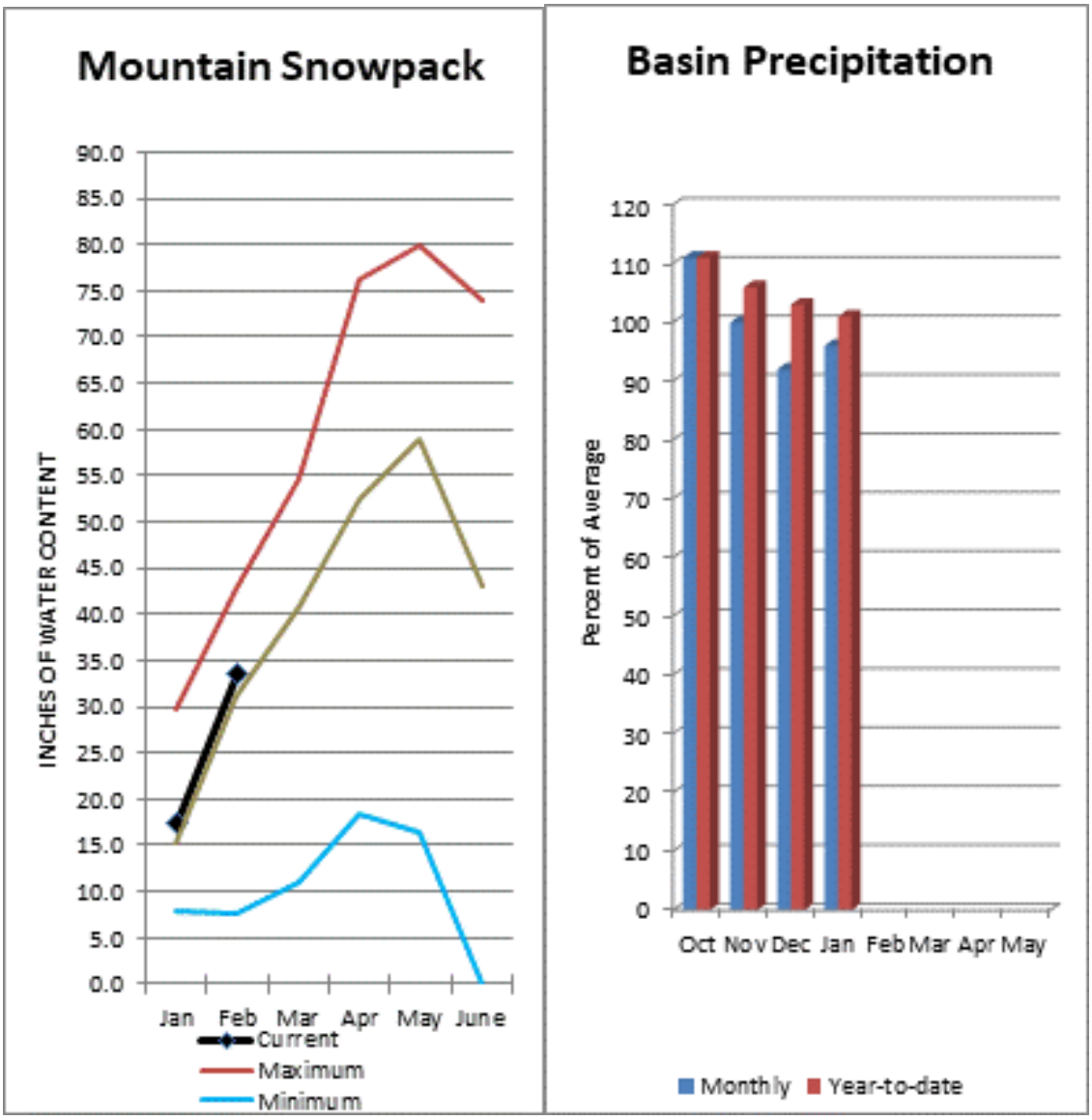
Central Puget Sound
Streamflow Forecasts - February 1, 2021

Central Puget Sound	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						
Cedar R nr Cedar Falls								
	APR-JUL	45	61	72	103%	83	100	70
	APR-SEP	50	67	78	103%	89	106	76
Rex R nr Cedar Falls								
	APR-JUL	18.9	24	27	113%	30	35	24
	APR-SEP	21	26	29	107%	32	37	27
Taylor Ck nr Selleck								
	APR-JUL	14.9	19.2	22	110%	25	29	20
	APR-SEP	18.2	23	26	108%	29	33	24
SF Tolt R nr Index								
	APR-JUL	9.9	12.8	14.7	104%	16.7	19.6	14.2
	APR-SEP	11.9	14.9	17	106%	19.1	22	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, 2021	# of Sites	% Median	Last Year % Median
Central Puget Sound	9	86%	82%
Cedar	6	84%	75%
Tolt	2	84%	81%
Snoqualimie	4	91%	79%
Skykomish	3	89%	93%



Runoff is forecasted to be near to slightly above average for the 3 major basins represented. January streamflow in Skagit River was 130% of average. Basin-wide precipitation for January was 96% of average, bringing water-year-to-date to 101% of average. February 1 average snow cover in Skagit River Basin was 114% and the Nooksack River Basin was 104%. February 1 Skagit River reservoir storage was 105% of average and 73% of capacity.

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

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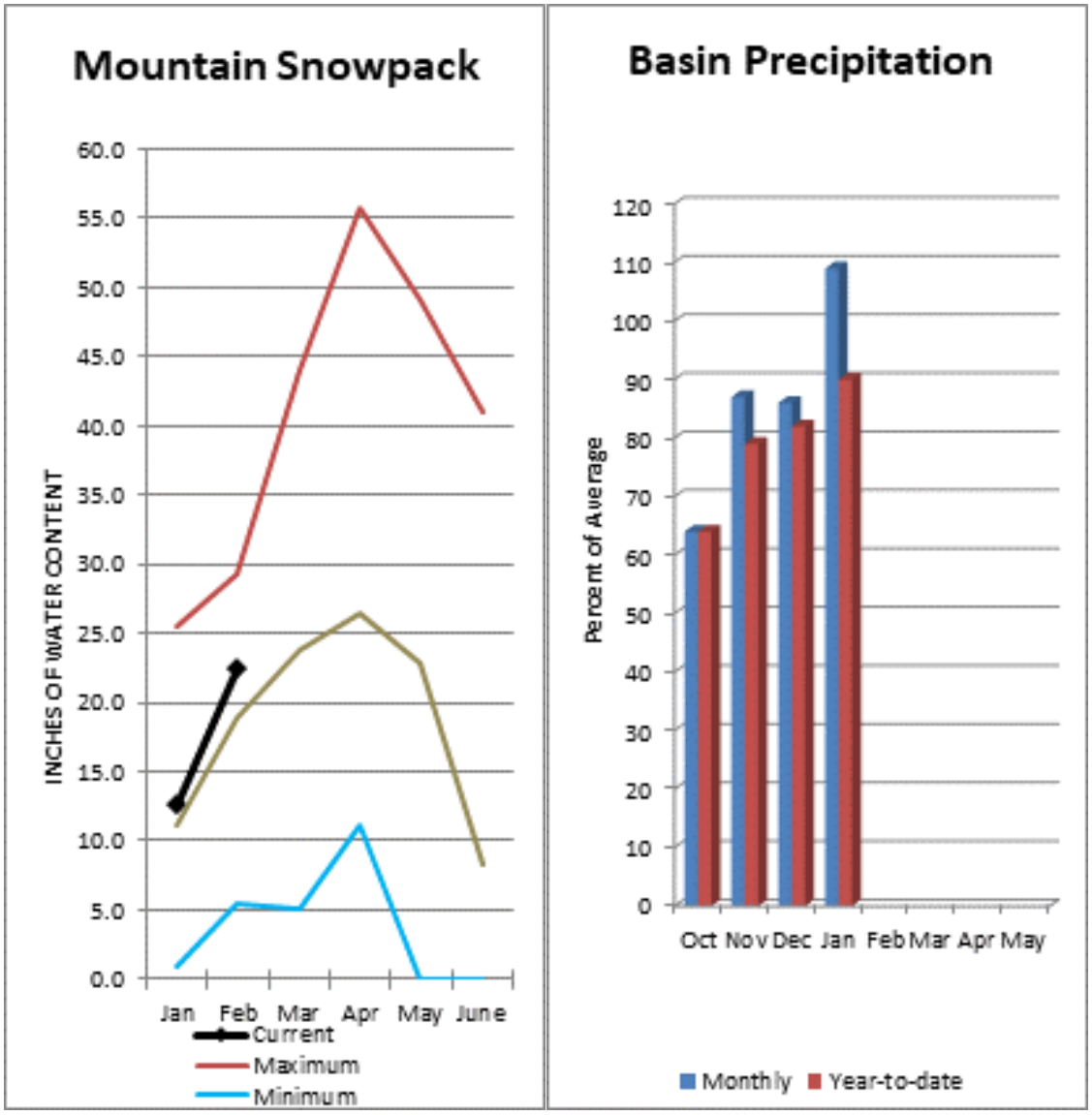
North Puget Sound
Streamflow Forecasts - February 1, 2021

North Puget Sound	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	210	230	245	104%	260	280	235
	APR-SEP	305	325	340	103%	355	380	330
Skagit R at Newhalem[2]								
	APR-JUL	1450	1660	1800	103%	1940	2150	1750
	APR-SEP	1720	1960	2120	102%	2280	2520	2070
Baker R at Concrete								
	APR-JUL	700	790	855	110%	915	1000	780
	APR-SEP	910	1010	1070	109%	1140	1240	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	1048.2	860.2	996.3	1434.7
Diablo Reservoir			85.8	90.6
Basin-wide Total	1048.2	860.2	996.3	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
North Puget Sound	15	108%	102%
Skagit	10	114%	109%
Baker	0		
Nooksack	3	104%	100%



January runoff in the Dungeness River was 130% of normal. January precipitation was 109% of average. Precipitation has accumulated at 90% of average for the water year. January precipitation at Quillayute was 111 % of normal brining water-year precipitation to 107%. Olympic Peninsula snowpack averaged 119% of normal on February 1.

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

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Olympic
Streamflow Forecasts - February 1, 2021

Olympic	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	91	113	129	108%	144	167	120
	APR-SEP	102	134	155	107%	177	210	145
Elwha R at McDonald Br nr Port Angeles								
	APR-JUL	330	400	450	113%	495	565	400
	APR-SEP	395	470	525	112%	575	655	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, 2021	# of Sites	% Median	Last Year % Median
Olympic	6	119%	119%

Issued by

Terry Cosby
Acting Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Comes-At-Night
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 March 1, 2021

Olallie Meadows SNOTEL site from the air on 2/27/2021. 15+ feet of snow equals 136% of normal snow water content, this why we use tall towers, shelters and precipitation gages. Olallie Meadows is remotely located in Old Growth forest near Snoqualmie Pass and hard to get to but notice the cross-country ski track in front of the site. Photo credit to Lauren Austin, Hydrologist, Oregon Snow Survey

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

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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

March 2021

General Outlook

February brought amazing snow fall across the state. With big snow comes big avalanche concerns which closed all mountain highway passes several times during the month. Precipitation was mostly near to much-above average for the month. February temperatures were 2-4 degrees below normal for the month, which brought much needed snow accumulation to the lower elevations and boosted some higher elevation sites to new records. Water-year temperatures are still trending slightly warmer than normal.

The most recent forecast through mid-March shows a high probability for below normal temperatures and above normal precipitation, with a return to near normal conditions later in the month. National Weather Service 3-month forecast, beginning March 1, indicates below normal temperatures and above normal precipitation which is indicative of the continuation of Enso La Nina. The US Drought Monitor indicates D0-D2 drought designation persisting in the south-central part of the state, showing a slight improvement from last month. (see maps page 4)

Snowpack

The March 1 statewide SNOTEL readings were 132% of normal, considerably higher than last month. The lowest readings in the state were 68% of the 30-year median for March 1 in the Newman Lake Basin. The Puyallup River Basin had the most snow with 149%. Westside medians from SNOTEL and March 1 snow surveys, included the North Puget Sound river basins with 125% of normal, the Central and South Puget river basins with 141% and 140% respectively, and the Lower Columbia basins with 131% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 122% and the Wenatchee area with 125%. Snowpack in the Spokane River Basin was at 99% and the Upper Columbia river basins had 128% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	99	108
Newman Lake	95	111
Lower Pend Oreille	97	110
Kettle	120	131
Okanogan	128	99
Methow	133	105
Conconully Lake	133	78
Central Columbia	125	101
Upper Yakima	129	104
Naches	123	120
Lower Yakima	116	90
Ahtanum Creek	116	90
Walla Walla	135	117
Lower Snake	123	111
Cowlitz	138	123
Lewis	129	94
White	137	127
Green	147	104
Puyallup	149	125
Cedar	136	97
Snoqualmie	139	97
Skykomish	148	118
Skagit	126	112
Nooksack	133	109
Olympic Peninsula	129	113

Precipitation

March precipitation accumulation was near to much-above average across the state. The big winner was the Walla Walla area with 256% precipitation. Individual stations ranged from 388% to a low of 61%. Statewide water-year average was 115% as of March 1. SNOTEL collects all form of precipitation including, rain, snow or sleet and hail.

RIVER BASIN	MARCH PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	141	98
Lower Pend Oreille	108	93
Upper Columbia	145	117
Central Columbia	111	113
Upper Yakima	179	114
Naches	153	108
Lower Yakima	145	101
Klickitat	154	101
Walla Walla	256	124
Lower Snake	223	114
Lower Columbia	165	110
South Puget Sound	205	119
Central Puget Sound	245	125
North Puget Sound	195	113
Olympic Peninsula	118	93

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 479,900-acre feet, 107% of average for the Upper Reaches and 158,800-acre feet or 116% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 61,600-acre feet, 46% of average and 26% of capacity; and Ross lake within the Skagit River Basin at 94% of average and 54% 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	26	46
Lower Pend Oreille	36	71
Upper Columbia	58	93
Central Columbia	35	84
Upper Yakima	58	107
Naches	69	116
Lower Snake	70	102
North Puget Sound	54	94

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

Streamflow

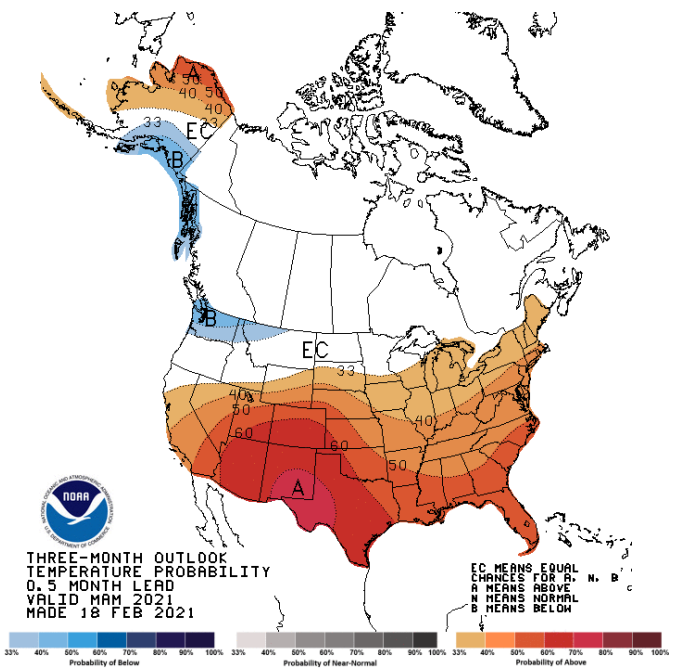
Early winter forecasts for April-September stream flows are never quite as robust as they are later in the season when we know more about the winter climatology. At times only a few degrees warmer or cooler than forecasted can make or break stream flow predictions. Volumetric forecasts are developed 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

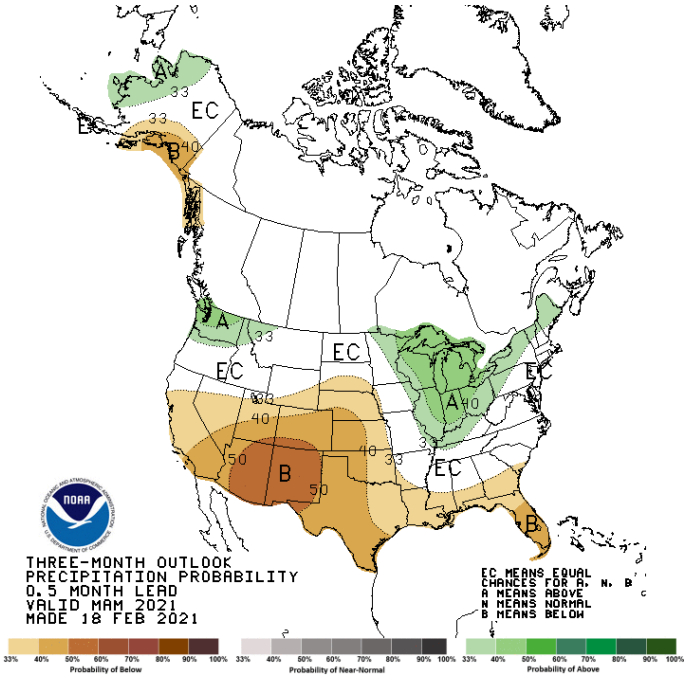
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	100-121
Pend Oreille	96-106
Upper Columbia	97-143
Central Columbia	99-118
Upper Yakima	123-138
Lower Yakima	116-128
Lower Snake-Walla Walla	85-123
Lower Columbia	109-122
South Puget Sound	116-121
Central Puget Sound	125-143
North Puget Sound	109-117
Olympic Peninsula	110-115

STREAM	PERCENT OF AVERAGE MARCH STREAMFLOWS
Pend Oreille at Albeni Fall Dam	63
Kettle at Laurier	90
Columbia at Birchbank	101
Spokane at Spokane	51
Similkameen at Nighthawk	105
Okanogan at Tonasket	115
Methow at Pateros	115
Chelan at Chelan	91
Stehekin near Stehekin	89
Wenatchee at Pashastin	84
Cle Elum near Roslyn	94
Yakima at Parker	76
Naches at Naches	55
Grande Ronde at Troy	54
Snake below Lower Granite Dam	58
Columbia River at The Dalles	70
Lewis at Merwin Dam	94
Cowlitz below Mayfield Dam	111
Skagit at Concrete	86
Dungeness near Sequim	54

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

Climate





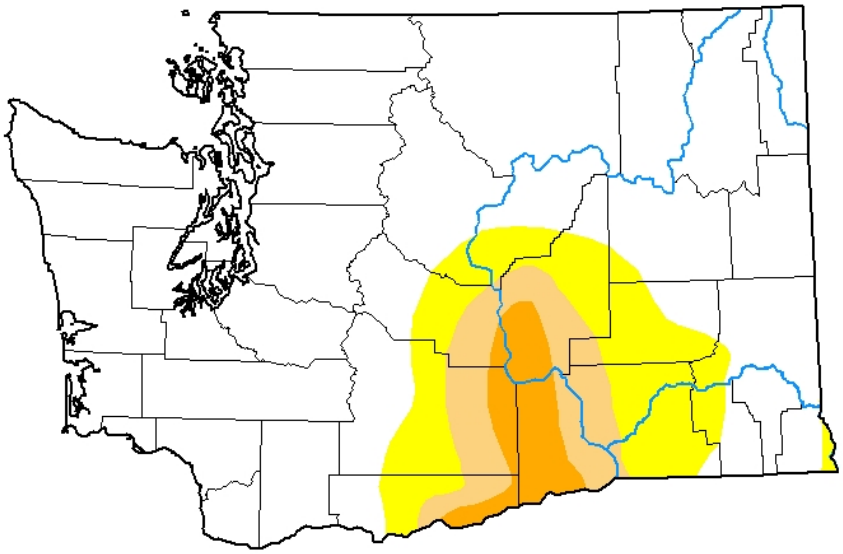
U.S. Drought Monitor

Washington

February 23, 2021

(Released Thursday, Feb. 25, 2021)

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

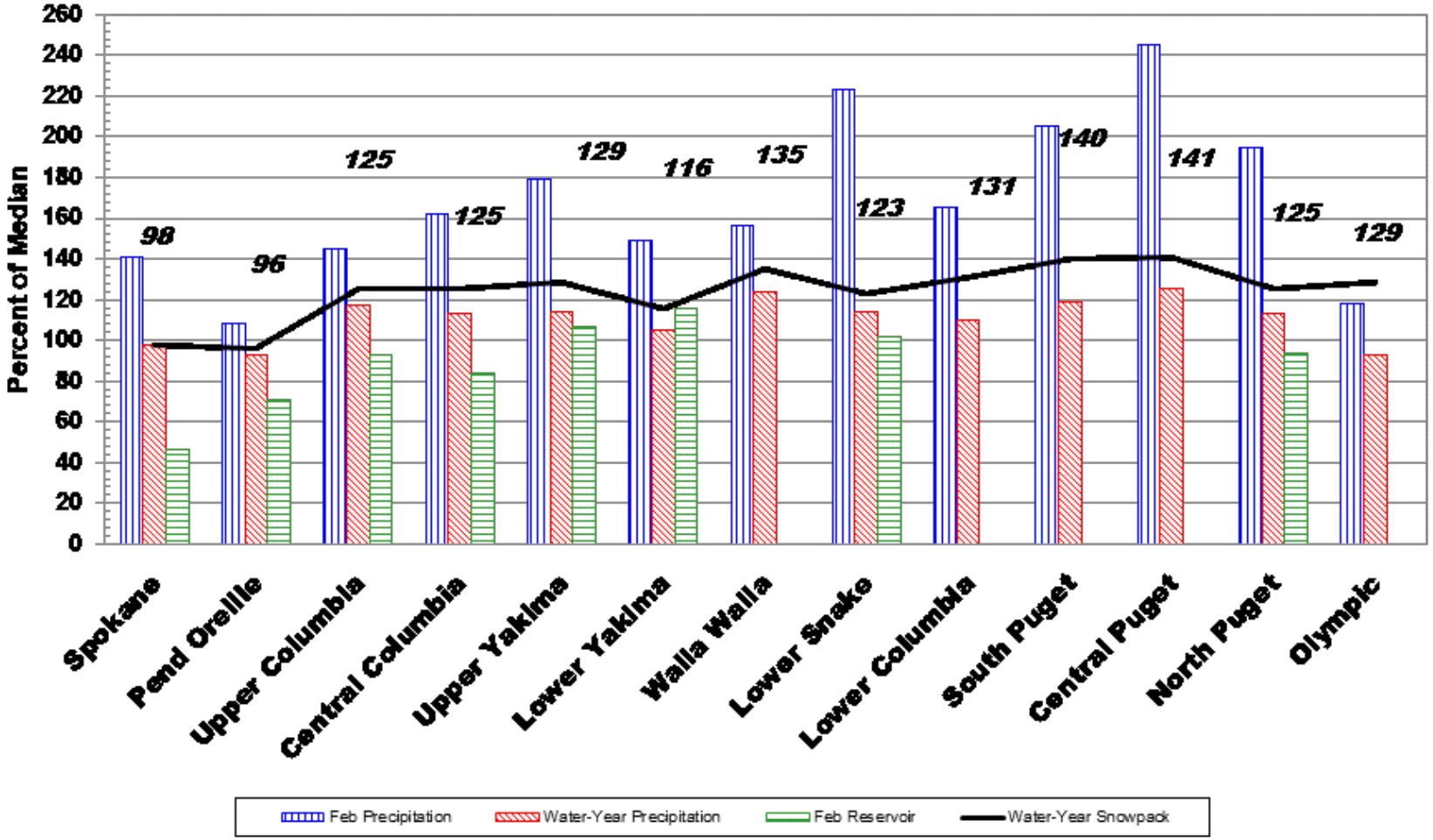
Washington:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/

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

NRCS Natural Resources Conservation Service

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

(Water Year = October 1 - Current Date)



88th Annual Western Snow Conference
April 12-15, 2021
Virtual Meeting
Bridging the Gap between Research and Operations

For public safety and health reasons, the 88th Annual Meeting of the Western Snow Conference will be held in a virtual format. The virtual format this year provides a unique opportunity to increase participation, particularly among those who would otherwise be unable to attend due to financial, geographic, or time constraints. You are invited to submit an abstract of 150 – 300 words for either oral or poster presentation by March 31, 2021. Those who submitted successful abstracts last year will be given preference as we prepare the 2021 conference agenda.

Details of this unique conference are still being finalized, including formats, platforms, and opportunity for vendor participation. Please check back here for updated information.

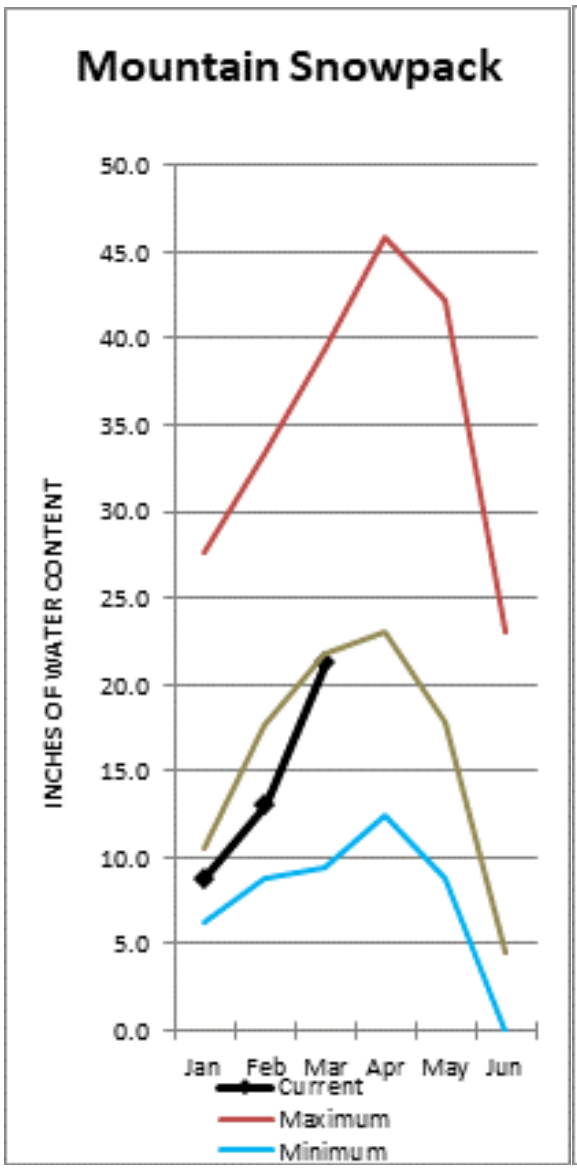
We are looking forward to "seeing" you online in April as we move ahead in this new world!

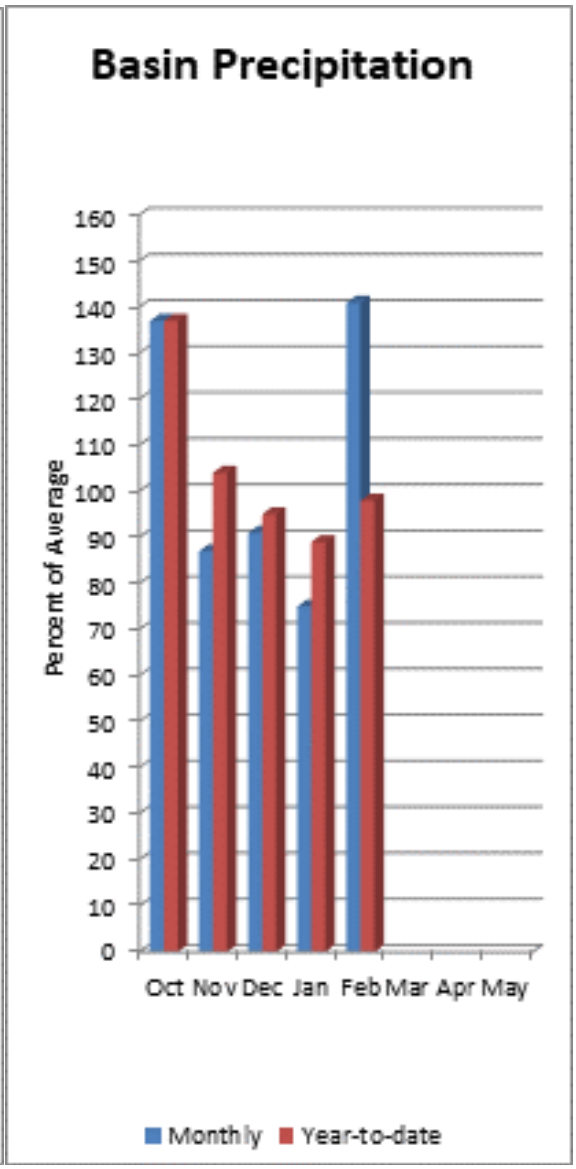
Noah Molotch — General Chair, WSC

Lucas Zukiewicz — Conference Chair

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

Also find Western Snow Conference on Facebook





Basin snowpack is 99% of normal and precipitation is 98% of average for the water year. Precipitation for February was much above normal at 141% of average. Streamflow on the Spokane River at Spokane was 51% of average for February. March 1 storage in Coeur d'Alene Lake was 61,00-acre feet, 46% of average and 26% of capacity. Snowpack at Quartz Peak SNOTEL site was 108% of average with 21 inches of water content.

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

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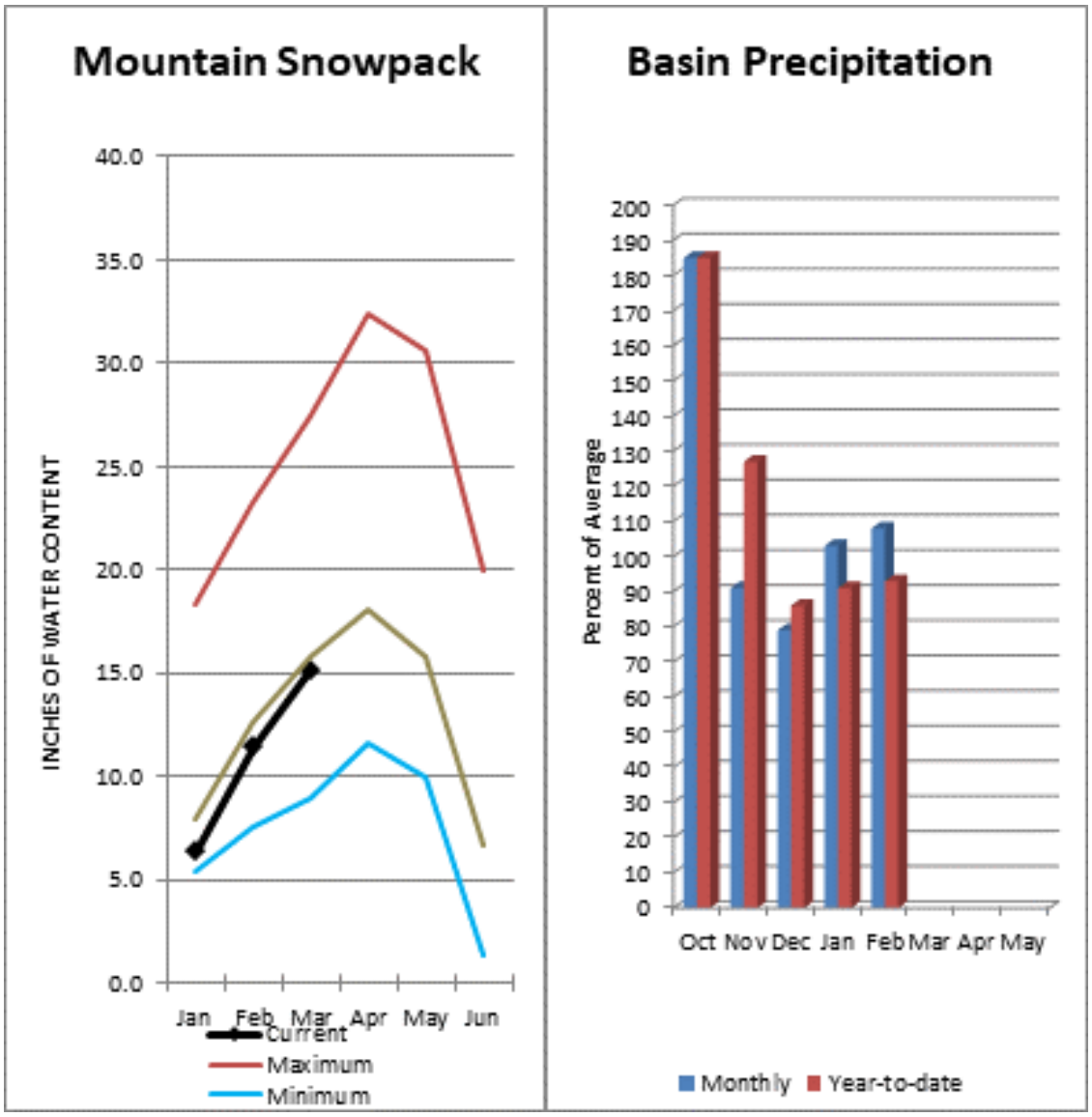
Spokane
Streamflow Forecasts - March 1, 2021

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	2070	2550	2880	121%	3210	3690	2390
	APR-SEP	2150	2640	2970	120%	3300	3790	2480
Spokane R at Long Lake[2]								
	APR-JUL	2360	2850	3190	122%	3520	4010	2620
	APR-SEP	2550	3050	3400	119%	3740	4240	2850
Chamokane Ck nr Long Lake								
	MAR-JUL	13.2	20	26	100%	32	43	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	61.6	64.8	132.8	238.5
Basin-wide Total	61.6	64.8	132.8	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Spokane	17	99%	108%
Newman Lake	4	95%	111%



March streamflow was 63% of average on the Pend Oreille River and 101% on the Columbia at Birchbank. March 1 snow cover was 97% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 21.5 inches of snow water on the snow pillow which is slightly below normal for March 1. Precipitation during February was 108% of average, bringing the year-to-date precipitation to 93% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 71% of normal.

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

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Lower Pend Oreille
Streamflow Forecasts - March 1, 2021

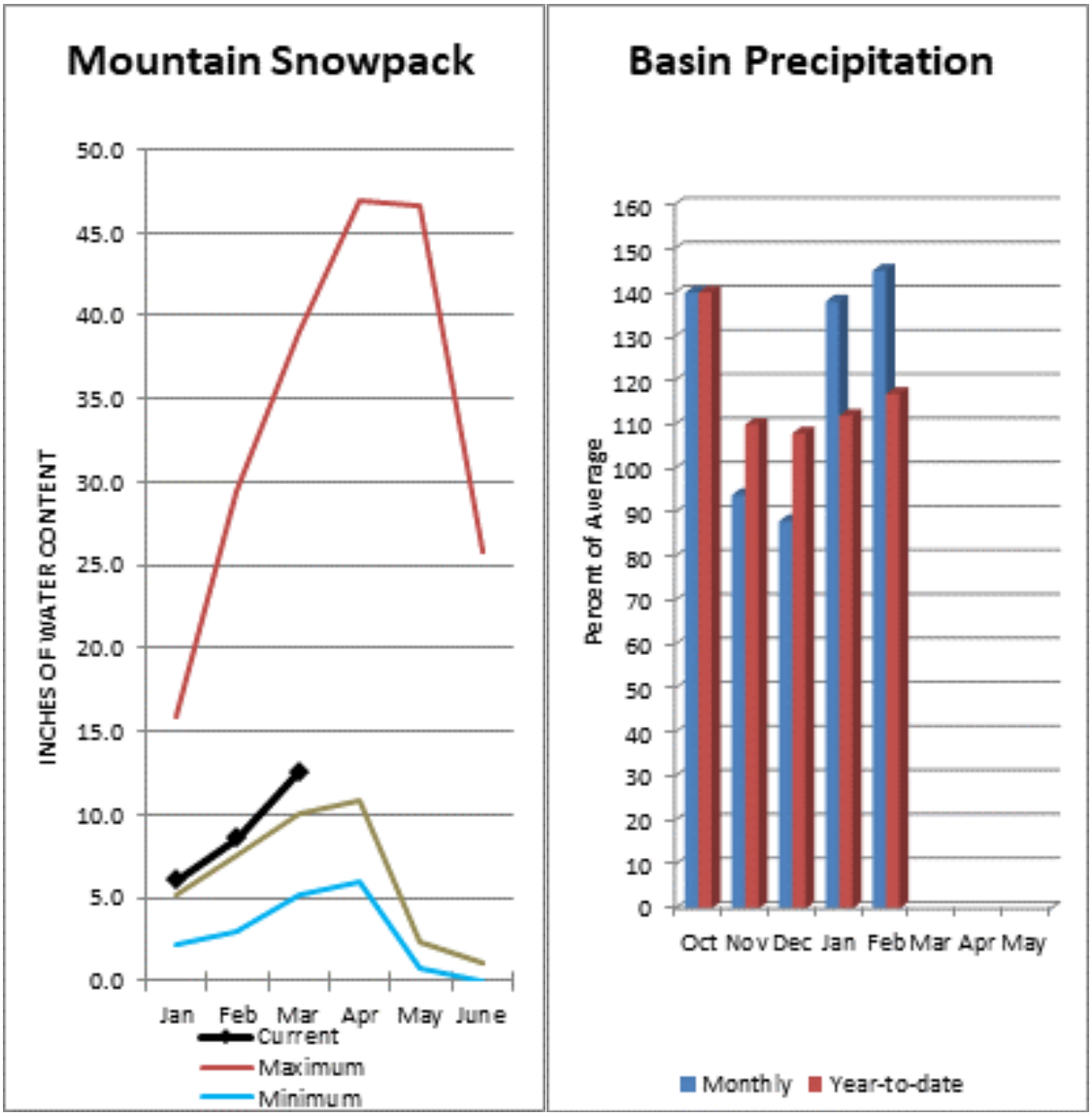
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Pend Oreille	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pend Oreille Lake Inflow[2]								
	APR-JUL	9680	11400	12500	106%	13600	15300	11800
	APR-SEP	10500	12400	13600	106%	14800	16700	12800
Priest R nr Priest River[2]								
	APR-JUL	540	665	750	96%	835	960	780
	APR-SEP	575	705	795	96%	880	1010	830
Pend Oreille R bl Box Canyon[2]								
	APR-JUL	9880	11500	12600	106%	13800	15400	11900
	APR-SEP	10700	12500	13800	106%	15000	16800	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	559.6	561.3	792.6	1561.3
Priest Lake	41.8	50.6	57.1	119.3
Basin-wide Total	601.4	611.9	849.7	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Lower Pend Oreille	12	97%	110%
Sullivan	1	96%	115%



March 1 snow cover on the Okanogan was 128% of normal, Omak Creek was 127% and the Methow was 133%. February precipitation in the Upper Columbia was 145% of average, with precipitation for the water year at 117% of average. February streamflow for the Methow River was 115% of average, 115% for the Okanogan River and 105% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 11.4 inches or 131% of normal for March 1. Combined storage in the Conconully Reservoirs was 13,600 acre-feet or 93% of normal.

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Upper Columbia
Streamflow Forecasts - March 1, 2021

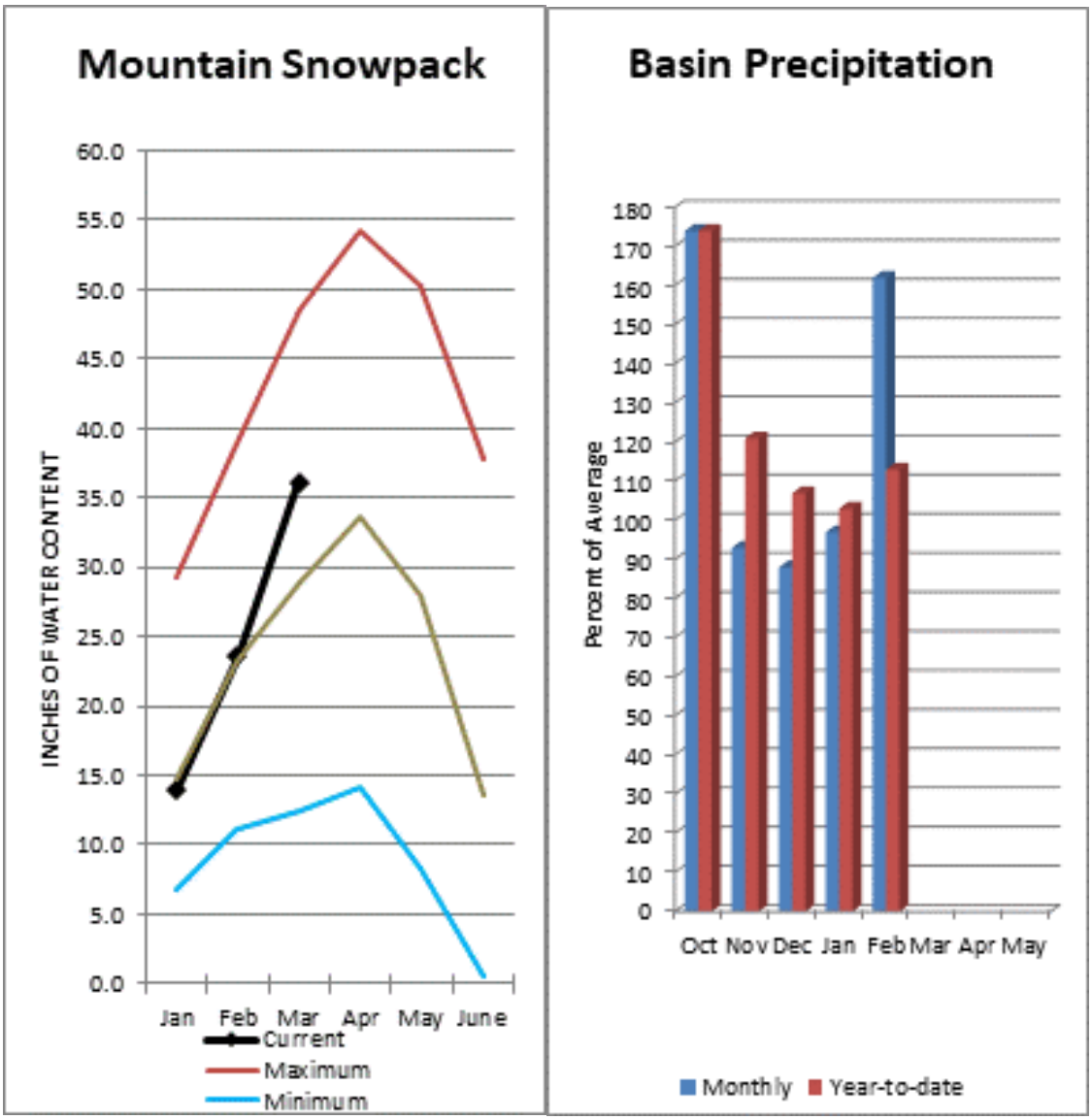
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kettle R nr Laurier								
	APR-JUL	1650	1850	1980	110%	2110	2310	1800
	APR-SEP	1710	1920	2060	110%	2200	2410	1880
Colville R at Kettle Falls								
	APR-JUL	62	102	129	108%	156	196	119
	APR-SEP	68	111	141	108%	171	215	131
Columbia R at Grand Coulee-NWS[2]								
	APR-JUL	45800		49400	97%		55100	51015
	APR-SEP	53700		58600	97%		64300	60110
Similkameen R nr Nighthawk								
	APR-JUL	1450	1600	1710	143%	1820	1970	1200
	APR-SEP	1520	1690	1810	141%	1930	2100	1280
Okanogan R nr Tonasket								
	APR-JUL	1460	1720	1900	128%	2080	2340	1480
	APR-SEP	1610	1910	2110	128%	2310	2610	1650
Okanogan R at Malott								
	APR-JUL	1490	1760	1940	134%	2120	2390	1450
	APR-SEP	1630	1930	2140	132%	2350	2660	1620
Methow R nr Pateros								
	APR-JUL	910	1050	1140	137%	1230	1370	835
	APR-SEP	985	1130	1230	137%	1330	1480	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 February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	6.2	6.9	7.3	10.5
Conconully Reservoir	7.4	7.8	7.4	13.0
Basin-wide Total	13.6	14.7	14.7	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Upper Columbia	41	125%	110%
Colville	2	114%	92%
Kettle	7	121%	133%
Okanogan	17	127%	102%
Omak	2	127%	72%
Sanpoil	3	125%	74%
Similkameen	16	130%	107%
Toats Coulee	41	125%	110%
Conconully Lake	4	133%	78%
Methow	9	133%	105%



Precipitation during February was 162% of average in the basin and 113% for the year-to-date. February average streamflow on the Chelan River was 91% and on the Wenatchee River 84%. March 1 snowpack in the Wenatchee River Basin was 126% of normal; the Chelan, 119%; the Entiat, 126%; Stemilt Creek, 93% and Colockum Creek, 123%. Reservoir storage in Lake Chelan was 93% of average. Lyman Lake SNOTEL had the most snow water with 53.9 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
Streamflow Forecasts - March 1, 2021

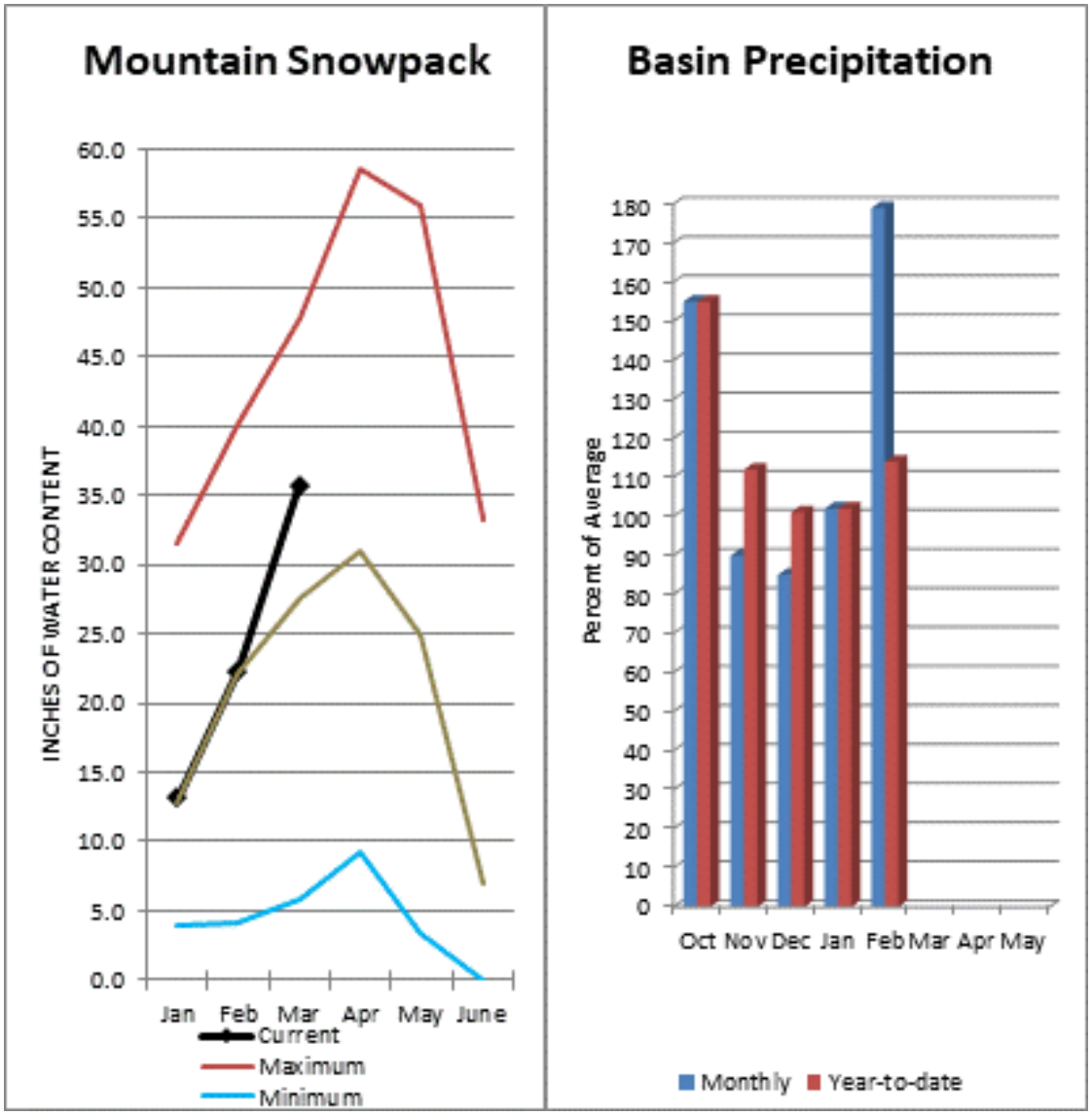
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Central Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin								
	APR-JUL	640	715	765	113%	815	890	680
	APR-SEP	745	830	885	112%	940	1020	790
Chelan R at Chelan								
	APR-JUL	960	1070	1140	114%	1210	1320	1000
	APR-SEP	1070	1200	1280	114%	1360	1490	1120
Entiat R nr Ardenvoir								
	APR-JUL	177	200	220	110%	240	265	200
	APR-SEP	192	220	240	109%	260	290	220
Wenatchee R at Plain								
	APR-JUL	960	1080	1160	117%	1240	1360	990
	APR-SEP	1040	1180	1270	118%	1360	1500	1080
Icicle Ck nr Leavenworth								
	APR-JUL	255	295	320	116%	345	385	275
	APR-SEP	280	320	350	117%	380	420	300
Wenatchee R at Peshastin								
	APR-JUL	1320	1480	1580	115%	1680	1840	1370
	APR-SEP	1440	1610	1730	116%	1850	2020	1490
Columbia R bl Rock Island Dam-NWS[2]								
	APR-JUL	50700		55000	99%		61200	55770
	APR-SEP	59500		64800	99%		71500	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 February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	235.3	215.9	279.8	677.4
Basin-wide Total	235.3	215.9	279.8	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Central Columbia	10	125%	101%
Lake Chelan	3	119%	101%
Entiat	1	126%	75%
Wenatchee	6	126%	104%
Stemilt	1	93%	68%
Colockum	1	123%	80%



March 1 reservoir storage for the Upper Yakima reservoirs was 479,900-acre feet, 107% of average. February streamflow on the Cle Elum River near Roslyn was 91%. March 1 snowpack was 129% based upon 9 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 179% of average for February and 114% 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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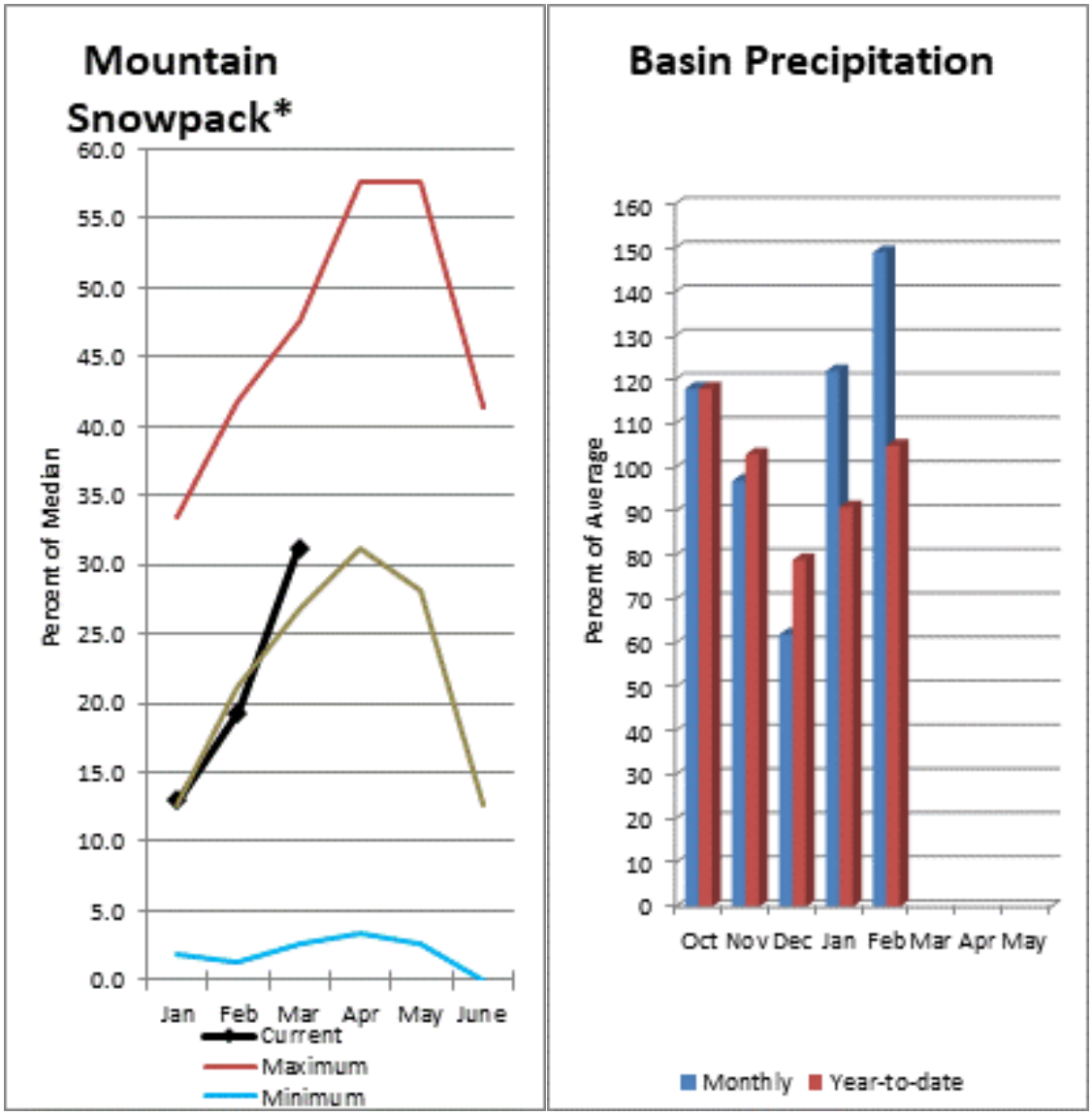
Upper Yakima
Streamflow Forecasts - March 1, 2021

Upper Yakima	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	113	133	147	127%	161	182	116
	APR-SEP	123	145	159	126%	174	196	126
Kachess Reservoir Inflow [2]								
	APR-JUL	105	122	133	128%	144	161	104
	APR-SEP	113	130	142	126%	154	171	113
Cle Elum Lake Inflow [2]								
	APR-JUL	395	445	475	123%	505	555	385
	APR-SEP	430	480	515	124%	550	600	415
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	135	161	179	138%	197	225	130
	APR-SEP	137	164	182	137%	200	225	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	99.7	113.8	92.3	157.8
Kachess	165.5	133.9	143.6	239.0
Cle Elum	214.7	212.7	214.4	436.9
Basin-wide Total	479.9	460.4	450.3	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Upper Yakima	9	129%	104%



February average streamflows within the basin were: Yakima River near Parker, 76% and the Naches River near Naches, 55%. March 1 reservoir storage for Bumping and Rimrock reservoirs was 158,800-acre feet, 116% of average. March 1 snowpack was 116% within the Lower Yakima Basin, 123% in the Naches and Ahtanum Creek reported in at 116% of normal. February precipitation was 153% of average and 108% for the water-year in the Naches River Basin. The Lower Yakima recorded 145% of average for February and 101% 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
Streamflow Forecasts - March 1, 2021

Lower Yakima	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						
Ahtanum Ck at Union Gap								
	APR-JUL	21	29	35	130%	40	49	27
	APR-SEP	23	31	37	128%	43	52	29
Yakima R nr Parker [2]								
	APR-JUL	1650	1920	2110	127%	2300	2580	1660
	APR-SEP	1800	2100	2300	126%	2490	2790	1820

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, 2021	# of Sites	% Median	Last Year % Median
Lower Yakima	2	116%	90%
Ahtanum	2	116%	90%
Simcoe-Toppenish	1	103%	73%
Satus	0		

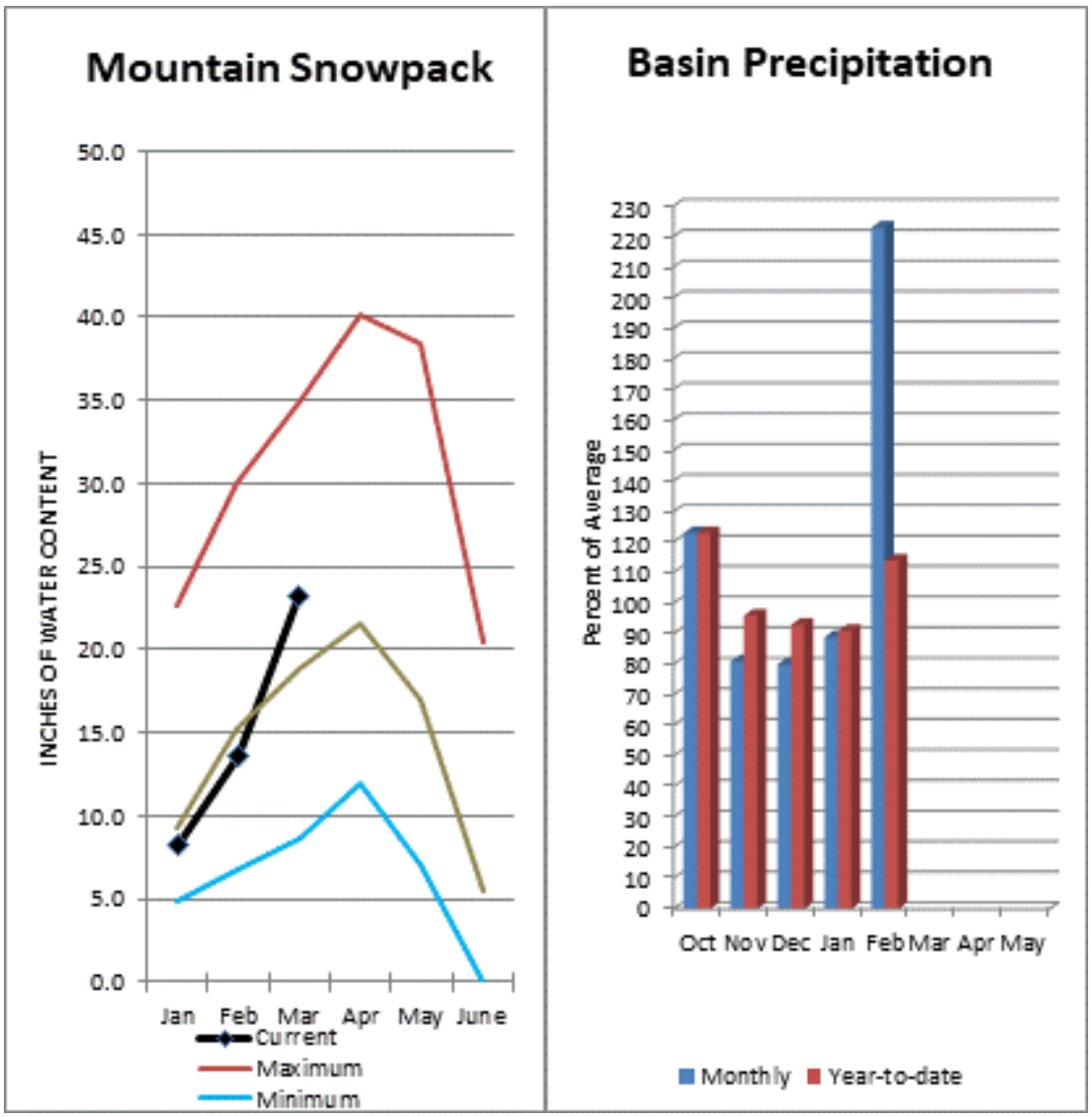
Naches
Streamflow Forecasts - March 1, 2021

Naches	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	106	122	133	117%	144	160	114
	APR-SEP	116	133	145	118%	157	174	123
American R nr Nile								
	APR-JUL	97	111	120	118%	130	143	102
	APR-SEP	105	120	131	119%	141	157	110
Rimrock Lake Inflow [2]								
	APR-JUL	180	200	215	115%	230	250	187
	APR-SEP	210	235	255	116%	270	300	220
Naches R nr Naches								
	APR-JUL	650	770	855	122%	935	1060	700
	APR-SEP	700	840	930	122%	1020	1160	760

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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	21.8	25.8	13.3	33.7
Rimrock	137.0	140.2	123.3	198.0
Basin-wide Total	158.8	166.0	136.6	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Naches	7	123%	120%



February precipitation was 223% of average, bringing the year-to-date precipitation to 114% of average. March 1 snowpack readings averaged 122% of normal. February streamflow was 58% of average for Snake River below Lower Granite Dam and 54% for Grande Ronde River near Troy. Dworshak Reservoir storage was 102% of average.

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

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Lower Snake-Walla Walla
Streamflow Forecasts - March 1, 2021

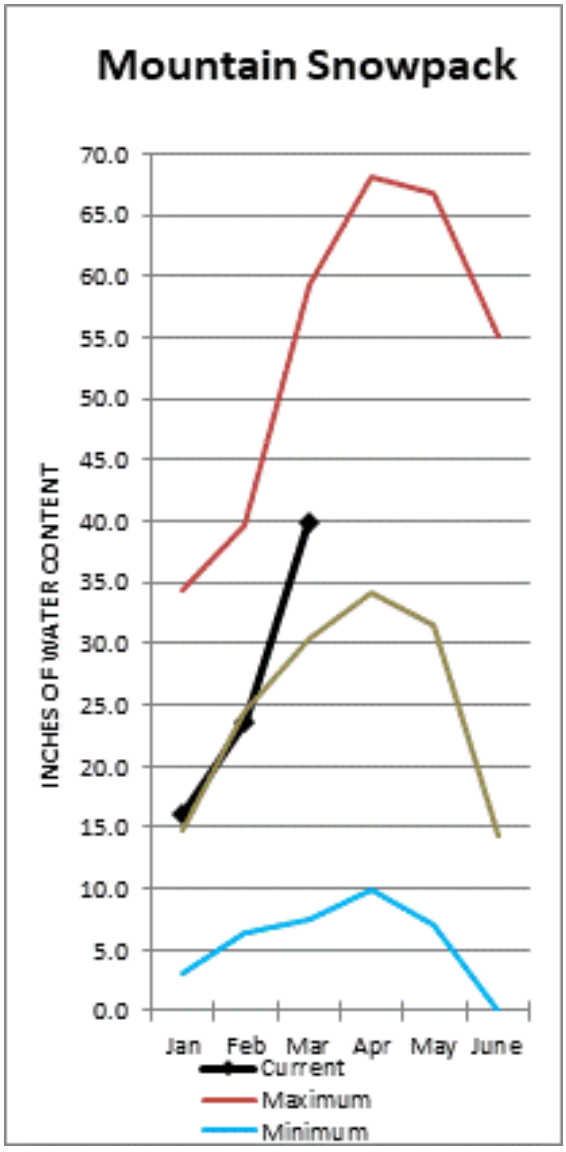
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake-Walla Walla	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	MAR-JUL	1470	1710	1880	125%	2050	2300	1510
	APR-SEP	1200	1440	1610	123%	1780	2030	1310
Asotin Ck at Asotin								
Clearwater R at Spalding[2]								
	APR-JUL	6050	7060	7750	112%	8430	9450	6890
	APR-SEP	6390	7440	8140	112%	8850	9900	7270
Snake R bl Lower Granite Dam-NWS[2]								
	APR-JUL	14300		16600	84%		20600	19848
	APR-SEP	16400		18900	85%		23200	22280
SF Walla Walla R nr Milton-Freewater								
	MAR-JUL	65	74	80	118%	86	95	68
	APR-SEP	62	71	77	117%	83	92	66
Mill Ck nr Walla Walla								
	APR-JUL	21	25	27	113%	30	34	24
	APR-SEP	24	28	31	115%	34	38	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

Reservoir Storage End of February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2413.9	2272.0	2358.0	3468.0
Basin-wide Total	2413.9	2272.0	2358.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Lower Snake-Walla Walla	20	122%	111%
Asotin	2	144%	109%
Grande Ronde	18	126%	117%
Walla Walla	4	135%	117%



The Columbia at The Dalles is forecasted to have 94% of average flows this summer according to the River Forecast Center. February average streamflow for Cowlitz River was 111% and the Columbia River at The Dalles was 70% of average. February precipitation was 165% of average and the water-year average was 110%. March 1 snow cover for Cowlitz River was 138%, and Lewis River was 129% of normal.

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Lower Columbia
Streamflow Forecasts - March 1, 2021

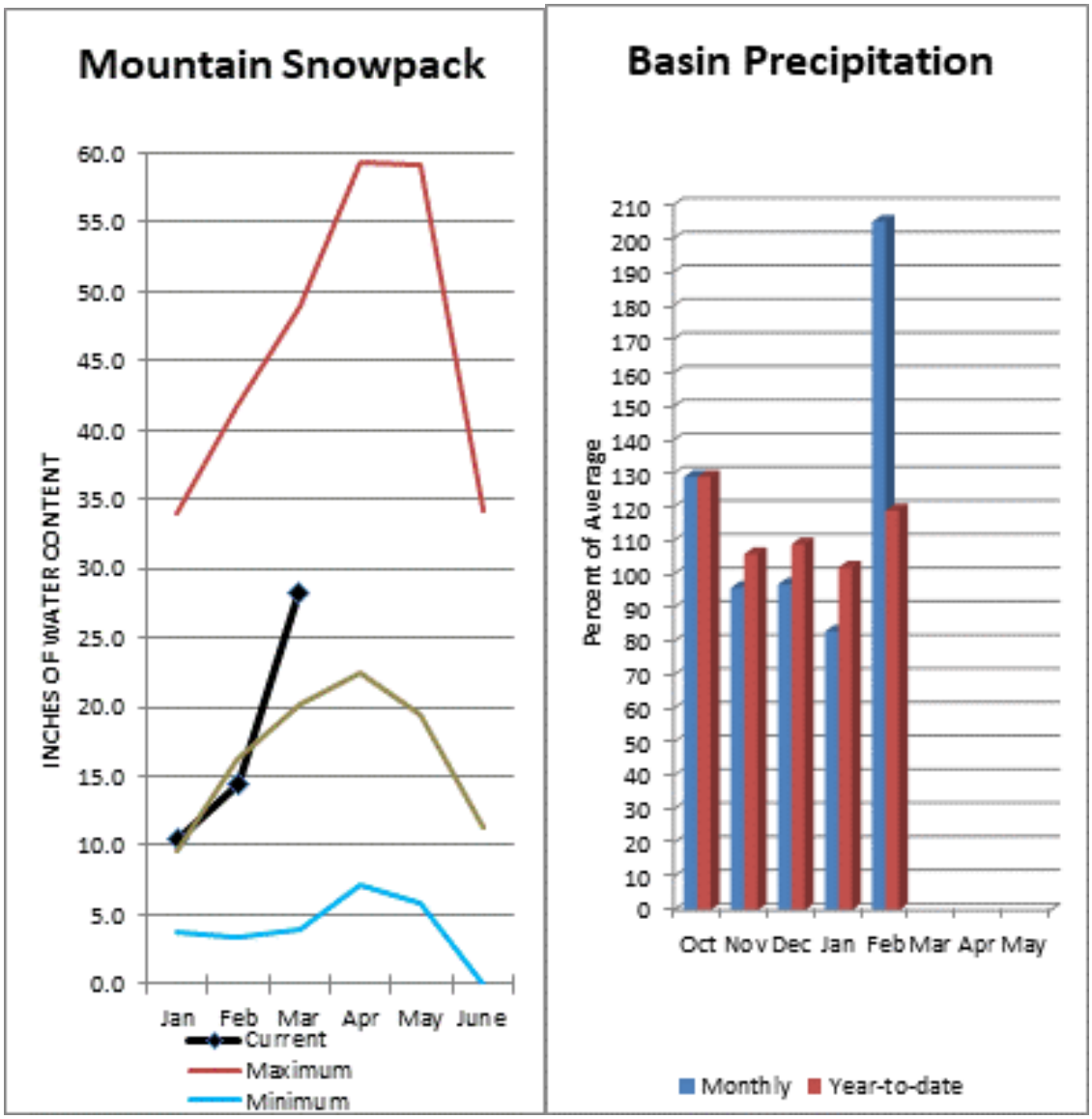
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Columbia	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	70700		75100	94%		86000	79855
	APR-SEP	81400		87600	94%		100000	92704
Klickitat R nr Glenwood								
	APR-JUL	114	135	149	118%	163	184	126
	APR-SEP	127	149	164	118%	179	200	139
Klickitat R nr Pitt								
	APR-JUL	405	475	520	120%	570	635	435
	APR-SEP	495	570	625	120%	675	755	520
Lewis R at Ariel[2]								
	APR-JUL	775	955	1080	111%	1200	1380	970
	APR-SEP	905	1090	1220	109%	1340	1520	1120
Cowlitz R bl Mayfiled[2]								
	APR-JUL	1530	1800	1990	122%	2170	2440	1630
	APR-SEP	1750	2040	2230	121%	2430	2710	1840
Cowlitz R at Castle Rock[2]								
	APR-JUL	1980	2430	2730	122%	3030	3480	2240
	APR-SEP	2280	2750	3060	120%	3380	3840	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

Reservoir Storage End of February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Yale				0.0
Swift			622.5	0.0
Mossyrock Dam (Riffe Lk)		839.7	1213.0	0.0
Merwin			398.3	0.0
Basin-wide Total		0.0	0.0	
# of reservoirs	0	0	0	0

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Lower Columbia	12	131%	110%
Lewis	6	129%	94%
Cowlitz	8	138%	123%



March 1 snowpack was 137% of average for the White River, 149% for Puyallup River and 147% in the Green River Basin. February precipitation was 205% of average, bringing the water year-to-date to 119% of average for the basins.

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

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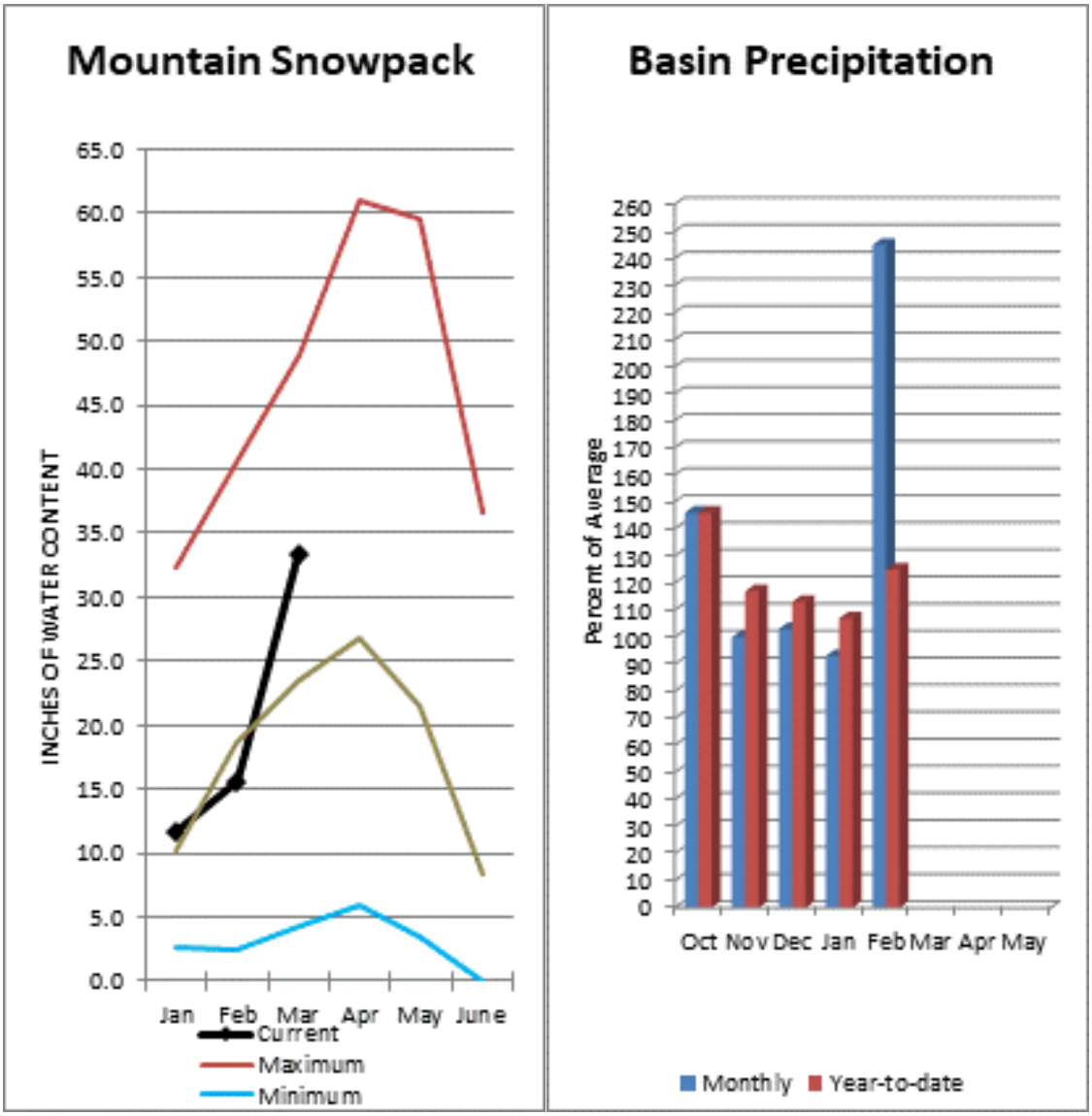
South Puget Sound
Streamflow Forecasts - March 1, 2021

South Puget Sound	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						
White R nr Buckley[1,2]								
	APR-JUL	390	470	505	117%	540	620	430
	APR-SEP	440	530	595	116%	610	700	515
Green R bl Howard A Hanson Dam[1,2]								
	APR-JUL	169	250	285	121%	320	400	235
	APR-SEP	198	280	315	121%	355	435	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, 2021	# of Sites	% Median	Last Year % Median
South Puget Sound	11	140%	119%
White	4	137%	127%
Puyallup	2	149%	125%
Green	5	147%	104%



Basin-wide precipitation for February was 245% of average, bringing water-year-to-date to 125% of average. March 1 median snow cover in Cedar River Basin was 136%, Tolt River Basin was 149%, Snoqualmie River Basin was 139%, and Skykomish River Basin was 148%.

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

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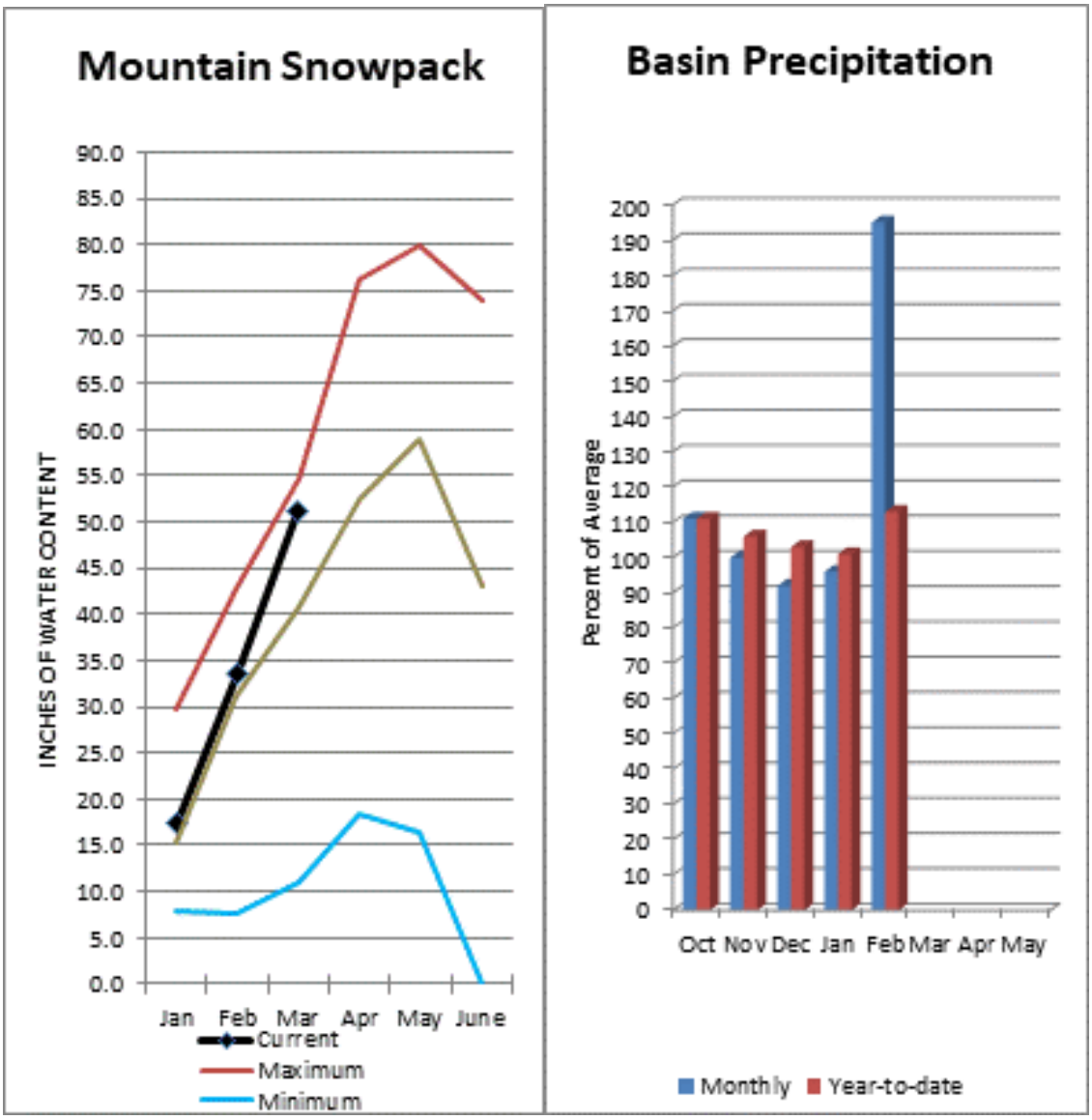
Central Puget Sound
Streamflow Forecasts - March 1, 2021

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

Central Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	APR-JUL	72	87	97	139%	107	122	70
	APR-SEP	77	92	103	136%	114	129	76
Rex R nr Cedar Falls								
	APR-JUL	24	29	33	138%	36	42	24
	APR-SEP	26	32	36	133%	40	46	27
Taylor Ck nr Selleck								
	APR-JUL	19.6	23	25	125%	27	30	20
	APR-SEP	25	28	30	125%	32	35	24
SF Tolt R nr Index								
	APR-JUL	15.5	18.2	20	141%	22	25	14.2
	APR-SEP	17.9	21	23	143%	25	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 March 1, 2021	# of Sites	% Median	Last Year % Median
Central Puget Sound	12	141%	106%
Cedar	8	136%	97%
Tolt	3	149%	113%
Snoqualimie	5	139%	97%
Skykomish	4	148%	118%



Runoff is forecasted to be near to slightly above average for the 3 major basins represented. February streamflow in Skagit River was 86% of average. Basin-wide precipitation for February was 195% of average, bringing water-year-to-date to 113% of average. March 1 average snow cover in Skagit River Basin was 126% and the Nooksack River Basin was 133%. March 1 Skagit River reservoir storage was 94% of average and 54% of capacity.

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

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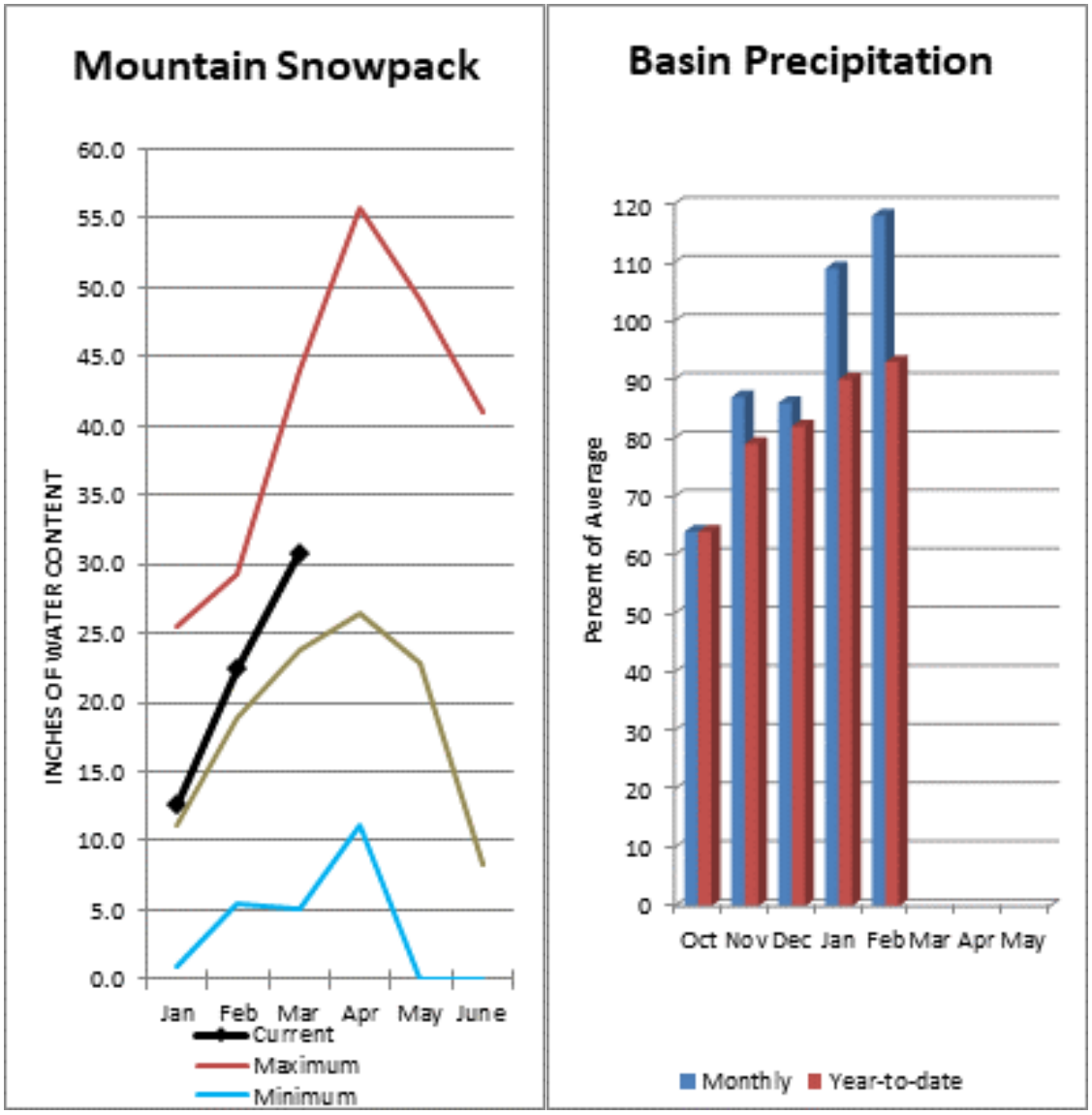
North Puget Sound
Streamflow Forecasts - March 1, 2021

North Puget Sound	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	220	240	255	109%	270	290	235
	APR-SEP	320	345	360	109%	375	400	330
Skagit R at Newhalem[2]								
	APR-JUL	1740	1930	2050	117%	2180	2370	1750
	APR-SEP	2070	2280	2420	117%	2570	2780	2070
Baker R at Concrete								
	APR-JUL	750	845	910	117%	975	1070	780
	APR-SEP	970	1070	1140	116%	1220	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 February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	781.7	788.4	832.4	1434.7
Diablo Reservoir			86.2	90.6
Basin-wide Total	781.7	788.4	832.4	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
North Puget Sound	18	125%	109%
Skagit	13	126%	113%
Baker	0		
Nooksack	3	133%	109%



February runoff in the Dungeness River was 54% of normal. February precipitation was 118% of average. Precipitation has accumulated at 93% of average for the water year. February precipitation at Quillayute was 111 % of normal brining water-year precipitation to 108%. Olympic Peninsula snowpack averaged 129% of normal on March 1.

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

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Olympic
Streamflow Forecasts - March 1, 2021

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Olympic	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Dungeness R nr Sequim								
	APR-JUL	101	118	130	108%	142	160	120
	APR-SEP	122	145	160	110%	175	198	145
Elwha R at McDonald Br nr Port Angeles								
	APR-JUL	360	420	460	115%	500	555	400
	APR-SEP	430	495	540	115%	585	650	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, 2021	# of Sites	% Median	Last Year % Median
Olympic	6	129%	113%

Issued by

Terry Cosby
Acting Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Comes-At-Night
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
April 1, 2021

Lauren Austin scouting for a new SNOTEL site in Icicle Creek drainage.
Photo by Robes Parish, USFW, looking North to Leavenworth, WA

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

For more water supply and resource management information, contact:

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Spokane Valley, WA 99206
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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 2021

General Outlook

March precipitation was disappointing to say the least. All areas of the state, excluding the Olympics, received much below normal precipitation. Snowpack accumulation was less than stellar until the last week when large storms hit the mountains and bolstered an already impressive pack. Temperatures were again slightly warmer on the east side and slightly cooler on the west side with the Cascade crest holding at near normal.

The most recent forecast through mid-April shows a high probability for below normal temperatures and above normal precipitation, with a return to near normal conditions later in the month. National Weather Service 3-month forecast, beginning April 1, indicates a slight chance for below normal temperatures and equal chances of below, normal, or above average precipitation. The US Drought Monitor indicates D0-D2 drought designation persisting in the south-central part of the state. (see maps on page 4)

Snowpack

The April 1 statewide SNOTEL readings were 131% of normal, holding steady from last month. The lowest readings in the state were 85% of the 30-year median for April 1 at Lost Horse SNOTEL near Toppenish. The Tolt River Basin had the most snow with 169%. Westside medians from SNOTEL and April 1 snow surveys, included the North Puget Sound river basins with 119% of normal, the Central and South Puget river basins with 152% and 138% respectively, and the Lower Columbia basins with 134% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 119% and the Wenatchee area with 121%. Snowpack in the Spokane River Basin was at 106% and the Upper Columbia river basins had 113% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	106	112
Newman Lake	111	125
Lower Pend Oreille	92	116
Kettle	111	127
Okanogan	116	114
Methow	118	106
Conconully Lake	110	69
Central Columbia	121	96
Upper Yakima	129	88
Naches	116	115
Lower Yakima	113	95
Ahtanum Creek	113	90
Walla Walla	139	120
Lower Snake	118	111
Cowlitz	135	123
Lewis	139	103
White	127	125
Green	156	109
Puyallup	147	157
Cedar	144	103
Snoqualmie	153	114
Skykomish	163	133
Skagit	118	109
Nooksack	130	118
Olympic Peninsula	135	105

Precipitation

April precipitation accumulation from SNOTEL was much below normal across most of the state. The big winner was the Olympic Peninsula area with 119% of average. All other basins were much below normal. Individual stations ranged from 125% to a low of 5%. Statewide water-year average was 106% as of April 1. SNOTEL collects all form of precipitation including, rain, snow or sleet and hail.

RIVER BASIN	APRIL PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	49	91
Lower Pend Oreille	41	85
Upper Columbia	35	105
Central Columbia	56	108
Upper Yakima	57	105
Naches	78	107
Lower Yakima	35	92
Klickitat	41	93
Walla Walla	52	111
Lower Snake	55	105
Lower Columbia	68	104
South Puget Sound	68	113
Central Puget Sound	64	116
North Puget Sound	54	107
Olympic Peninsula	119	95

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 506,100-acre feet, 99% of average for the Upper Reaches and 166,000-acre feet or 110% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 114,600-acre feet, 69% of average and 48% of capacity; and Ross lake within the Skagit River Basin at 77% of average and 39% 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	48	69
Lower Pend Oreille	38	76
Upper Columbia	48	74
Central Columbia	30	81
Upper Yakima	61	99
Naches	72	110
Lower Snake	60	86
North Puget Sound	39	77

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

Streamflow

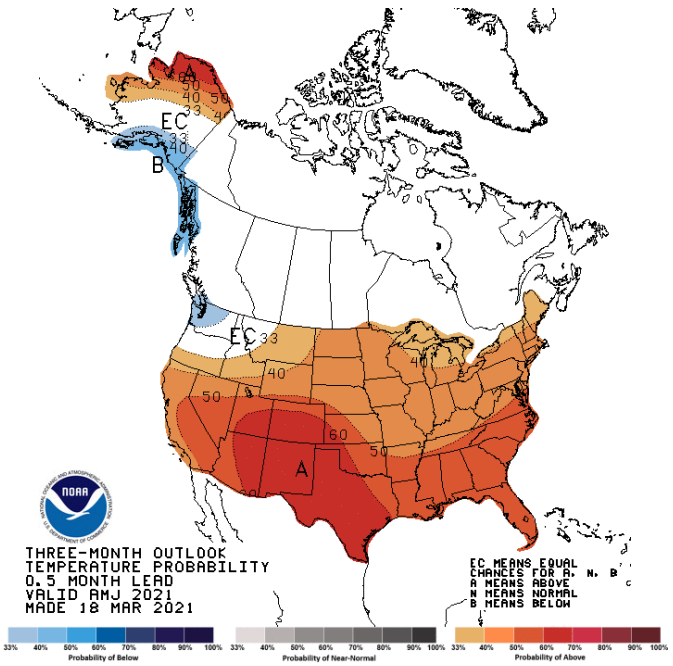
Early winter forecasts for April-September stream flows are never quite as robust as they are later in the season when we know more about the winter climatology. At times only a few degrees warmer or cooler than forecasted can make or break stream flow predictions. Volumetric forecasts are developed using current, historic, and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. The lack of precipitation last month highly effected normal runoff throughout the region.

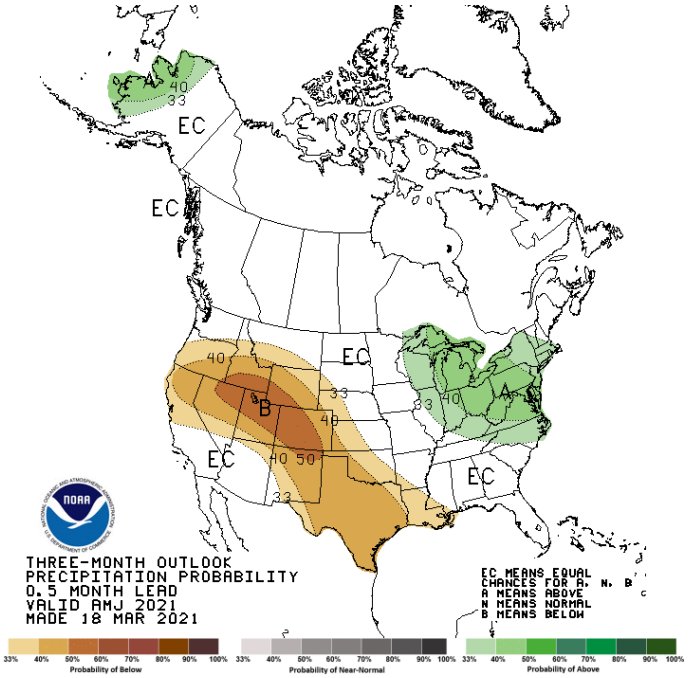
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	90-99
Pend Oreille	84-96
Upper Columbia	96-130
Central Columbia	98-113
Upper Yakima	119-128
Naches	109-115
Lower Yakima	114-119
Lower Snake-Walla Walla	78-118
Lower Columbia	91-122
South Puget Sound	115-127
Central Puget Sound	121-137
North Puget Sound	108-114
Olympic Peninsula	114-117

STREAM	PERCENT OF AVERAGE APRIL STREAMFLOWS
Pend Oreille at Albeni Fall Dam	65
Kettle at Laurier	62
Columbia at Birchbank	80
Spokane at Spokane	64
Similkameen at Nighthawk	86
Okanogan at Tonasket	84
Methow at Pateros	99
Chelan at Chelan	80
Stehekin near Stehekin	72
Wenatchee at Pashastin	70
Cle Elum near Roslyn	65
Yakima at Parker	66
Naches at Naches	49
Grande Ronde at Troy	87
Snake below Lower Granite Dam	69
Columbia River at The Dalles	67
Lewis at Merwin Dam	68
Cowlitz below Mayfield Dam	82
Skagit at Concrete	69
Dungeness near Sequim	55

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

Climate





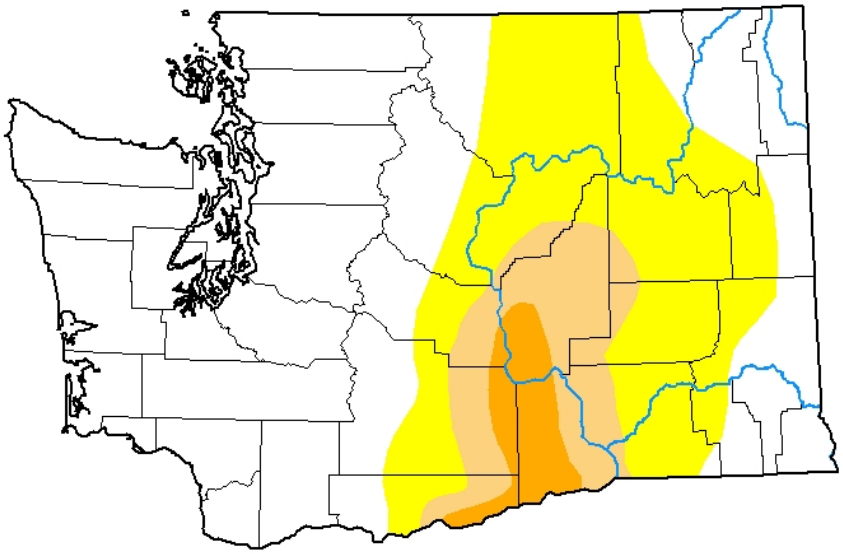
U.S. Drought Monitor

Washington

March 30, 2021

(Released Thursday, Apr. 1, 2021)

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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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/

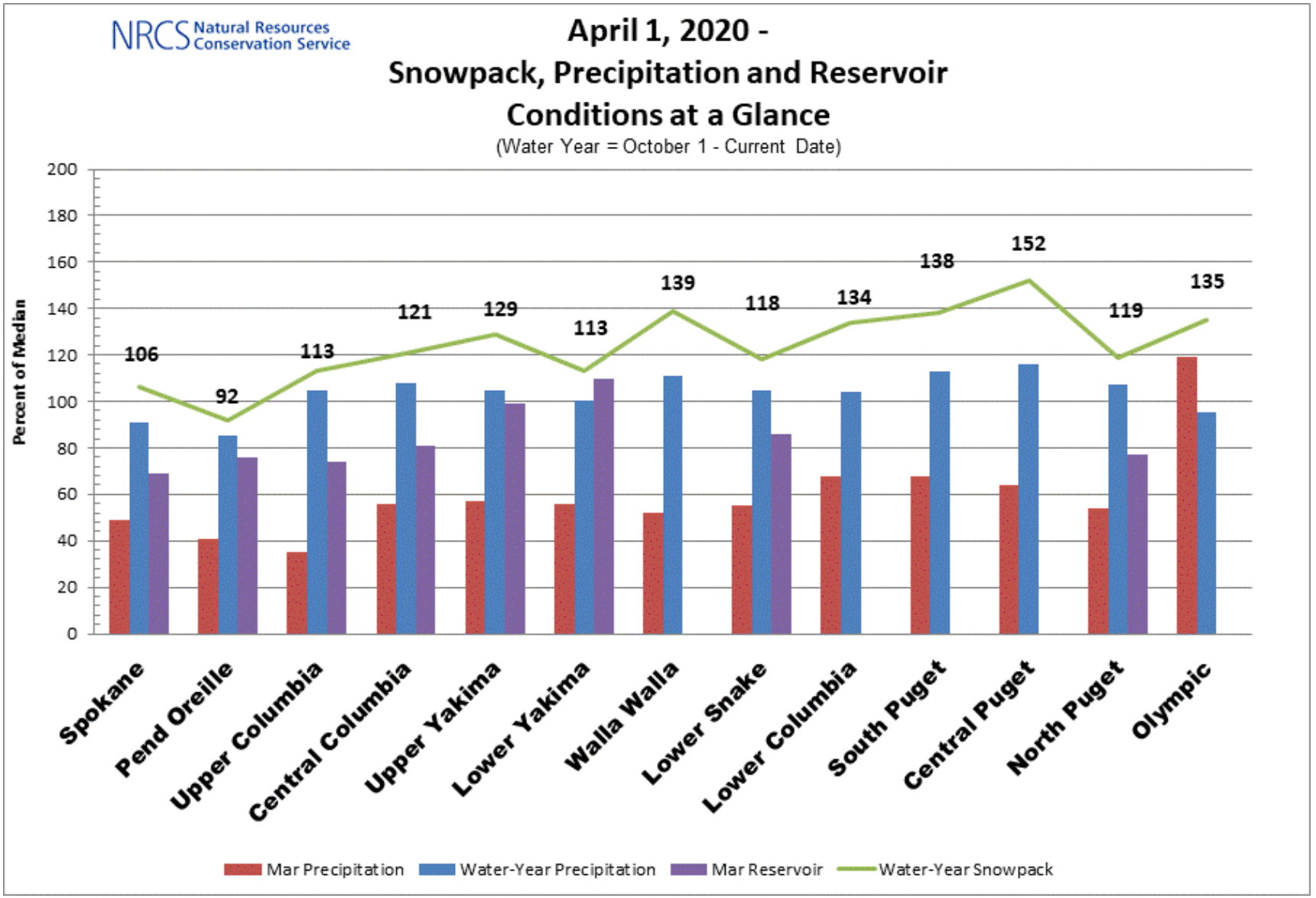
Idaho:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

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
April 1, 2020 -
Snowpack, Precipitation and Reservoir
Conditions at a Glance
(Water Year = October 1 - Current Date)
Percent of Median
200
180
160
140
120
100
80
60
40
20
0
106
92
113
121
129
113
139
118
134
138
152
119
135
Spokane
Pend Oreille
Upper Columbia
Central Columbia
Upper Yakima
Lower Yakima
Walla Walla
Lower Snake
Lower Columbia
South Puget
Central Puget
North Puget
Olympic
Mar Precipitation
Water-Year Precipitation
Mar Reservoir
Water-Year Snowpack

88th Annual Western Snow Conference
April 12-15, 2021
Virtual Meeting
Bridging the Gap between Research and Operations

Dear Members and Friends of the Western Snow Conference:

Registration is now open for our upcoming first ever Virtual Western Snow Conference. We are passing on the cost savings of this virtual conference to allow vendors and others who may have not had the opportunity to attend in the past to participate in this year's conference. Please see the following links for additional information:

- Conference Registration through **EVENTBRITE**
- Conference **AGENDA**

We are looking forward to "seeing" you online in April as we move ahead in this new world!

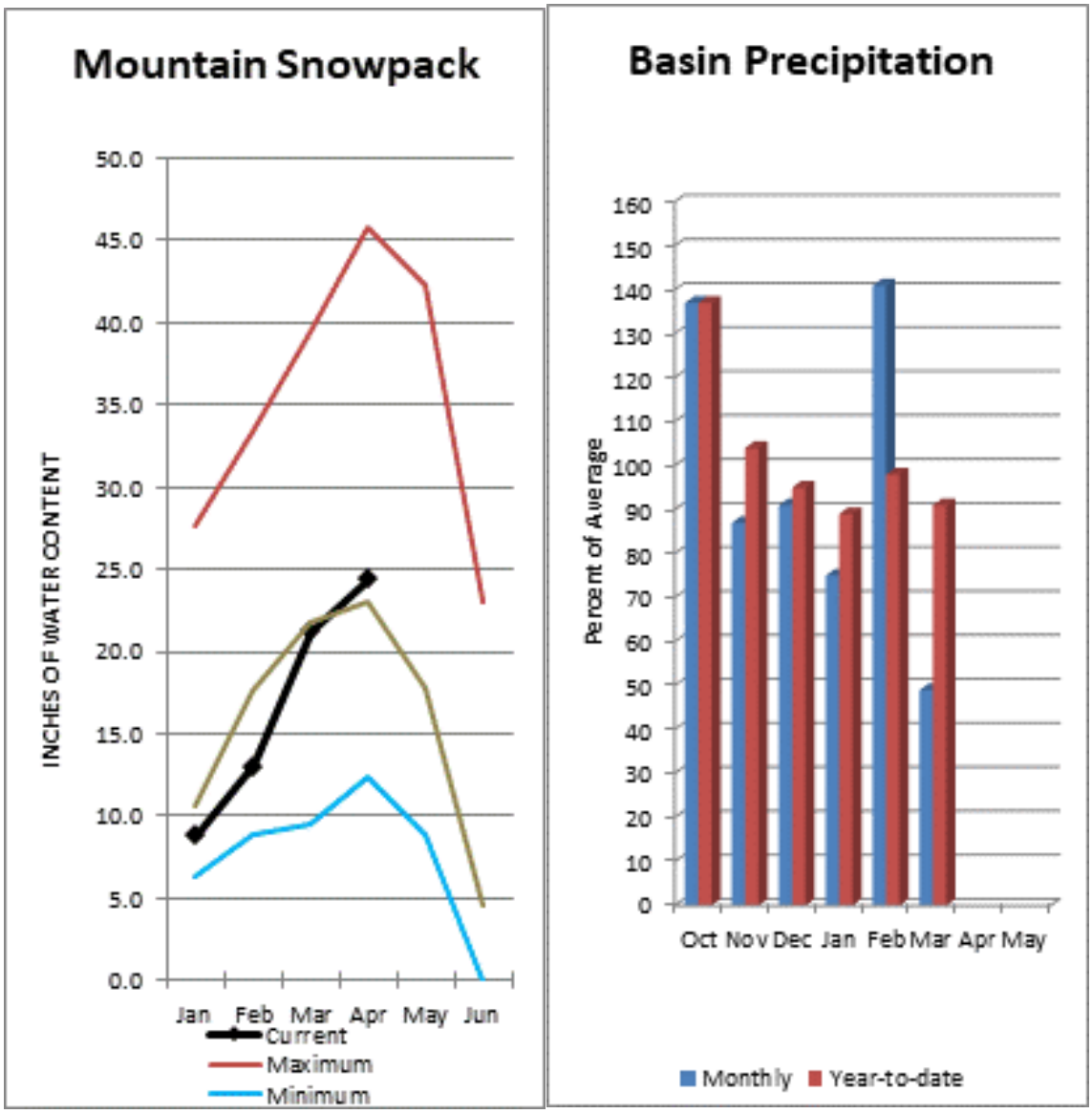
Noah Molotch — General Chair, WSC

Lucas Zukiewicz — Conference Chair

Additional information about the conference 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 104% of normal and precipitation is 91% of average for the water year. Precipitation for March was much below normal at 49% of average. Streamflow on the Spokane River at Spokane was 64% of average for March. April 1 storage in Coeur d'Alene Lake was 114,100-acre feet, 69% of average and 48% of capacity. Snowpack at Quartz Peak SNOTEL site was 112% of average with 21.1 inches of water content.

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

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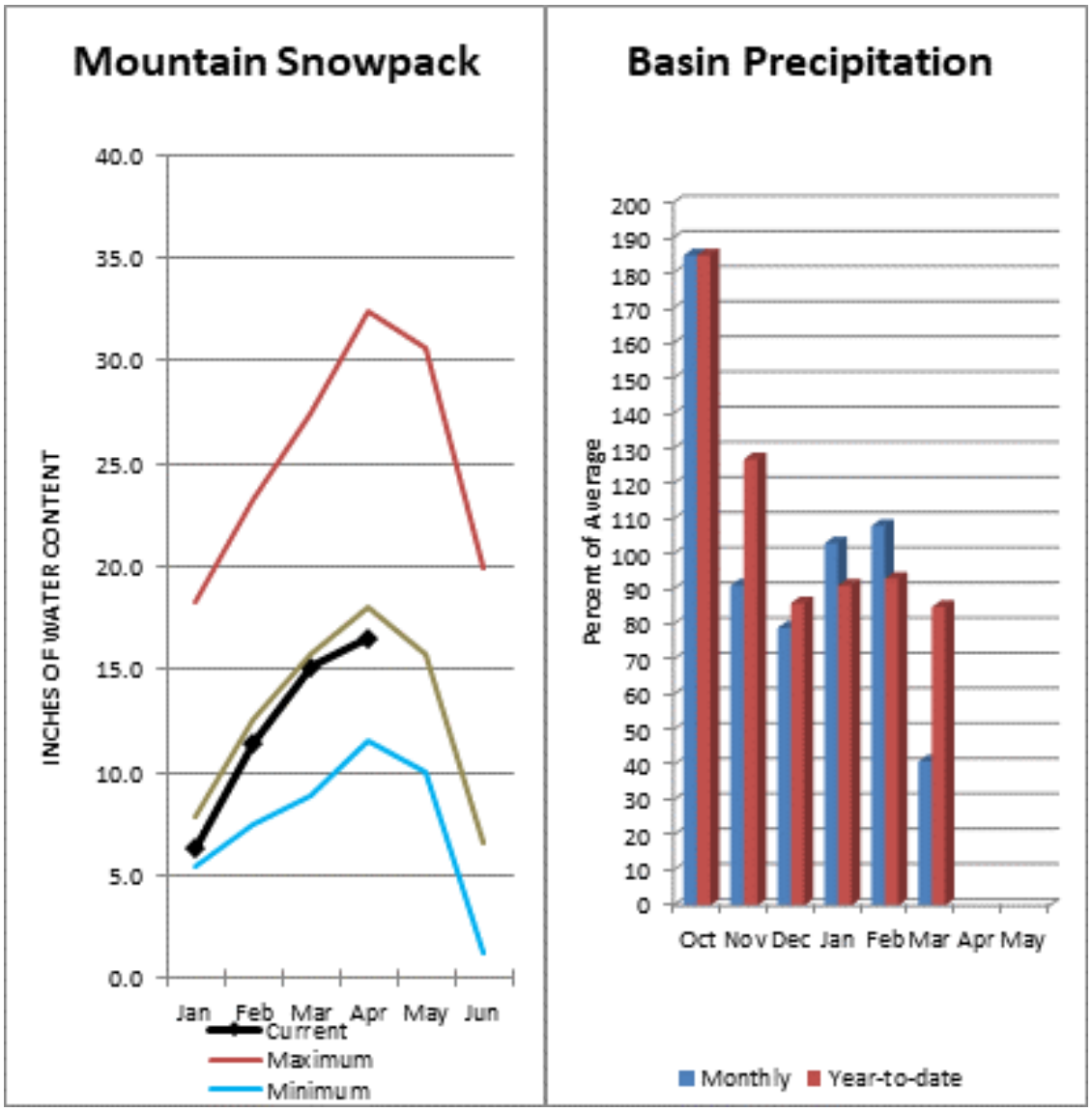
Spokane
Streamflow Forecasts - April 1, 2021

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	1770	2120	2350	98%	2590	2940	2390
	APR-SEP	1840	2190	2440	98%	2680	3030	2480
Spokane R at Long Lake[2]								
	APR-JUL	2010	2370	2620	100%	2870	3230	2620
	APR-SEP	2200	2570	2830	99%	3080	3460	2850
Chamokane Ck nr Long Lake								
	APR-JUL	7	10.5	13.3	90%	16.4	22	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	114.1	88.7	165.5	238.5
Basin-wide Total	114.1	88.7	165.5	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Spokane	15	104%	111%
Newman Lake	2	111%	125%



April streamflow was 65% of average on the Pend Oreille River and 80% on the Columbia at Birchbank. April 1 snow cover was 92% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 23 inches of snow water on the snow pillow which is slightly below normal for April 1. Precipitation during March was 44% of average, bringing the year-to-date precipitation to 85% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 76% of normal.

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

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Lower Pend Oreille
Streamflow Forecasts - April 1, 2021

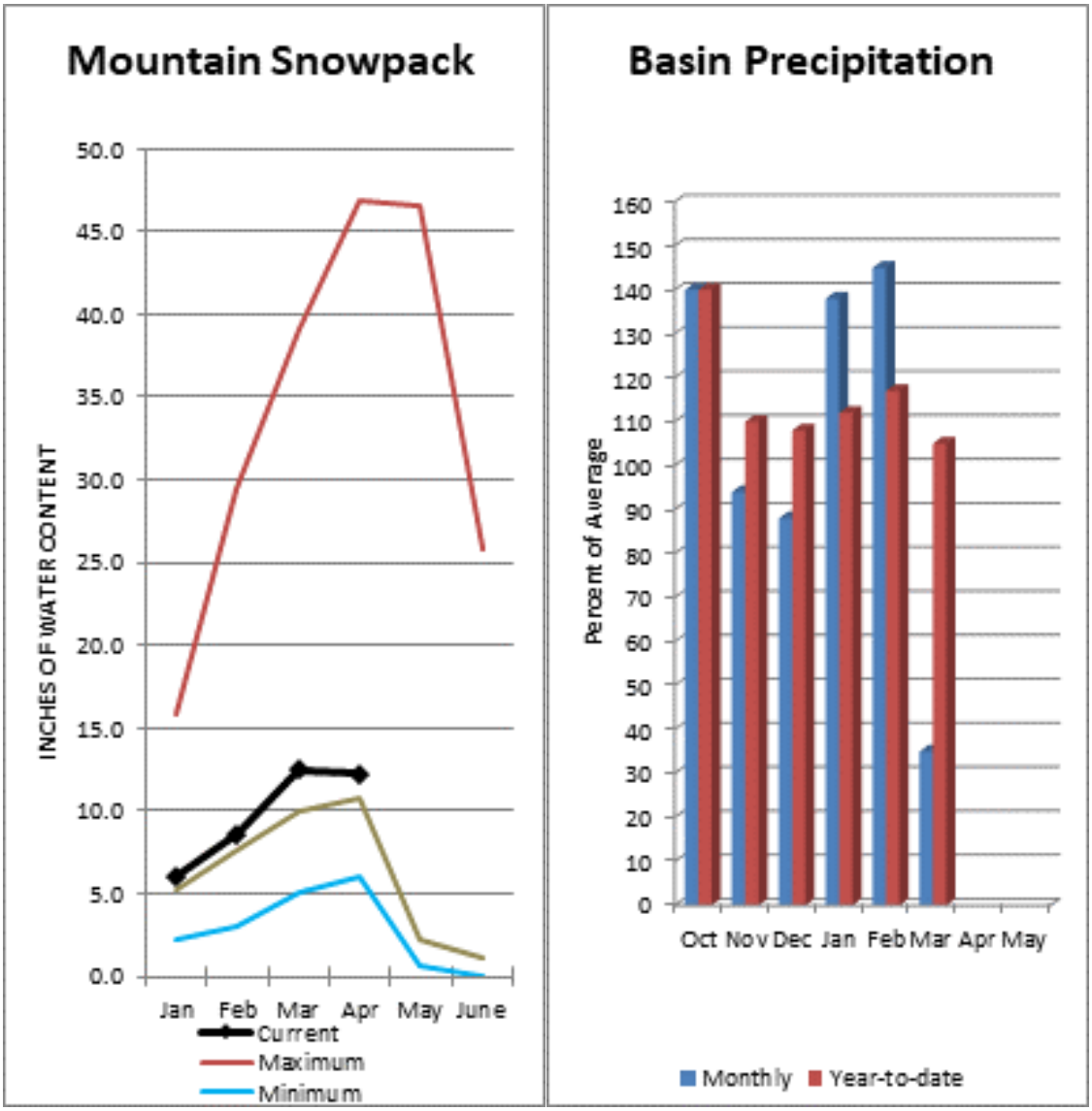
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Pend Oreille	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pend Oreille Lake Inflow[2]								
	APR-JUL	9340	10500	11300	96%	12200	13300	11800
	APR-SEP	10100	11400	12300	96%	13200	14600	12800
Priest R nr Priest River[2]								
	APR-JUL	490	590	660	85%	730	835	780
	APR-SEP	520	625	700	84%	775	880	830
Pend Oreille R bl Box Canyon[2]								
	APR-JUL	9450	10600	11400	96%	12200	13400	11900
	APR-SEP	10200	11500	12400	95%	13400	14700	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	593.6	578.8	773.0	1561.3
Priest Lake	45.2	48.7	67.6	119.3
Basin-wide Total	638.7	627.5	840.6	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Lower Pend Oreille	9	92%	118%
Sullivan	1	88%	111%



April 1 snow cover on the Okanogan was 113% of normal, Omak Creek was 115% and the Methow was 118%. March precipitation in the Upper Columbia was 35% of average, with precipitation for the water year at 105% of average. March streamflow for the Methow River was 99% of average, 84% for the Okanogan River and 86% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 10 inches or 110% of normal for April 1. Combined storage in the Conconully Reservoirs was 11,200 acre-feet or 73% of normal.

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Upper Columbia
Streamflow Forecasts - April 1, 2021

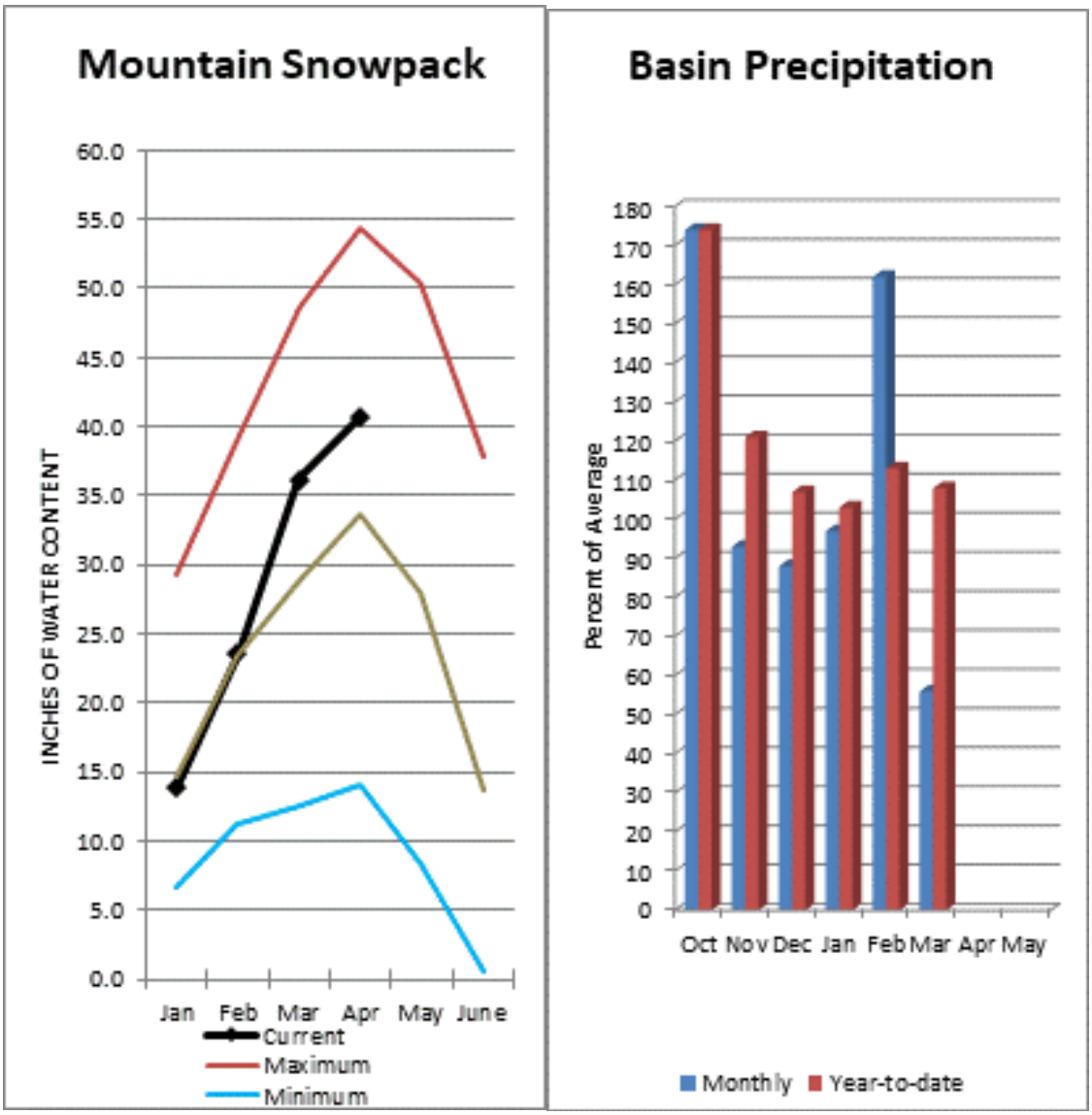
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kettle R nr Laurier								
	APR-JUL	1560	1760	1890	105%	2030	2220	1800
	APR-SEP	1610	1820	1960	104%	2110	2320	1880
Colville R at Kettle Falls								
	APR-JUL	52	91	118	99%	145	185	119
	APR-SEP	57	100	130	99%	159	200	131
Columbia R at Grand Coulee-NWS[2]								
	APR-JUL	43600		48000	94%		53700	51015
	APR-SEP	53800		57600	96%		63600	60110
Similkameen R nr Nighthawk								
	APR-JUL	1330	1470	1570	131%	1670	1810	1200
	APR-SEP	1410	1570	1670	130%	1770	1920	1280
Okanogan R nr Tonasket								
	APR-JUL	1410	1600	1740	118%	1870	2070	1480
	APR-SEP	1540	1770	1930	117%	2080	2310	1650
Okanogan R at Malott								
	APR-JUL	1430	1630	1770	122%	1910	2110	1450
	APR-SEP	1570	1800	1960	121%	2120	2360	1620
Methow R nr Pateros								
	APR-JUL	850	950	1020	122%	1090	1190	835
	APR-SEP	910	1020	1090	122%	1160	1270	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 March, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	5.6	6.9	7.3	10.5
Conconully Reservoir	5.6	7.9	7.8	13.0
Basin-wide Total	11.2	14.9	15.1	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Upper Columbia	28	113%	113%
Colville	0		
Kettle	7	111%	130%
Okanogan	12	113%	114%
Omak	1	115%	73%
Sanpoil	1	115%	73%
Similkameen	10	118%	108%
Toats Coulee	28	113%	113%
Conconully Lake	1	110%	69%
Methow	5	118%	106%



Precipitation during March was 56% of average in the basin and 108% for the year-to-date. March average streamflow on the Chelan River was 80% and on the Wenatchee River 70%. April 1 snowpack in the Wenatchee River Basin was 121% of normal; the Chelan, 113%; the Entiat, 113%; Stemilt Creek, 85% and Colockum Creek, 143%. Reservoir storage in Lake Chelan was 81% of average. Lyman Lake SNOTEL had the most snow water with 59.2 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
Streamflow Forecasts - April 1, 2021

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

Central Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin								
	APR-JUL	635	695	730	107%	770	830	680
	APR-SEP	750	810	850	108%	890	945	790
Chelan R at Chelan								
	APR-JUL	940	1010	1060	106%	1110	1190	1000
	APR-SEP	1050	1130	1190	106%	1250	1330	1120
Entiat R nr Ardenvoir								
	APR-JUL	171	192	205	103%	220	240	200
	APR-SEP	185	210	225	102%	240	265	220
Wenatchee R at Plain								
	APR-JUL	995	1080	1130	114%	1180	1270	990
	APR-SEP	1080	1180	1240	115%	1300	1390	1080
Icicle Ck nr Leavenworth								
	APR-JUL	260	290	310	113%	330	360	275
	APR-SEP	285	315	340	113%	360	395	300
Wenatchee R at Peshastin								
	APR-JUL	1370	1470	1540	112%	1610	1710	1370
	APR-SEP	1480	1600	1680	113%	1760	1880	1490
Columbia R bl Rock Island Dam-NWS[2]								
	APR-JUL	48800		53200	95%		59700	55770
	APR-SEP	59400		64000	98%		70400	65200

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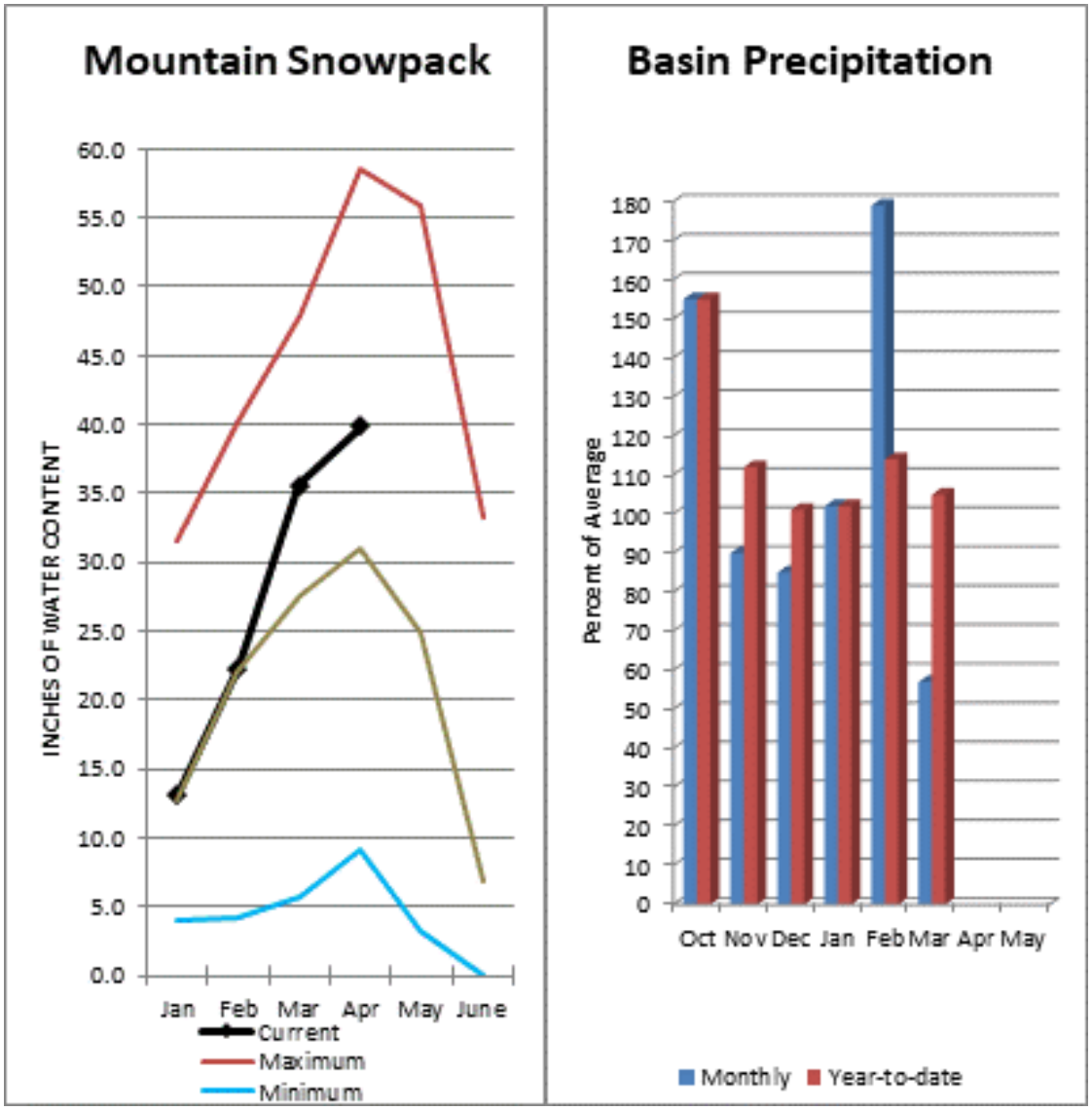
3) Median value used in place of average

Reservoir Storage End of March, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	206.2	203.0	256.1	677.4
Basin-wide Total	206.2	203.0	256.1	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Central Columbia	9	121%	96%
Lake Chelan	3	113%	94%
Entiat	1	113%	61%
Wenatchee	5	121%	97%
Stemilt	1	85%	80%
Colockum	1	143%	121%



April 1 reservoir storage for the Upper Yakima reservoirs was 506,100-acre feet, 99% of average. March streamflow on the Cle Elum River near Roslyn was 65%. April 1 snowpack was 129% based upon 9 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 57% of average for March and 105% 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: 4/6/2021 3:11:34 PM

Upper Yakima
Streamflow Forecasts - April 1, 2021

Upper Yakima	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	120	133	142	122%	151	164	116
	APR-SEP	129	144	154	122%	163	178	126
Kachess Reservoir Inflow [2]								
	APR-JUL	111	120	127	122%	134	143	104
	APR-SEP	119	129	136	120%	143	153	113
Cle Elum Lake Inflow [2]								
	APR-JUL	410	435	455	118%	470	500	385
	APR-SEP	445	470	495	119%	515	545	415
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	134	154	167	128%	180	200	130
	APR-SEP	136	156	170	128%	184	205	133

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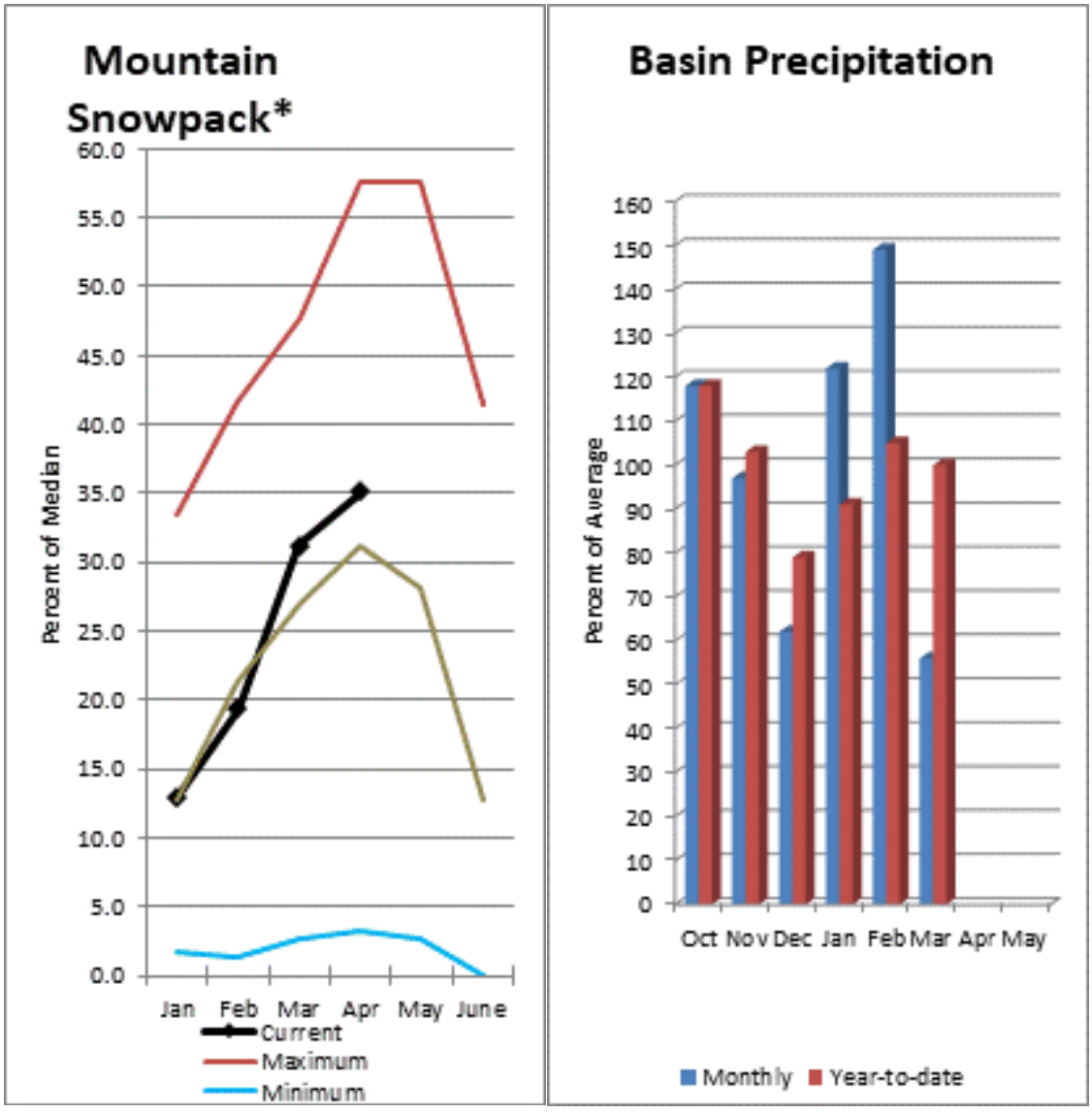
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
3) Median value used in place of average

Reservoir Storage End of March, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	103.5	122.5	106.3	157.8
Kachess	174.8	144.9	159.8	239.0
Cle Elum	227.8	230.3	246.3	436.9
Basin-wide Total	506.1	497.6	512.4	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Upper Yakima	6	129%	88%



March average streamflows within the basin were: Yakima River near Parker, 66% and the Naches River near Naches, 49%. April 1 reservoir storage for Bumping and Rimrock reservoirs was 166,000-acre feet, 110% of average. April 1 snowpack was 113% within the Lower Yakima Basin, 116% in the Naches and Ahtanum Creek reported in at 113% of normal. March precipitation was 78% of average and 107% for the water-year in the Naches River Basin. The Lower Yakima recorded 35% of average for March 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
Streamflow Forecasts - April 1, 2021

Lower Yakima	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						
Ahtanum Ck at Union Gap								
	APR-JUL	18.5	26	30	111%	35	42	27
	APR-SEP	20	28	33	114%	38	45	29
Yakima R nr Parker [2]								
	APR-JUL	1700	1870	1980	119%	2090	2260	1660
	APR-SEP	1860	2040	2170	119%	2290	2470	1820

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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

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Lower Yakima	3	113%	95%
Ahtanum	2	113%	90%
Simcoe-Toppenish	1	104%	80%
Satus	1	109%	120%

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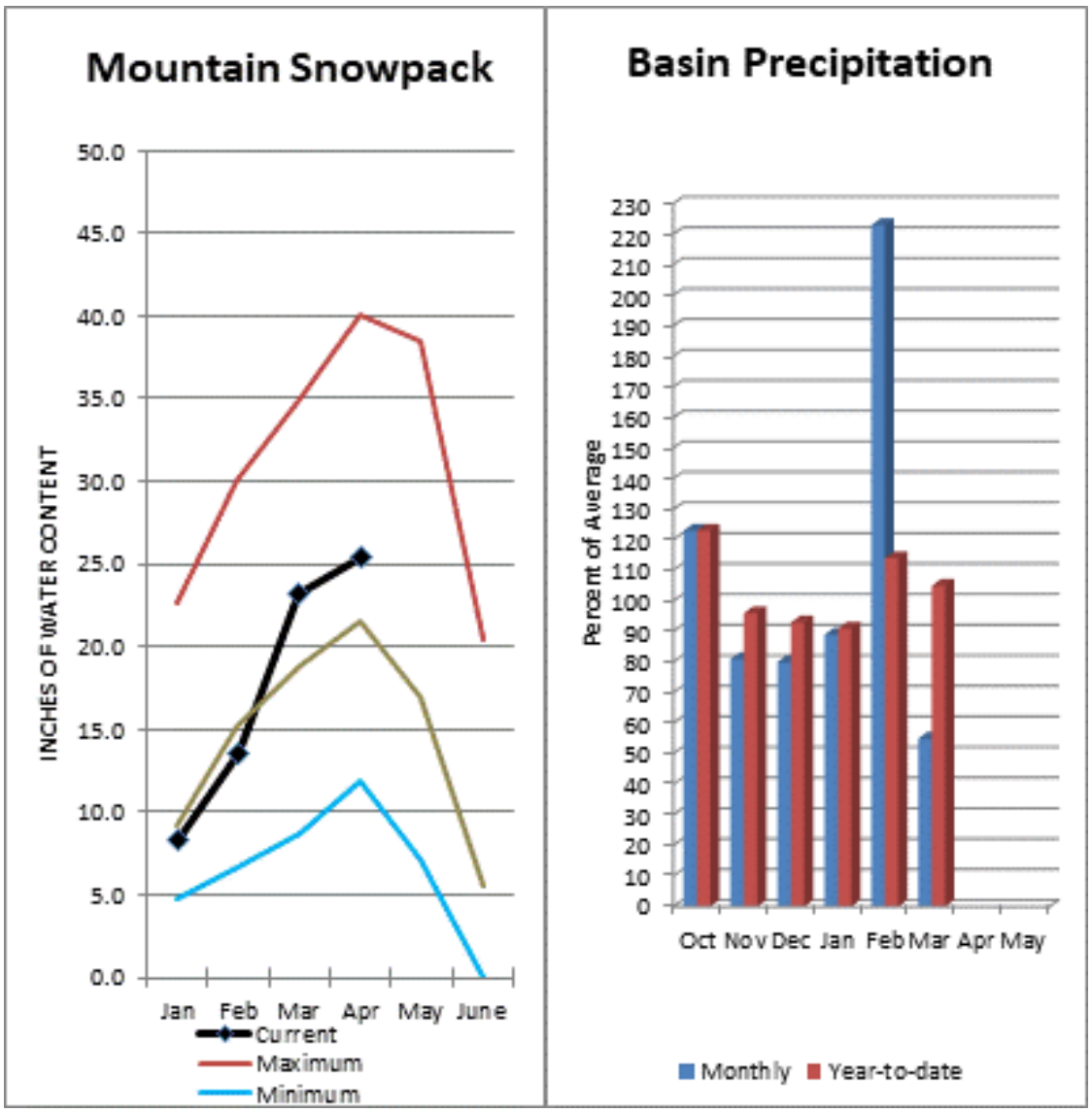
Naches
Streamflow Forecasts - April 1, 2021

Naches	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	107	118	126	111%	133	144	114
	APR-SEP	116	128	137	111%	145	157	123
American R nr Nile								
	APR-JUL	96	106	113	111%	120	130	102
	APR-SEP	103	115	123	112%	131	143	110
Rimrock Lake Inflow [2]								
	APR-JUL	180	194	205	110%	215	230	187
	APR-SEP	210	230	240	109%	250	270	220
Naches R nr Naches								
	APR-JUL	650	740	800	114%	865	950	700
	APR-SEP	705	805	875	115%	945	1050	760

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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	18.8	24.8	14.6	33.7
Rimrock	147.2	152.7	136.6	198.0
Basin-wide Total	166.0	177.6	151.2	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Naches	7	116%	115%



March precipitation was 55% of average, bringing the year-to-date precipitation to 105% of average. April 1 snowpack readings in the Lower Snake averaged 116% of normal, 139% for the Walla Walla and Asotin Creek, the Grande Ronde was 118%. March streamflow was 69% of average for Snake River below Lower Granite Dam and 87% for Grande Ronde River near Troy. Dworshak Reservoir storage was 86% of average.

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

Data Current as of: 4/6/2021 3:12:17 PM

Lower Snake-Walla Walla
Streamflow Forecasts - April 1, 2021

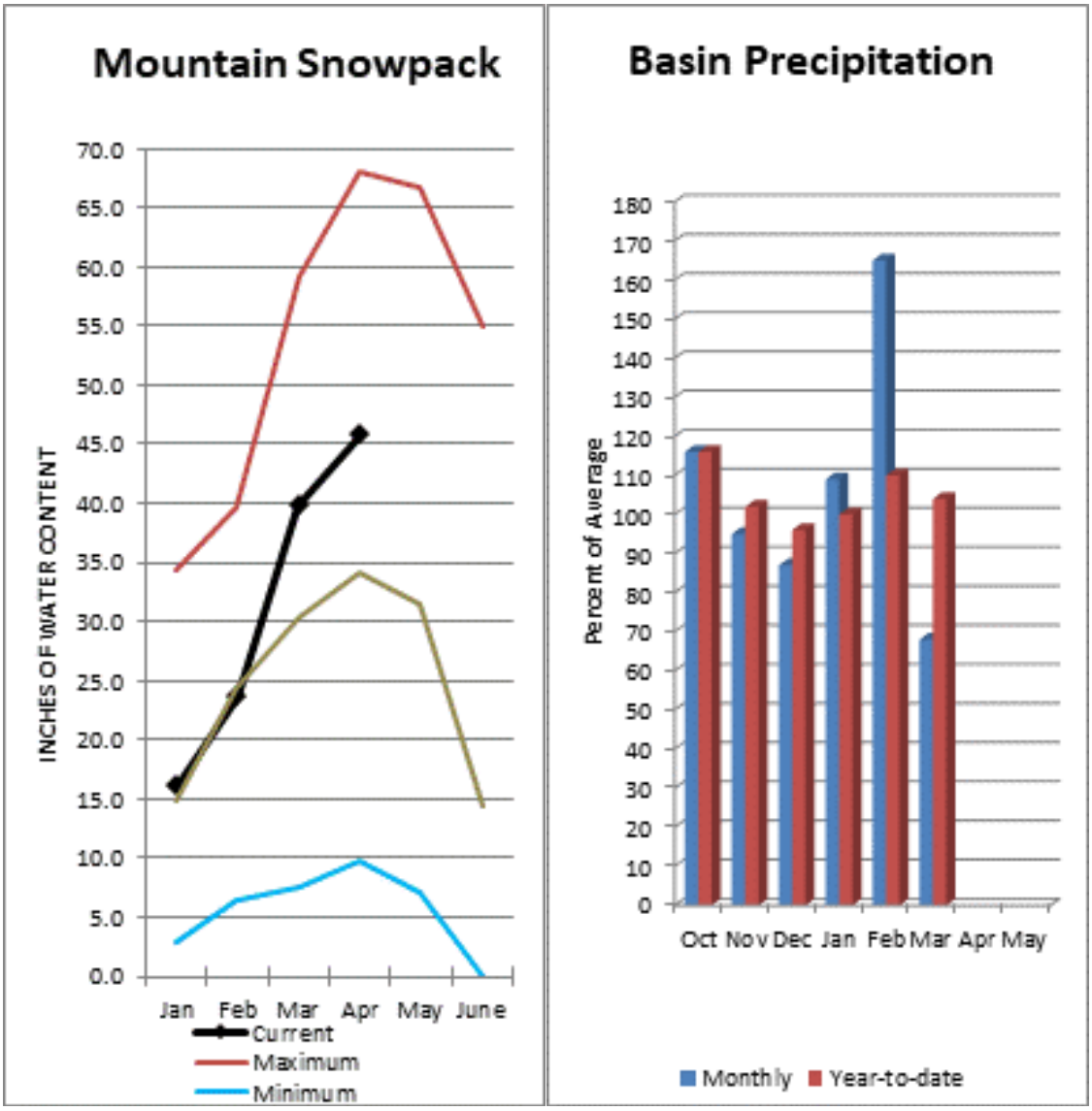
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Snake-Walla Walla	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy								
	APR-JUL	1130	1320	1450	119%	1570	1760	1220
	APR-SEP	1220	1420	1550	118%	1680	1870	1310
Asotin Ck at Asotin								
	APR-JUL	24	31	35	100%	40	48	35
Clearwater R at Spalding[2]								
	APR-JUL	5970	6770	7310	106%	7850	8640	6890
	APR-SEP	6270	7110	7680	106%	8260	9100	7270
Snake R bl Lower Granite Dam-NWS[2]								
	APR-JUL	13700		15000	76%		18300	19848
	APR-SEP	15900		17400	78%		20800	22280
SF Walla Walla R nr Milton-Freewater								
	APR-JUL	49	56	61	113%	66	73	54
	APR-SEP	62	69	74	112%	79	87	66
Mill Ck nr Walla Walla								
	APR-JUL	21	25	27	113%	29	33	24
	APR-SEP	25	28	30	111%	33	36	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

Reservoir Storage End of March, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2074.8	2338.0	2417.0	3468.0
Basin-wide Total	2074.8	2338.0	2417.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Lower Snake-Walla Walla	19	116%	113%
Asotin	2	139%	120%
Grande Ronde	17	118%	116%
Walla Walla	4	139%	120%



The Columbia at The Dalles is forecasted to have 91% of average flows this summer according to the River Forecast Center. March average streamflow for Cowlitz River was 82% and the Columbia River at The Dalles was 67% of average. March precipitation was 68% of average and the water-year average was 104%. April 1 snow cover for Cowlitz River was 135%, and Lewis River was 139% of normal.

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Lower Columbia
Streamflow Forecasts - April 1, 2021

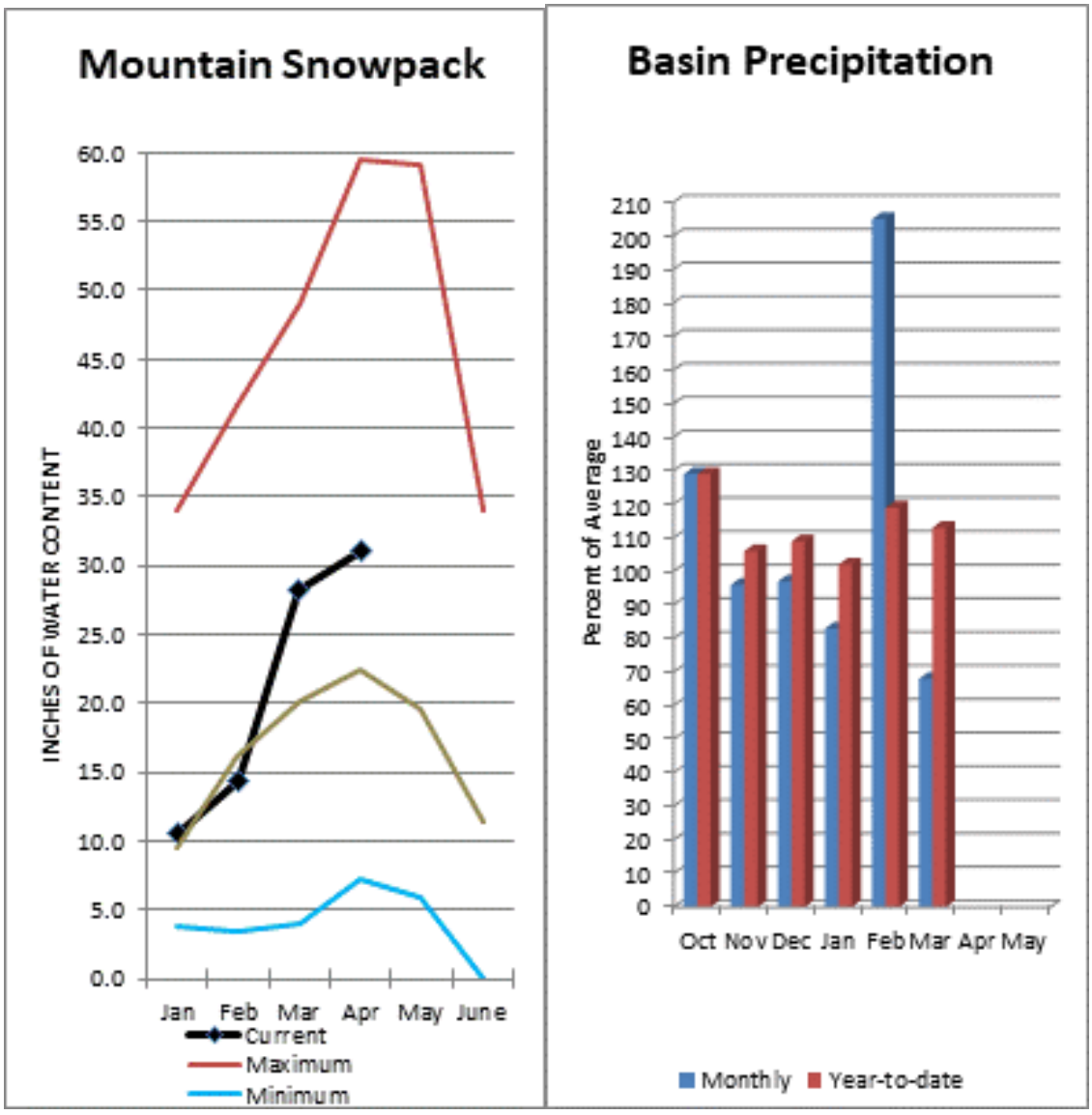
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Columbia	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	66900		71600	90%		81200	79855
	APR-SEP	79200		84600	91%		95100	92704
Klickitat R nr Glenwood								
	APR-JUL	113	128	138	110%	148	163	126
	APR-SEP	126	142	152	109%	163	179	139
Klickitat R nr Pitt								
	APR-JUL	395	450	490	113%	525	580	435
	APR-SEP	480	545	585	113%	630	690	520
Lewis R at Ariel[2]								
	APR-JUL	870	1020	1130	116%	1240	1400	970
	APR-SEP	1010	1180	1290	115%	1400	1560	1120
Cowlitz R bl Mayfiled[2]								
	APR-JUL	1630	1850	2000	123%	2150	2380	1630
	APR-SEP	1840	2080	2240	122%	2400	2640	1840
Cowlitz R at Castle Rock[2]								
	APR-JUL	2110	2490	2750	123%	3000	3380	2240
	APR-SEP	2390	2790	3060	120%	3330	3730	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

Reservoir Storage End of March, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Yale				0.0
Swift			644.2	0.0
Mossyrock Dam (Riffe Lk)		739.6	1270.0	0.0
Merwin			399.5	0.0
Basin-wide Total		0.0	0.0	
# of reservoirs	0	0	0	0

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
Lower Columbia	12	134%	114%
Lewis	6	139%	103%
Cowlitz	8	135%	123%



April 1 snowpack was 122% of average for the White River, 147% for Puyallup River and 156% in the Green River Basin. March precipitation was 68% of average, bringing the water year-to-date to 113% of average for the basins.

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

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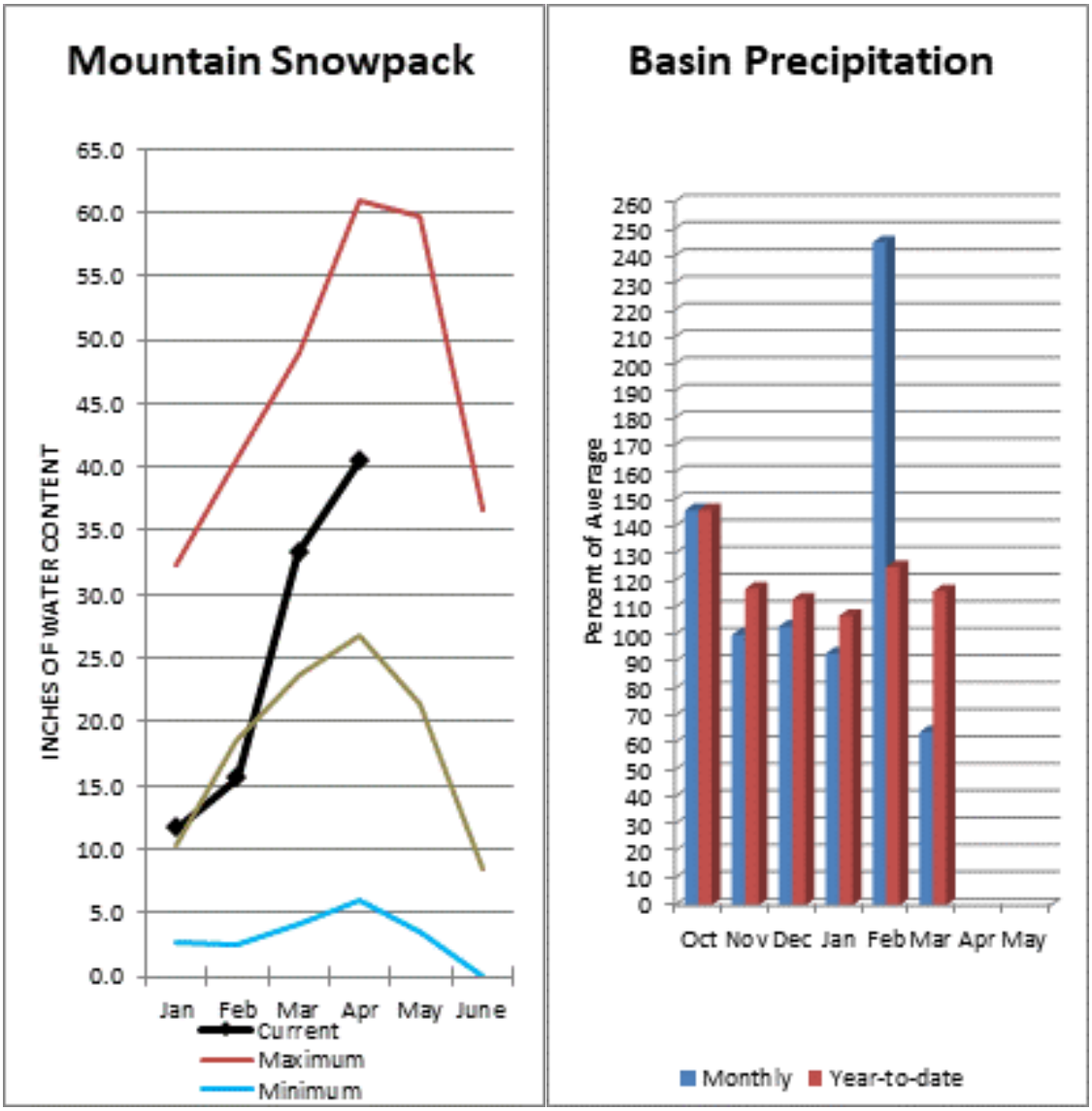
South Puget Sound
Streamflow Forecasts - April 1, 2021

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

South Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
White R nr Buckley[1,2]								
	APR-JUL	395	465	500	116%	535	605	430
	APR-SEP	470	555	590	115%	630	715	515
Green R bl Howard A Hanson Dam[1,2]								
	APR-JUL	230	280	300	128%	320	370	235
	APR-SEP	255	305	330	127%	355	405	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, 2021	# of Sites	% Median	Last Year % Median
South Puget Sound	11	138%	120%
White	4	127%	125%
Puyallup	2	147%	157%
Green	5	156%	109%



Basin-wide precipitation for March was 64% of average, bringing water-year-to-date to 116% of average. April 1 median snow cover in Cedar River Basin was 144%, Tolt River Basin was 169%, Snoqualmie River Basin was 153%, and Skykomish River Basin was 163%.

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

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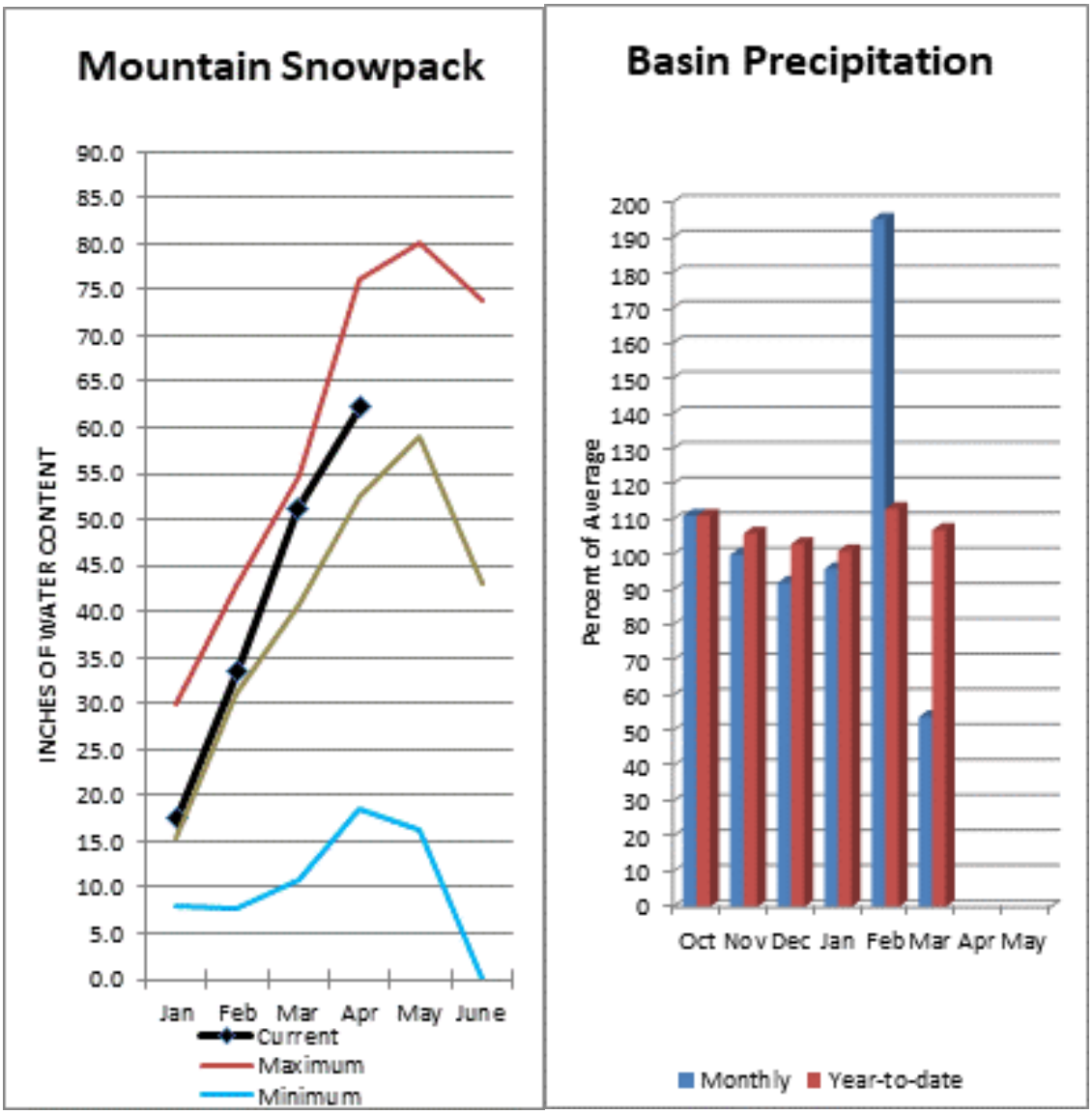
Central Puget Sound
Streamflow Forecasts - April 1, 2021

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

Central Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	APR-JUL	76	87	95	136%	103	114	70
	APR-SEP	82	94	102	134%	110	122	76
Rex R nr Cedar Falls								
	APR-JUL	25	29	32	133%	35	39	24
	APR-SEP	27	32	35	130%	38	43	27
Taylor Ck nr Selleck								
	APR-JUL	19.7	23	24	120%	26	29	20
	APR-SEP	24	27	29	121%	31	34	24
SF Tolt R nr Index								
	APR-JUL	16.1	18.4	20	141%	22	24	14.2
	APR-SEP	17	19.8	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 April 1, 2021	# of Sites	% Median	Last Year % Median
Central Puget Sound	9	152%	116%
Cedar	6	144%	103%
Tolt	2	169%	131%
Snoqualimie	4	153%	114%
Skykomish	3	163%	133%



Runoff is forecasted to be near to slightly above average for the 3 major basins represented. March streamflow in Skagit River was 69% of average. Basin-wide precipitation for March was 54% of average, bringing water-year-to-date to 107% of average. April 1 average snow cover in Skagit River Basin was 119% and the Nooksack River Basin was 130%. April 1 Skagit River reservoir storage was 77% of average and 39% of capacity.

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

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North Puget Sound
Streamflow Forecasts - April 1, 2021

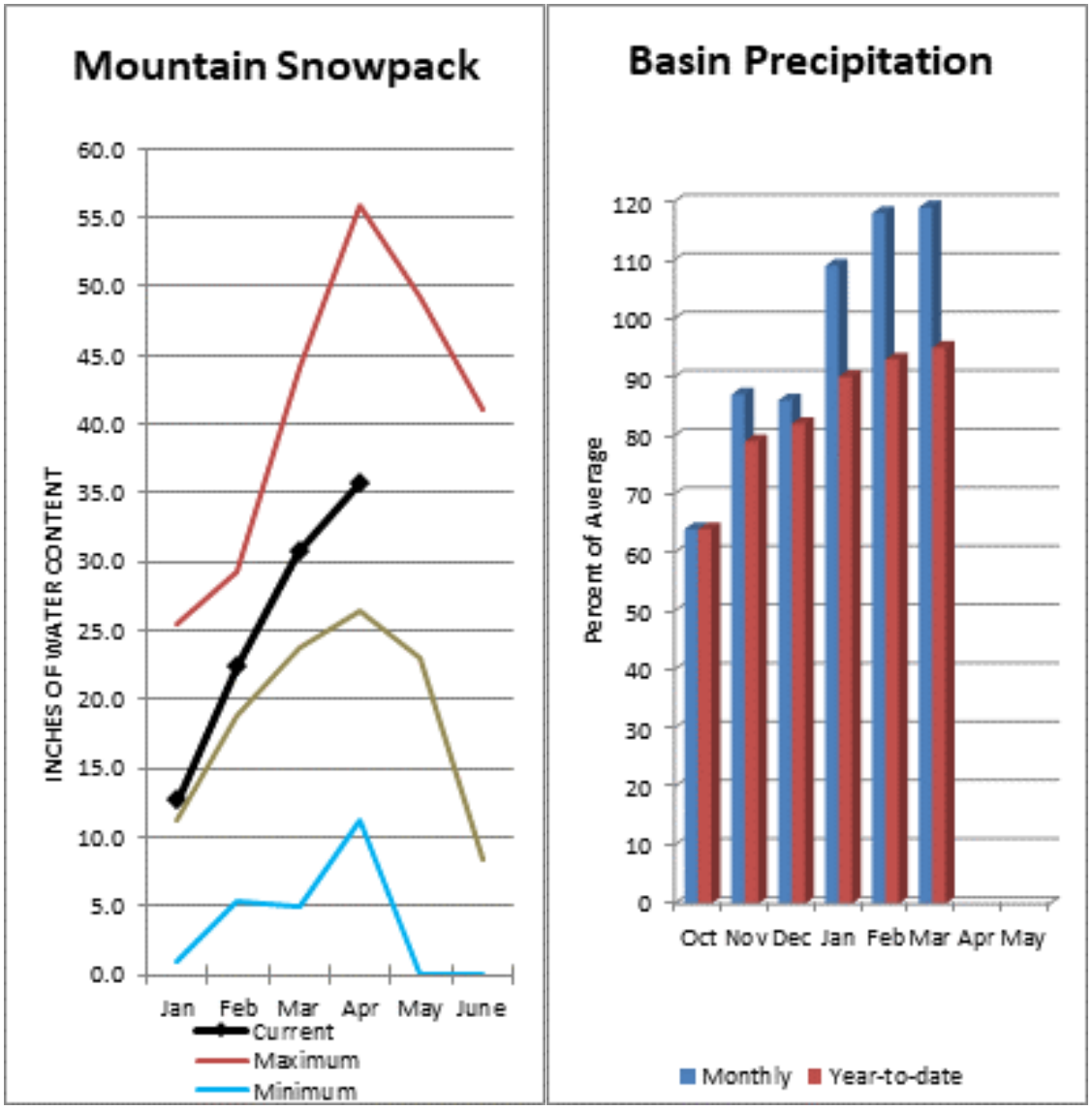
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

North Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Thunder Ck nr Newhalem								
	APR-JUL	220	240	255	109%	265	285	235
	APR-SEP	320	340	355	108%	370	395	330
Skagit R at Newhalem[2]								
	APR-JUL	1810	1910	1980	113%	2040	2140	1750
	APR-SEP	2160	2280	2360	114%	2440	2560	2070
Baker R at Concrete								
	APR-JUL	780	845	890	114%	935	1000	780
	APR-SEP	990	1070	1120	114%	1170	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 March, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	559.8	579.2	730.5	1434.7
Diablo Reservoir			86.0	90.6
Basin-wide Total	559.8	579.2	730.5	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2021	# of Sites	% Median	Last Year % Median
North Puget Sound	15	120%	109%
Skagit	10	119%	113%
Baker	0		
Nooksack	3	130%	118%



March runoff in the Dungeness River was 55% of normal. March precipitation was 119% of average. Precipitation has accumulated at 9953% of average for the water year. March precipitation at Quillayute was 86 % of normal brining water-year precipitation to 105%. Olympic Peninsula snowpack averaged 134% of normal on April 1.

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

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Olympic
Streamflow Forecasts - April 1, 2021

Olympic	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	118	128	135	113%	142	152	120
	APR-SEP	143	156	165	114%	174	187	145
Elwha R at McDonald Br nr Port Angeles								
	APR-JUL	410	445	470	118%	495	530	400
	APR-SEP	485	525	550	117%	575	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 April 1, 2021	# of Sites	% Median	Last Year % Median
Olympic	6	134%	105%

Issued by

Terry Cosby
Acting Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Comes-At-Night
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.**

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Mount Vernon, WA 98273-2873

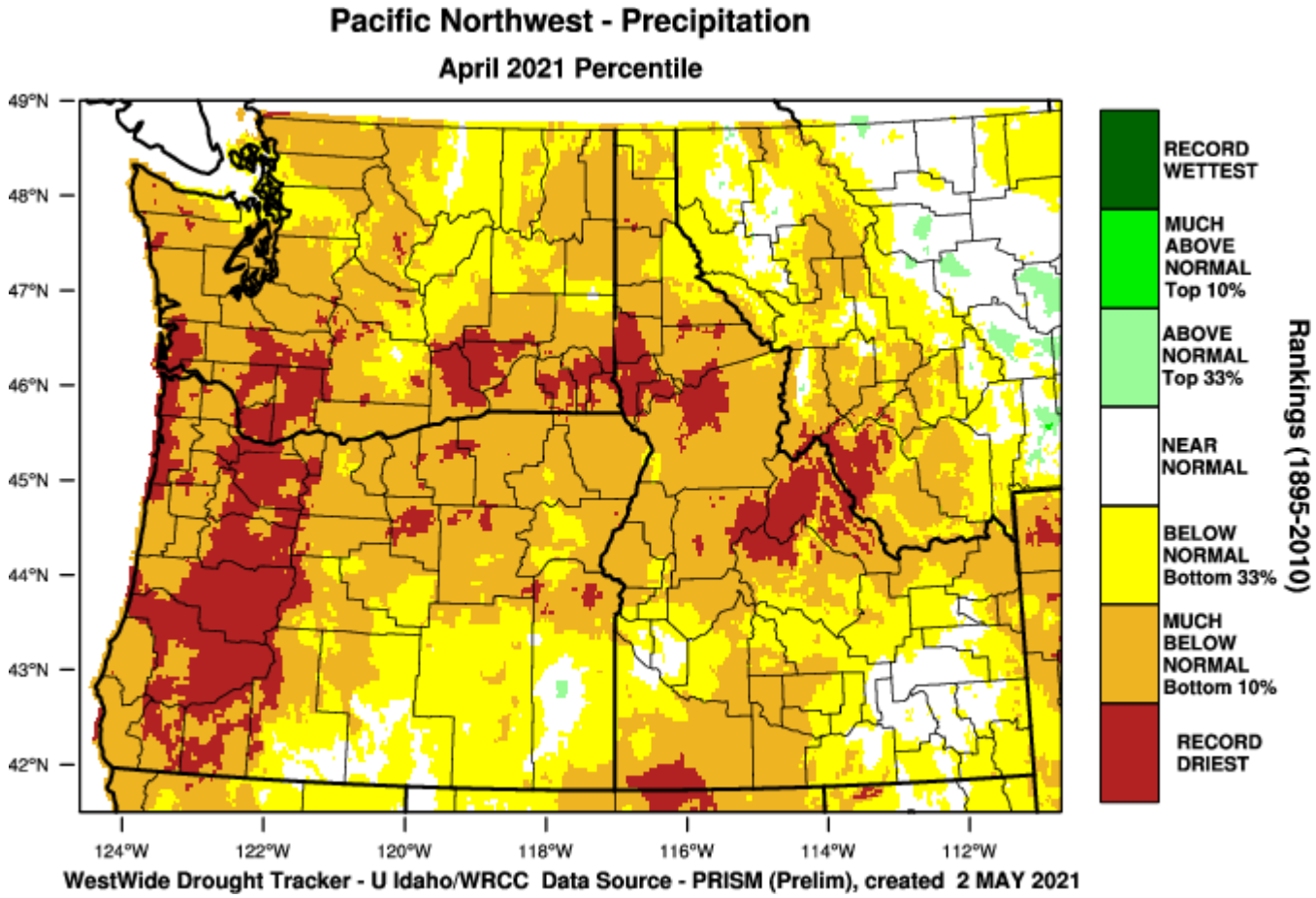
Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA

NRCS Natural Resources Conservation Service

United States Department of Agriculture

Washington
Water Supply Outlook Report
May 1, 2021



Record low April precipitation across the Pacific North West

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

May 2021

General Outlook

Once again Washington experienced a very dry month, in fact a record dry month at many locations. Due to the lack of precipitation and lots of sunshine many SNOTEL sites on the east side melted out 1-2 weeks early. Higher elevation sites and the sites along the western Cascades seem to have fared better and exhibited normal melt rates. The North Puget Basin was the only area to increase snow percentages, more due to slow melt than anything.

The most recent forecast through mid-May shows a high probability for above normal temperatures and below normal precipitation, with a return to near normal conditions later in the month. National Weather Service 3-month forecast, beginning May 1, indicates above normal temperatures and below normal precipitation. The latest US Drought Monitor indicates an expansion of D0 (Abnormally Dry) to Western Washington following the lack of rainfall over the last two months. D1 & D2 (Moderate and Severe) have also expanded their grip on the east side. (see maps on page 4)

Snowpack

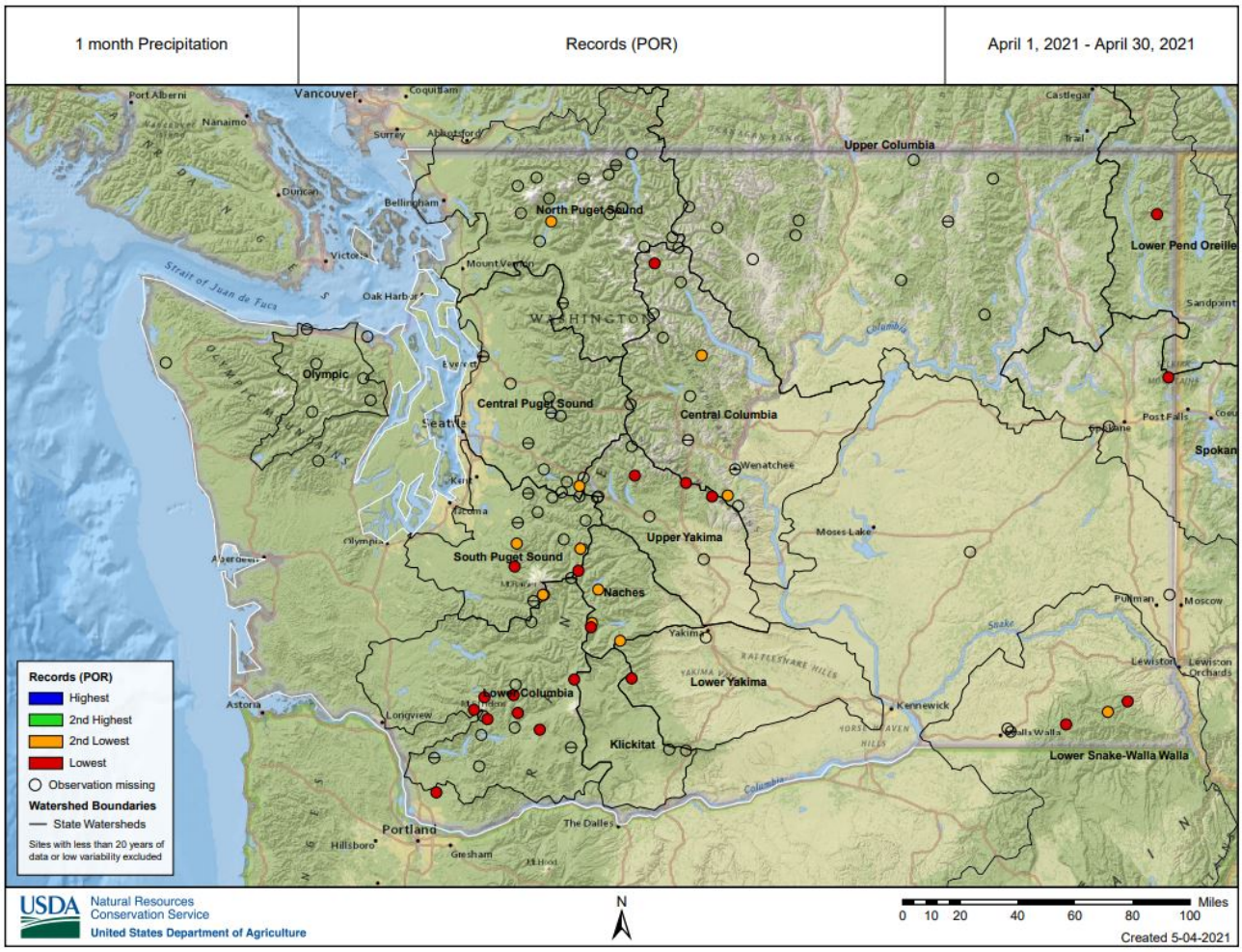
The May 1 statewide SNOTEL readings were 122% of normal, slightly lower than last month. Snow sites in the central belt have begun to meltout, many 1-2 weeks early. The Tolt River Basin held the most snow with 198%. Westside medians from SNOTEL and May 1 snow surveys, included the North Puget Sound river basins with 115% of normal, the Central and South Puget river basins with 174% and 131% respectively, and the Lower Columbia basins with 112% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 96% and the Wenatchee area with 115%. Snowpack in the Spokane River Basin was at 86% and the Upper Columbia river basins had 112% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	86	108
Newman Lake	37	89
Lower Pend Oreille	68	107
Okanogan	78	39
Methow	123	108
Conconully Lake	0	0
Central Columbia	112	86
Upper Yakima	132	70
Naches	98	95
Lower Yakima	58	45
Ahtanum Creek	58	45
Walla Walla	90	90
Lower Snake	82	85
Cowlitz	118	107
Lewis	125	88
White	96	93
Green	168	92
Puyallup	168	171
Cedar	167	95
Snoqualmie	188	113
Skykomish	183	135
Skagit	119	99
Nooksack	121	110
Olympic Peninsula	129	97

Precipitation

May precipitation accumulation from SNOTEL was much below normal across the entire state. Individual stations ranged from 53% to a low of 14%. Many sites recorded record low rainfall last month. Statewide water-year average was near normal as of May 1. SNOTEL collects all form of precipitation including, rain, snow or sleet and hail.

RIVER BASIN	MAY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	50	87
Lower Pend Oreille	45	81
Upper Columbia	50	88
Central Columbia	38	103
Upper Yakima	35	100
Naches	30	100
Lower Yakima	28	87
Klickitat	24	87
Walla Walla	33	103
Lower Snake	36	97
Lower Columbia	24	97
South Puget Sound	40	106
Central Puget Sound	50	110
North Puget Sound	49	103
Olympic Peninsula	52	93



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

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 583,100-acre feet, 96% of average for the Upper Reaches and 175,300-acre feet or 98% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 154,300-acre feet, 68% of average and 65% of capacity; and Ross lake within the Skagit River Basin at 81% 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	65	68
Lower Pend Oreille	57	93
Upper Columbia	55	78
Central Columbia	45	102
Upper Yakima	70	96
Naches	76	98
Lower Snake	66	86
North Puget Sound	42	81

Streamflow

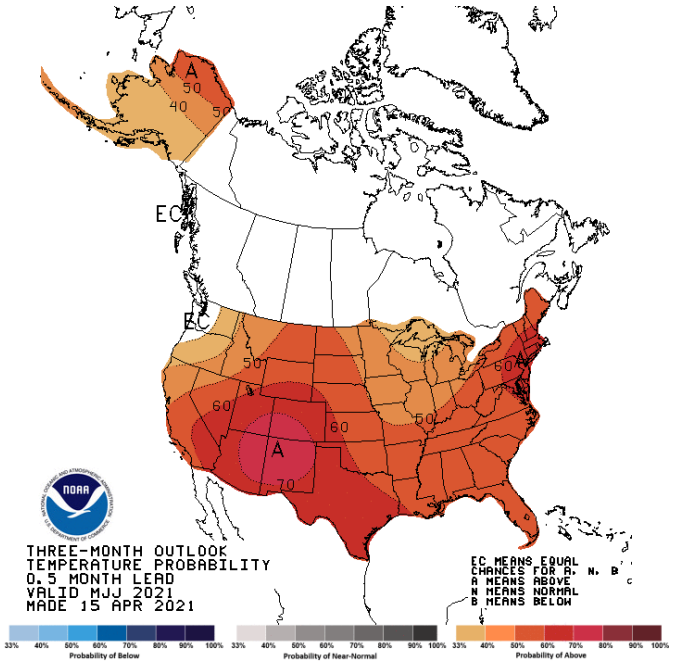
While seasonal forecasts this time of year are generally quite robust abnormal climate conditions can still affect final outcomes. The lack of or unavailability of certain data sets can also reduce accuracy (Example: failure to continue monthly measurements at historic long term manual snow courses can effect calculated runoff from major drainages of a large basin) Volumetric forecasts are developed using current, historic, and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. The lack of precipitation last month highly effected normal runoff throughout the region, however irrigation releases and a mid-month temperature spike helped bolster some recorded flows.

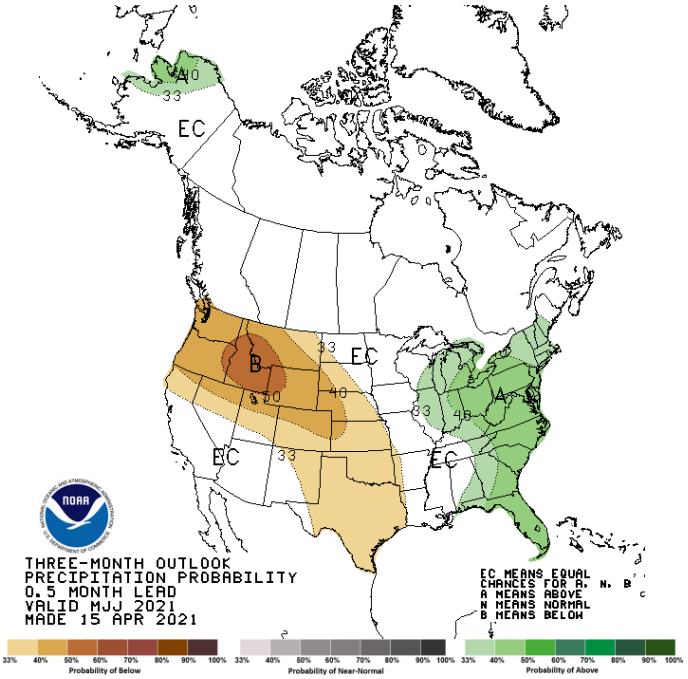
BASIN	PERCENT OF AVERAGE FORCAST (50% CHANCE OF EXCEEDENCE)
Spokane	58-93
Pend Oreille	71-88
Upper Columbia	60-122
Central Columbia	87-106
Upper Yakima	110-116
Naches	97-102
Lower Yakima	88-106
Klickitat	92-99
Lower Snake-Walla Walla	52-100
Lower Columbia	89-111
South Puget Sound	99-100
Central Puget Sound	111-124
North Puget Sound	102-106
Olympic Peninsula	100-104

STREAM	PERCENT OF AVERAGE MAY STREAMFLOWS
Pend Oreille at Albeni Fall Dam	71
Kettle at Laurier	97
Columbia at Birchbank	73
Spokane at Spokane	73
Similkameen at Nighthawk	155
Okanogan at Tonasket	135
Methow at Pateros	162
Chelan at Chelan	115
Stehekin near Stehekin	117
Wenatchee at Pashastin	102
Cle Elum near Roslyn	107
Yakima at Parker	104
Naches at Naches	107
Grande Ronde at Troy	99
Snake below Lower Granite Dam	70
Columbia River at The Dalles	73
Lewis at Merwin Dam	64
Cowlitz below Mayfield Dam	78
Skagit at Concrete	99
Dungeness near Sequim	80

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

Climate





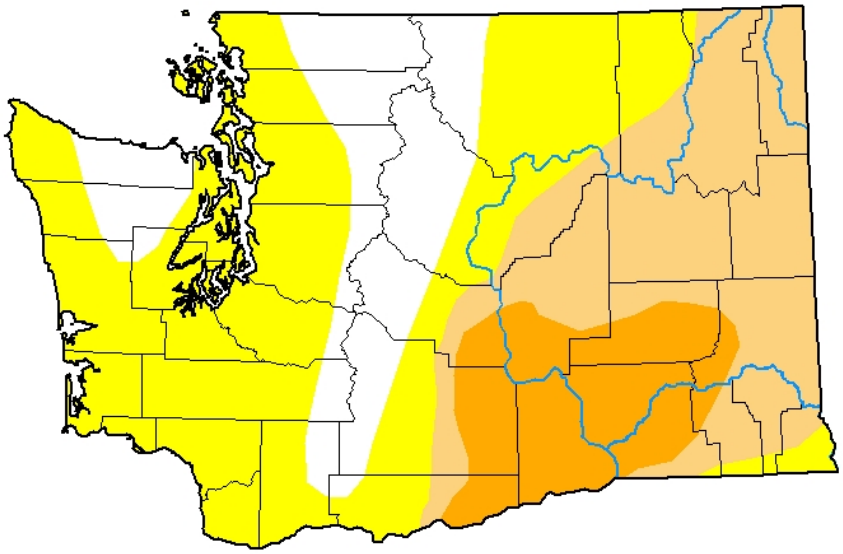
U.S. Drought Monitor

Washington

April 27, 2021

(Released Thursday, Apr. 29, 2021)

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:

Richard Heim
NCEI/NOAA

droughtmonitor.unl.edu

Natural Resources Conservation Service

Washington State
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julie.koeberle@usda.gov
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/

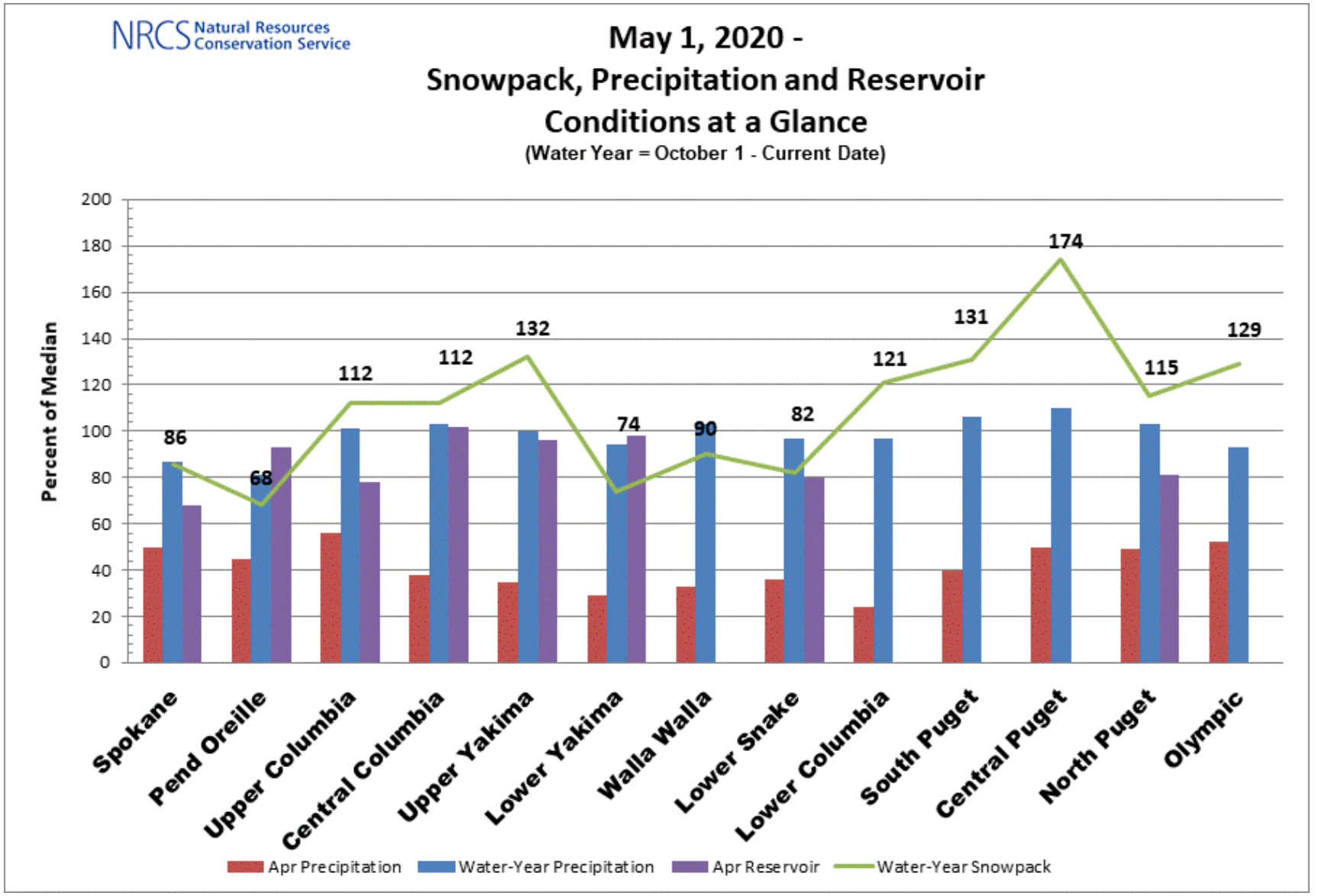
Idaho:
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

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/


NRCS Natural Resources Conservation Service
May 1, 2020 -
Snowpack, Precipitation and Reservoir
Conditions at a Glance
(Water Year = October 1 - Current Date)
Percent of Median
200
180
160
140
120
100
80
60
40
20
0
86
68
112
112
132
74
90
82
121
131
174
115
129
Spokane
Pend Oreille
Upper Columbia
Central Columbia
Upper Yakima
Lower Yakima
Walla Walla
Lower Snake
Lower Columbia
South Puget
Central Puget
North Puget
Olympic
Apr Precipitation
Water-Year Precipitation
Apr Reservoir
Water-Year Snowpack

88th Annual Western Snow Conference

Dear Members and Friends of the Western Snow Conference:

The 88th meeting of the Western Snow Conference set a new record for registration and attendance, and we would like to thank all the participants – especially students and vendors – for supporting the Conference as we navigated the virtual world this year. The presentations were interesting and informative, and a special thanks goes to all the presenters for staying on schedule and being prepared.

We would also like to thank Montana State University for hosting the Webex meeting, and especially Maddie Beck for all her efforts as our facilitator - both during the conference and behind the scenes. Maddie is continuing on at MSU for her Master's in Snow Science; we hope to see her as a presenter next year!

Stay tuned here for future Conference updates as our team of volunteers work to provide follow up materials. Thanks again for joining us. We hope to see you in person next year!

- Conference **AGENDA**
- Instructions for **AUTHORS** (**Example Paper** and **Proceedings Template**)
- Federal Telecommunications Certification NDAA889

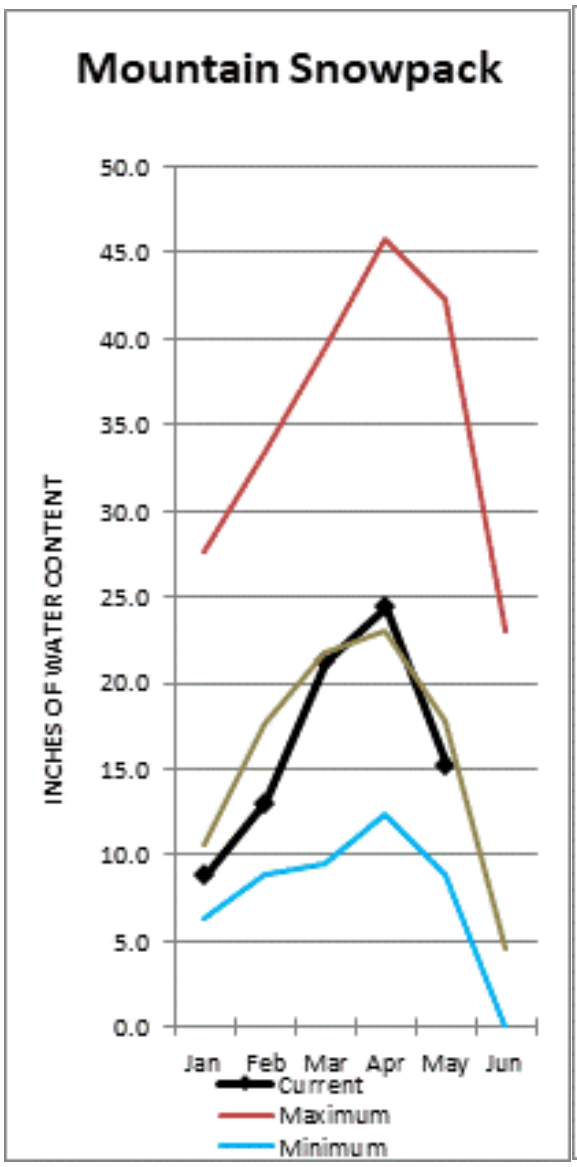
If you have any questions, please contact us at **westernsnowconference@gmail.com**.

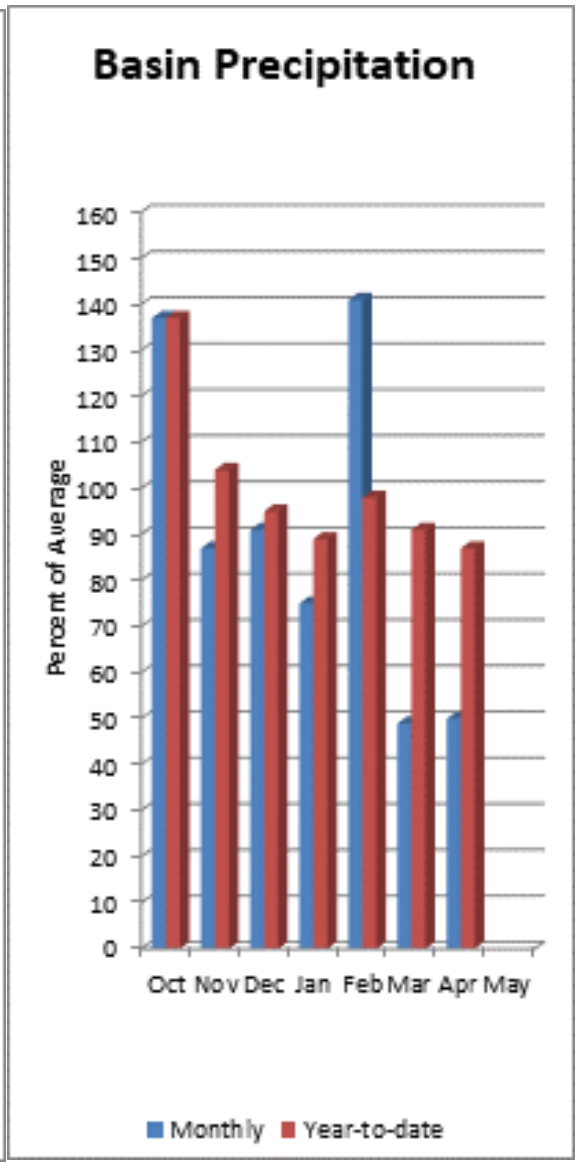
Noah Molotch — General Chair, WSC

Lucas Zukiewicz — Conference Chair

Also find westernsnowconference.org online and on Facebook

Spokane River Basin





Basin snowpack is 86% of normal and precipitation is 87% of average for the water year. Precipitation for April was much below normal at 50% of average. Streamflow on the Spokane River at Spokane was 73% of average for April. May 1 storage in Coeur d'Alene Lake was 154,300-acre feet, 68% of average and 65% of capacity. Snowpack at Quartz Peak SNOTEL site melted out 18 days before normal. Normally the site would still have 14.4 inches of water content.

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

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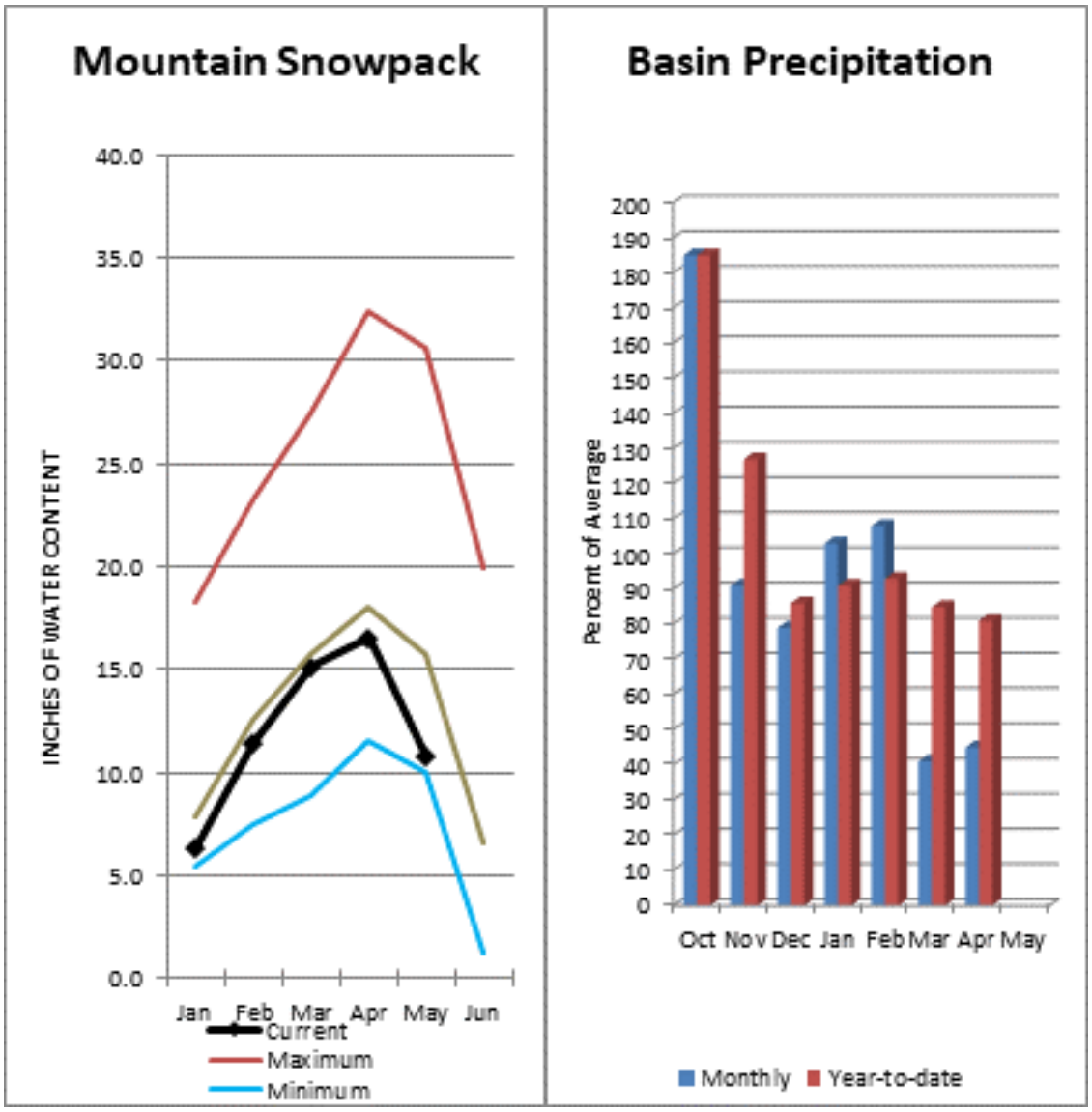
Spokane
Streamflow Forecasts - May 1, 2021

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	1030	1260	1420	93%	1570	1800	1530
	MAY-SEP	1100	1340	1500	93%	1660	1900	1620
Spokane R at Long Lake[2]								
	MAY-JUL	1230	1470	1630	95%	1780	2020	1710
	MAY-SEP	1400	1650	1820	93%	1990	2240	1950
Chamokane Ck nr Long Lake								
	MAY-JUL	2.3	3.5	4.5	58%	5.7	7.5	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	154.3	218.8	228.0	238.5
Basin-wide Total	154.3	218.8	228.0	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
Spokane	12	86%	108%
Newman Lake	2	37%	89%



May streamflow was 71% of average on the Pend Oreille River and 73% on the Columbia at Birchbank. May 1 snow cover was 68% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 17.3 inches of snow water on the snow pillow which is only 73% of normal for May 1. Precipitation during April was 45% of average, dropping the year-to-date precipitation to 81% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 93% of normal.

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

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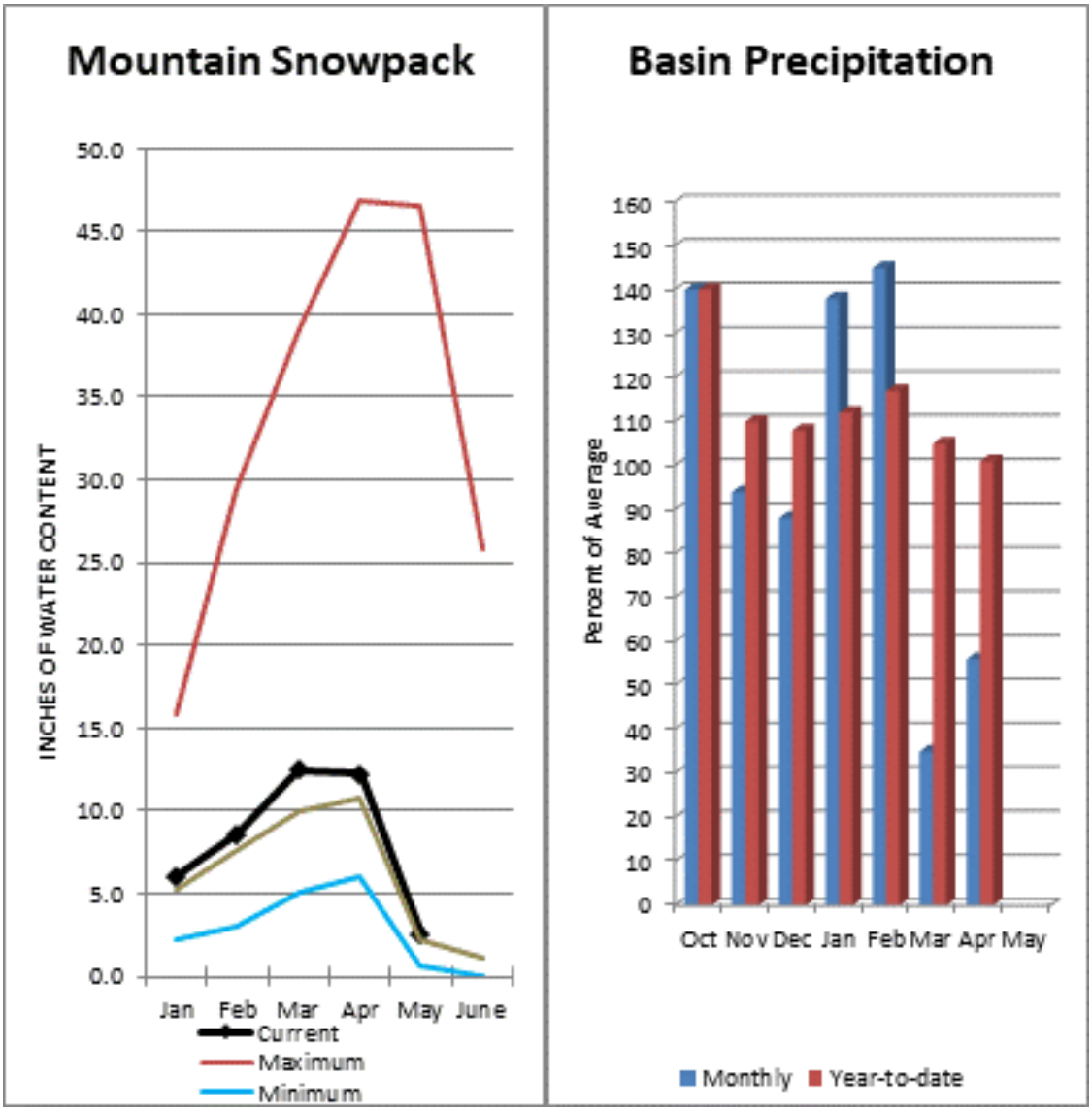
Lower Pend Oreille
Streamflow Forecasts - May 1, 2021

Lower Pend Oreille	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]								
	MAY-JUL	7070	7920	8500	88%	9080	9930	9690
	MAY-SEP	7710	8710	9380	88%	10100	11100	10700
Priest R nr Priest River[2]								
	MAY-JUL	275	350	405	70%	460	535	580
	MAY-SEP	310	395	450	71%	505	590	630
Pend Oreille R bl Box Canyon[2]								
	MAY-JUL	7100	7980	8580	88%	9170	10000	9750
	MAY-SEP	7710	8750	9450	88%	10200	11200	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	884.2	908.5	931.7	1561.3
Priest Lake	80.8	84.6	101.9	119.3
Basin-wide Total	964.9	993.0	1033.6	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
Lower Pend Oreille	8	68%	107%
Sullivan	1	73%	101%



May 1 snow cover on the Okanogan was 78% of normal, Omak Creek was 78% and the Methow was 123%. Conconully Basin snowpack had already melted out. April precipitation in the Upper Columbia was 56% of average, with precipitation for the water year at 101% of average. A mid-month temperature spike led to rapid mid-elevation snowmelt which contributed to above normal runoff. April streamflow for the Methow River was 162% of average, 135% for the Okanogan River and 155% for the Similkameen. Combined storage in the Conconully Reservoirs was 12,900 acre-feet which is 78% of normal.

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Upper Columbia
Streamflow Forecasts - May 1, 2021

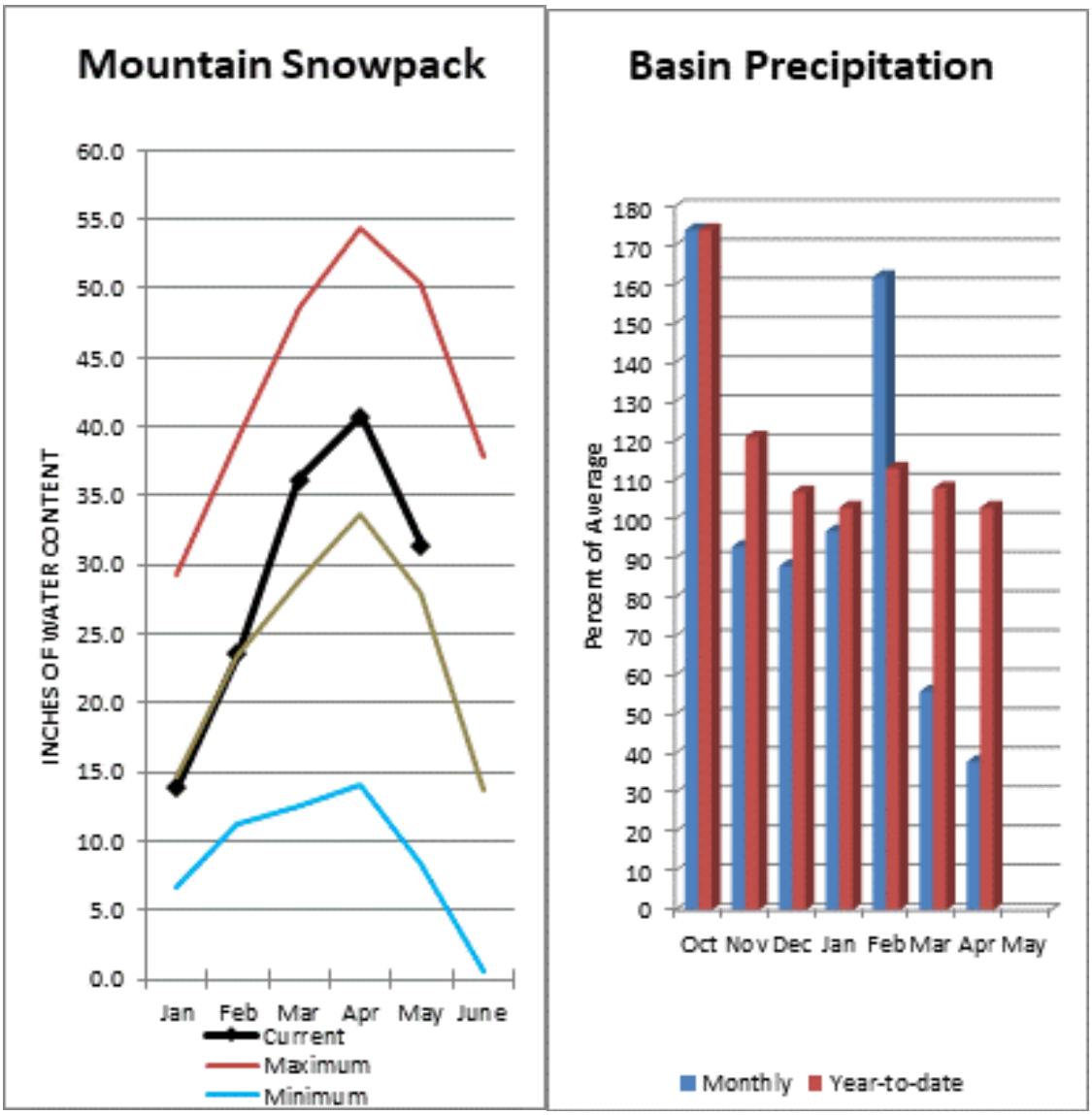
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Upper Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kettle R nr Laurier								
	MAY-JUL	955	1160	1310	90%	1450	1660	1450
	MAY-SEP	985	1210	1370	90%	1530	1760	1530
Colville R at Kettle Falls								
	MAY-JUL	0.45	25	42	58%	59	84	72
	MAY-SEP	3.1	31	50	60%	69	97	84
Columbia R at Grand Coulee-NWS[2]								
	MAY-JUL	35600		40300	92%		47000	43870
	MAY-SEP	43200		49500	93%		58400	52970
Similkameen R nr Nighthawk								
	MAY-JUL	1100	1220	1300	123%	1380	1500	1060
	MAY-SEP	1170	1300	1390	122%	1480	1610	1140
Okanogan R nr Tonasket								
	MAY-JUL	1140	1330	1460	112%	1590	1780	1300
	MAY-SEP	1240	1480	1640	112%	1790	2030	1470
Okanogan R at Malott								
	MAY-JUL	1150	1350	1490	117%	1620	1820	1270
	MAY-SEP	1260	1500	1670	116%	1830	2070	1440
Methow R nr Pateros								
	MAY-JUL	595	690	755	103%	820	915	730
	MAY-SEP	645	750	815	103%	885	990	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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	5.7	7.5	7.6	10.5
Conconully Reservoir	7.2	8.3	8.9	13.0
Basin-wide Total	12.9	15.8	16.5	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
Upper Columbia	9	110%	101%
Colville	0		
Kettle	2	12%	54%
Okanogan	2	78%	39%
Omak	1	78%	39%
Sanpoil	1	78%	39%
Similkameen	4	132%	116%
Toats Coulee	9	110%	101%
Conconully Lake	1		
Methow	4	123%	108%



Precipitation during April was 38% of average in the basin and 103% for the year-to-date. April average streamflow on the Chelan River was 115% and on the Wenatchee River 102%. May 1 snowpack in the Wenatchee River Basin was 109% of normal; the Chelan, 105%; the Entiat, 0%; Stemilt Creek, 10% and Colockum Creek, 83%. Reservoir storage in Lake Chelan was 102% of average. Lyman Lake SNOTEL had the most snow water with 57 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
Streamflow Forecasts - May 1, 2021

Central Columbia	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						
Stehekin R at Stehekin								
	MAY-JUL	510	565	600	101%	640	695	595
	MAY-SEP	620	675	710	101%	745	800	705
Chelan R at Chelan								
	MAY-JUL	710	775	820	95%	865	930	860
	MAY-SEP	810	880	930	95%	980	1050	975
Entiat R nr Ardenvoir								
	MAY-JUL	124	143	156	88%	168	187	178
	MAY-SEP	135	156	171	87%	185	205	196
Wenatchee R at Plain								
	MAY-JUL	730	800	850	103%	900	970	825
	MAY-SEP	810	890	945	103%	1000	1080	920
Icicle Ck nr Leavenworth								
	MAY-JUL	205	230	250	106%	270	295	235
	MAY-SEP	225	255	275	106%	295	330	260
Wenatchee R at Peshastin								
	MAY-JUL	1030	1120	1180	104%	1250	1340	1140
	MAY-SEP	1130	1240	1310	104%	1380	1490	1260
Columbia R bl Rock Island Dam-NWS[2]								
	MAY-JUL	39300		45000	94%		51600	47930
	MAY-SEP	47300		54700	95%		63500	57360

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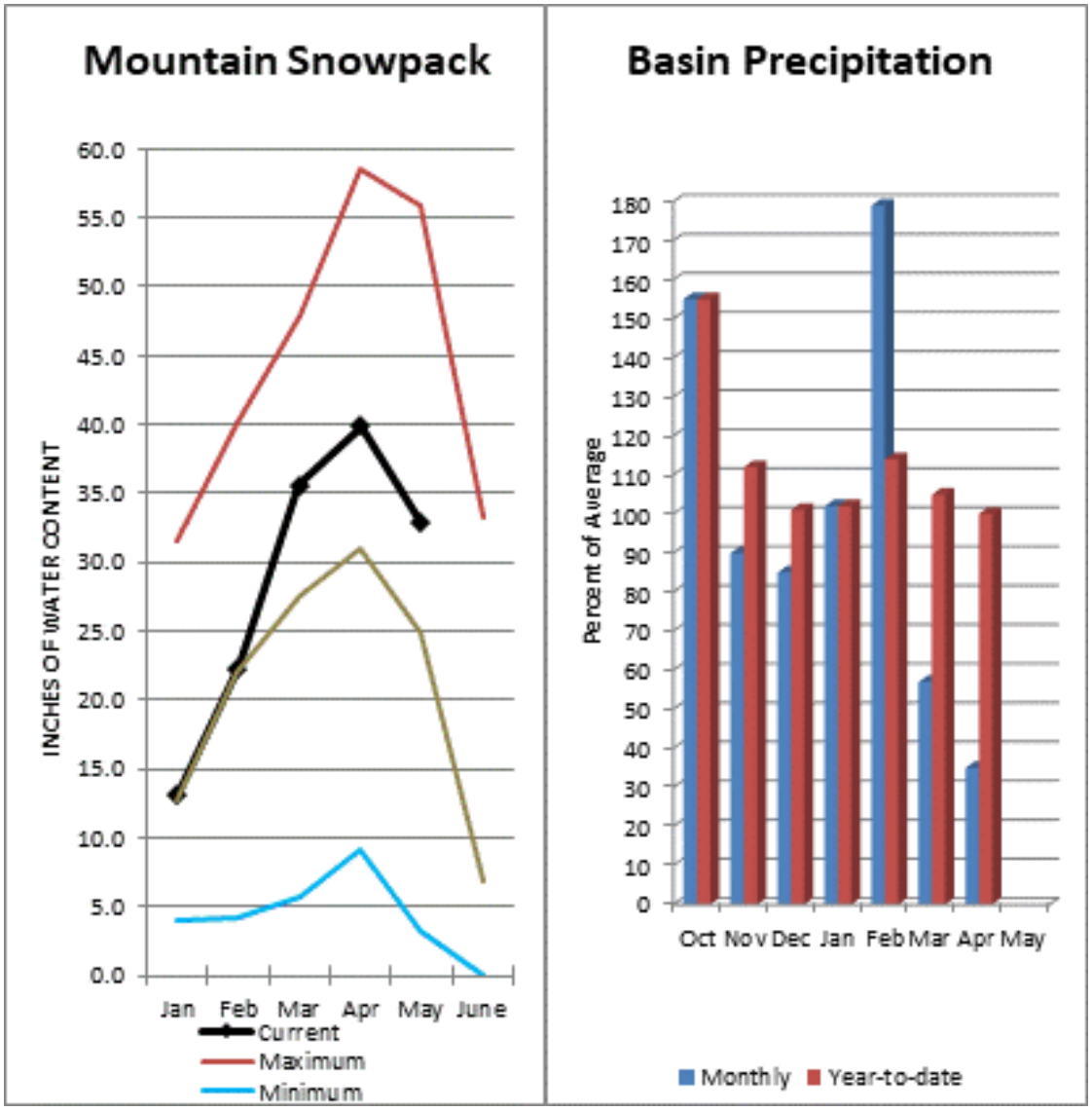
3) Median value used in place of average

Reservoir Storage End of April, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan	306.2	277.2	300.7	677.4
Basin-wide Total	306.2	277.2	300.7	677.4
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
Central Columbia	9	108%	86%
Lake Chelan	3	105%	88%
Entiat	1	0%	0%
Wenatchee	5	109%	87%
Stemilt	1	10%	36%
Colockum	1	83%	0%



May 1 reservoir storage for the Upper Yakima reservoirs was 583,100-acre feet, 96% of average. April streamflow on the Cle Elum River near Roslyn was 107%. May 1 snowpack was 128% based upon 8 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 35% of average for April 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
Streamflow Forecasts - May 1, 2021

Upper Yakima	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]								
	MAY-JUL	79	90	97	114%	105	116	85
	MAY-SEP	87	100	109	114%	117	130	96
Kachess Reservoir Inflow [2]								
	MAY-JUL	74	81	86	113%	91	97	76
	MAY-SEP	81	89	95	113%	100	108	84
Cle Elum Lake Inflow [2]								
	MAY-JUL	305	325	340	111%	350	370	305
	MAY-SEP	335	360	375	110%	390	410	340
Teanaway R bl Forks nr Cle Elum								
	MAY-JUL	68	83	93	118%	102	117	79
	MAY-SEP	70	85	95	116%	106	120	82

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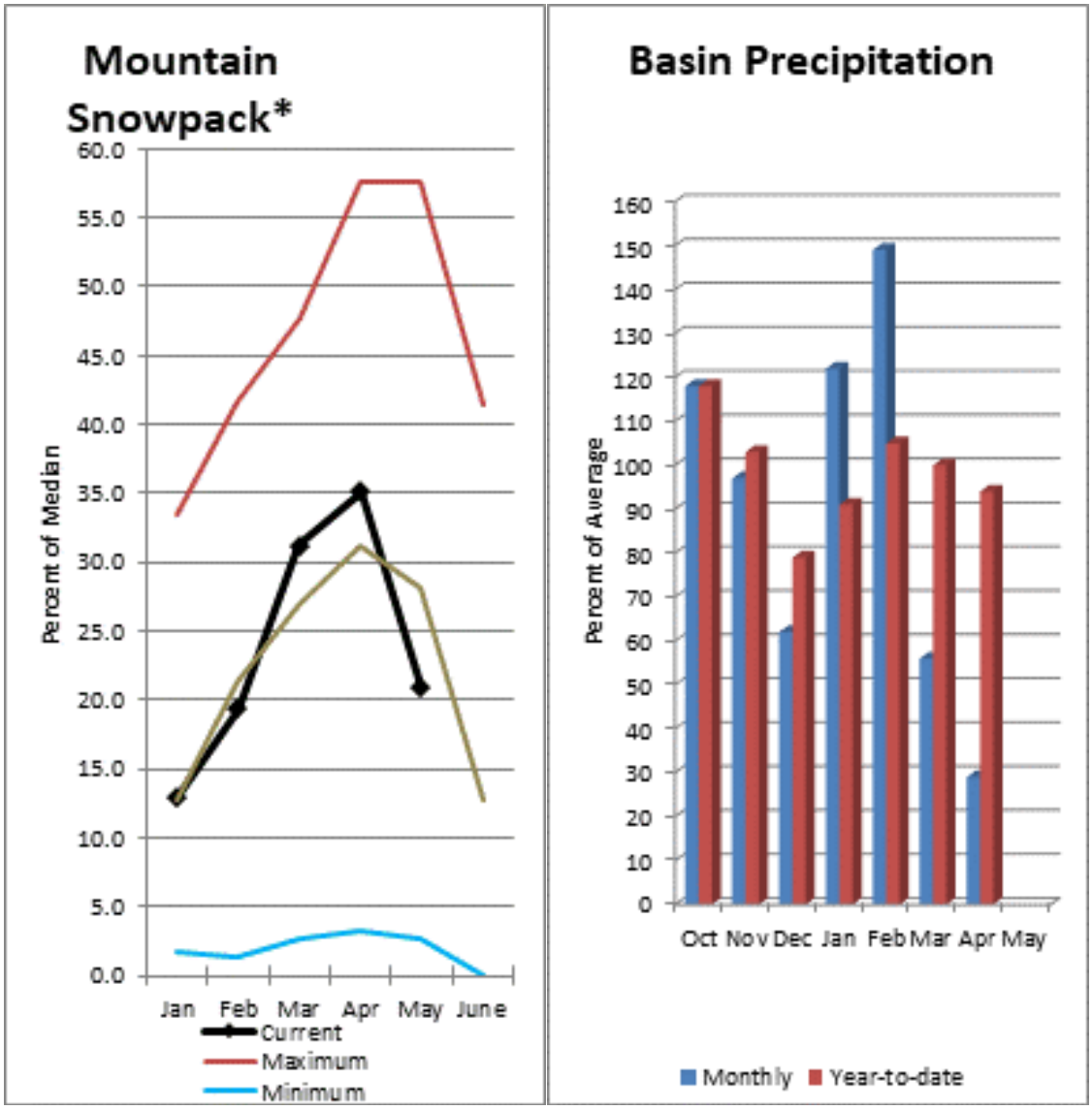
3) Median value used in place of average

Reservoir Storage End of April, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	111.7	125.1	122.1	157.8
Kachess	196.1	170.9	183.7	239.0
Cle Elum	275.3	285.6	302.6	436.9
Basin-wide Total	583.1	581.6	608.4	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
Upper Yakima	8	128%	70%



April average streamflows within the basin were: Yakima River near Parker, 104% and the Naches River near Naches, 107%. May 1 reservoir storage for Bumping and Rimrock reservoirs was 175,300-acre feet, 98% of average. May 1 snowpack was 58% within the Lower Yakima Basin, 98% in the Naches and Ahtanum Creek reported in at 58% of normal. April precipitation was 30% of average and 100% for the water-year in the Naches River Basin. The Lower Yakima recorded 28% of average for April and 87% 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
Streamflow Forecasts - May 1, 2021

Lower Yakima	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						
Ahtanum Ck at Union Gap								
	MAY-JUL	7.2	12.6	16.3	84%	20	25	19.3
	MAY-SEP	8.9	14.6	18.5	88%	22	28	21
Yakima R nr Parker [2]								
	MAY-JUL	1130	1230	1310	107%	1380	1480	1230
	MAY-SEP	1280	1390	1470	106%	1550	1660	1390

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, 2021	# of Sites	% Median	Last Year % Median
Lower Yakima	2	58%	45%
Ahtanum	2	58%	45%
Simcoe-Toppenish	1	1%	0%
Satus	0		

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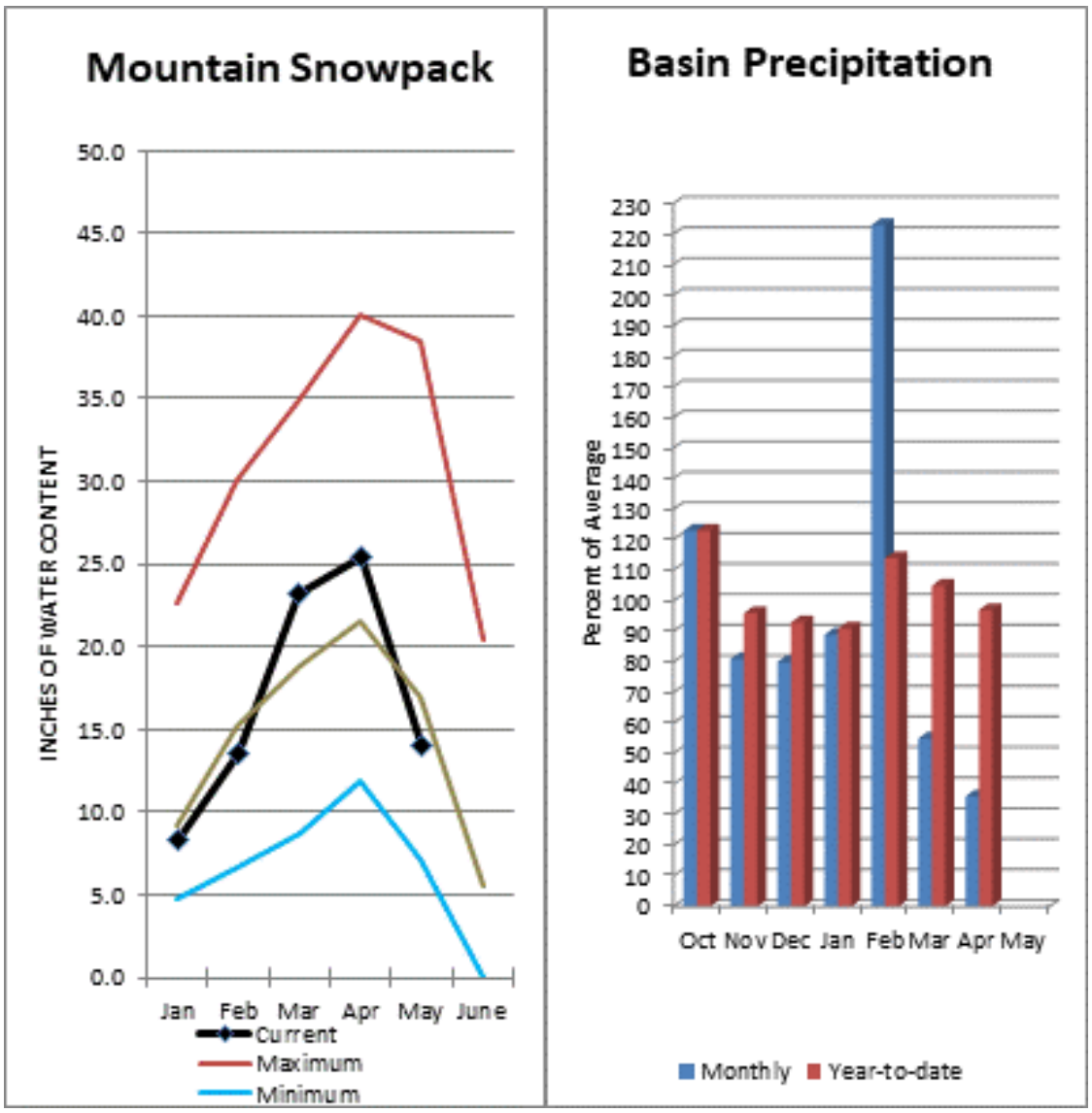
Naches
Streamflow Forecasts - May 1, 2021

Naches	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]								
	MAY-JUL	81	88	93	100%	97	105	93
	MAY-SEP	89	97	103	100%	108	116	103
American R nr Nile								
	MAY-JUL	68	77	83	99%	89	98	84
	MAY-SEP	74	84	92	100%	99	109	92
Rimrock Lake Inflow [2]								
	MAY-JUL	129	140	147	97%	153	164	151
	MAY-SEP	157	171	180	97%	189	205	185
Naches R nr Naches								
	MAY-JUL	425	495	545	101%	590	660	540
	MAY-SEP	465	550	610	102%	665	750	600

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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	21.8	23.0	21.7	33.7
Rimrock	153.5	159.3	156.9	198.0
Basin-wide Total	175.3	182.2	178.6	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
Naches	7	98%	95%



April precipitation was 36% of average, bringing the year-to-date precipitation to 97% of average. May 1 snowpack readings in the Lower Snake averaged 82% of normal, 90% for the Walla Walla and the Grande Ronde was 80%. April streamflow was 70% of average for Snake River below Lower Granite Dam and 99% for Grande Ronde River near Troy. Dworshak Reservoir storage was 86% of average.

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

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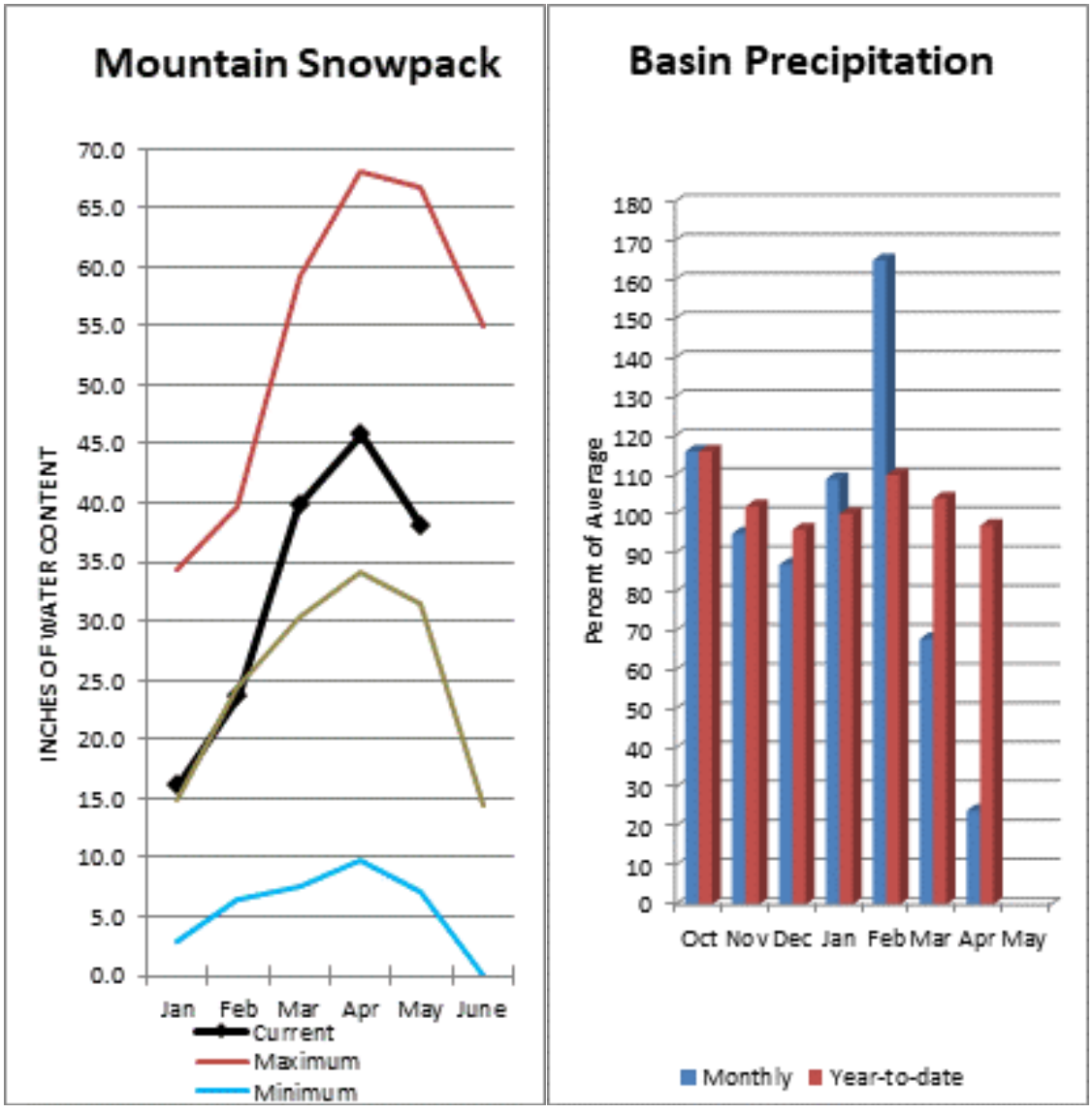
Lower Snake-Walla Walla
Streamflow Forecasts - May 1, 2021

Lower Snake-Walla Walla	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)
Grande Ronde R at Troy								
	MAY-JUL	550	695	790	92%	890	1040	860
	MAY-SEP	625	775	875	93%	975	1120	945
Asotin Ck at Asotin								
	MAY-JUL	7.4	10.2	12.4	52%	14.8	18.7	24
Clearwater R at Spalding[2]								
	MAY-JUL	3620	4210	4620	88%	5020	5610	5260
	MAY-SEP	3870	4520	4960	88%	5410	6060	5640
Snake R bl Lower Granite Dam-NWS[2]								
	MAY-JUL	9700		10700	70%		13400	15280
	MAY-SEP	11800		12900	73%		15900	17715
SF Walla Walla R nr Milton-Freewater								
	MAY-JUL	27	33	36	97%	40	46	37
	MAY-SEP	39	45	49	100%	53	59	49
Mill Ck nr Walla Walla								
	MAY-JUL	9.6	11.9	13.4	96%	15	17.3	13.9
	MAY-SEP	12.8	15.3	16.9	98%	18.6	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

Reservoir Storage End of April, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2273.7	2585.0	2646.0	3468.0
Basin-wide Total	2273.7	2585.0	2646.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
Lower Snake-Walla Walla	18	82%	85%
Asotin	2	0%	0%
Grande Ronde	16	80%	87%
Walla Walla	4	90%	90%



The Columbia at The Dalles is forecasted to have 89% of average flows this summer according to the River Forecast Center. April average streamflow for Cowlitz River was 78% and the Columbia River at The Dalles was 73% of average. April precipitation was 24% of average and the water-year average was 97%. May 1 snow cover for Cowlitz River was 118%, and Lewis River was 125% of normal.

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Lower Columbia
Streamflow Forecasts - May 1, 2021

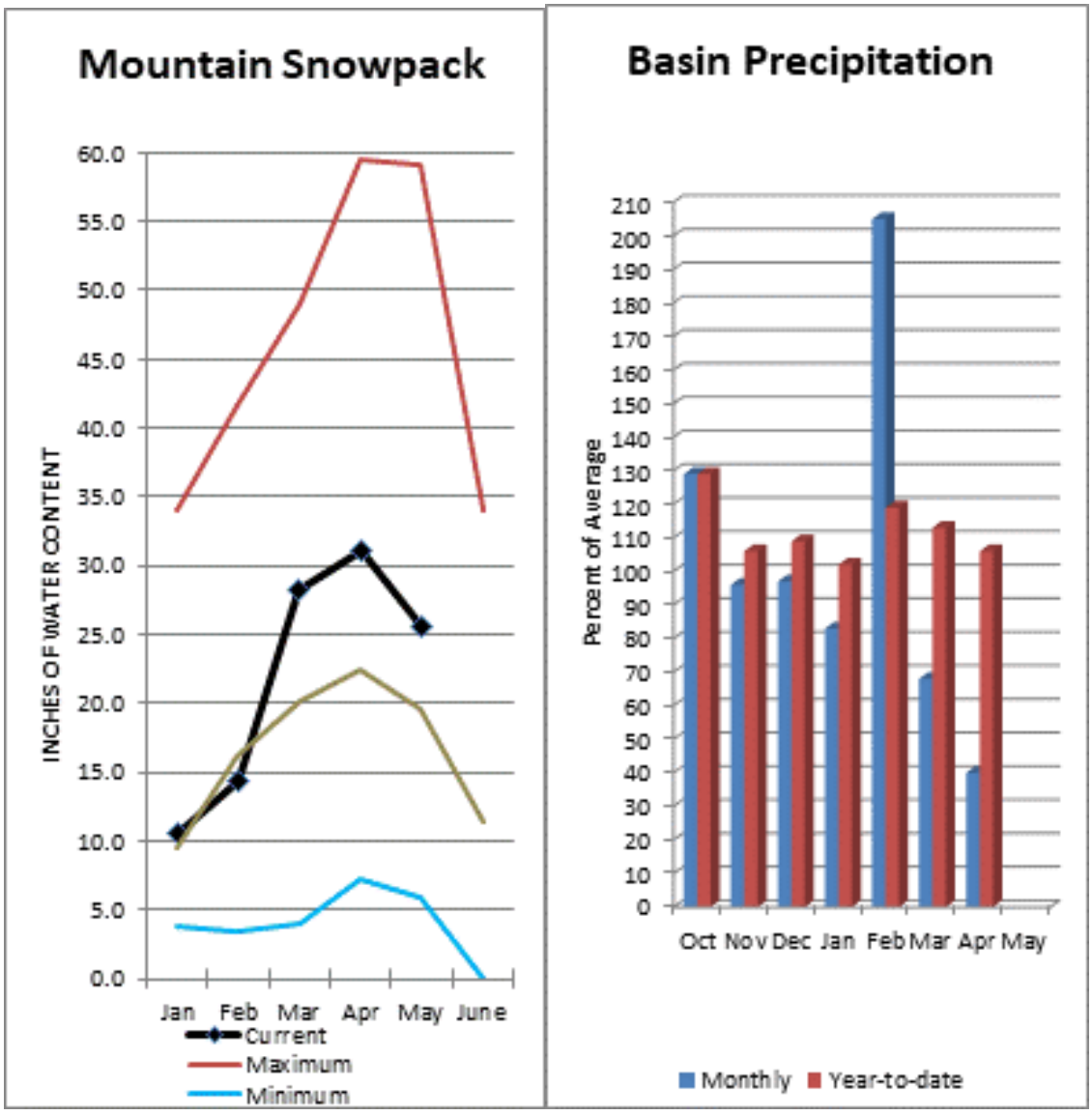
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Lower Columbia	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	51600		57900	88%		66700	66050
	MAY-SEP	62300		70600	89%		81700	78900
Klickitat R nr Glenwood								
	MAY-JUL	67	80	89	92%	98	111	97
	MAY-SEP	78	92	101	92%	111	125	110
Klickitat R nr Pitt								
	MAY-JUL	240	275	300	98%	325	360	305
	MAY-SEP	315	360	390	99%	415	460	395
Lewis R at Ariel[2]								
	MAY-JUL	525	620	685	111%	750	845	615
	MAY-SEP	660	765	835	108%	910	1020	770
Cowlitz R bl Mayfiled[2]								
	MAY-JUL	1040	1200	1310	111%	1420	1580	1180
	MAY-SEP	1240	1420	1540	111%	1660	1840	1390
Cowlitz R at Castle Rock[2]								
	MAY-JUL	1250	1530	1720	108%	1910	2200	1600
	MAY-SEP	1500	1810	2020	107%	2230	2540	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

Reservoir Storage End of April, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Yale				0.0
Swift			686.2	0.0
Mossyrock Dam (Riffe Lk)		818.9	1381.0	0.0
Merwin			409.7	0.0
Basin-wide Total		0.0	0.0	
# of reservoirs	0	0	0	0

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
Lower Columbia	12	121%	101%
Lewis	6	125%	88%
Cowlitz	8	118%	107%



May 1 snowpack was 108% of average for the White River, 168% for Puyallup River and 169% in the Green River Basin. April precipitation was 40% of average, bringing the water year-to-date to106% of average for the basins.

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

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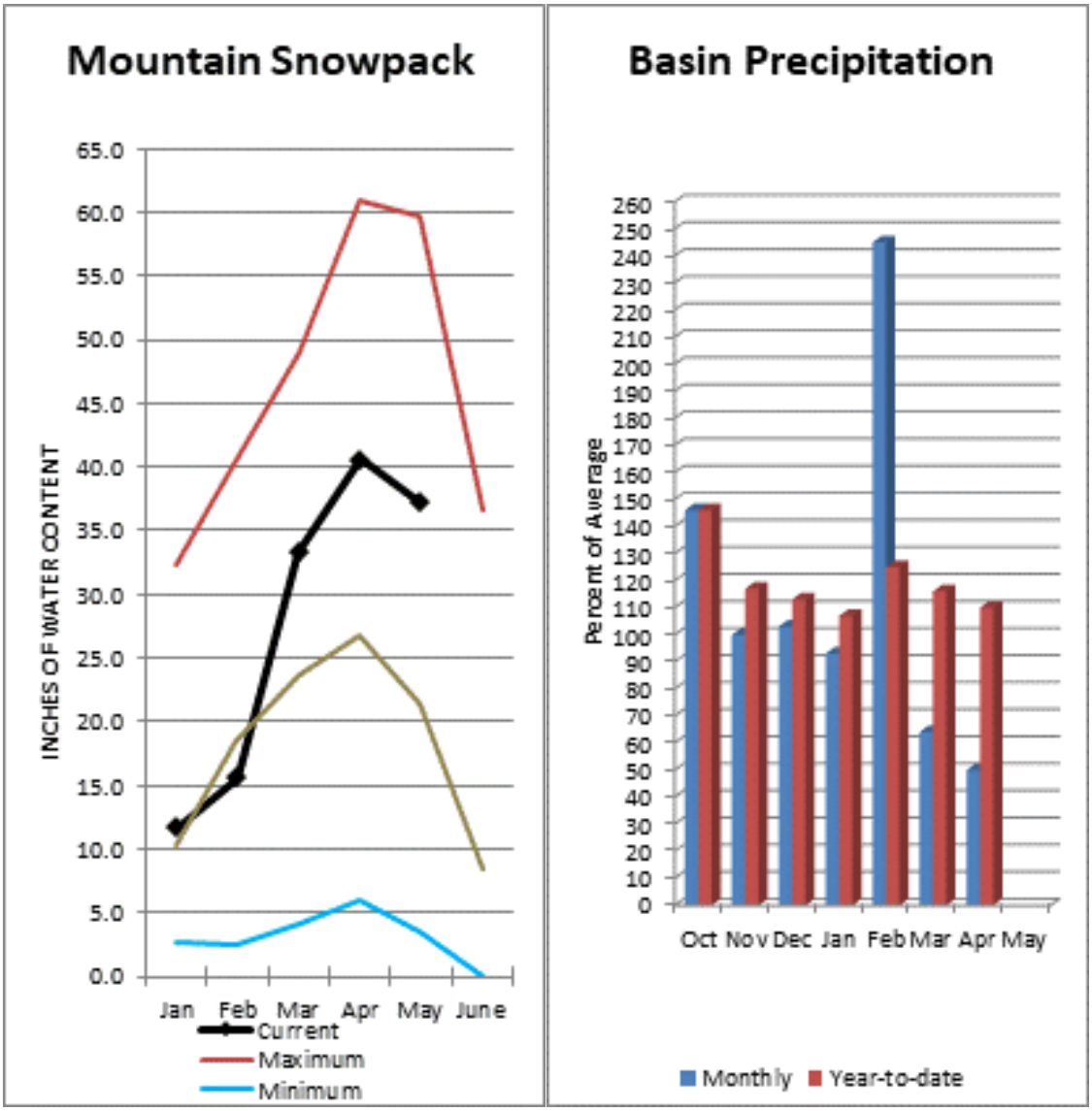
South Puget Sound
Streamflow Forecasts - May 1, 2021

South Puget Sound	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						
White R nr Buckley[1,2]								
	MAY-JUL	230	300	330	100%	360	425	330
	MAY-SEP	300	380	415	99%	450	530	420
Green R bl Howard A Hanson Dam[1,2]								
	MAY-JUL	103	137	153	101%	169	205	152
	MAY-SEP	118	157	175	100%	193	235	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, 2021	# of Sites	% Median	Last Year % Median
South Puget Sound	11	134%	106%
White	4	108%	97%
Puyallup	2	168%	171%
Green	5	169%	96%



Basin-wide precipitation for April was 50% of average, bringing water-year-to-date to 110% of average. May 1 median snow cover in Cedar River Basin was 167%, Tolt River Basin was 198%, Snoqualmie River Basin was 188%, and Skykomish River Basin was 183%.

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

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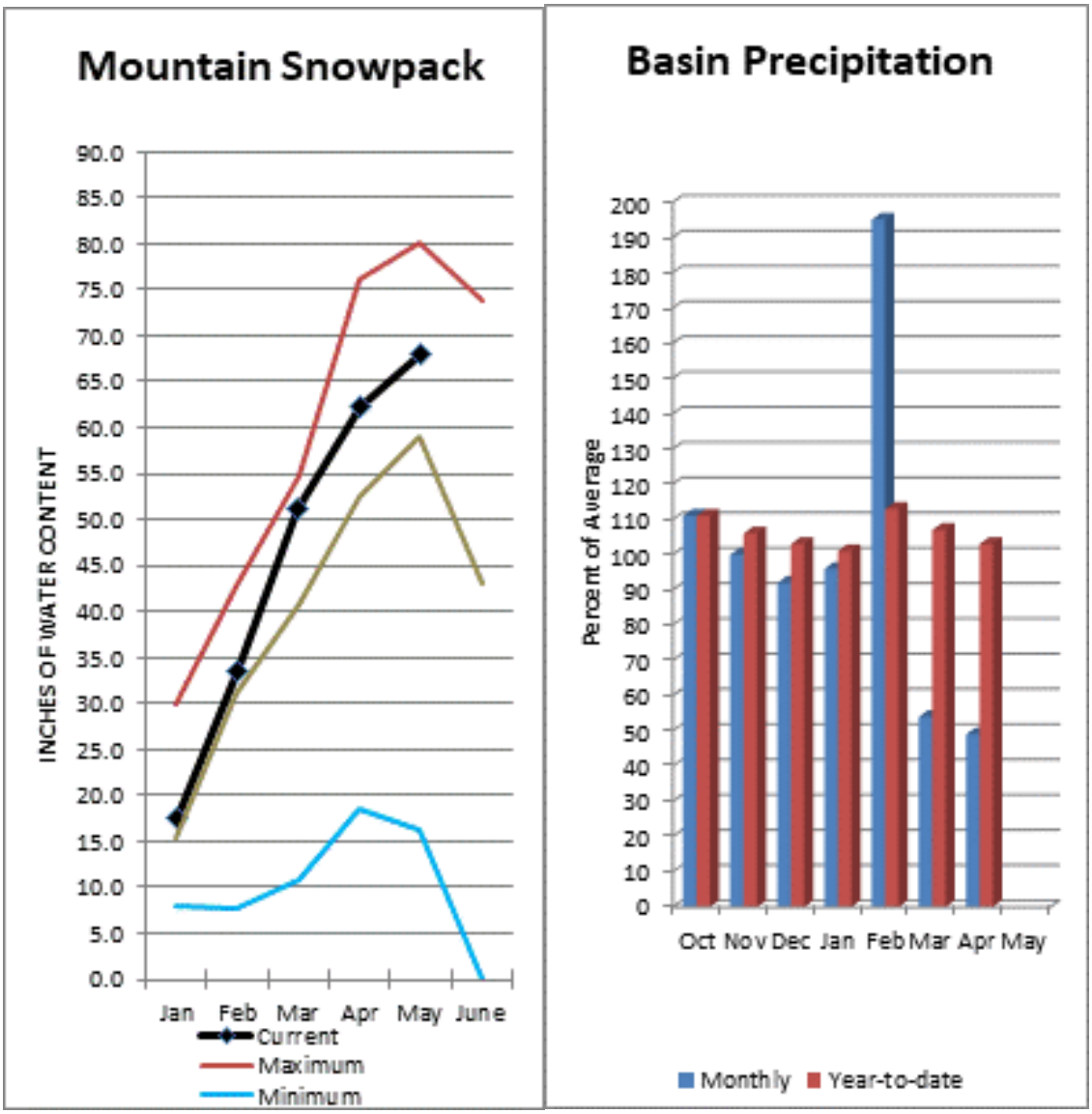
Central Puget Sound
Streamflow Forecasts - May 1, 2021

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

Central Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls								
	MAY-JUL	46	54	60	122%	66	75	49
	MAY-SEP	49	59	66	118%	73	84	56
Rex R nr Cedar Falls								
	MAY-JUL	15.1	18.4	21	130%	23	26	16.2
	MAY-SEP	15.3	19.6	23	124%	25	30	18.5
Taylor Ck nr Selleck								
	MAY-JUL	11.3	13.6	15.2	114%	16.8	19.1	13.3
	MAY-SEP	14.2	17	18.8	111%	21	23	16.9
SF Tolt R nr Index								
	MAY-JUL	9.1	11.7	13.5	130%	15.2	17.8	10.4
	MAY-SEP	9.9	13.1	15.2	124%	17.3	20	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, 2021	# of Sites	% Median	Last Year % Median
Central Puget Sound	9	174%	113%
Cedar	6	167%	95%
Tolt	2	198%	136%
Snoqualimie	4	188%	113%
Skykomish	3	183%	135%



Runoff is forecasted to be near to slightly above average for the 3 major basins represented. April streamflow in Skagit River was 99% of average. Basin-wide precipitation for April was 49% of average, bringing water-year-to-date to 103% of average. May 1 average snow cover in Skagit River Basin was 115%, not including several low and mid elevation manual snow courses which were not measured this year. Nooksack River Basin reported 121% of normal snowpack. May 1 Skagit River reservoir storage was 81% of average and 42% of capacity.

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

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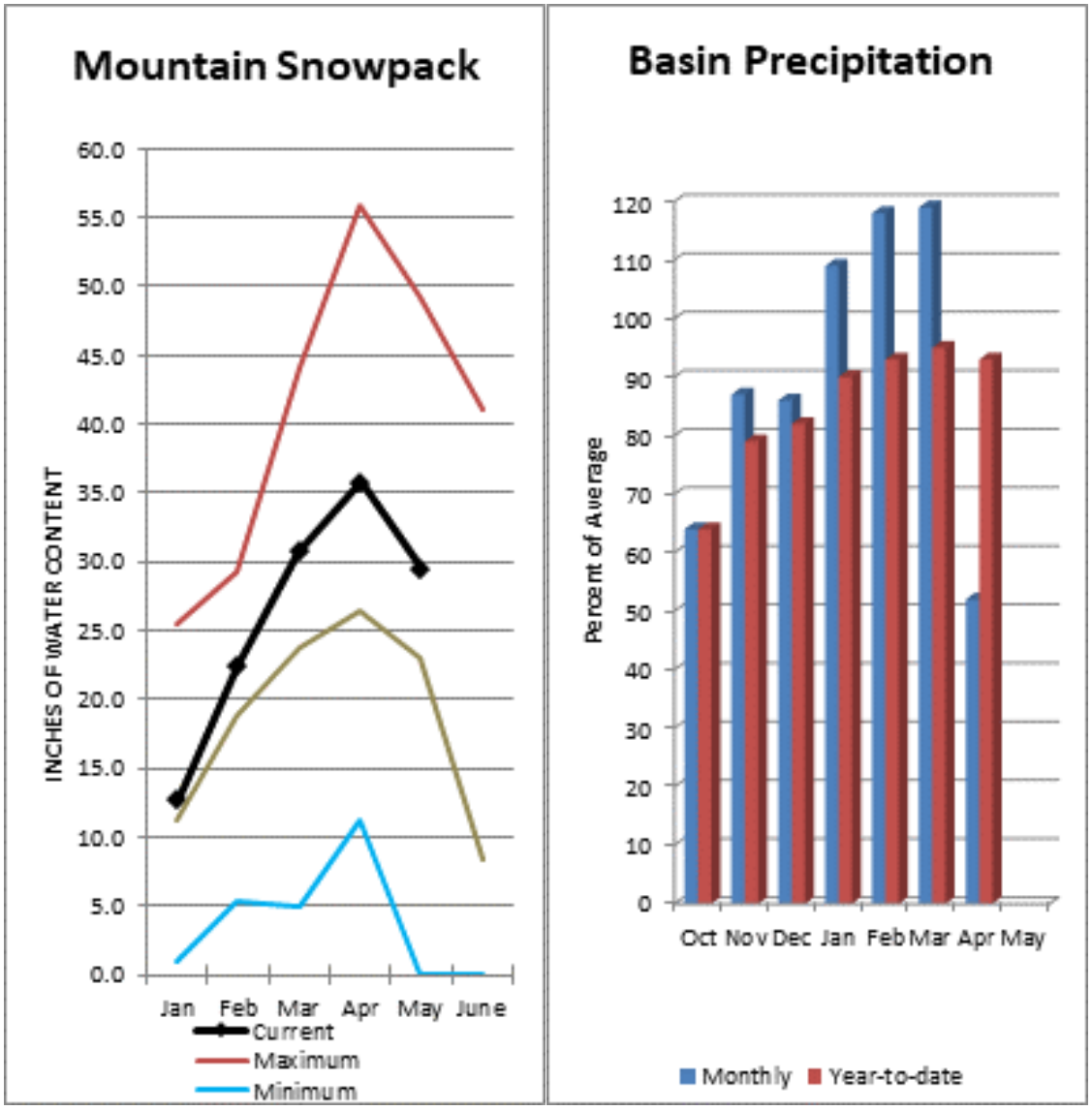
North Puget Sound
Streamflow Forecasts - May 1, 2021

North Puget Sound	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								
	MAY-JUL	176	196	210	100%	225	245	210
	MAY-SEP	270	295	310	102%	325	350	305
Skagit R at Newhalem[2]								
	MAY-JUL	1430	1520	1580	106%	1650	1740	1490
	MAY-SEP	1740	1850	1920	106%	1990	2100	1810
Baker R at Concrete								
	MAY-JUL	555	615	655	103%	700	760	635
	MAY-SEP	745	820	865	104%	915	990	835

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, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	608.3	593.0	754.4	1434.7
Diablo Reservoir			85.9	90.6
Basin-wide Total	608.3	593.0	754.4	1434.7
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2021	# of Sites	% Median	Last Year % Median
North Puget Sound	9	113%	100%
Skagit	5	115%	99%
Baker	0		
Nooksack	3	121%	110%



April runoff in the Dungeness River was 80% of normal. April precipitation was 52% of average. Precipitation has accumulated at 93% of average for the water year. April precipitation at Quillayute was 31 % of normal brining water-year precipitation to 98%. Quillayute only received 2.43" of rain for the month which is 3rd driest in 55 years of record. Olympic Peninsula snowpack averaged 129% of normal on May 1.

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

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Olympic
Streamflow Forecasts - May 1, 2021

Olympic	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								
	MAY-JUL	84	94	101	100%	108	118	101
	MAY-SEP	104	116	125	100%	133	146	125
Elwha R at McDonald Br nr Port Angeles								
	MAY-JUL	260	300	330	103%	360	400	320
	MAY-SEP	335	375	405	104%	430	475	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, 2021	# of Sites	% Median	Last Year % Median
Olympic	6	129%	97%

Issued by

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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.**

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Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA