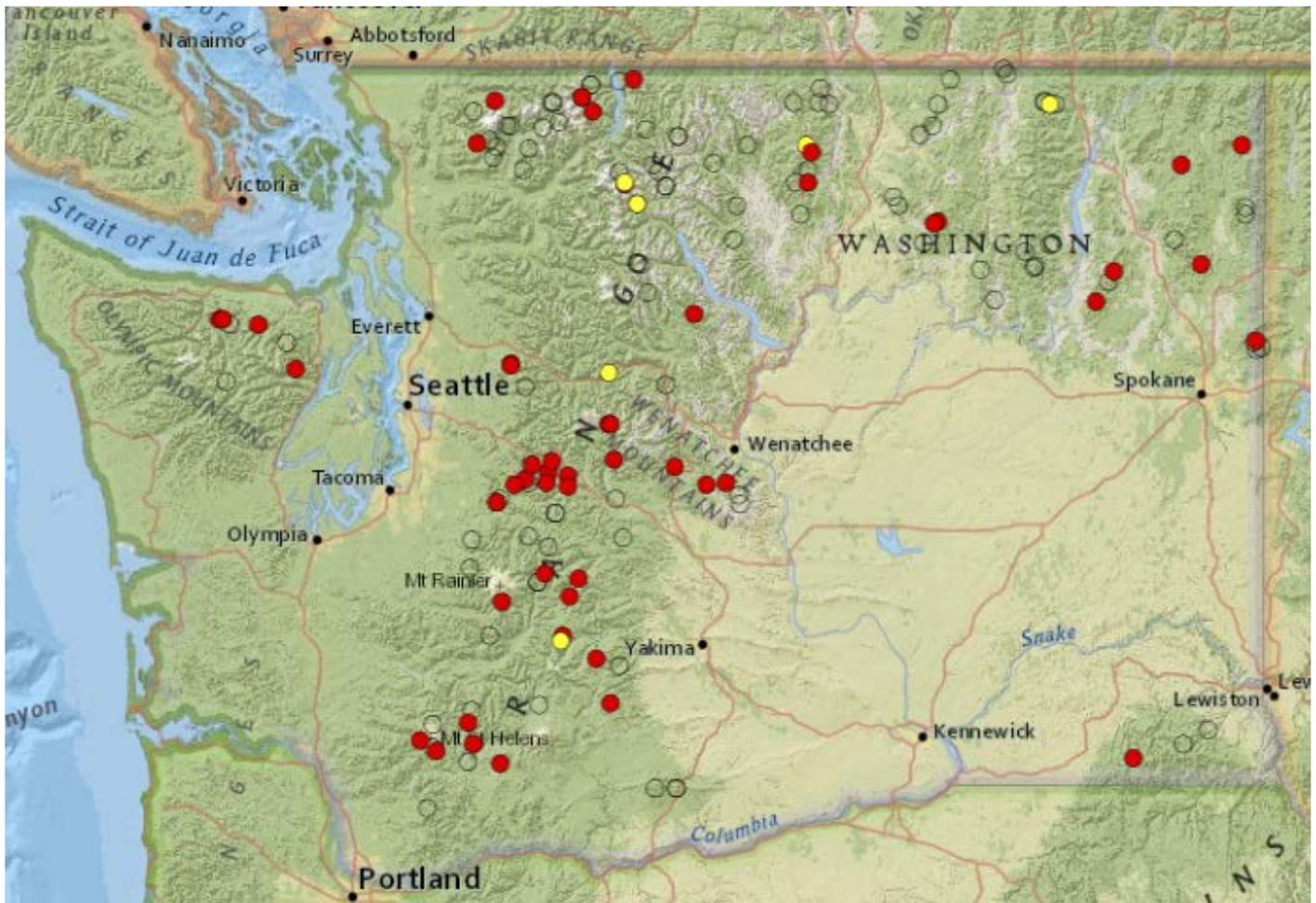


Washington Water Supply Outlook Report April 1, 2015



A new map product is being introduced soon by the National Water and Climate Center depicting NRCS SNOTEL and Snow Course sites with new record low or near record low snow water equivalent (SWE) for April 2. Stations colored red are in record territory, while yellow shows stations at their second lowest record for the day. Stations with open circles have less than 20 years of record and most all of those have record lows.

Reminder: We are soliciting field work photos from our snow surveyors again this year. Each month we pick one to grace the cover of this report. The photographer will be given proper credit of course. Please include all specific information when submitting photos. Scott.pattee@wa.usda.gov

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.

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Washington Water Supply Outlook

April 2015

General Outlook

Some snow accumulated in the high country in Washington but added little to the over snowpack. Conditions have practically spun out of control to the point where 74% of our long-term snow monitoring sites have set new record low snow amounts. Many of them reporting in with zero snow for the first time in their history. As expected streamflow forecasts have also tanked in many areas and are also setting new record low flows. Another sort term storm cycle appears to be moving however the mid-month forecast indicates a return to warm and dry. Forecaster models are still holding to the same pattern for the long term. <http://www.cpc.ncep.noaa.gov/>

Snowpack

The April 1 statewide SNOTEL readings were 22% of normal shattering the previous record low of 33% set in 2005. The Cedar River was snow free followed closely by the Olympics at only 3% of the 30-year median for April 1, the lowest year on record in both basins since measurements began. Readings from the Methow River Basin reported the highest at 79% of normal for April 1. Westside medians from SNOTEL, and April 1 snow surveys, included the North Puget Sound river basins with 44% of normal, the Central and South Puget river basins with 4% and 27% respectively, and the Lower Columbia basins with 16% of normal. Snowpack along the east slopes of the Cascade Mountains included the Lower Yakima with 24% and the Wenatchee area with 34%. Snowpack in the Spokane River Basin was at 31% and the Walla Walla River Basin had 27% of the long term median.

BASIN	PERCENT OF NORMAL	PERCENT OF LAST YEAR
Spokane	31	116
Newman Lake	0	95
Pend Oreille	68	142
Okanogan	67	99
Methow	79	114
Conconully Lake	11	56
Central Columbia	34	102
Upper Yakima	11	101
Lower Yakima	24	98
Ahtanum Creek	19	82
Walla Walla	27	96
Lower Snake	44	112
Cowlitz	29	114
Lewis	3	73
White	41	105
Green	0	86
Puyallup	0	0
Cedar	2	91
Snoqualmie	3	96
Skykomish	6	94
Skagit	56	124
Nooksack	13	117
Baker	N/A	N/A
Olympic Peninsula	3	82

Precipitation

Precipitation fell in the form of rain only last month with near to slightly below average rainfall over most of the state. Even so the water-year to date precipitation remains near to slightly above normal in all basins. The Conconully Lake area was the driest at 48% of normal precipitation for March. Lyman Lake SNOTEL in the upper Chelan Basin measured 232% of normal rainfall for the month. Elbow Lake SNOTEL in the South Fork Nooksack River Basin continues to rein over the entire SNOTEL network with a water-year accumulation of 131.2 inches, 22 inches above normal or 120% of average for the water-year.

RIVER BASIN	MARCH PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	108	92
Pend Oreille	89	101
Upper Columbia	71	101
Central Columbia	78	96
Upper Yakima	80	88
Lower Yakima	86	98
Walla Walla	73	91
Lower Snake	73	91
Lower Columbia	94	102
South Puget Sound	85	98
Central Puget Sound	87	97
North Puget Sound	100	112
Olympic Peninsula	72	105

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. More rainfall than snow has helped buffer many reservoirs to above normal levels for this time of year. In most cases managers are electing to hold this excess water due to the uncertainty of the snowpack. April 1 Reservoir storage in the Yakima Basin was 833,000-acre feet, 163% of average for the Upper Reaches and 232,000-acre feet or 153% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 227,000 acre feet, 137% of average and 95% of capacity; and the Skagit River reservoirs at 98% of average and 51% 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	95	137
Pend Oreille	51	102
Upper Columbia	87	135
Central Columbia		
Upper Yakima	100	163
Lower Yakima	100	153
Lower Snake	93	133
North Puget Sound	51	98

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

Streamflow

April to September runoff forecasts for April 1 continued to drop since the March forecasts were issued due to the obvious lack of snowfall and above normal temperatures. March streamflows were mostly well above normal due to heavy rains and snow melt. April-September forecasts for some Western Washington streams include the Cedar River near Cedar Falls, 53%; White River, 74%; and Skagit River, 81%. Some Eastern Washington streams include the Yakima River near Parker 36%, Wenatchee River at Plain 52%; and Spokane River near Post Falls 46%. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. **The 50% chance of exceedance of average flows is normally used for planning purposes however with the current uncertainty in weather forecasts and the current lack of snow in most locations it may be advisable to use the 70-90% chance of exceedance to ensure adequate water supply this summer.**

BASIN	PERCENT OF AVERAGE (50 PERCENT CHANCE OF EXCEEDENCE)
Spokane	46-59
Pend Oreille	51-89
Upper Columbia	39-92
Central Columbia	52-89
Upper Yakima	23-40
Lower Yakima	31-67
Walla Walla	76-63
Lower Snake	52-77
Lower Columbia	54-83
South Puget Sound	45-74
Central Puget Sound	42-68
North Puget Sound	66-86
Olympic Peninsula	57-58

STREAM	PERCENT OF AVERAGE MARCH STREAMFLOWS
Pend Oreille at Albeni Fall Dam	232
Kettle at Laurier	364
Columbia at Birchbank	210
Spokane at Spokane	124
Similkameen at Nighthawk	307
Okanogan at Tonasket	241
Methow at Pateros	317
Chelan at Chelan	196
Wenatchee at Pashastin	158
Cle Elum near Roslyn	136
Yakima at Parker	93
Naches at Naches	111
Grande Ronde at Troy	64
Snake below Lower Granite Dam	90
Columbia River at The Dalles	106
Lewis at Merwin Dam	62
Cowlitz below Mayfield Dam	89
Skagit at Concrete	124
Dungeness near Sequim	117

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

Soil Moisture

Near to above normal fall precipitation provided for wet and nearly saturated soils (60-70% saturation) as the snow finally began to accumulate in mid-December. Great fall soil moisture conditions can help buffer low snowpack runoff come spring. The recent dry spell has resulted in a slight reduction to stored soil moisture however levels are still in good shape. Current soil moisture data is available from a limited number of SNOTEL sites scattered throughout each basin. As the effort continues to install additional sensors and more years of data are acquired this information will become invaluable to the streamflow forecasting community.



Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

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rashawn.tama@por.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>

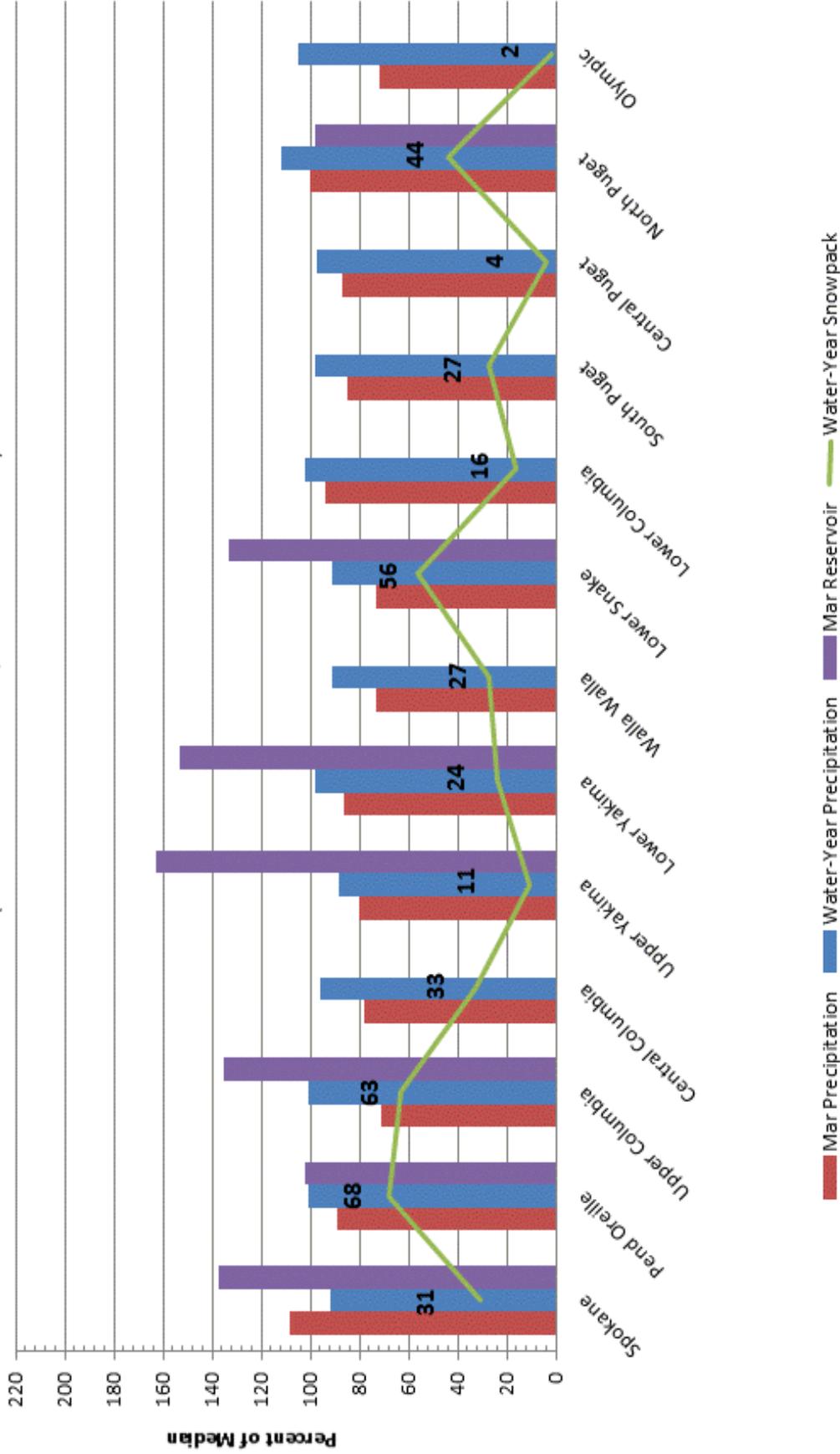
USDA-NRCS Agency Homepages

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/>

April 1, 2015 - Snowpack, Precipitation and Reservoir Conditions at a Glance

(Water Year = October 1, 2014 - Current Date)



Western Snow Conference

The Western Snow Conference is an annual tradition which started in 1932 as an international forum for individuals and organizations to share scientific, management and socio-political information on snow and runoff. The principal aim of the Western Snow Conference is to advance snow and hydrological sciences. The South Pacific Area Committee is making plans for the 83rd Annual Western Snow Conference in 2015.

Mark your calendar and start thinking about submitting a paper to attend the 2015 Western Snow Conference:

Dates: April 20-24, 2015

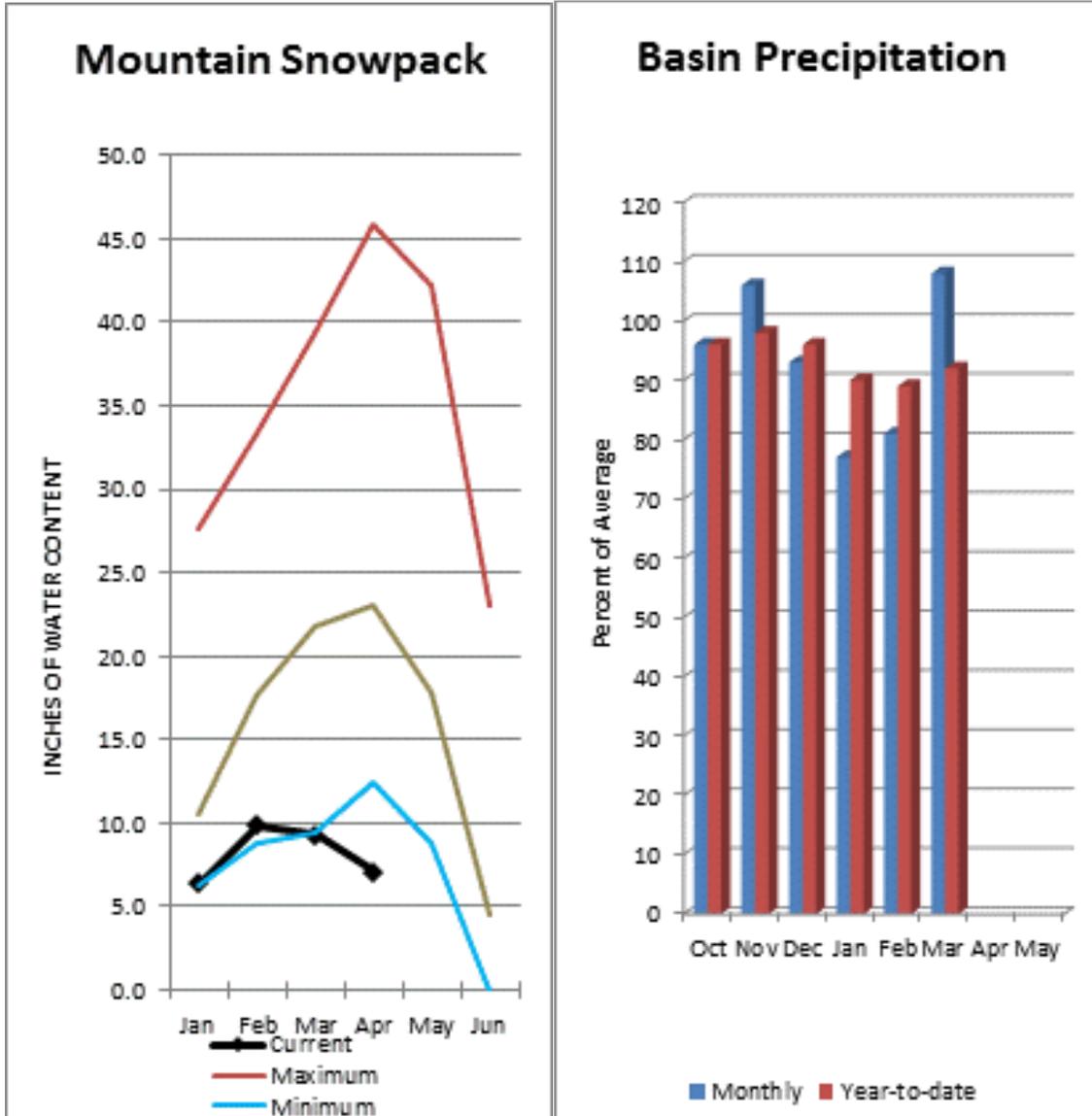
Location: Grass Valley, California

The Conference will begin Monday, April 20th with a short course and panel discussion on " LIDAR Basics, Applications, and Use in Snow Hydrology and Field Studies " with several invited experts in the field. Tuesday and Wednesday will include formal paper and poster presentations on a variety of topics, including climate variability, climate change impacts on snow and runoff, water management, water supply forecasting, and modeling and climatology of snow. Thursday will include a technical tour to visit hydrologic and gold mining points of interest around Grass Valley

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

Also find Western Snow Conference on Facebook and Twitter.

Spokane River Basin



The April 1 forecasts for summer runoff within the Spokane River Basin are 46% of average near Post Falls and 48% at Long Lake. The Chamokane River near Long Lake forecasted to have 59% of average flows for the May-August period. The forecast is based on a basin snowpack that is 31% of normal and precipitation that is 92% of average for the water year. Precipitation for March was near normal at 108% of average. Streamflow on the Spokane River at Spokane was 124% of average for March. April 1 storage in Coeur d'Alene Lake was 227,000 acre feet, 137% of average and 95% of capacity. Snowpack at Quartz Peak SNOTEL site was melted out by the 1st of the month. Normally the site would still have 19 inches of water content. Average temperatures in the Spokane basin were 4-6 degrees above normal for March and 3-5 degrees above normal for the water year.

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

Data Current as of: 4/7/2015 8:59:22 AM

Spokane Streamflow Forecasts - April 1, 2015

Spokane	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						30yr Avg (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Spokane R nr Post Falls ²	APR-JUL	540	875	1100	46%	1330	1660	2390
	APR-SEP	565	905	1140	46%	1370	1720	2480
Spokane R at Long Lake ²	APR-JUL	585	950	1200	46%	1450	1810	2620
	APR-SEP	740	1120	1380	48%	1640	2020	2850
Chamokane Ck nr Long Lake	MAY-AUG	1.82	4	5.5	59%	7	9.2	9.3

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

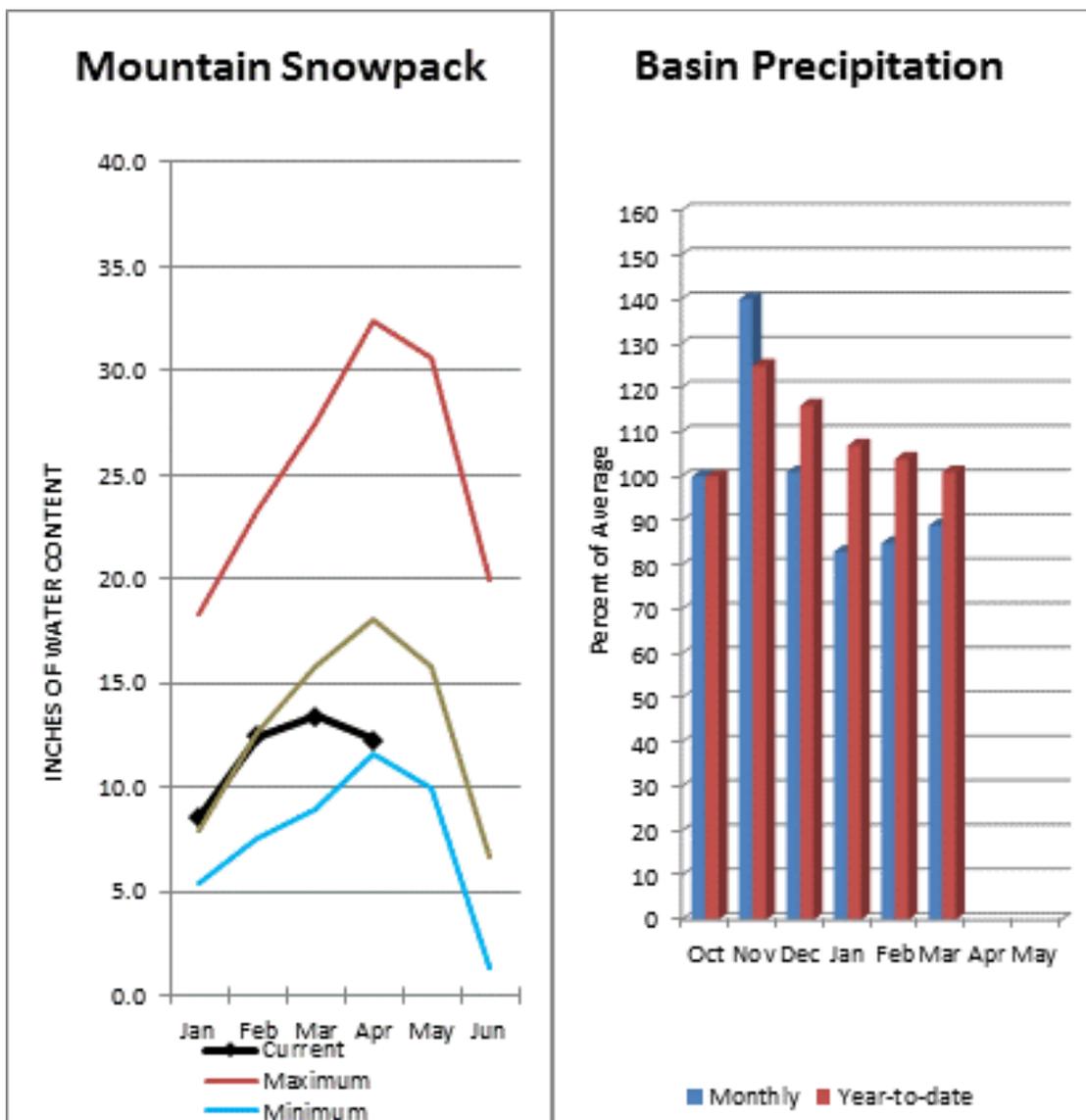
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Coeur d' Alene	227.3	191.6	165.5	238.5
Basin-wide Total	227.3	191.6	165.5	238.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Spokane	16	31%	116%
Newman Lake	3	1%	95%

Pend Oreille River Basins



The April – September average forecast for the Priest River near the town of Priest River is 51% and the Pend Orielle below Box Canyon is 88%. March streamflow was 232% of average on the Pend Oreille River and 216% on the Columbia at Birchbank. April 1 snow cover was 68% of normal in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 12.9 inches of snow water on the snow pillow. Normally Bunchgrass would have 26.2 inches on April 1. Precipitation during March was 89% of average, keeping the year-to-date precipitation at 101% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 102% of normal. Average temperatures were 4-6 degrees above normal for March and 3-5 degrees above normal for the water year.

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

Pend Oreille River Basins

Data Current as of: 4/7/2015 8:59:25 AM

Pend Oreille Basins Streamflow Forecasts - April 1, 2015

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

Pend Oreille Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pend Oreille Lake Inflow ²	APR-JUL	8670	9700	10400	88%	11100	12100	11800
	APR-SEP	9380	10600	11400	89%	12200	13300	12800
Priest R nr Priest River ²	APR-JUL	220	320	390	50%	460	560	780
	APR-SEP	245	350	420	51%	495	600	830
Pend Oreille R bl Box Canyon ²	APR-JUL	8780	9830	10500	88%	11300	12300	11900
	APR-SEP	9520	10700	11500	88%	12400	13600	13000

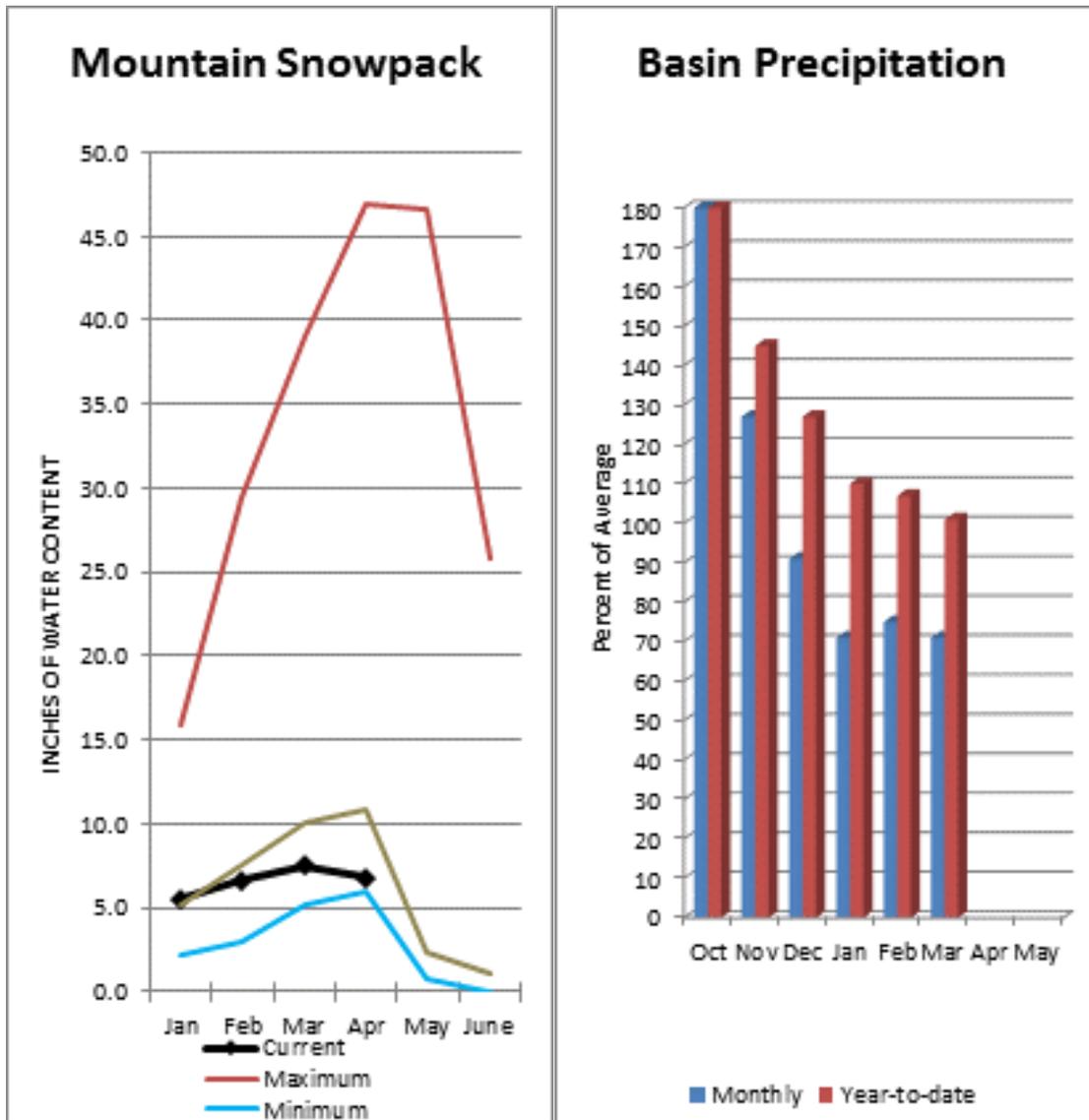
1) 90% and 10% exceedance probabilities are actually 95% and 5%

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, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Pend Oreille	754.7	632.2	773.0	1561.3
Priest Lake	100.2	65.6	67.6	119.3
Basin-wide Total	854.9	697.8	840.6	1680.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Pend Oreille Basins	75	68%	142%
Colville River	3	4%	74%
Kettle River	8	63%	102%



Summer runoff average forecast for the Okanogan River is 74%, Similkameen River is 90%, Kettle River 49% and Methow River is 73%. April 1 snow cover on the Okanogan was 67% of normal, Omak Creek was 41% and the Methow was 79%. March precipitation in the Upper Columbia was 71% of average, with precipitation for the water year at 101% of average. March streamflow for the Methow River was 317% of average, 241% for the Okanogan River and 307% for the Similkameen. Salmon Meadows SNOTEL, in the Conconully Basin, was snow free on April 1. Combined storage in the Conconully Reservoirs was 20,400 acre-feet or 135% of normal. Temperatures were 4-6 degrees above normal for March and 2-4 degrees above for the water year.

Upper Columbia River Basins

Data Current as of: 4/7/2015 8:59:28 AM

Upper Columbia Basins Streamflow Forecasts - April 1, 2015

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

Upper Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kettle R nr Laurier	APR-JUL	465	725	905	50%	1080	1340	1800
	APR-SEP	460	740	925	49%	1120	1390	1880
Colville R at Kettle Falls	APR-JUL	16.4	32	46	39%	62	90	119
	APR-SEP	18.9	36	51	39%	69	100	131
Columbia R at Grand Coulee ^{1,2}	APR-JUL	40300	43900	45500	89%	47200	50800	51015
	APR-SEP	46200	52100	54800	91%	57500	63300	60110
Similkameen R nr Nighthawk ¹	APR-JUL	735	970	1080	90%	1190	1420	1200
	APR-SEP	770	1030	1150	90%	1270	1520	1280
Okanogan R nr Tonasket ¹	APR-JUL	620	900	1030	70%	1160	1440	1480
	APR-SEP	690	1010	1160	70%	1310	1630	1650
Okanogan R at Malott ¹	APR-JUL	660	940	1070	74%	1200	1480	1450
	APR-SEP	730	1050	1200	74%	1350	1670	1620
Methow R nr Pateros	APR-JUL	470	555	610	73%	665	750	835
	APR-SEP	510	595	655	73%	715	805	895
Columbia R at Birchbank ^{1,2}	APR-JUL	27200	30100	31400	93%	32700	35600	33840
	APR-SEP	33900	37500	39200	94%	40800	44400	41750

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

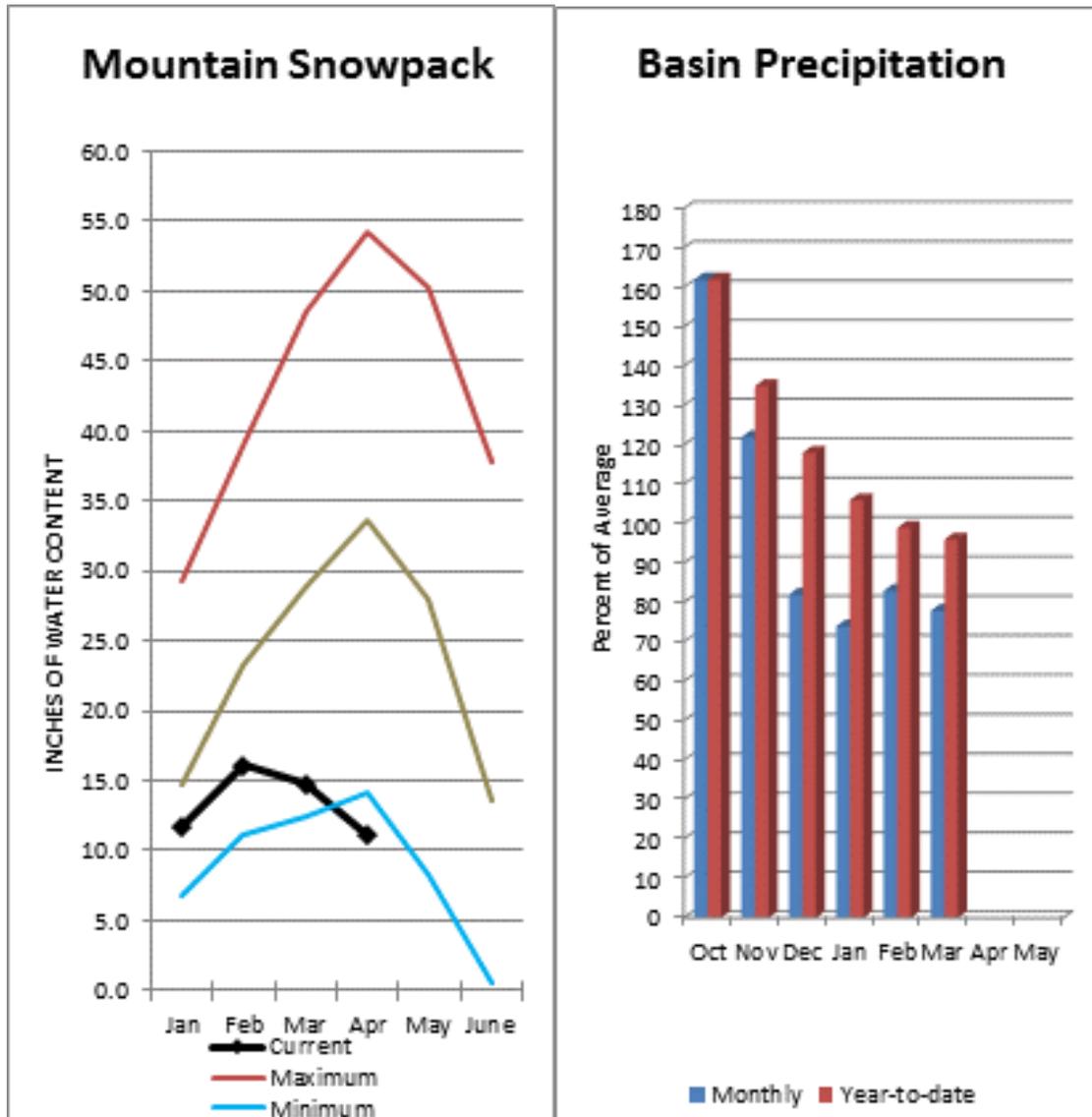
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	7.7	9.3	7.3	10.5
Conconully Reservoir	12.8	11.6	7.8	13.0
Basin-wide Total	20.4	20.9	15.1	23.5
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Upper Columbia Basins	26	63%	102%
Okanogan River	14	67%	99%
Omak Creek	3	33%	64%
Sanpoil River	1		
Similkameen River	5	70%	122%
Toats Coulee Creek	4	48%	86%
Conconully Lake	3	11%	56%
Methow River	5	79%	114%

Central Columbia River Basins



Precipitation during March was 78% of average in the basin and 96% for the year-to-date. Runoff for Entiat River is forecast to be 65% of average for the summer. The April-September average forecast for Chelan River is 69%, Wenatchee River at Plain is 52%, Stehekin River is 83% and Icicle Creek is 55%. March average streamflows on the Chelan River were 196% and on the Wenatchee River 158%. April 1 snowpack in the Wenatchee River Basin was 34% of normal; the Chelan, 63%; the Entiat, 0%; Stemilt Creek, 14% and Colockum Creek, 0%. Lyman Lake SNOTEL had the most snow water with 41.8 inches of water. This site would normally have 57.6 inches on April 1. Temperatures were 4-6 degrees above normal for March and 3-4 degrees above normal for the water year.

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

Central Columbia River Basins

Data Current as of: 4/7/2015 8:59:31 AM

Central Columbia Basins Streamflow Forecasts - April 1, 2015

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

Central Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Stehekin R at Stehekin	APR-JUL	470	530	570	84%	615	675	680
	APR-SEP	560	615	655	83%	695	755	790
Chelan R at Chelan	APR-JUL	625	680	715	72%	755	810	1000
	APR-SEP	685	740	775	69%	815	870	1120
Entiat R nr Ardenvoir	APR-JUL	109	124	134	67%	144	159	200
	APR-SEP	118	134	144	65%	155	170	220
Wenatchee R at Plain	APR-JUL	415	480	525	53%	570	640	990
	APR-SEP	440	510	560	52%	610	680	1080
Icicle Ck nr Leavenworth	APR-JUL	122	141	155	56%	168	188	275
	APR-SEP	128	150	165	55%	181	205	300
Wenatchee R at Peshastin	APR-JUL	595	680	740	54%	800	885	1370
	APR-SEP	620	720	785	53%	850	945	1490
Columbia R bl Rock Island Dam ²	APR-JUL	42700	46400	48900	88%	51300	55000	55770
	APR-SEP	50900	55300	58200	89%	61100	65500	65200

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

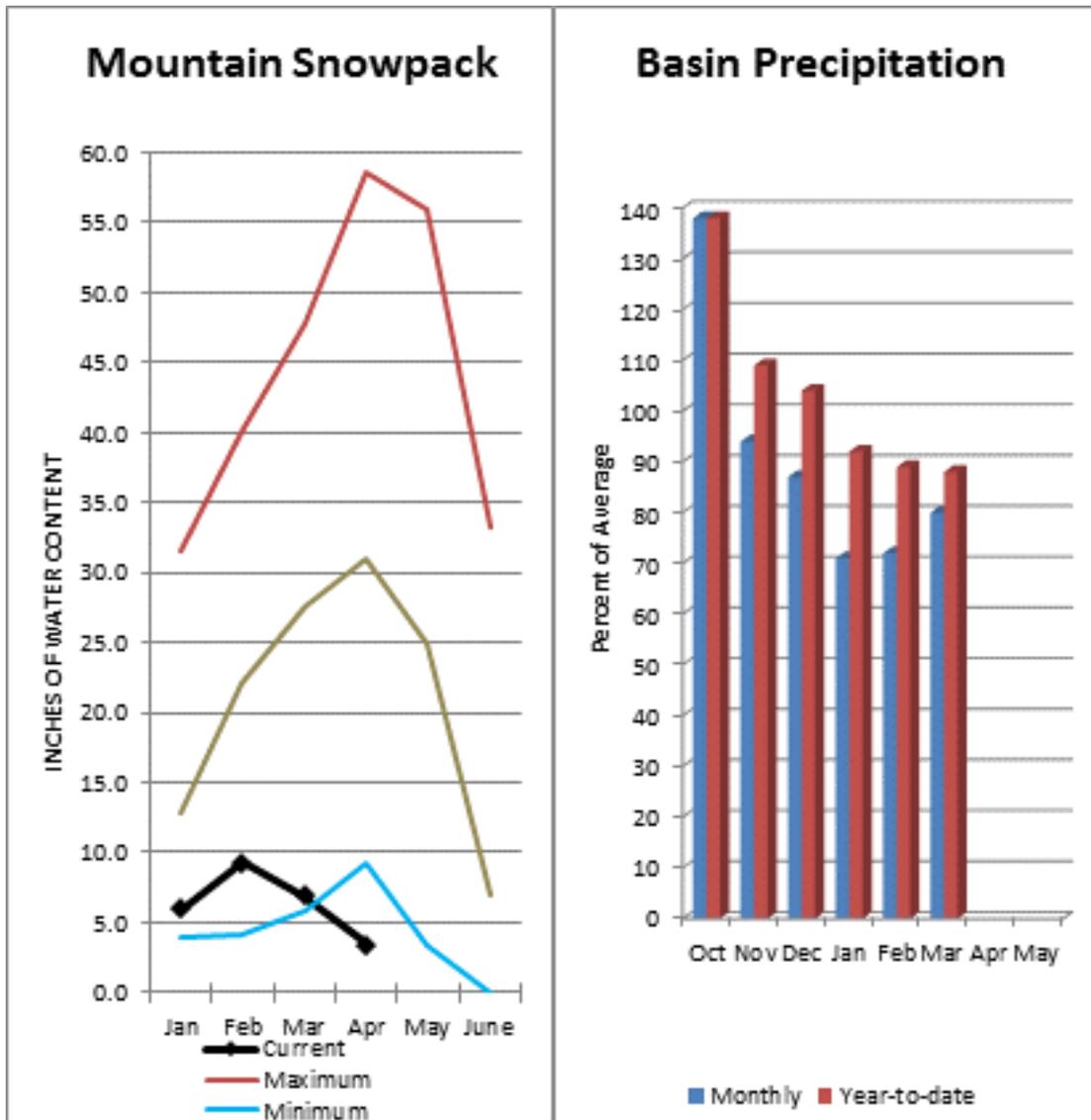
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Chelan		227.6	256.1	676.1
Basin-wide Total		0.0	0.0	0.0
# of reservoirs	0	0	0	0

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Central Columbia Basins	3	63%	109%
Chelan Lake Basin	3	63%	109%
Entiat River	1	3%	100%
Wenatchee River	7	33%	103%
Stemilt Creek	1	14%	84%
Colockum Creek	1	5%	118%

Upper Yakima River Basin



April 1 reservoir storage for the Upper Yakima reservoirs was 833,000-acre feet, 163% of average. Forecasts for the Yakima River at Cle Elum are 40% of average and the Teanaway River near Cle Elum is at 23%. Lake inflows are all forecasted to be below average this summer as well. March streamflows within the basin were Cle Elum River near Roslyn at 200%. April 1 snowpack was 11% based upon 8 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 80% of average for March and 88% 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.

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

Data Current as of: 4/7/2015 8:59:34 AM

Upper Yakima River Streamflow Forecasts - April 1, 2015

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

Upper Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Keechelus Reservoir Inflow ²	APR-JUL	21	32	40	34%	47	59	116
	APR-SEP	26	38	46	37%	54	66	126
Kachess Reservoir Inflow ²	APR-JUL	17.3	26	32	31%	38	47	104
	APR-SEP	23	32	38	34%	44	53	113
Cle Elum Lake Inflow ²	APR-JUL	120	142	157	41%	171	193	385
	APR-SEP	124	150	167	40%	185	210	415
Yakima R at Cle Elum ²	APR-JUL	143	215	265	35%	315	385	755
	APR-SEP	159	245	305	37%	365	455	830
Teanaway R bl Forks nr Cle Elum	APR-JUL	0.17	17.3	29	22%	41	58	130
	APR-SEP	1.03	18.3	30	23%	42	59	133

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

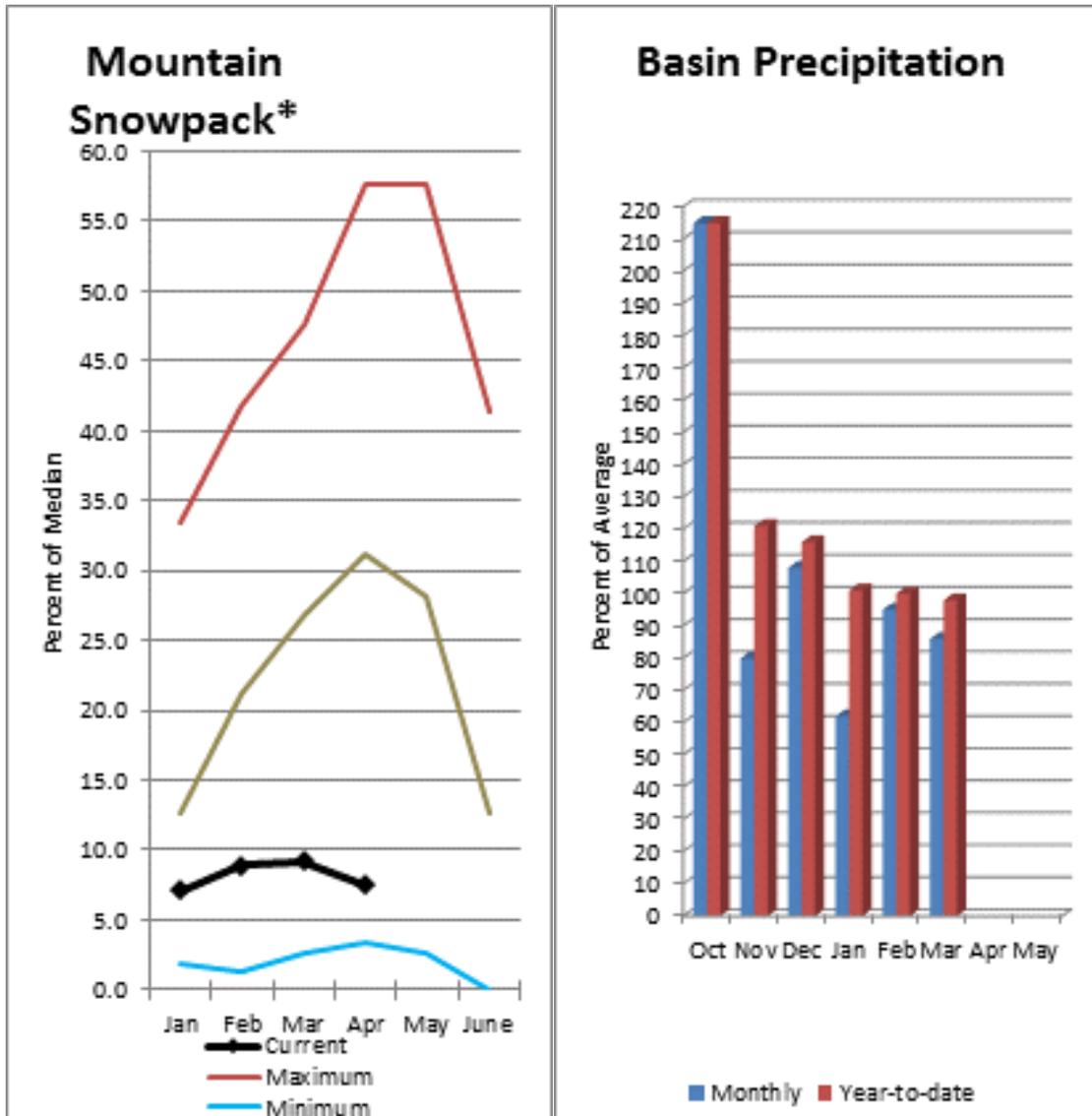
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Keechelus	158.1	137.3	106.3	157.8
Kachess	238.8	218.6	159.8	239.0
Cle Elum	436.3	254.4	246.3	436.9
Basin-wide Total	833.2	610.2	512.4	833.7
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Upper Yakima River	9	11%	103%

Lower Yakima River Basin



March average streamflows within the basin were: Yakima River near Parker, 93% and the Naches River near Naches, 111%. April 1 reservoir storage for Bumping and Rimrock reservoirs was 232,000-acre feet, 153% of average. Forecast averages for Yakima River near Parker are 36%; American River near Nile, 40%; Ahtanum Creek, 55%; and Klickitat River near Glenwood, 54%. April 1 snowpack was 24% based upon 7 snow course and SNOTEL readings within the Lower Yakima Basin and Ahtanum Creek reported in at 30% of normal. Precipitation was 86% of average for March and 98% for the water-year. Temperatures were 4-8 degrees above normal for March and for 3-5 degrees above normal for the water year. Volume forecasts for Yakima Basin are for natural flow. As such, they April 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.

Lower Yakima River Basin

Data Current as of: 4/7/2015 8:59:37 AM

Lower Yakima River Streamflow Forecasts - April 1, 2015

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

Lower Yakima River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Bumping Lake Inflow ²	APR-JUL	25	34	40	35%	46	54	114
	APR-SEP	25	35	41	33%	48	58	123
American R nr Nile	APR-JUL	28	37	42	41%	48	57	102
	APR-SEP	28	37	44	40%	50	60	110
Rimrock Lake Inflow ²	APR-JUL	60	74	84	45%	94	108	187
	APR-SEP	69	87	100	45%	112	130	220
Naches R nr Naches	APR-JUL	122	177	215	31%	255	310	700
	APR-SEP	130	193	235	31%	275	340	760
Ahtanum Ck at Union Gap	APR-JUL	7.3	11.7	14.6	54%	17.5	22	27
	APR-SEP	8.7	13	16	55%	19	23	29
Yakima R nr Parker ²	APR-JUL	380	505	590	36%	675	800	1660
	APR-SEP	435	565	655	36%	745	875	1820
Klickitat R nr Glenwood	APR-JUL	47	59	67	53%	75	87	126
	APR-SEP	52	66	75	54%	84	97	139
Klickitat R nr Pitt	APR-JUL	197	245	280	64%	310	360	435
	APR-SEP	255	310	350	67%	390	445	520

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

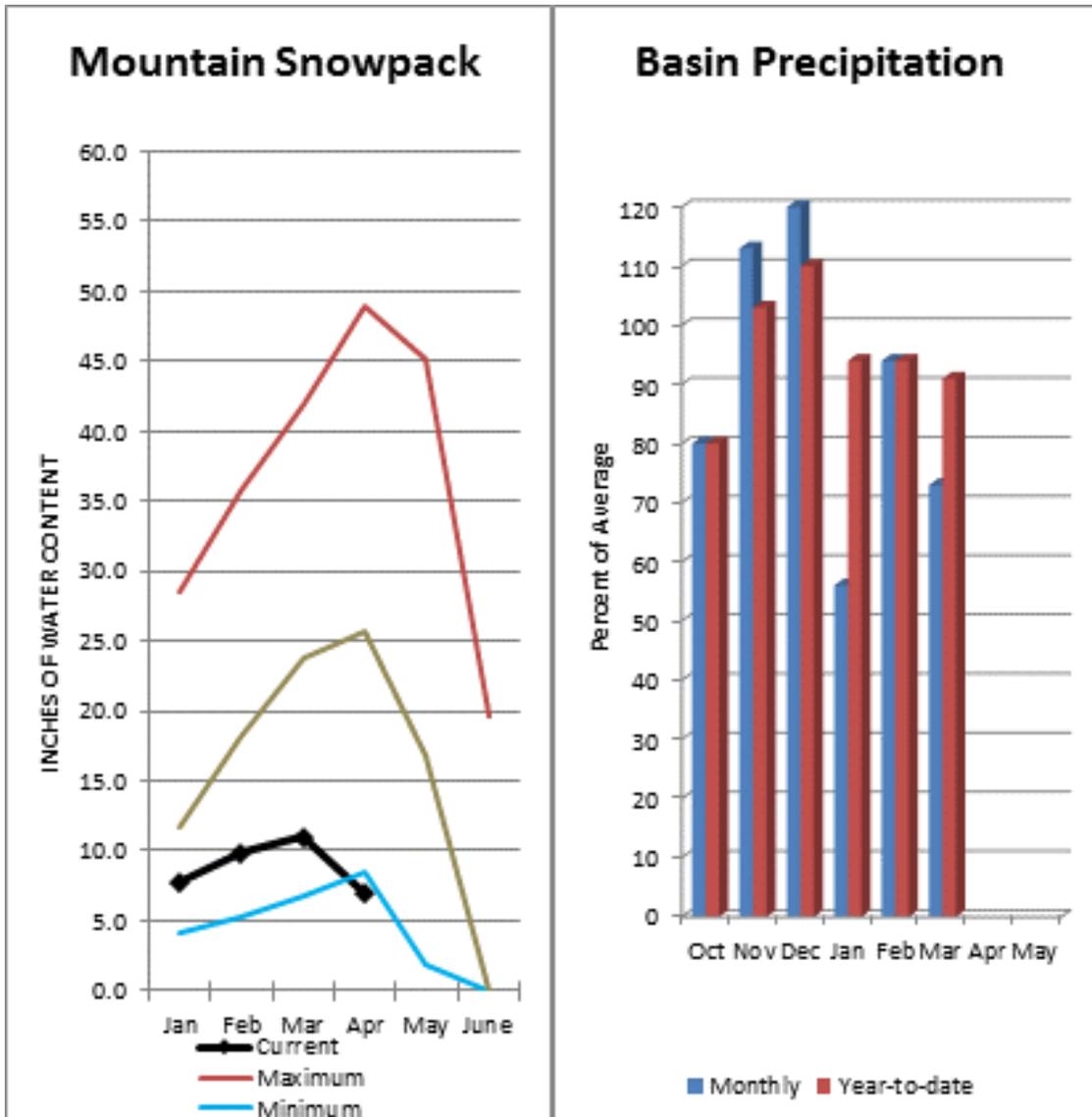
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bumping Lake	34.0	20.0	14.6	33.7
Rimrock	197.9	181.4	136.6	198.0
Basin-wide Total	231.9	201.5	151.2	231.7
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Lower Yakima River	7	24%	98%
Ahtanum Creek	2	19%	82%

Walla Walla River Basin



March precipitation was 73% of average, maintaining the year-to-date precipitation at 91% of average. Snowpack in the basin was 27% of normal. Streamflow forecasts are 63% of average for Mill Creek and 76% for the SF Walla Walla near Milton-Freewater. Average temperatures were 4-6 degrees above normal for March and 3-5 degrees above normal for the water year.

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

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Walla Walla River Streamflow Forecasts - April 1, 2015

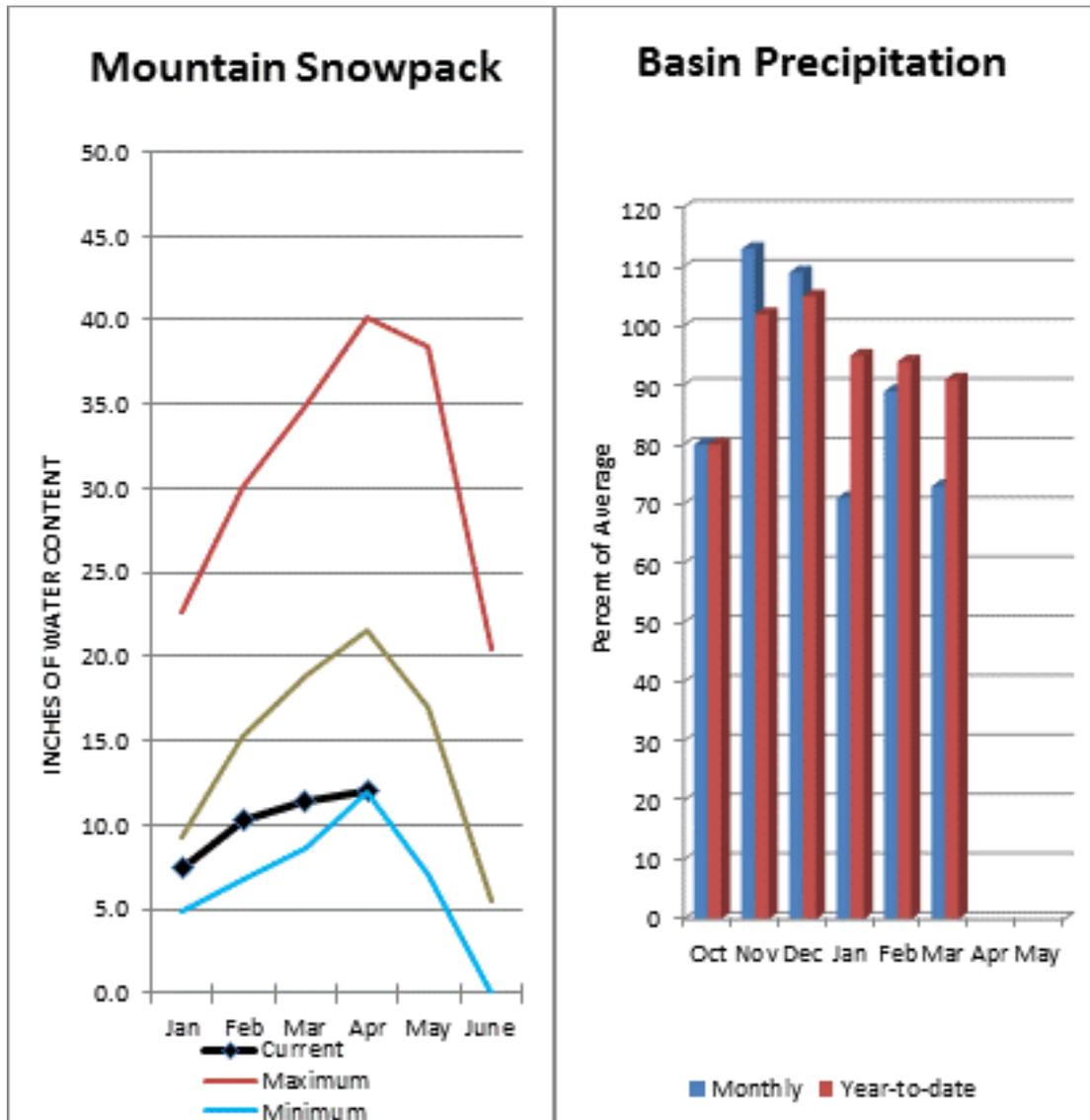
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Walla Walla River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
SF Walla Wall R nr Milton-Freewater	APR-JUL	27	35	40	74%	45	53	54
	APR-SEP	36	44	50	76%	56	64	66
Mill Ck nr Walla Walla	APR-JUL	7.3	11.6	14.5	60%	17.4	22	24
	APR-SEP	9.4	14	17	63%	20	25	27

- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Walla Walla River	2	27%	96%

Lower Snake River Basin



The Grande Ronde River can expect summer flows to be about 92% of normal. The forecast for Asotin Creek at Asotin predicts 60% of average flows for the April – July runoff period. March precipitation was 73% of average, bringing the year-to-date precipitation to 91% of average. April 1 snowpack readings averaged 44% of normal. March streamflow was 90% of average for Snake River below Lower Granite Dam and 64% for Grande Ronde River near Troy. Dworshak Reservoir storage was 133% of average. Average temperatures were 4-6 degrees above normal for March and 3-5 degrees above for the water year.

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

Lower Snake River Basin

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Lower Snake, Grande Ronde, Clearwater Basins Streamflow Forecasts - April 1, 2015

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

Lower Snake, Grande Ronde, Clearwater Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Grande Ronde R at Troy	APR-JUL	405	535	630	52%	735	905	1220
	APR-SEP	445	580	680	52%	790	970	1310
Asotin Ck at Asotin	APR-JUL	8.3	15.9	21	60%	26	34	35
Clearwater R at Spalding ²	APR-JUL	3990	4760	5280	77%	5800	6570	6890
	APR-SEP	4250	5060	5610	77%	6160	6970	7270
Snake R bl Lower Granite Dam ¹²	APR-JUL	8480	11900	13400	68%	14900	18300	19848
	APR-SEP	10200	14000	15700	70%	17400	21200	22280

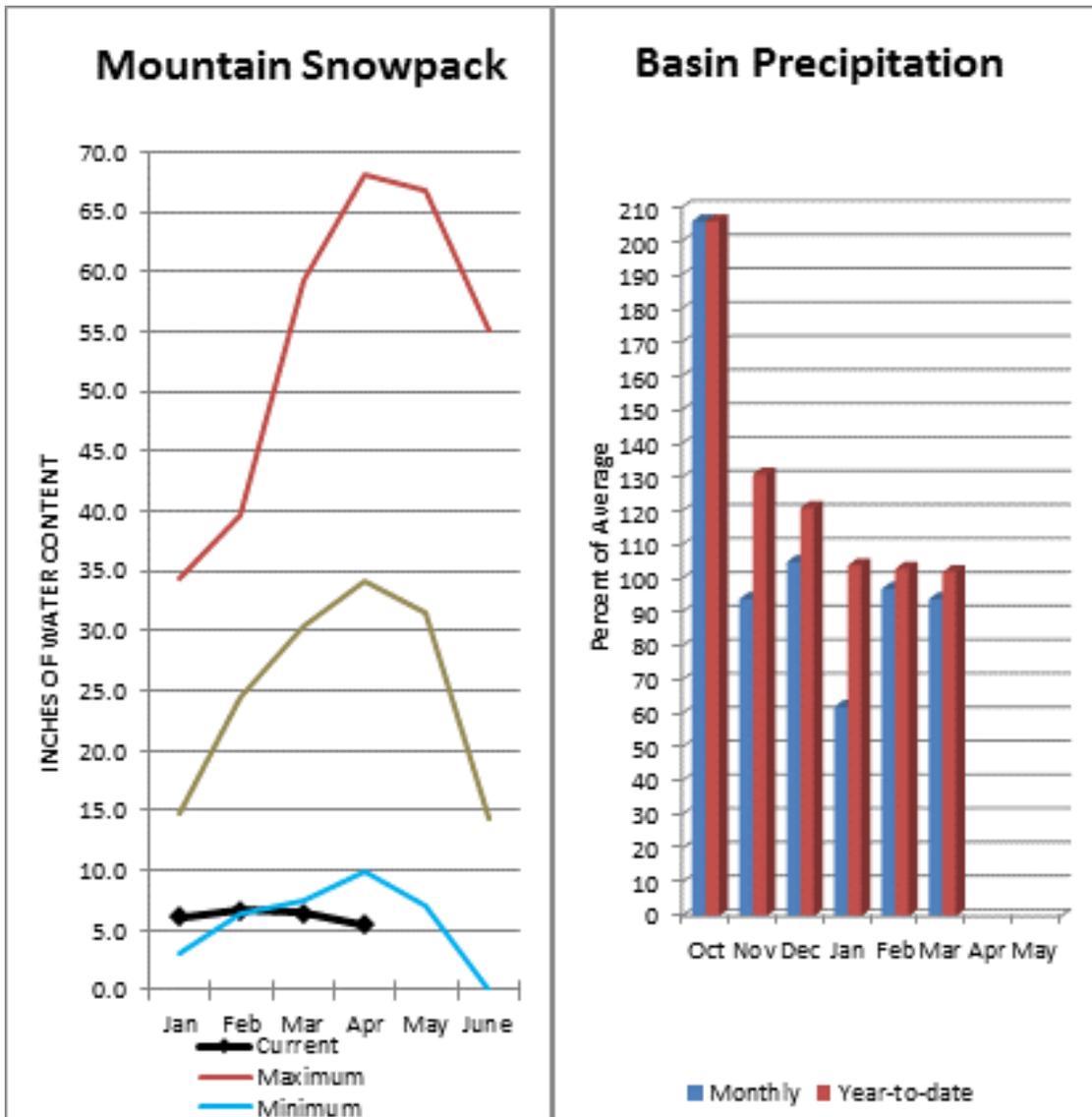
1) 90% and 10% exceedance probabilities are actually 95% and 5%

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

3) Median value used in place of average

Reservoir Storage End of March, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	3214.1	2124.6	2417.0	3468.0
Basin-wide Total	3214.1	2124.6	2417.0	3468.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Lower Snake, Grande Ronde, Clearwater Basins	16	54%	115%



Forecasts for April – September streamflows within the basin are Lewis River at Ariel, 75% and Cowlitz River at Castle Rock, 67% of average. The Columbia at The Dalles is forecasted to have 83% of average flows this summer according to the River Forecast Center. March average streamflow for Cowlitz River was 89%. The Columbia River at The Dalles was 106% of average. March precipitation was 94% of average and the water-year average was 102%. April 1 snow cover for Cowlitz River was 29%, and Lewis River was 3% of normal. Temperatures were 2-4 degrees above normal during March and for the water year.

Lower Columbia River Basins

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Lower Columbia Basins Streamflow Forecasts - April 1, 2015

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

Lower Columbia Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Columbia R at The Dalles ²	APR-JUL	55700	61100	64800	81%	68500	73900	79855
	APR-SEP	66300	72600	76900	83%	81300	87600	92704
Klickitat R nr Glenwood	APR-JUL	47	59	67	53%	75	87	126
	APR-SEP	52	66	75	54%	84	97	139
Klickitat R nr Pitt	APR-JUL	197	245	280	64%	310	360	435
	APR-SEP	255	310	350	67%	390	445	520
Lewis R at Ariel ²	APR-JUL	435	605	720	74%	835	1000	970
	APR-SEP	540	715	835	75%	955	1130	1120
Cowlitz R bl Mayfield ²	APR-JUL	715	920	1060	65%	1200	1410	1620
	APR-SEP	840	1060	1220	66%	1370	1600	1840
Cowlitz R at Castle Rock ²	APR-JUL	970	1270	1470	66%	1670	1970	2230
	APR-SEP	1170	1490	1700	67%	1910	2220	2520

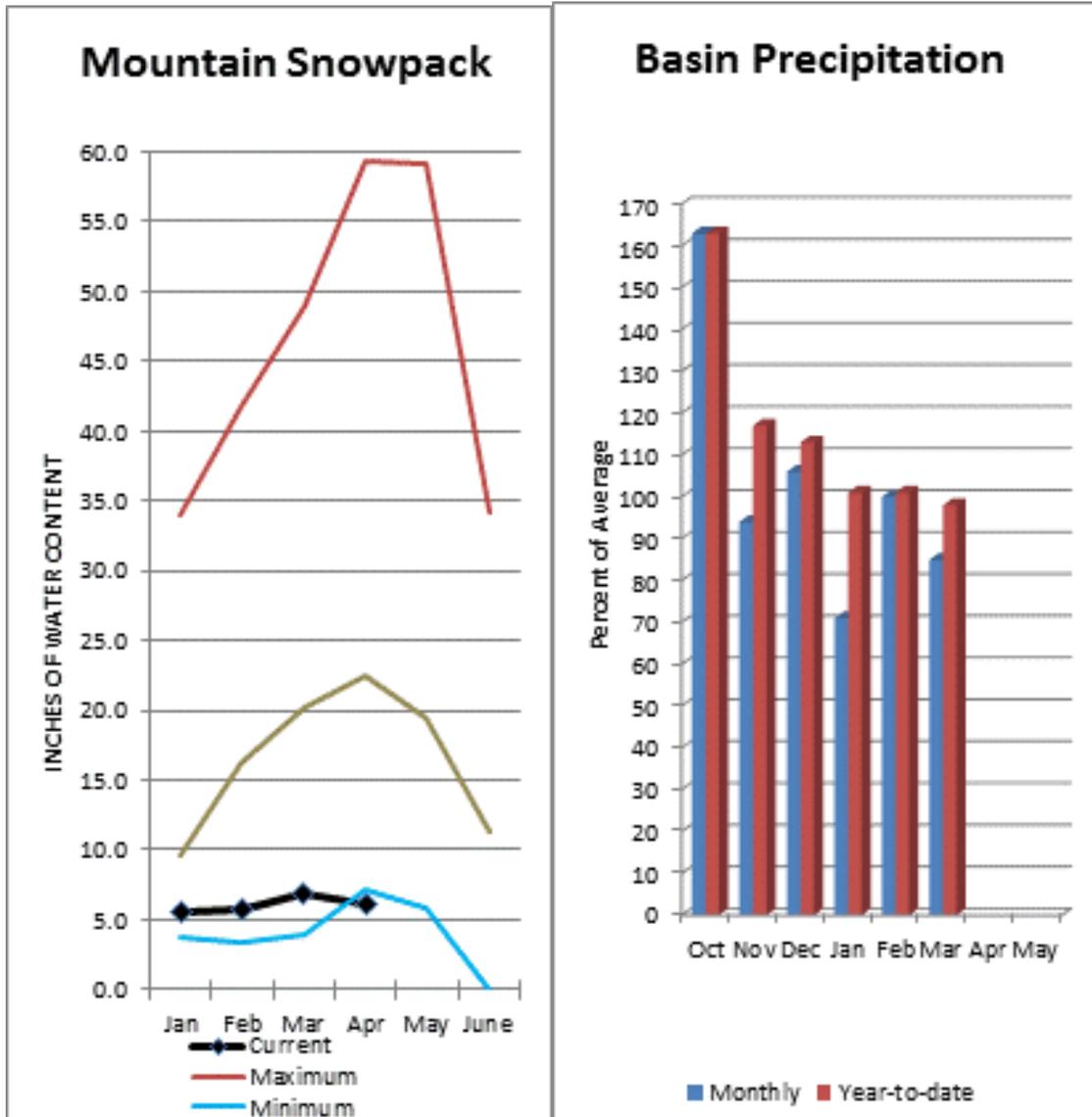
1) 90% and 10% exceedance probabilities are actually 95% and 5%

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, 2015	# of Sites	% Median	Last Year % Median
Lower Columbia Basins	11	16%	93%
Lewis River	5	3%	73%
Cowlitz River	6	29%	114%

South Puget Sound River Basins



Summer runoff is forecast to be 45% of normal for the Green River below Howard Hanson Dam and 74% for the White River near Buckley. April 1 snowpack was 41% of average for the White River. Both the Puyallup and Green River basins had melted out prior to April 1. March precipitation was 85% of average, bringing the water year-to-date to 98% of average for the basins. Average temperatures in the area were 2-4 degrees above normal for March and for the water-year.

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

South Puget Sound River Basins

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South Puget Sound Basins Streamflow Forecasts - April 1, 2015

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

South Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
White R nr Buckley ^{1,2}	APR-JUL	186	270	310	72%	345	430	430
	APR-SEP	240	335	380	74%	420	515	515
Green R bl Howard A Hanson Dam ^{1,2}	APR-JUL	17.9	77	104	44%	131	190	235
	APR-SEP	28	89	117	45%	145	205	260

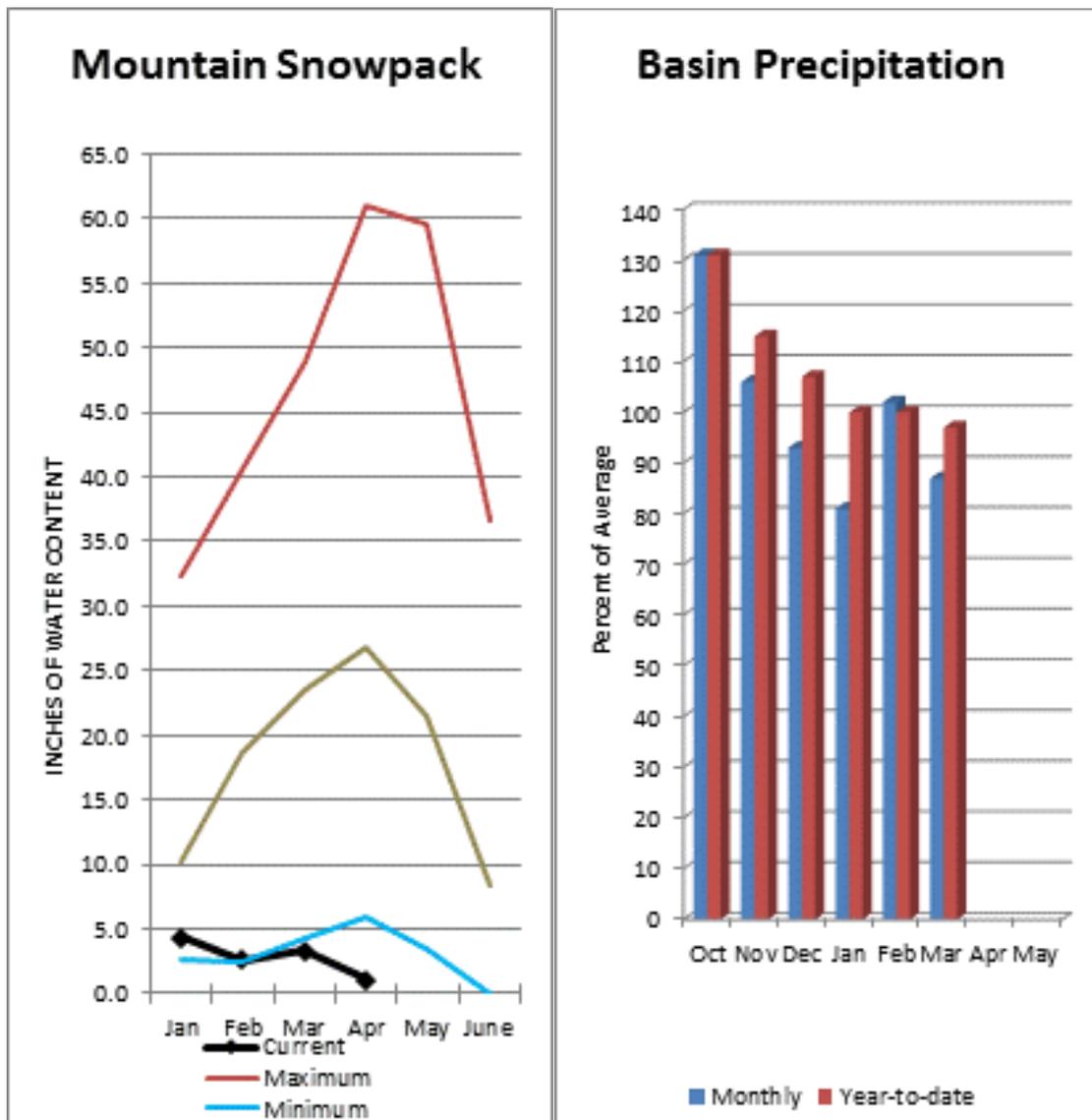
1) 90% and 10% exceedance probabilities are actually 95% and 5%

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, 2015	# of Sites	% Median	Last Year % Median
South Puget Sound Basins	12	27%	100%
White River	3	41%	105%
Green River	4	0%	86%

Central Puget Sound River Basins



Forecast for spring and summer flows are: 51% for Cedar River near Cedar Falls; 42% for Rex River; 66% for South Fork of the Tolt River; and 68% for Taylor Creek near Selleck. Basin-wide precipitation for March was 87% of average, bringing water-year-to-date to 97% of average. Thanks to an end of month snow storm both the Cedar River and Tolt River basins picked up a wee bit of snow, but only enough to last a day or two. Snoqualmie River Basin was 3%, and Skykomish River Basin was 6%. This is a new all-time record low for April 1 snow survey at Alpine Meadows, since records began in 1969. Temperatures were 2-4 degrees above normal for March and for the water-year.

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

Central Puget Sound River Basins

Data Current as of: 4/7/2015 8:59:52 AM

Central Puget Sound Basins Streamflow Forecasts - April 1, 2015

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

Central Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Cedar R nr Cedar Falls	APR-JUL	21	29	35	50%	41	49	70
	APR-SEP	24	33	39	51%	45	54	76
Rex R nr Cedar Falls	APR-JUL	3.5	7.4	10	42%	12.6	16.5	24
	APR-SEP	4.4	8.5	11.3	42%	14.1	18.2	27
Taylor Ck nr Selleck	APR-JUL	9.4	11.9	13.6	68%	15.3	17.8	20
	APR-SEP	11.6	14.4	16.3	68%	18.2	21	24
SF Tolt R nr Index	APR-JUL	5.7	7.8	9.2	65%	10.7	12.8	14.2
	APR-SEP	6.4	8.9	10.6	66%	12.3	14.8	16.1

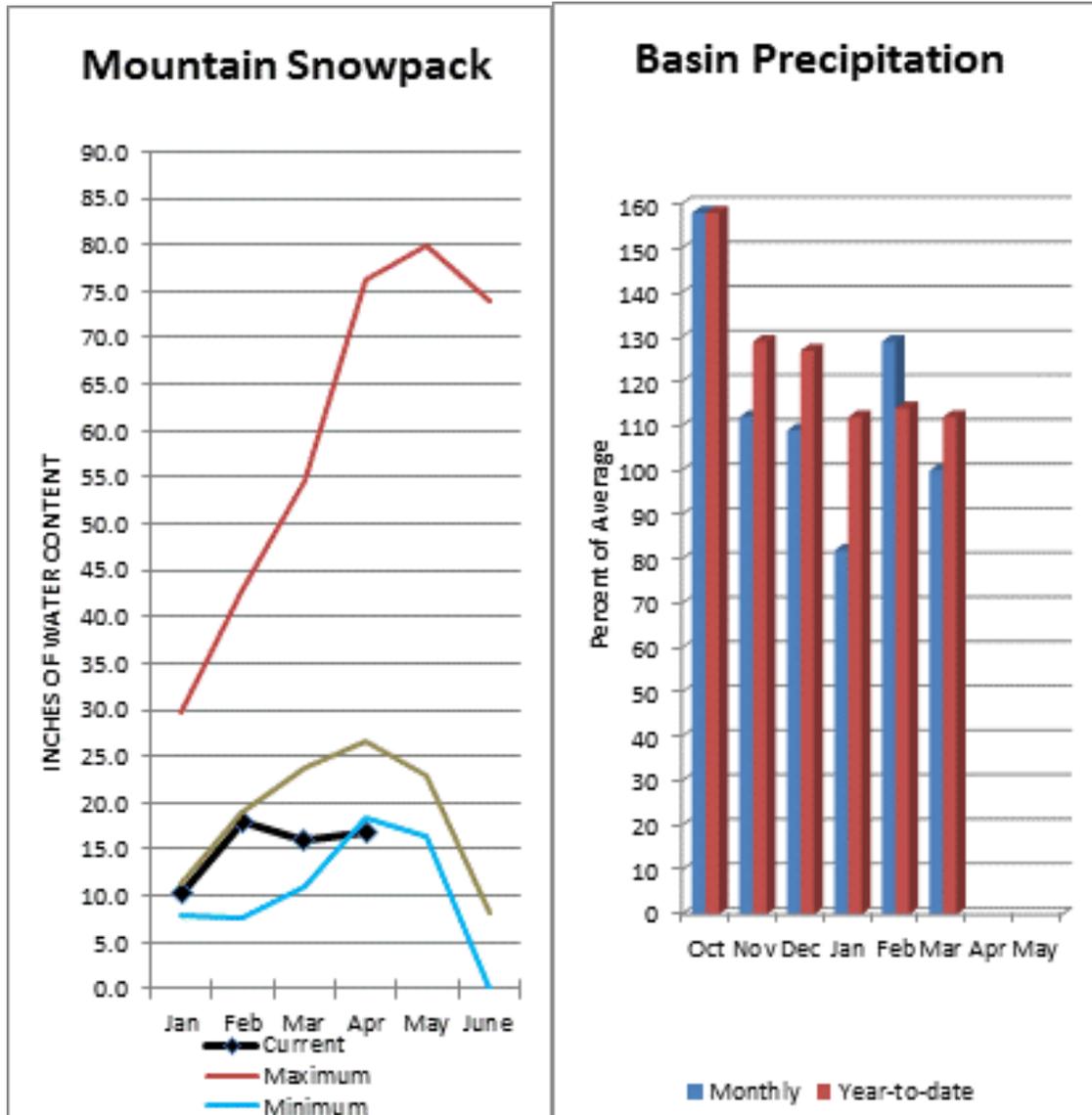
1) 90% and 10% exceedance probabilities are actually 95% and 5%

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, 2015	# of Sites	% Median	Last Year % Median
Central Puget Sound Basins	15	4%	97%
Puyallup River	5	35%	105%
Cedar River	6	2%	91%
Tolt River	3	1%	100%
Snoqualmie River	5	3%	99%
Skykomish River	3	6%	94%

North Puget Sound River Basins



Forecast for Skagit River streamflow at Newhalem is 81% of average for the spring and summer period. March streamflow in Skagit River was 124% of average. Other forecast points included Baker River at 66% and Thunder Creek at 86% of average. Basin-wide precipitation for March was 100% of average, bringing water-year-to-date to 112% of average. April 1 average snow cover in Skagit River Basin was 56%, Nooksack River Basin was 13% and Baker River Basin was not available. April 1 Skagit River reservoir storage was 98% of average and 51% of capacity. Average temperatures were 2-4 degrees above normal for March and 2-3 degrees above for the water year.

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

North Puget Sound River Basins

Data Current as of: 4/7/2015 8:59:55 AM

North Puget Sound Basins Streamflow Forecasts - April 1, 2015

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

North Puget Sound Basins	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Thunder Ck nr Newhalem	APR-JUL	169	187	200	85%	215	230	235
	APR-SEP	250	270	285	86%	300	320	330
Skagit R at Newhalem ²	APR-JUL	1210	1310	1390	83%	1460	1560	1680
	APR-SEP	1440	1560	1650	81%	1730	1860	2030
Baker R at Concrete	APR-JUL	390	460	510	65%	555	625	780
	APR-SEP	500	585	645	66%	700	785	980

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

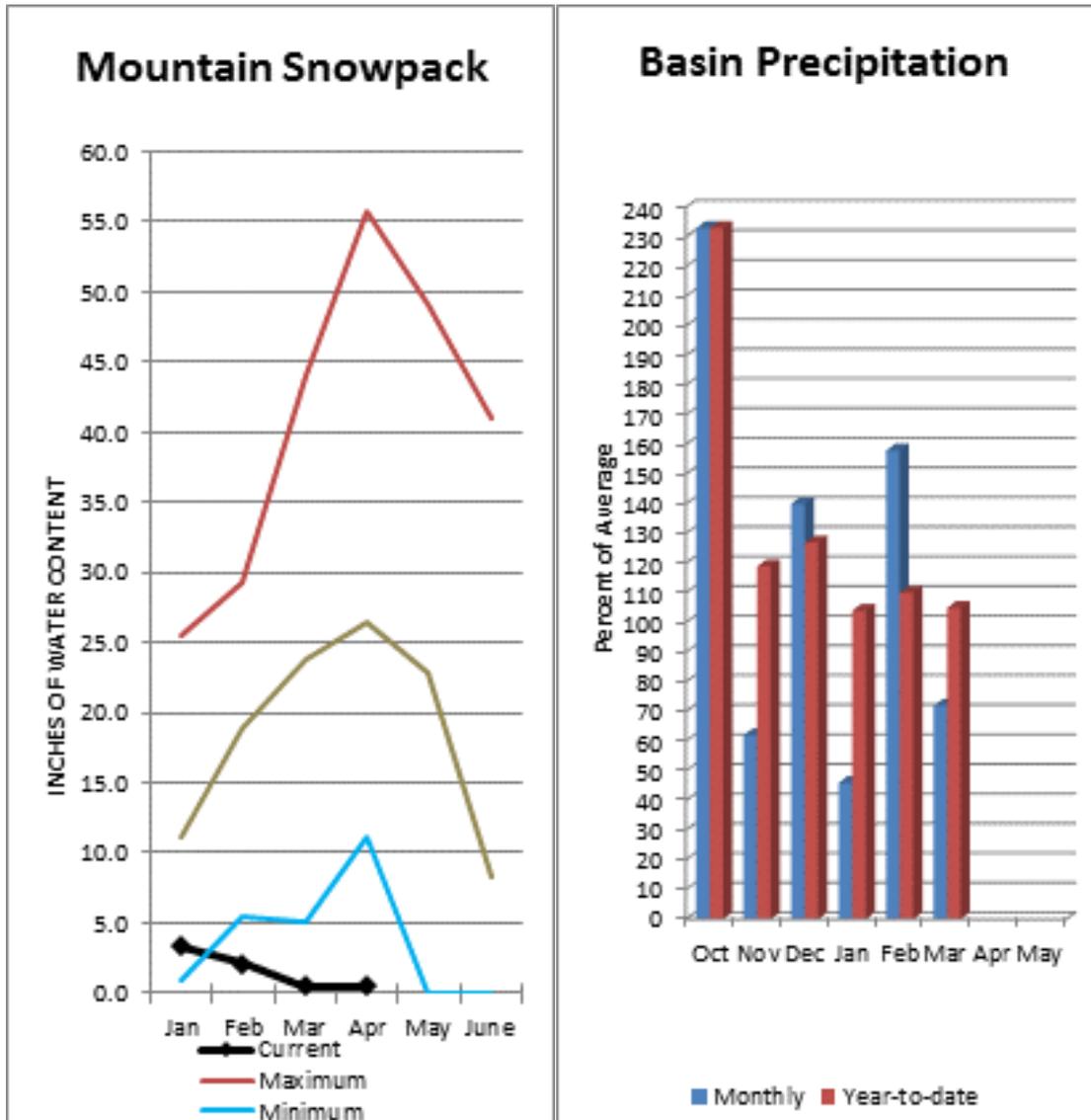
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3) Median value used in place of average

Reservoir Storage End of March, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ross	712.5	417.5	730.5	1404.1
Diablo Reservoir			86.0	90.6
Basin-wide Total	712.5	417.5	730.5	1404.1
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
North Puget Sound Basins	23	36%	116%
Skagit River	13	56%	124%
Baker River	7	28%	110%
Nooksack River	3	13%	117%

Olympic Peninsula River Basins



Forecasted average runoff for streamflow for the Dungeness River is 58% and Elwha River is 57%. March runoff in the Dungeness River was 190% of normal. Big Quilcene and Wynoochee rivers may expect below average runoff this summer as well. March precipitation was 72% of average. Precipitation has accumulated at 105% of average for the water year. March precipitation at Quillayute was 136% of normal. Olympic Peninsula snowpack averaged a dismal 3% of normal on April 1. With average water content of only 0.8 inches the Olympics shattered to previous record of 11.2 inches in 2005. Temperatures were 4-6 degrees above average for March and 2-3 degrees above normal for the water year.

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

Olympic Peninsula River Basins

Data Current as of: 4/7/2015 8:59:58 AM

Olympic Penninsula Streamflow Forecasts - April 1, 2015

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

Olympic Penninsula	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Dungeness R nr Sequim	APR-JUL	46	60	70	58%	80	94	120
	APR-SEP	53	72	84	58%	96	115	145
Elwha R at McDonald Bridge nr Port Angeles	APR-JUL	173	210	235	59%	265	300	400
	APR-SEP	194	240	270	57%	300	345	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, 2015	# of Sites	% Median	Last Year % Median
Olympic Penninsula	6	2%	82%

Issued by

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

Released by

Roylene Rides At The Door
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

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

Canada	Snow Survey Network Program – British Columbia Ministry of Environment River Forecast Center – British Columbia Ministry of Forests, Lands and Natural Resource Operations
State	Washington State Department of Ecology Washington State Department of Natural Resources
Federal	Department of the Army Corps of Engineers U.S. Department of Agriculture Forest Service U.S. Department of Commerce NOAA, National Weather Service U.S. Department of Interior Bonneville Power Administration Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs Recourse Conservation & Development Councils
Local	City of Tacoma City of Seattle Chelan County P.U.D. Pacific Power and Light Company 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'klallum Tribe
Private	Okanogan Irrigation District Wenatchee Heights Irrigation District Newman Lake Homeowners Association Whitestone Reclamation District

*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

