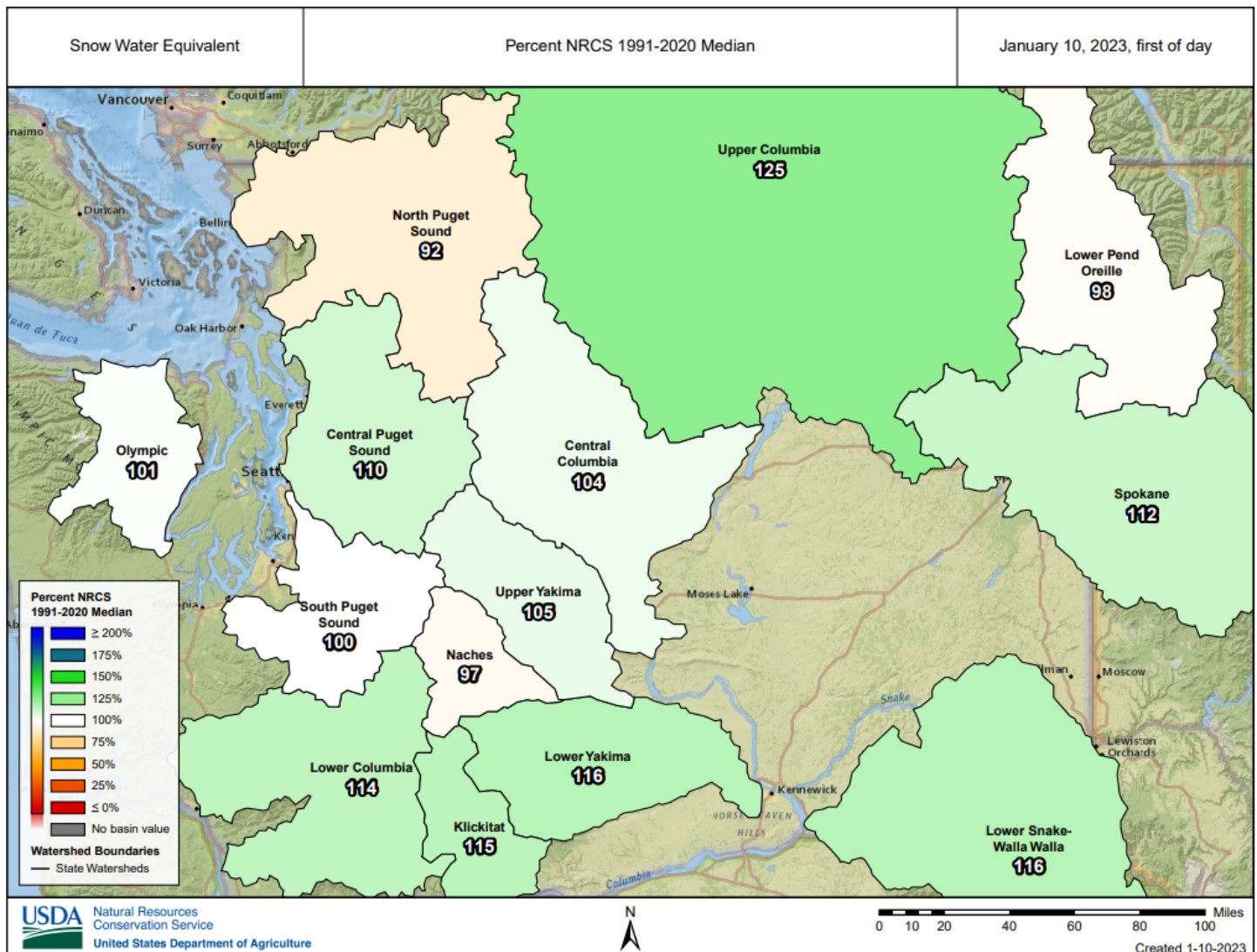


Washington Water Supply Outlook Report January 1, 2023



By no means a record setting year but Washington is in pretty good shape overall. Looking forward to seeing fresh snowfall over the next few days and beyond in order to keep this number up.

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.

"The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers. If you believe you experienced discrimination when obtaining services from USDA, participating in a USDA program, or participating in a program that receives financial assistance from USDA, you may file a complaint with USDA. Information about how to file a discrimination complaint is available from the Office of the Assistant Secretary for Civil Rights. To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (866) 632-9992 (voice). Persons with disabilities who require alternative means for communication of program information (Braille, Large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). Individuals who are deaf, hard of hearing or have speech disabilities may contact USDA through the Federal Relay service at (800) 877-8339 or (800) 845-6136 (in Spanish). USDA is an equal opportunity provider, employer and lender."

Washington Water Supply Outlook

January 2023

General Outlook

Following a very dry summer, water-year 2023 started off with extremely dry conditions. The last waning days of October brought much needed rain to the region. November continued the trend but remained warm preventing much snow accumulation until the end of the month. Authentic snowfall finally began statewide in early December, with it, brought normal pass and highway headaches that mostly come from ill prepared drivers. Another major wintry system hit the state just before the holidays, thwarting many holiday travel plans, yours truly included.

The most recent forecast through late-January shows a probability for above normal temperatures and above normal precipitation. NWS 3-month (Jan-Feb-Mar) forecast indicates below normal temperatures and above normal precipitation which is indicative of the forecasted Enso La Nina #3. The US Drought Monitor indicates the continuation of D0, Abnormally Dry, for most of the state with a few pockets of D1, Moderate Drought. (see maps on page 4)

Snowpack

The January 1 statewide SNOTEL readings were 113% of normal but have decreased daily due to a lack of fresh snowfall. The lowest readings in the state were at 72% of the 30-year median for January 1 in the Status Creek Basin. Omak and Sanpoil creeks had the most snow with 229%. Westside medians from SNOTEL included the North Puget Sound River basins with 96% of normal, the Central and South Puget River basins with 137% and 111% respectively, and the Lower Columbia basins with 117% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 112% and the Wenatchee area with 109%. Snowpack in the Spokane River Basin was at 133% and the Upper Columbia River basins had 121% of the long-term median.

BASIN	PERCENT OF MEDIAN	LAST YEAR PERCENT MEDIAN
Spokane	133	105
Newman Lake	148	75
Lower Pend Oreille	129	95
Kettle	136	93
Omak	229	78
Methow	109	112
Conconully Lake	163	67
Central Columbia	109	95
Upper Yakima	115	87
Lower Yakima	108	91
Ahtanum Creek	133	85
Walla Walla	124	114
Lower Snake	130	105
Cowlitz	111	111
Lewis	133	139
White	111	103
Green	120	101
Puyallup	140	188
Cedar	134	118
Snoqualmie	143	126
Skykomish	140	122
Skagit	96	107
Nooksack	100	94
Olympic Peninsula	81	100

Precipitation

Precipitation accumulation was above normal across the state except in a few select basins. Statewide average was 93% of average as of January 1. The summer of 2022 was the driest on record and unfortunately carried over until the end of October leaving a deficit that will be hard to fill. November was wet at the beginning and end of the month but not enough to make up most summer deficits. December brought mostly snow, again early and late with a short dry spell in the middle. Colder than normal temperatures helped maintain the pack through the month. SNOTEL collects all form of precipitation including, rain, snow, sleet, and hail.

RIVER BASIN	DECEMBER PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	120	95
Lower Pend Oreille	118	89
Upper Columbia	142	100
Central Columbia	107	88
Upper Yakima	94	95
Naches	113	96
Lower Yakima	145	107
Klickitat	130	101
Walla Walla	92	108
Lower Snake	103	107
Lower Columbia	124	96
South Puget Sound	103	100
Central Puget Sound	103	93
North Puget Sound	112	81
Olympic Peninsula	124	78

Reservoir

Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. January 1 Reservoir storage in the Yakima Basin was 344,600-acre feet, 92% of median for the Upper Reaches and 101% of median for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 76,900-acre feet, 109% of median and 32% of capacity; and Ross Lake within the Skagit River Basin at 64% of average and 85% 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 MEDIAN
Spokane	32	109
Lower Pend Oreille	25	88
Upper Columbia	57	88
Central Columbia	45	78
Upper Yakima	41	92
Naches	49	101
Lower Snake	52	125
North Puget Sound	64	85
South Puget Sound	N/A	132

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

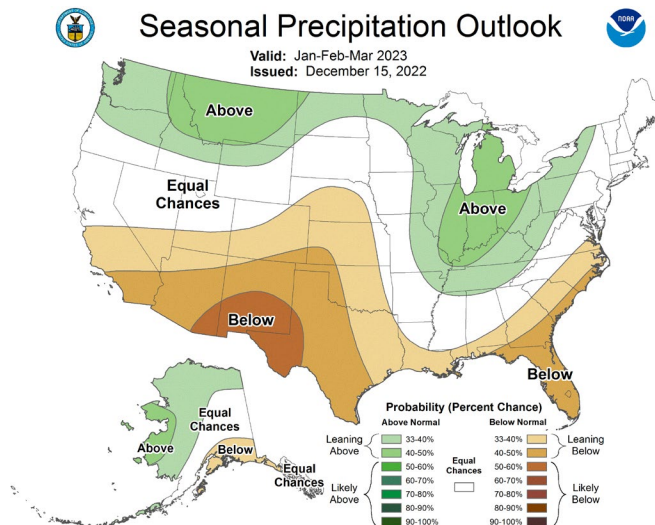
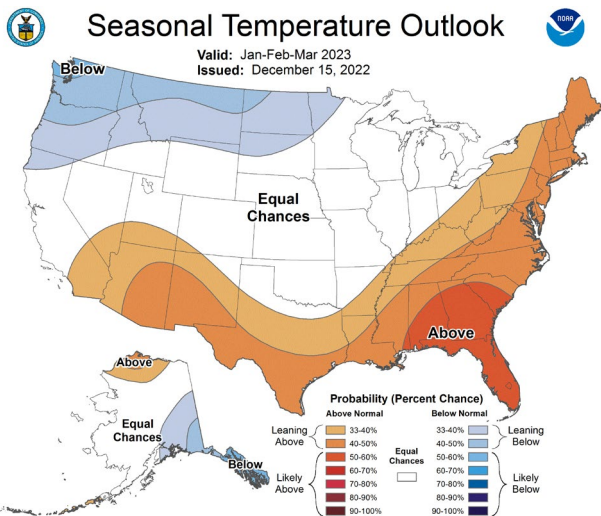
Streamflow

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 FORECAST (50% CHANCE OF EXCEEDENCE)
Spokane	96-106
Lower Pend Oreille	97-108
Upper Columbia	80-140
Central Columbia	80-112
Upper Yakima	101-107
Lower Yakima	101-121
Naches	98-106
Klickitat	99-104
Lower Snake-Walla Walla	87-108
Lower Columbia	103-113
South Puget Sound	104-110
Central Puget Sound	133-149
North Puget Sound	102-108
Olympic Peninsula	101-102

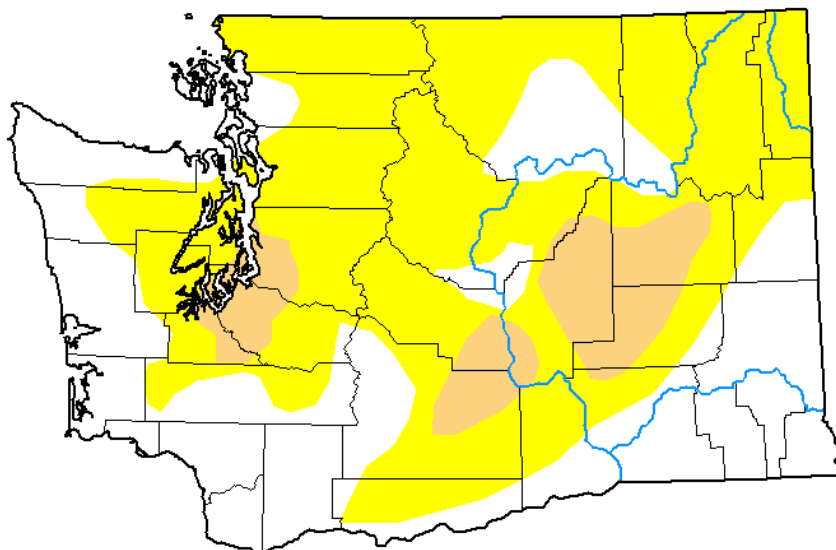
STREAM	PERCENT OF AVERAGE DECEMBER RUNOFF
Priest River - near Priest River	76
Kettle at Laurier	63
Columbia at Birchbank	60
Spokane at Spokane	62
Similkameen at Nighthawk	59
Okanogan near Tonasket	67
Methow at Pateros	61
Chelan at Chelan	43
Stehekin near Stehekin	38
Wenatchee at Pashastin	42
Cle Elum near Roslyn	62
Yakima near Parker	78
Naches near Naches	105
Grande Ronde at Troy	74
Snake below Lower Granite Dam	77
Columbia River at The Dalles	64
Lewis at Merwin Dam	92
Cowlitz below Mayfield Dam	81
Skagit at Concrete	83
Dungeness near Sequim	74

Climate

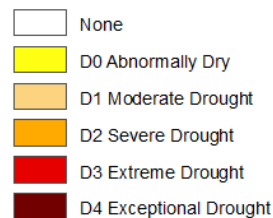


U.S. Drought Monitor Washington

January 3, 2023
(Released Thursday, Jan. 5, 2023)
Valid 7 a.m. EST



Intensity:



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:

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CPC/NOAA



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):

<https://www.nrcs.usda.gov/wps/portal/wcc/home/>

USDA-NRCS Agency Homepages

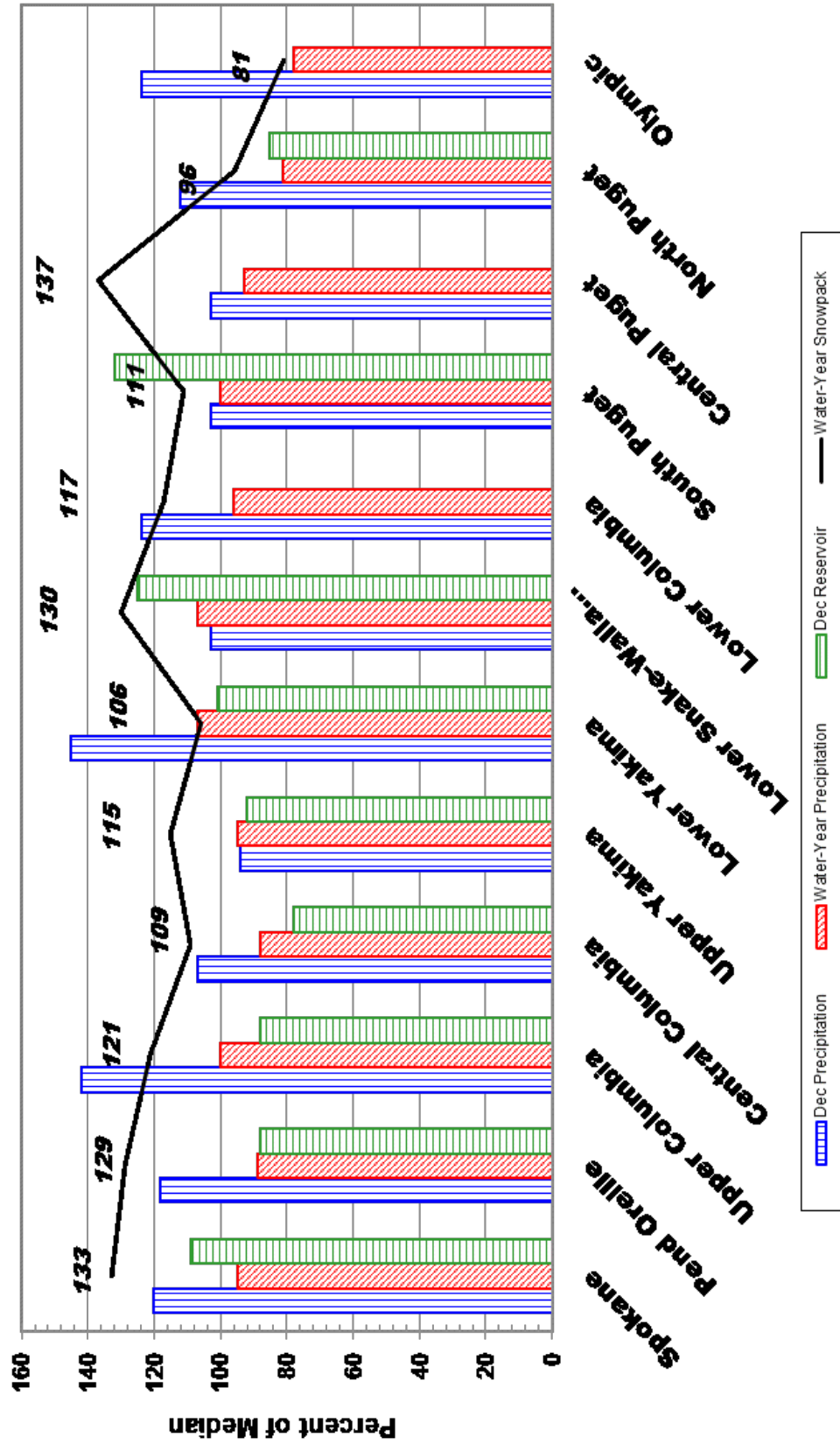
Washington:

<https://www.nrcs.usda.gov/wps/portal/nrcs/site/wa/home/>

NRCS National:

<https://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/>

January 1, 2023 - Snowpack, Precipitation and Reservoir Conditions at a Glance (Water Year = October 1 - Current Date)



90th Annual Western Snow Conference

April 17-20, 2023

Flagstaff, AZ

Please join us on April 17-20, 2023, for the 90th annual meeting of the Western Snow Conference, to be held in Flagstaff, Arizona on the Northern Arizona University campus. In addition to the in-person conference meeting, a virtual attendance option is being planned to allow for broader participation.

You are invited to submit an abstract of 150 – 300 words for either oral or poster presentation by February 1, 2023. All snow-related research in the context of measurements, modeling, and water supply are welcome. In order to encourage participation in the Conference, all presenters are required to attend in person.

Please see the [Call for Papers](#) for additional information. Abstracts can be submitted online [HERE](#).

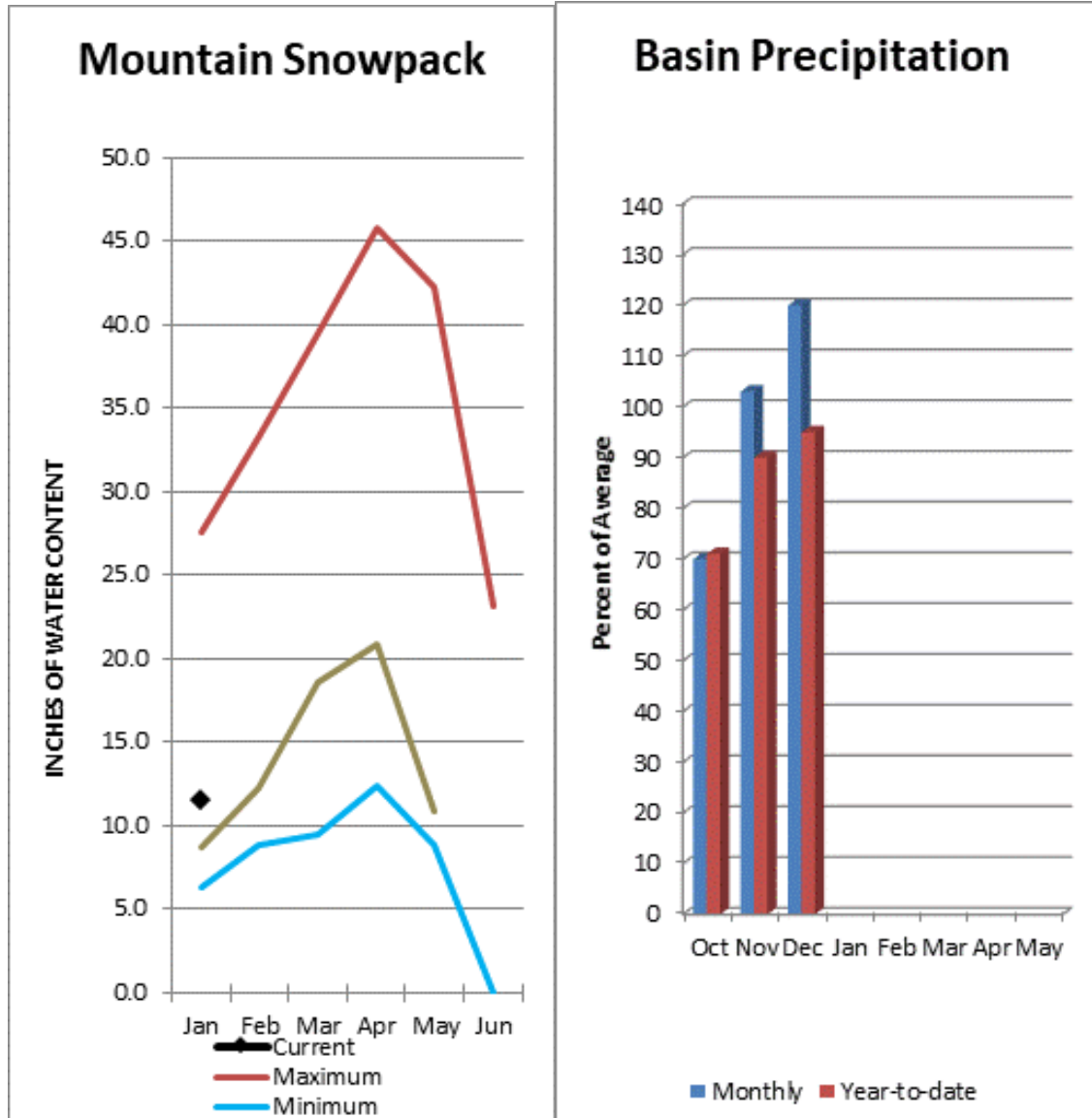
Details of this conference are still being finalized, including formats, platforms, and opportunity for vendor participation.

Teri Smyly
General Chair, WSC

Kevin Richards
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 133% of normal and precipitation is 95% of normal for the water year. Precipitation for December was 120% of normal. Reservoir storage is currently at 109% of normal.

Spokane River Basin

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Spokane Streamflow Forecasts - January 1, 2023

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

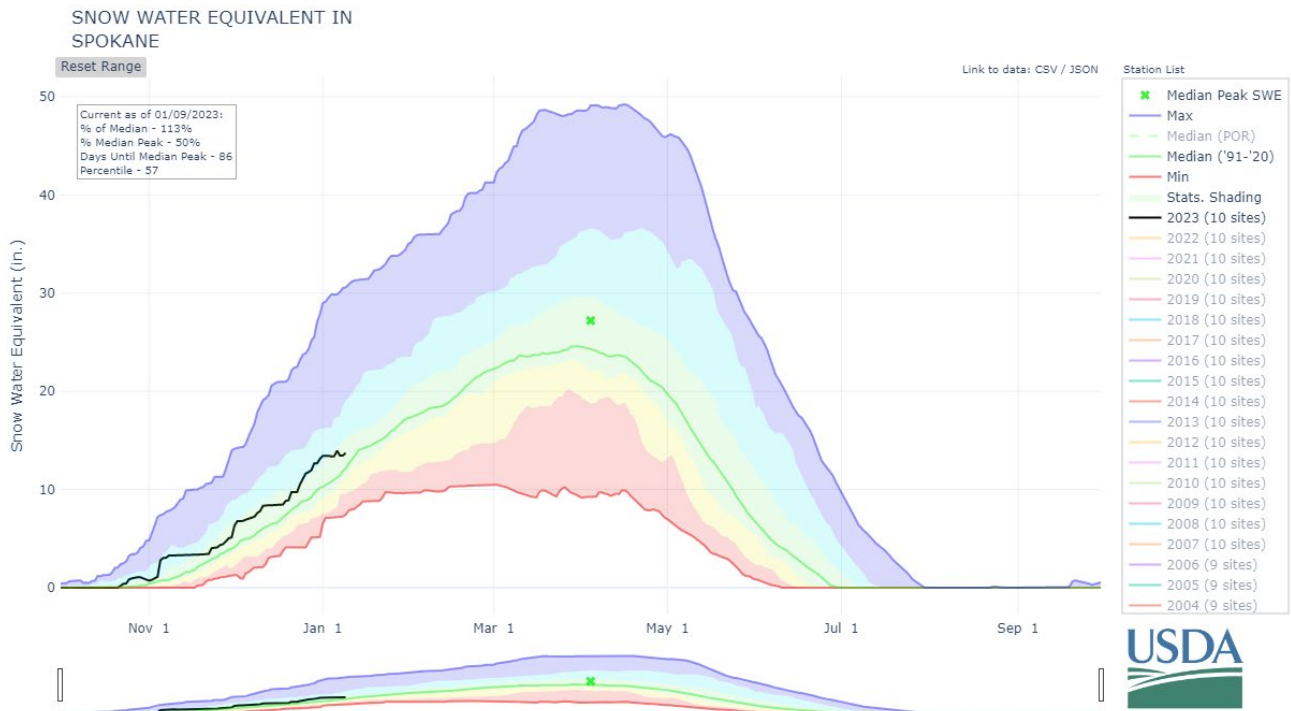
Spokane	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Spokane R at Long Lake ²	APR-JUL	1600	2340	2840	104%	3350	4090	2720
	APR-SEP	1760	2520	3040	106%	3550	4310	2870
Spokane R nr Post Falls ²	APR-JUL	1360	2070	2560	102%	3040	3750	2510
	APR-SEP	1430	2150	2640	103%	3130	3850	2570
NF Coeur d'Alene R at Enaville ²								
Chamokane Ck nr Long Lake	MAR-JUL	11.9	19.9	26	96%	34	47	27
St. Joe R at Calder ²								

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

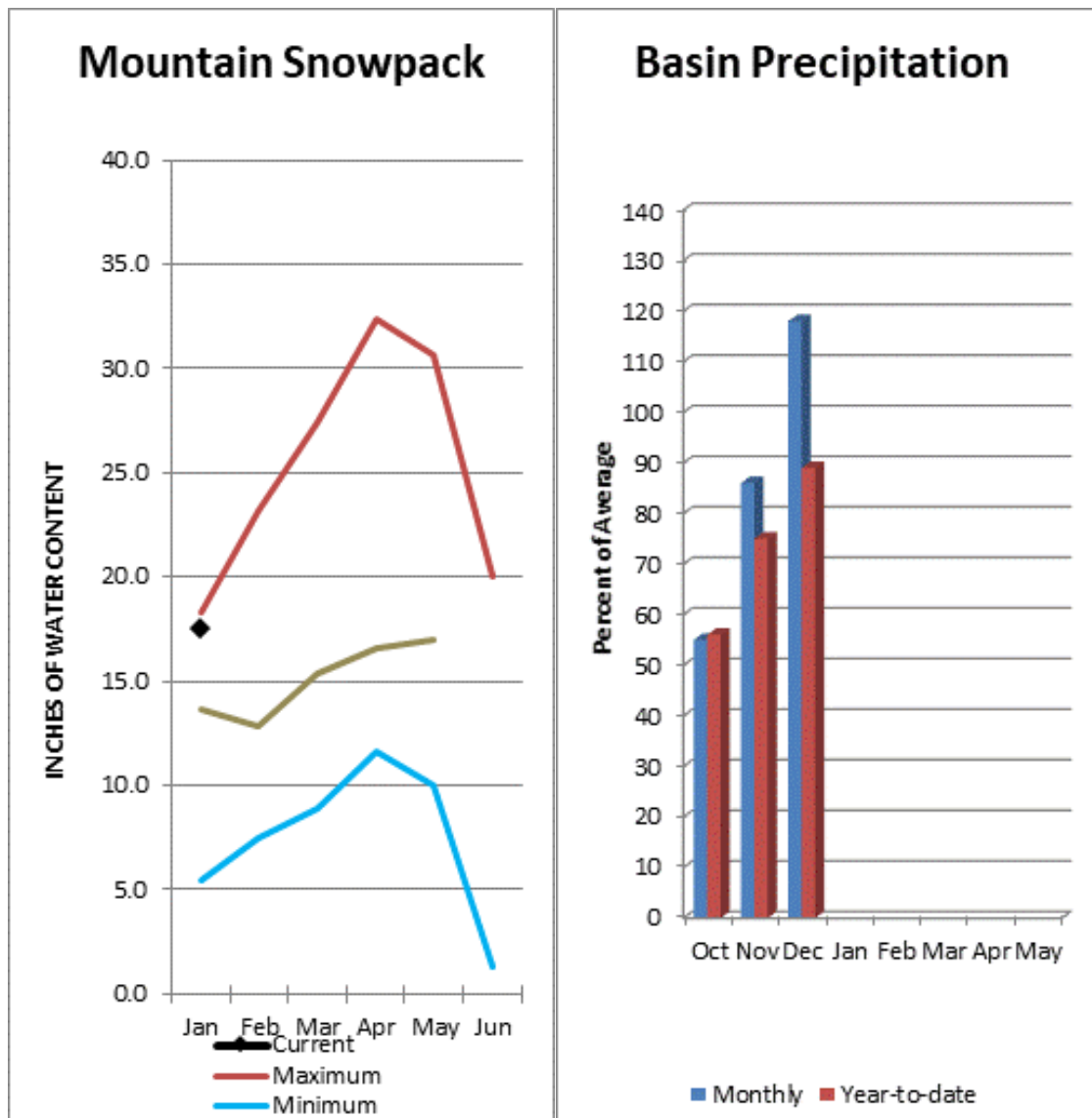
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Coeur d' Alene	76.9	61.6	70.8	238.5

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Spokane	14	133%	105%
Newman Lake	2	148%	75%



Lower Pend Oreille River Basins



January 1 snow cover was 126% of normal in the Pend Oreille Basin River Basin and precipitation during December was 122% of normal, bringing the year-to-date precipitation at 89% of normal. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 88% of normal.

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

Lower Pend Oreille River Basins

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Lower Pend Oreille Streamflow Forecasts - January 1, 2023

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

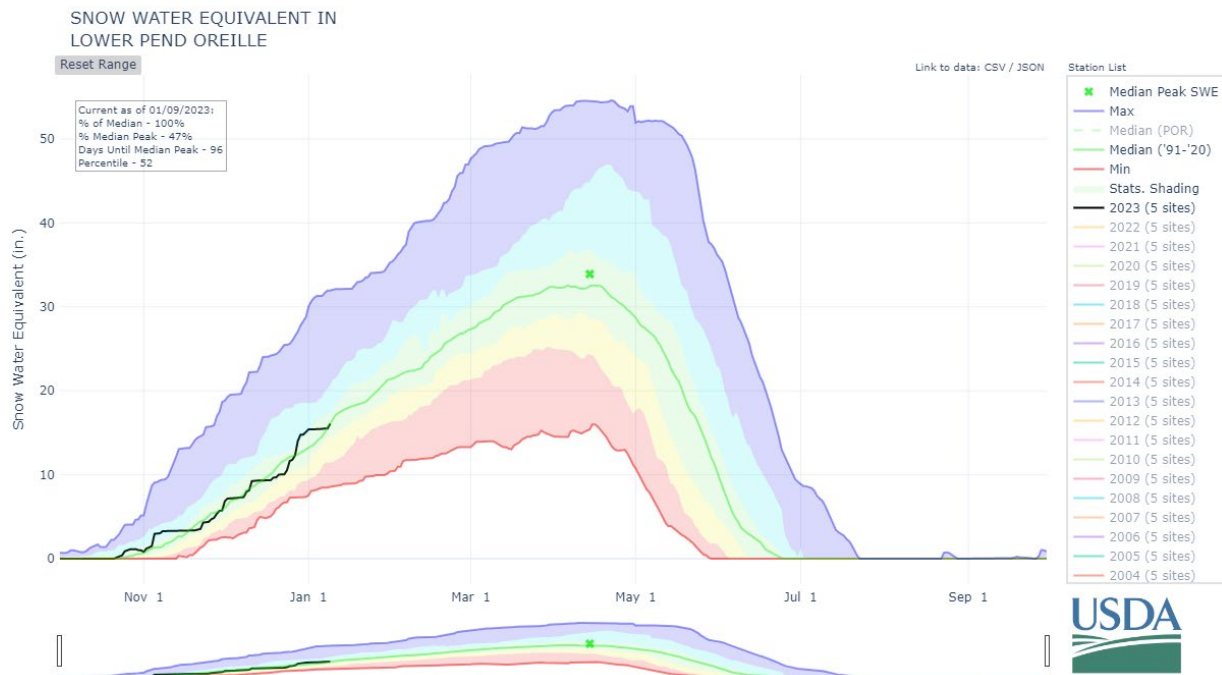
Lower Pend Oreille	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Pend Oreille Lake Inflow ²	APR-JUL	8420	10900	12500	107%	14200	16600	11700
	APR-SEP	9180	11800	13500	107%	15300	17900	12600
Pend Oreille R bl Box Canyon ²	APR-JUL	8660	11100	12700	109%	14300	16800	11700
	APR-SEP	9390	12000	13700	108%	15500	18100	12700
Priest R nr Priest River ²	APR-JUL	520	695	810	96%	925	1100	840
	APR-SEP	555	735	855	97%	975	1150	880

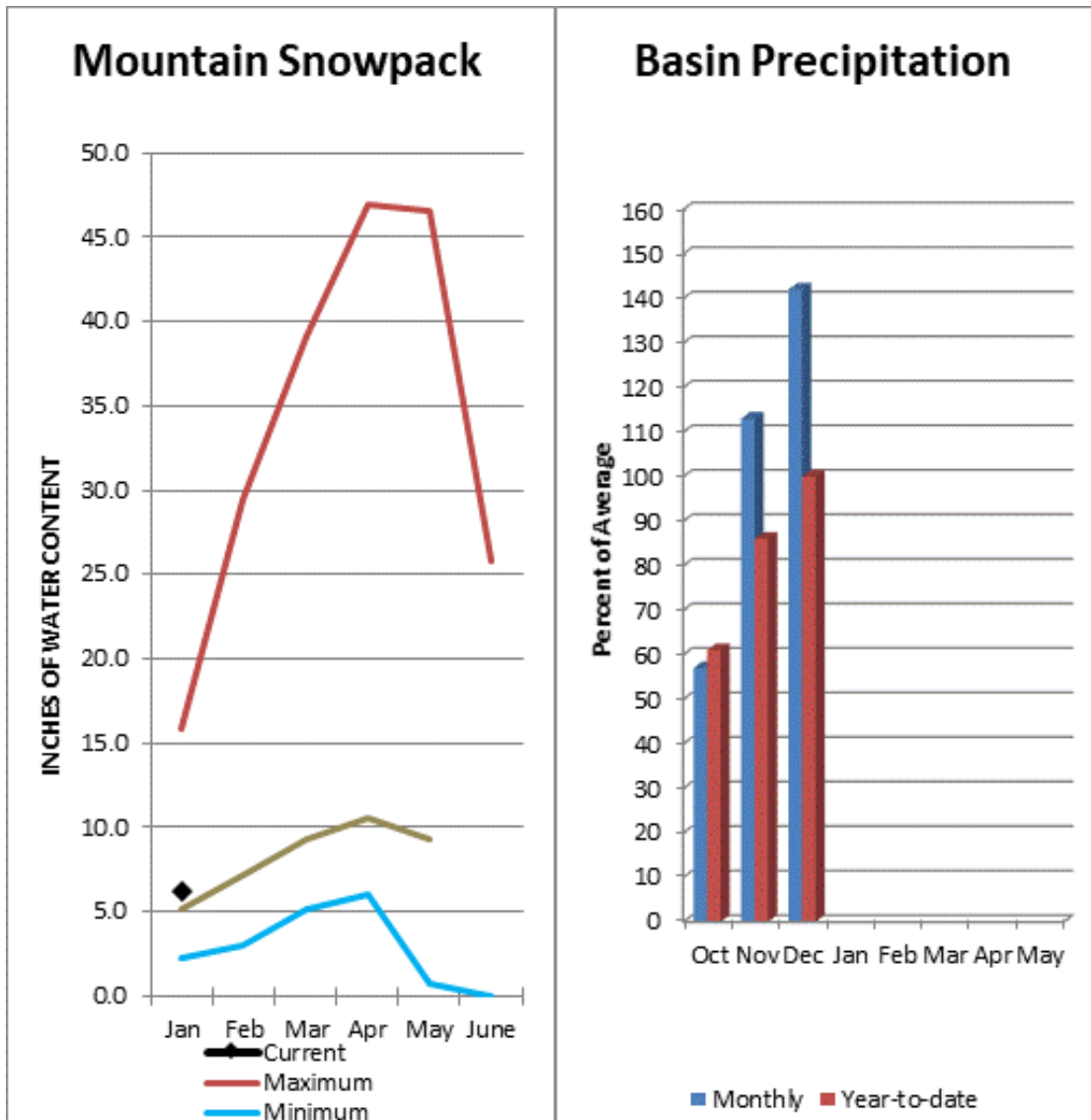
1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Priest Lake		63.4	55.6	119.3
Lake Pend Oreille	544.8	543.0	620.0	1561.3

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Lower Pend Oreille	10	126%	99%
Sullivan	1	102%	86%





January 1 snow cover on the Upper Columbia basins was 123% of normal and December precipitation was 142% of normal, with precipitation for the water year at 100% of normal. Combined storage in the Conconully Reservoirs was 88% of normal.

Upper Columbia Streamflow Forecasts - January 1, 2023

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

Upper Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Similkameen R nr Nighthawk	APR-JUL	730	990	1170	93%	1350	1610	1260
	APR-SEP	785	1060	1240	93%	1420	1690	1340
Methow R nr Pateros	APR-JUL	660	870	1010	113%	1150	1360	895
	APR-SEP	710	930	1080	112%	1230	1450	965
Okanogan R nr Tonasket	APR-JUL	1060	1430	1670	110%	1920	2280	1520
	APR-SEP	1190	1580	1840	114%	2110	2500	1620
Kettle R nr Laurier	APR-JUL	1380	1770	2040	111%	2300	2690	1840
	APR-SEP	1440	1850	2120	109%	2390	2800	1950
Colville R at Kettle Falls	APR-JUL	64	120	159	138%	198	255	115
	APR-SEP	71	132	173	140%	215	275	124
Columbia R at Grand Coulee-NWS ²	APR-JUL	30400		40700	77%		53900	52600
	APR-SEP	36600		48600	80%		64700	60600
Okanogan R at Malott	APR-JUL	1070	1450	1710	110%	1970	2350	1550
	APR-SEP	1200	1610	1880	112%	2160	2560	1680

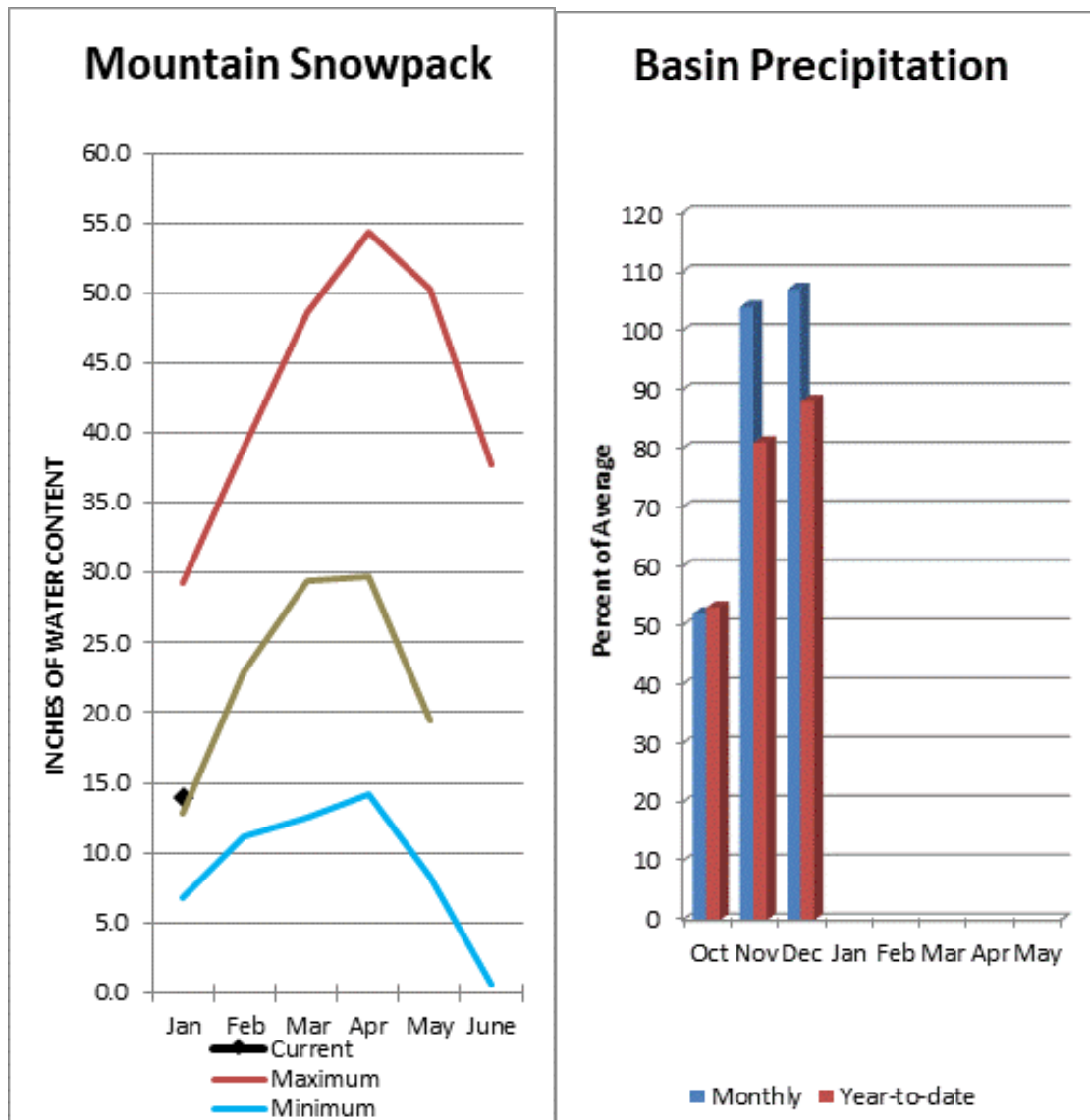
1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	6.4	3.2	7.7	10.5
Conconully Reservoir	7.0	4.5	7.6	13.0

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Upper Columbia	18	123%	102%
Toats Coulee	0		
Sanpoil	1	229%	78%
Omak	1	229%	78%
Methow	4	109%	112%
Kettle	6	136%	93%
Concully Lake	1	163%	67%
Colville	0		

Central Columbia River Basins



January 1 snowpack in the Central Columbia River basins was 109% of normal. Precipitation during December was 107% of normal in the basin and 88% for the year-to-date. Reservoir storage in Lake Chelan was 78% of the median.

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

Central Columbia River Basins

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Central Columbia Streamflow Forecasts - January 1, 2023

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

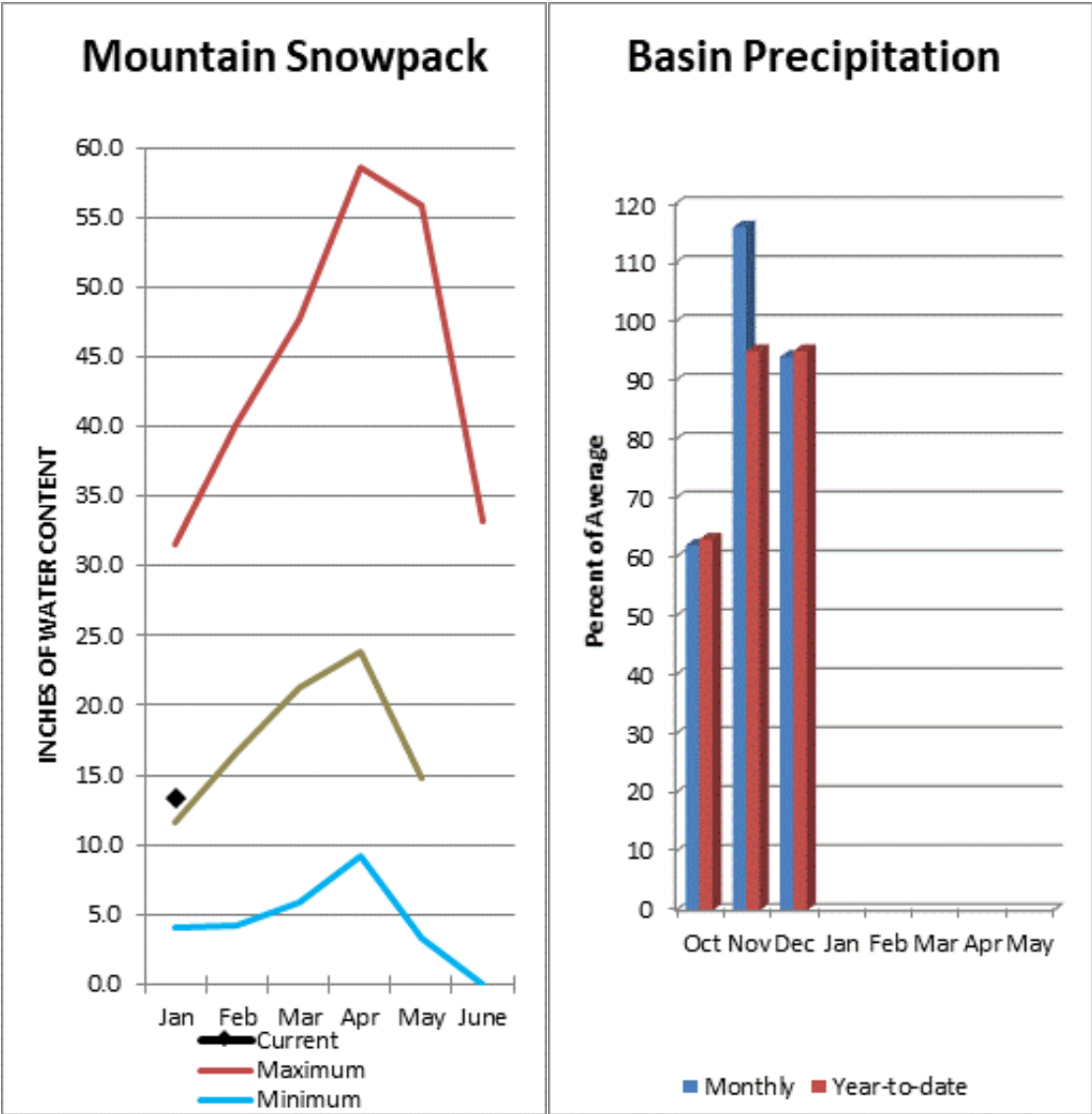
Central Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Wenatchee R at Plain	APR-JUL	735	910	1030	96%	1150	1320	1070
	APR-SEP	795	990	1120	97%	1250	1450	1160
Chelan R at Chelan ²	APR-JUL	755	915	1020	98%	1130	1280	1040
	APR-SEP	835	1010	1130	97%	1250	1420	1170
Stehekin R at Stehekin	APR-JUL	520	620	690	97%	760	860	715
	APR-SEP	605	720	795	95%	870	985	835
Icicle Ck nr Leavenworth	APR-JUL	189	235	270	93%	305	350	290
	APR-SEP	200	255	290	94%	325	380	310
Wenatchee R at Peshastin	APR-JUL	1010	1230	1390	97%	1550	1770	1440
	APR-SEP	1080	1340	1510	98%	1680	1940	1540
Entiat R nr Ardenvoir	APR-JUL	146	187	215	98%	245	285	220
	APR-SEP	154	199	230	98%	260	305	235
Columbia R bl Rock Island Dam-NWS ²	APR-JUL	33300		44200	77%		59900	57600
	APR-SEP	39800		52400	80%		71300	65800

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

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Chelan	303.0	510.6	386.8	677.4

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Central Columbia	11	109%	95%
Wenatchee	7	109%	97%
Stemilt	1	130%	70%
Lake Chelan	3	96%	105%
Entiat	1	152%	77%
Colckum	1	150%	60%



January 1 snowpack was 115% of normal. Precipitation was 94% of normal for December and 95% for the water-year. January 1 reservoir storage for the Upper Yakima reservoirs was 92% of normal.

Upper Yakima Streamflow Forecasts - January 1, 2023

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

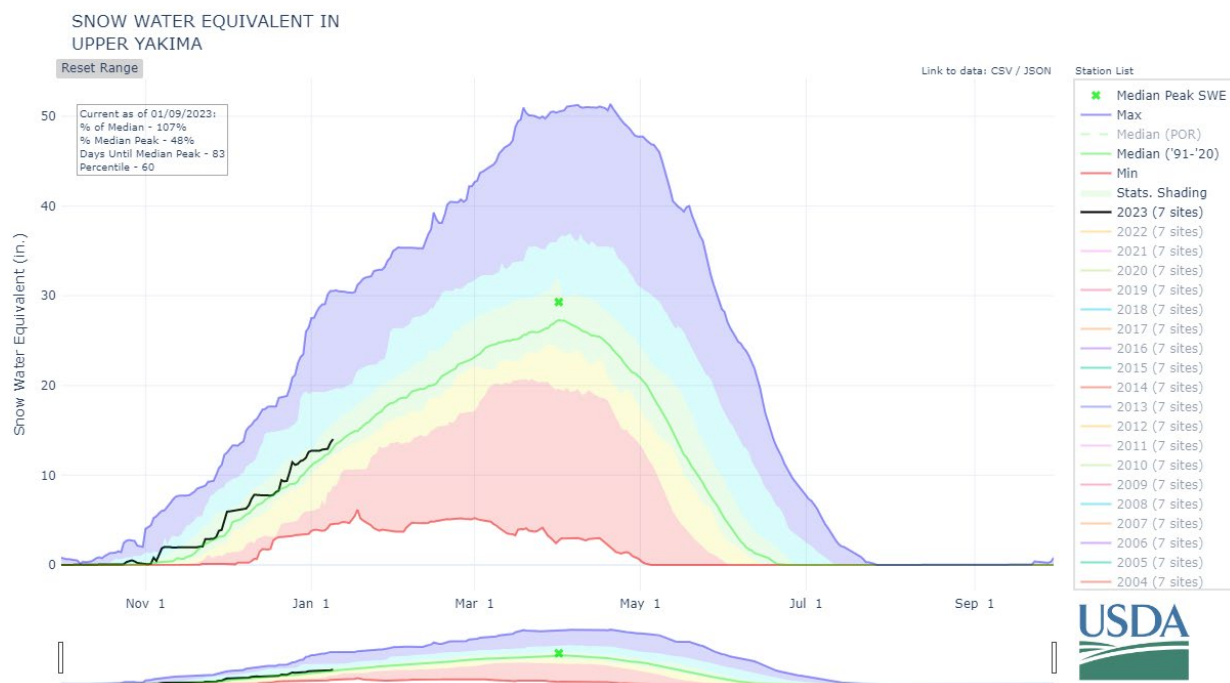
Upper Yakima	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Kachess Reservoir Inflow ²								
	APR-JUL	68	90	106	107%	121	144	99
	APR-SEP	77	100	115	106%	131	154	108
Teanaway R bl Forks nr Cle Elum								
	APR-JUL	74	112	137	105%	163	200	131
	APR-SEP	76	114	140	104%	166	205	134
Keechelus Reservoir Inflow ²								
	APR-JUL	76	103	120	107%	138	165	112
	APR-SEP	85	113	132	105%	151	178	126
Cle Elum Lake Inflow ²								
	APR-JUL	275	345	390	101%	440	505	385
	APR-SEP	300	375	425	101%	475	550	420

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

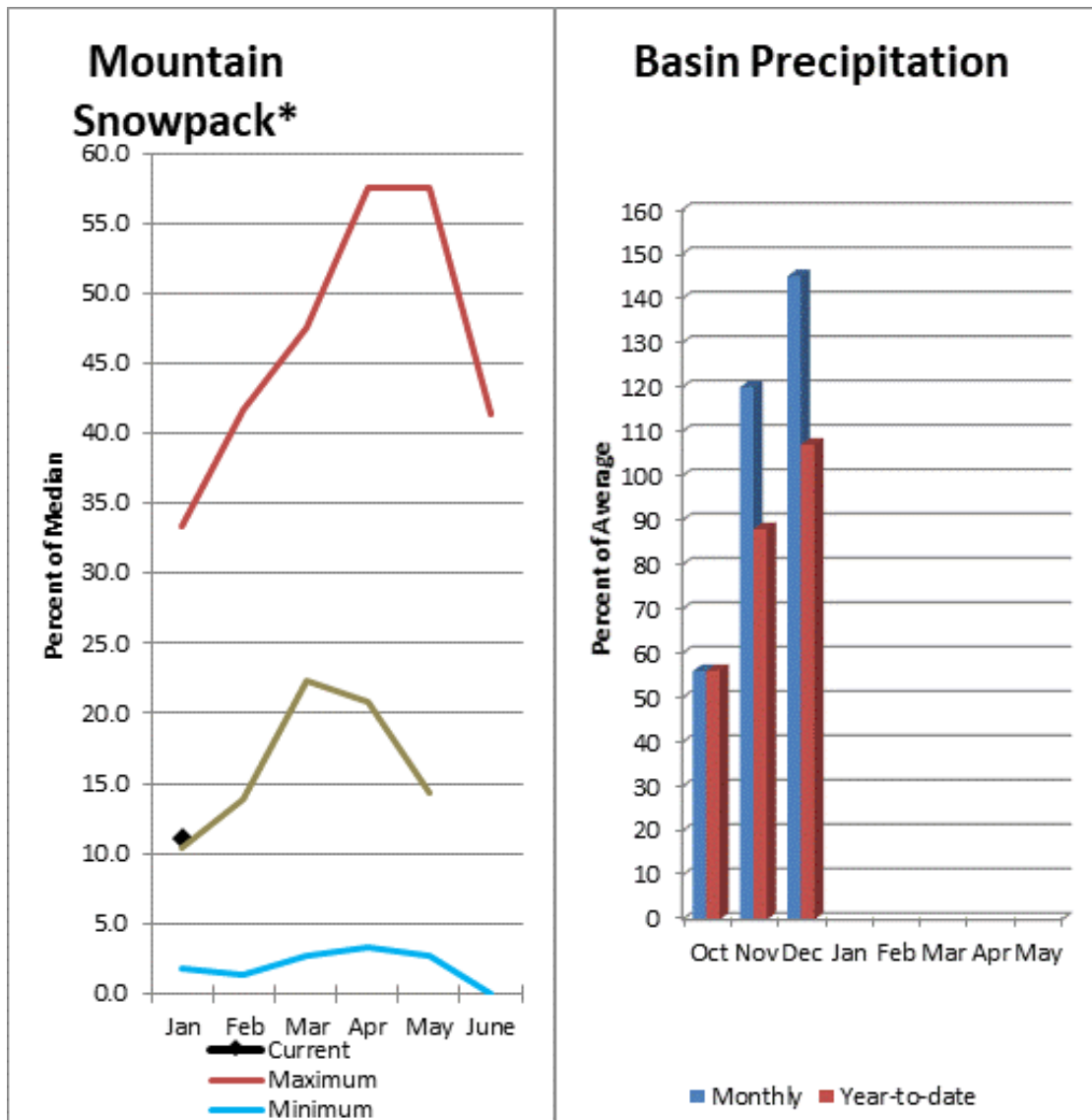
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Cle Elum	162.8	240.4	174.2	436.9
Keechelus	54.4	102.0	72.5	157.8
Kachess	127.4	162.8	129.1	239.0

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Upper Yakima	7	115%	87%
Upper Yakima	7	115%	87%



Lower Yakima - Naches River Basin



January 1 combined basin snowpack was 110% of normal. December precipitation was 130% of normal and 100% for the water-year. January 1 reservoir storage for Bumping and Rimrock reservoirs was 101% of the median.

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

Lower Yakima – Naches River Basins

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Lower Yakima Streamflow Forecasts - January 1, 2023

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

Lower Yakima	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Yakima R nr Parker ²	APR-JUL	1090	1490	1750	101%	2020	2410	1730
	APR-SEP	1210	1630	1910	101%	2190	2610	1890
Ahtanum Ck at Union Gap	APR-JUL	11.3	24	32	123%	40	53	26
	APR-SEP	13.3	26	34	121%	43	56	28

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

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Lower Yakima	3	108%	91%
Simcoe-Toppenish	1	140%	88%
Satus	1	72%	101%
Ahtanum	2	133%	85%

Naches Streamflow Forecasts - January 1, 2023

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

Naches	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
American R nr Nile	APR-JUL	71	92	106	106%	120	140	100
	APR-SEP	76	99	114	106%	130	152	108
Rimrock Lake Inflow ²	APR-JUL	140	172	194	100%	215	250	194
	APR-SEP	166	205	230	98%	255	295	235
Naches R nr Naches ²	APR-JUL	470	640	755	105%	870	1040	720
	APR-SEP	510	695	825	106%	950	1130	775
Bumping Lake Inflow ²	APR-JUL	78	101	117	103%	132	156	114
	APR-SEP	84	109	127	104%	144	169	122

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

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Rimrock	97.2	120.0	95.9	198.0
Bumping Lake	14.0	15.6	14.7	33.7

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Naches	9	104%	91%
Naches	9	104%	91%

Klickitat Streamflow Forecasts - January 1, 2023

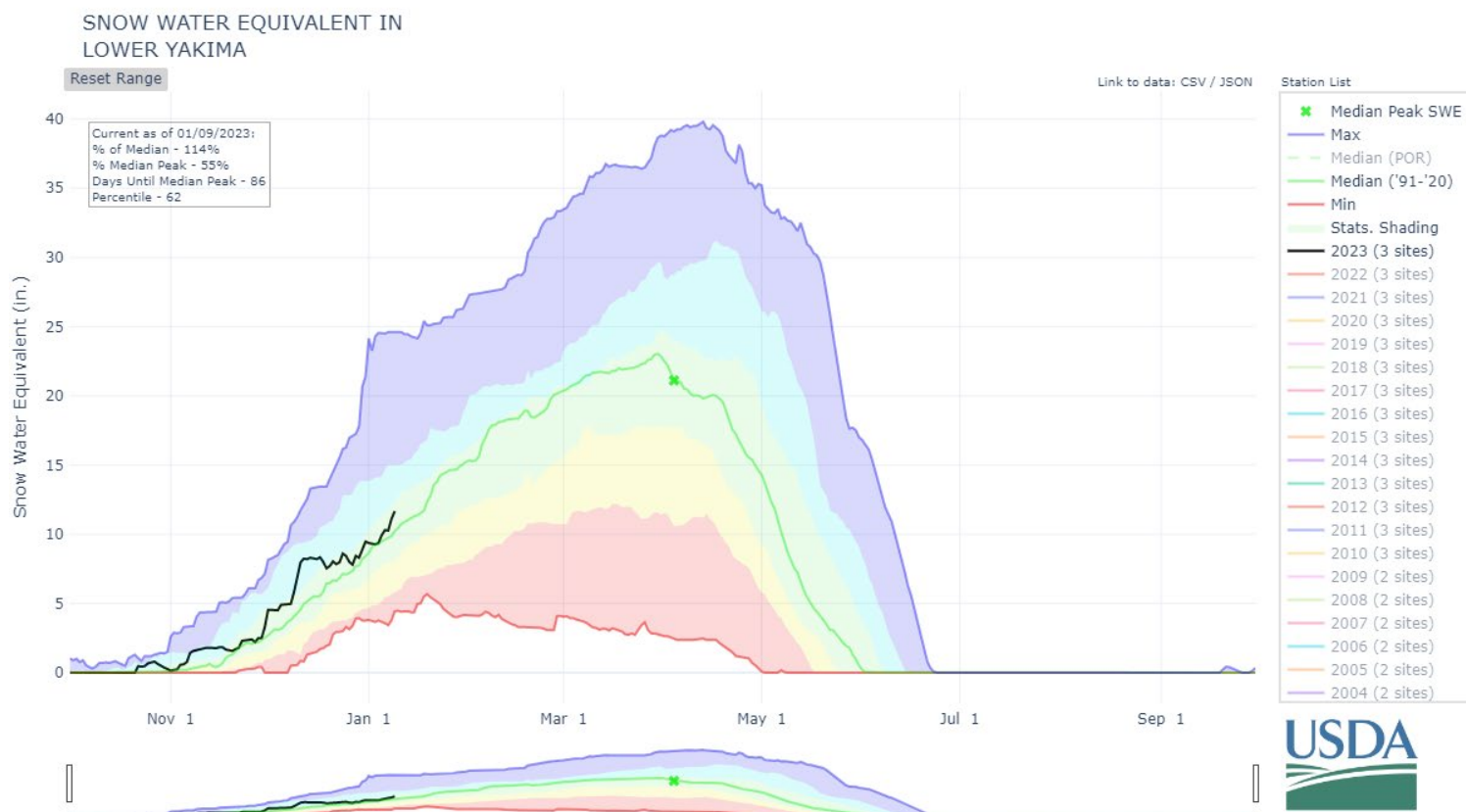
Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

Klickitat	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Klickitat R nr Glenwood	APR-JUL	81	110	131	99%	151	180	132
	APR-SEP	90	122	144	99%	165	197	145
Klickitat R nr Pitt	APR-JUL	295	400	470	103%	540	645	455
	APR-SEP	370	485	565	104%	645	760	545

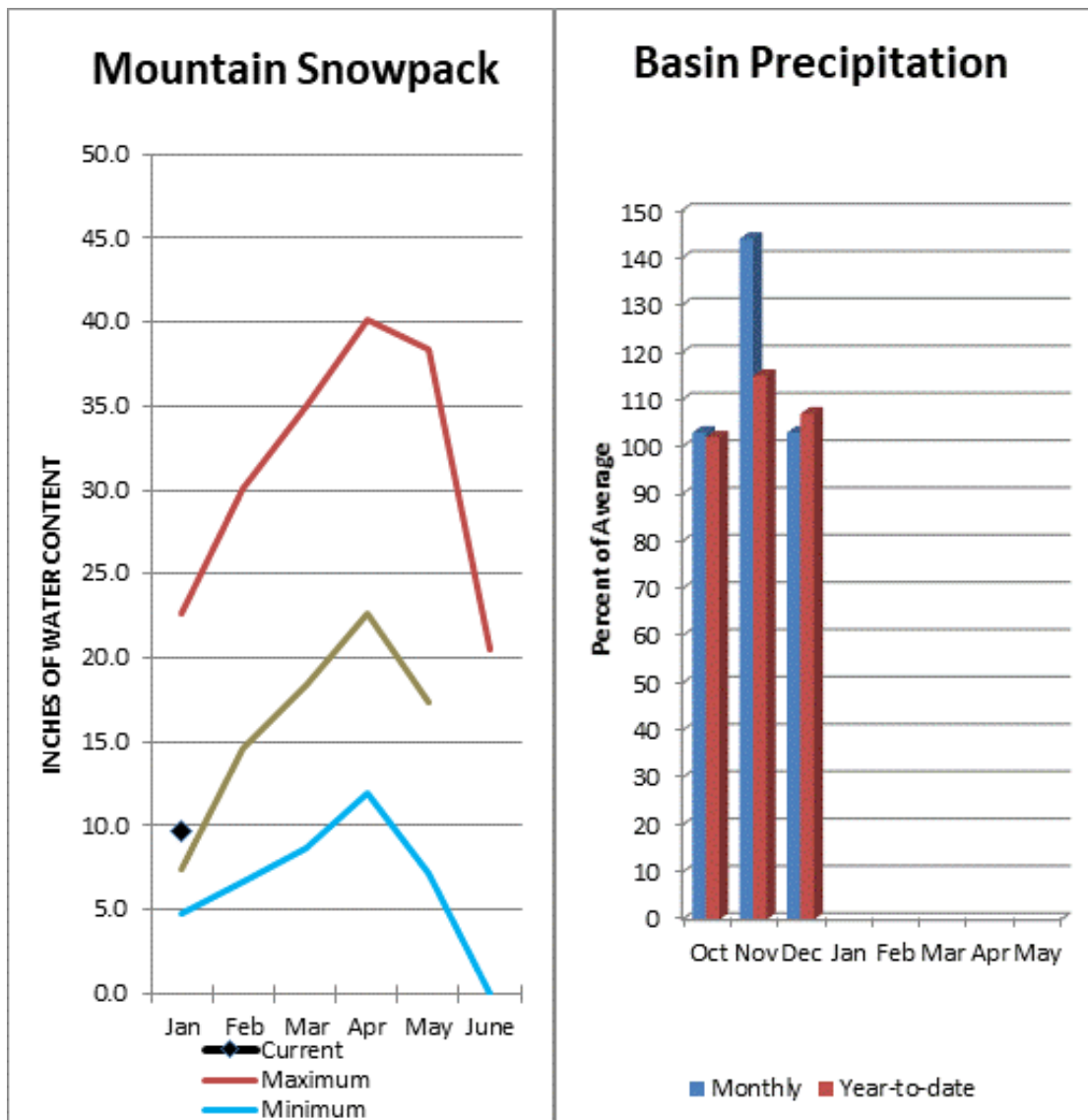
1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Watershed Snowpack Analysis January 1, 2023		# of Sites	% Median	Last Year % Median
Klickitat		4	111%	99%
Klickitat		4	111%	99%



Lower Snake – Walla Walla River Basin



January 1 snowpack readings were 129% of normal. December precipitation was 103% of normal, bringing the year-to-date precipitation to 107% of normal. Reservoir storage was 125% of the median.

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

Lower Snake – Walla Walla River Basin

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Lower Snake-Walla Walla Streamflow Forecasts - January 1, 2023

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

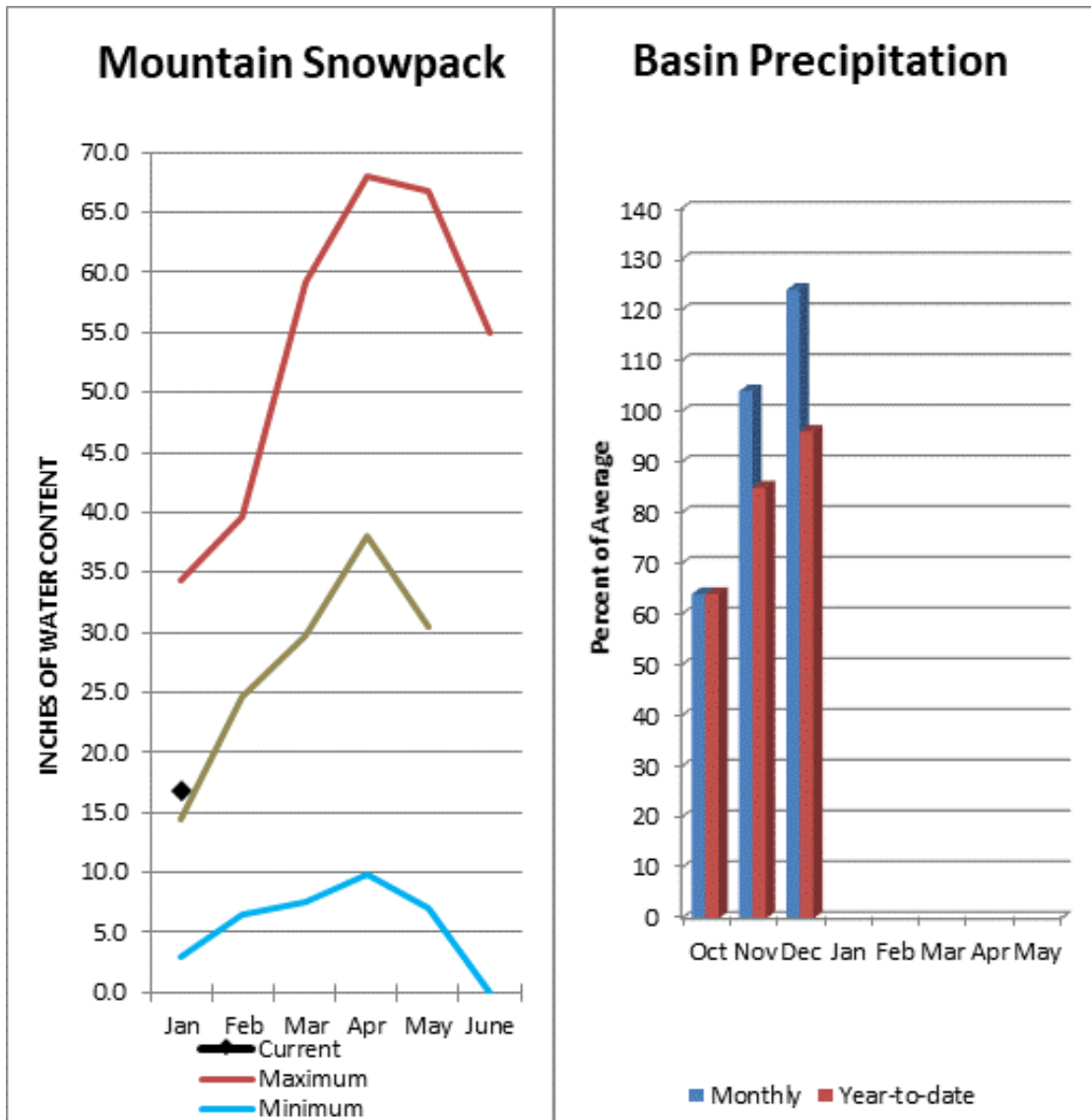
Lower Snake-Walla Walla	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Catherine Ck nr Union	APR-JUL	50	65	74	114%	84	98	65
	APR-SEP	54	69	79	114%	89	103	69
Snake R bl Lower Granite Dam-NWS ²	APR-JUL	11000		16600	84%		24000	19700
	APR-SEP	13000		19000	87%		26900	21800
Mill Ck nr Walla Walla	APR-JUL	16.5	23	27	108%	32	38	25
	APR-SEP	19.7	26	31	107%	35	42	29
SF Walla Walla R nr Milton-Freewater	MAR-JUL	55	67	75	106%	83	94	71
	APR-SEP	55	65	72	103%	79	90	70
Lostine R nr Lostine	APR-JUL	91	104	113	101%	123	136	112
	APR-SEP	97	111	121	101%	131	146	120
Grande Ronde R at Troy	MAR-JUL	1170	1500	1720	109%	1950	2270	1580
	APR-SEP	985	1280	1480	110%	1680	1980	1350
Imnaha R at Imnaha	APR-JUL	170	235	275	106%	320	380	260
	APR-SEP	185	250	295	107%	340	405	275
Asotin Ck at Asotin	APR-JUL	17	26	34	103%	42	56	33
Bear Ck nr Wallowa	APR-JUL	49	62	70	108%	79	91	65
	APR-SEP	50	63	72	106%	81	94	68

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

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Wallowa Lake	18.8	19.4	15.0	37.5

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Lower Snake-Walla Walla	15	130%	105%
Walla Walla	5	124%	114%
Grande Ronde	14	129%	104%
Asotin	2	116%	159%



January 1 snow cover for Lower Columbia was 117% of normal. December precipitation was 124% of normal and the water-year was 96%.

Lower Columbia Streamflow Forecasts - January 1, 2023

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

Lower Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Cowlitz R bl Mayfield ²	APR-JUL	1210	1520	1740	109%	1960	2270	1600
	APR-SEP	1420	1760	1990	111%	2220	2560	1790
Lewis R at Ariel	APR-JUL	715	920	1060	103%	1200	1400	1030
	APR-SEP	845	1060	1200	104%	1340	1560	1150
Cowlitz R at Castle Rock ²	APR-JUL	1520	2010	2340	110%	2670	3160	2120
	APR-SEP	1770	2280	2630	113%	2980	3490	2330

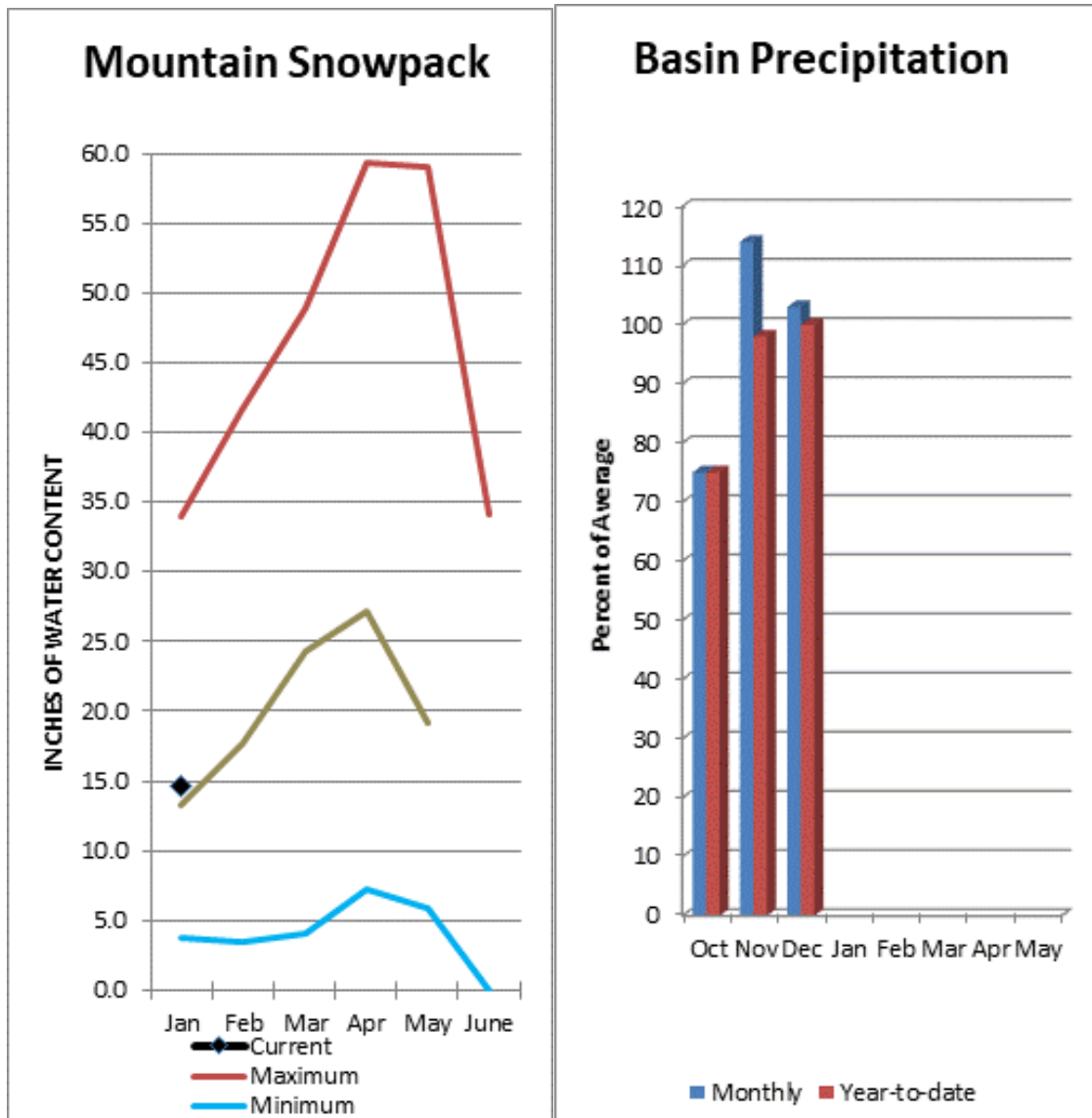
1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Mayfield		128.0	128.2	0.0
Merwin			397.4	0.0
Yale			355.4	0.0
Mossyrock Dam (Riffe Lk)		804.8	822.2	0.0
Swift			646.6	0.0

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Lower Columbia	15	117%	118%
Lewis	8	133%	139%
Cowlitz	9	111%	111%

South Puget Sound River Basins



January 1 snowpack was 111% of normal for the South Puget Sound. December precipitation was 103% of normal, bringing the water year-to-date to 100% of normal for the basins.

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

South Puget Sound River Basins

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South Puget Sound Streamflow Forecasts - January 1, 2023

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

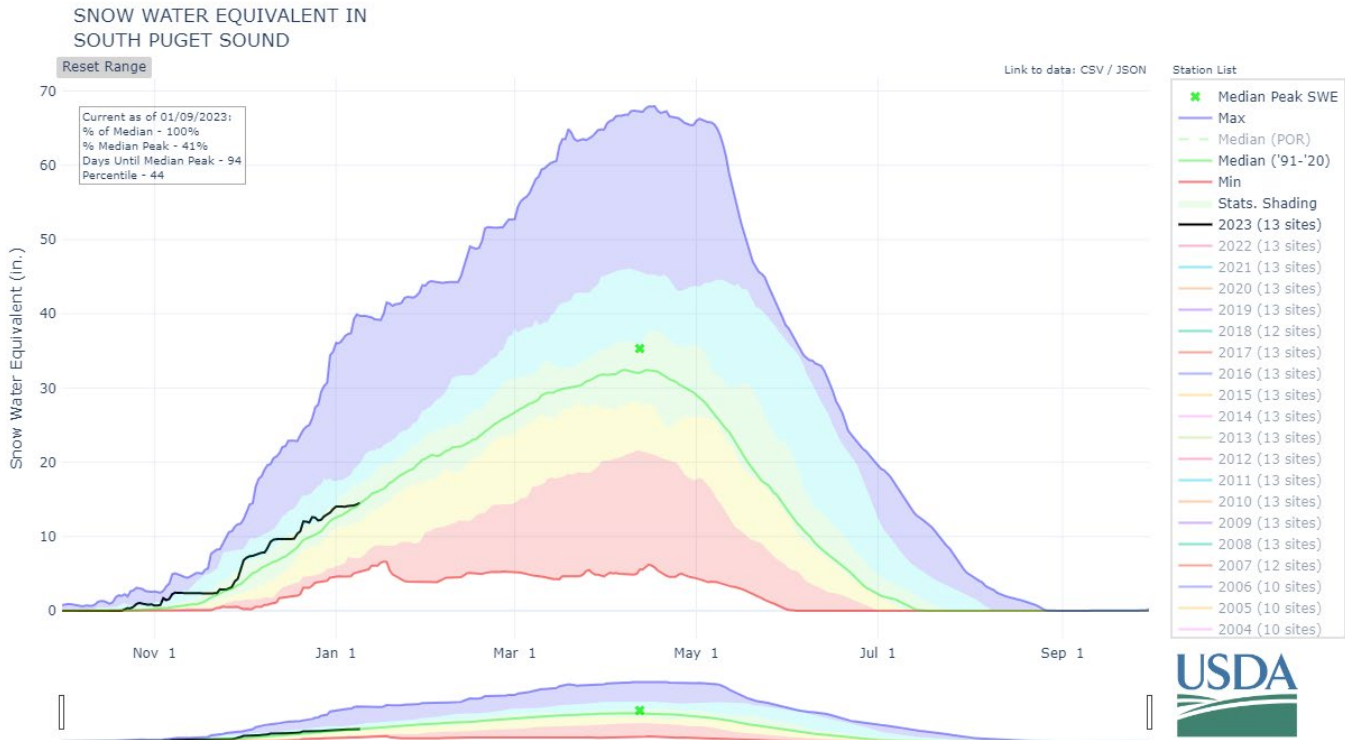
South Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Green R bl Howard A Hanson Dam ^{1,2}	APR-JUL	157	215	245	104%	270	330	235
	APR-SEP	180	240	265	104%	295	355	255
White R nr Buckley ¹	APR-JUL	365	440	480	112%	515	595	430
	APR-SEP	440	530	570	110%	610	705	520

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

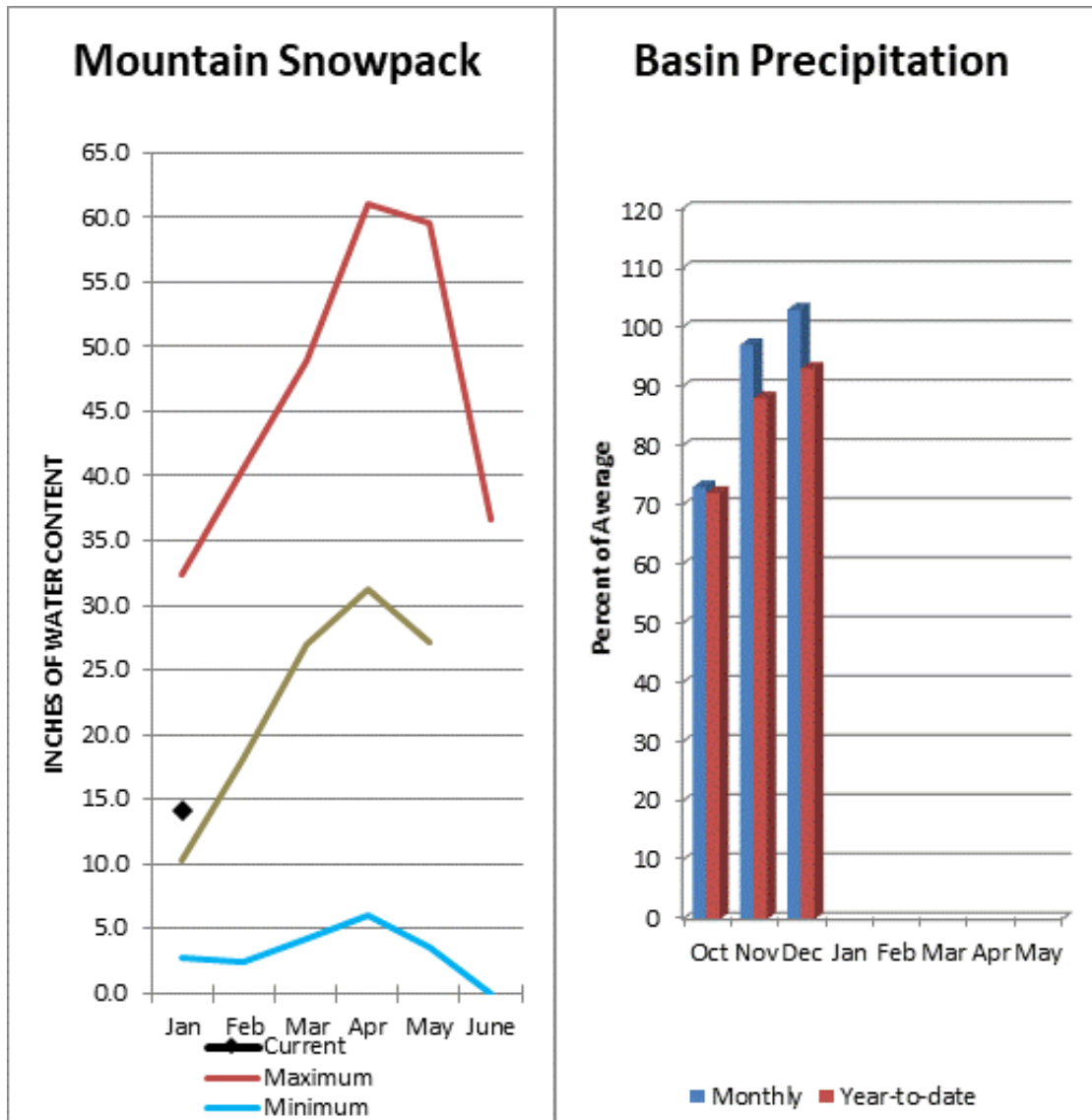
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Howard Hansen	2.6	1.7	2.0	0.0

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
South Puget Sound	13	111%	103%
White	5	111%	103%
Puyallup	2	140%	188%
Green	6	120%	101%



Central Puget Sound River Basins



January 1 median snow cover in Central Puget Sound was 137%. Basin-wide precipitation for December was 103% of normal, bringing water-year-to-date to 93% of normal.

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

Central Puget Sound River Basins

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Central Puget Sound Streamflow Forecasts - January 1, 2023

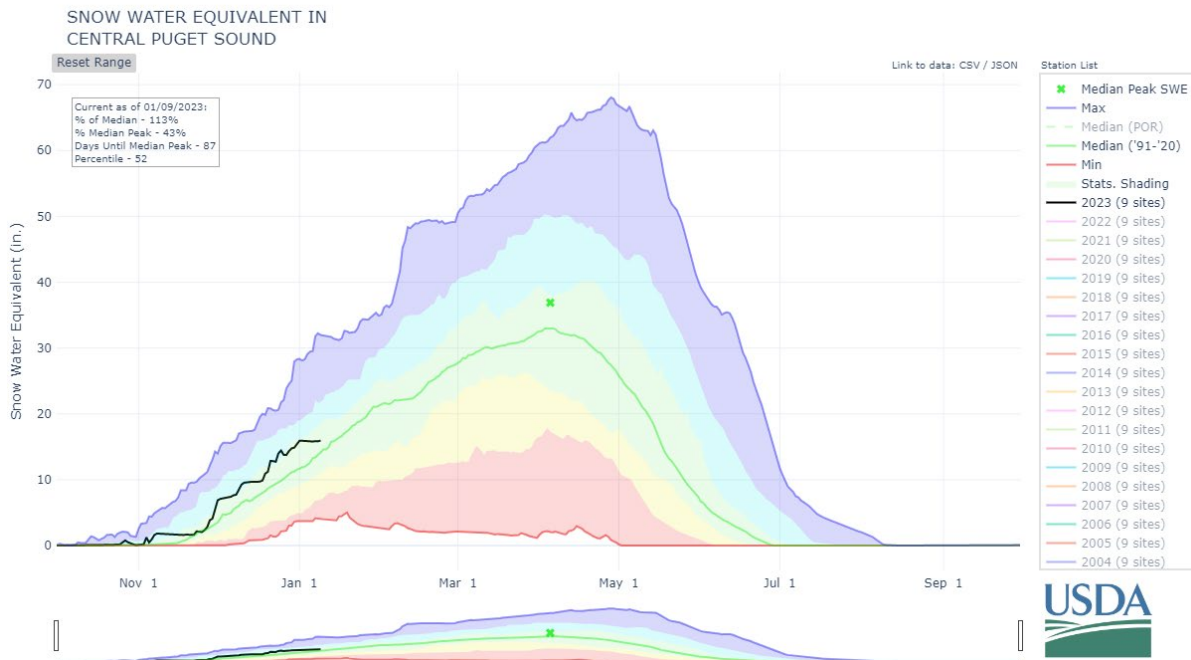
Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

Central Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Taylor Ck nr Selleck	APR-JUL	15.5	19.4	22	105%	25	28	21
	APR-SEP	18.9	23	26	108%	28	32	24
SF Tolt R nr Index	APR-JUL	10.6	13.7	15.9	119%	18	21	13.4
	APR-SEP	12.3	15.6	17.9	116%	20	23	15.4
Rex R nr Cedar Falls	APR-JUL	18.8	23	27	117%	30	35	23
	APR-SEP	21	25	29	112%	32	37	26
Cedar R nr Cedar Falls	APR-JUL	49	66	78	108%	90	108	72
	APR-SEP	56	73	85	110%	98	115	77

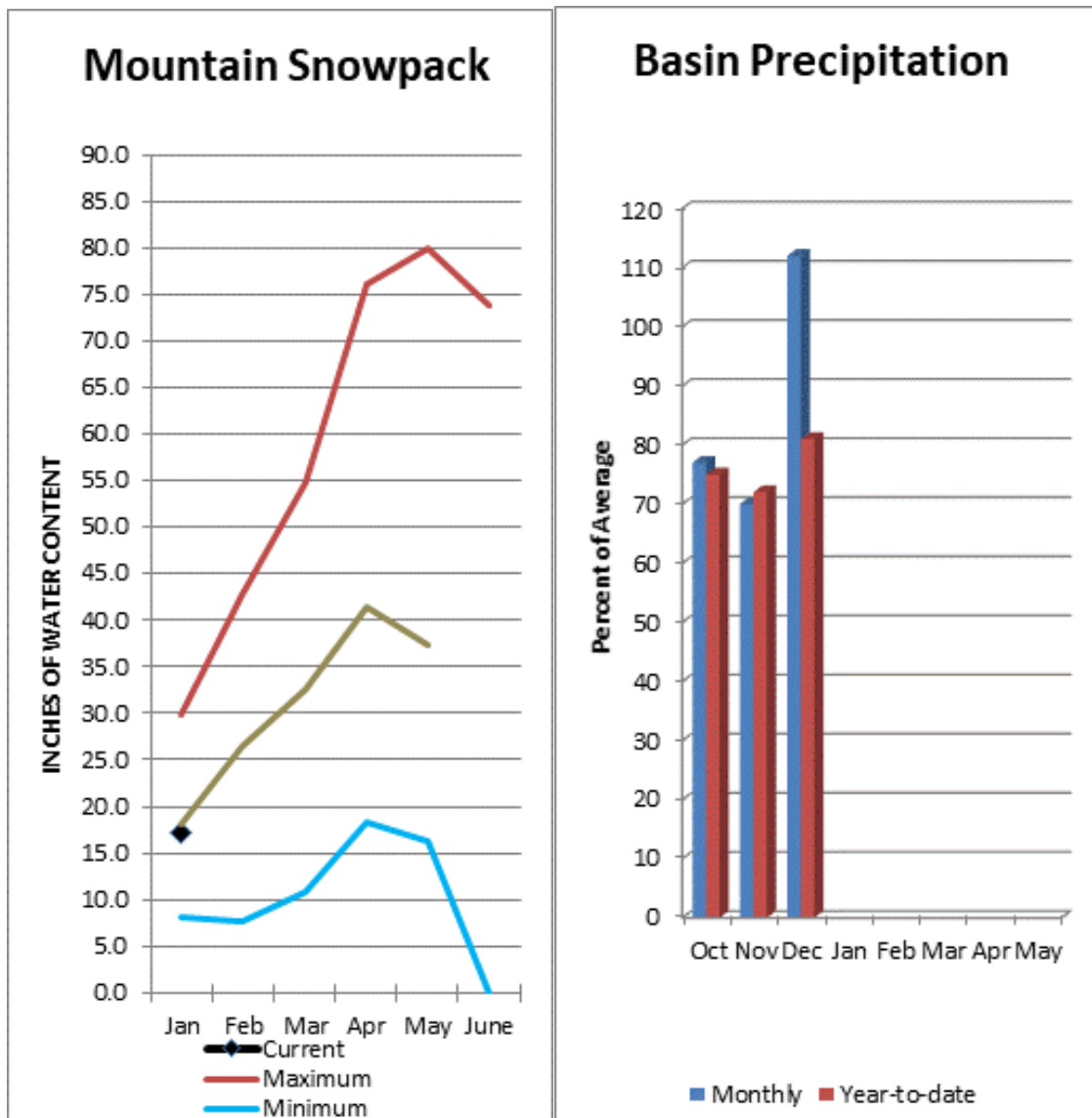
1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Central Puget Sound	9	137%	119%
Tolt	2	150%	133%
Snoqualmie	4	143%	126%
Skykomish	3	140%	122%
Cedar	6	134%	118%



North Puget Sound River Basins



January 1 median snow cover in North Puget Sound was 96%. Basin-wide precipitation for December was 112% of normal, bringing water-year-to-date to 81% of normal. January 1 Basin-wide reservoir storage was 85% of normal.

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

North Puget Sound River Basins

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North Puget Sound Streamflow Forecasts - January 1, 2023

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

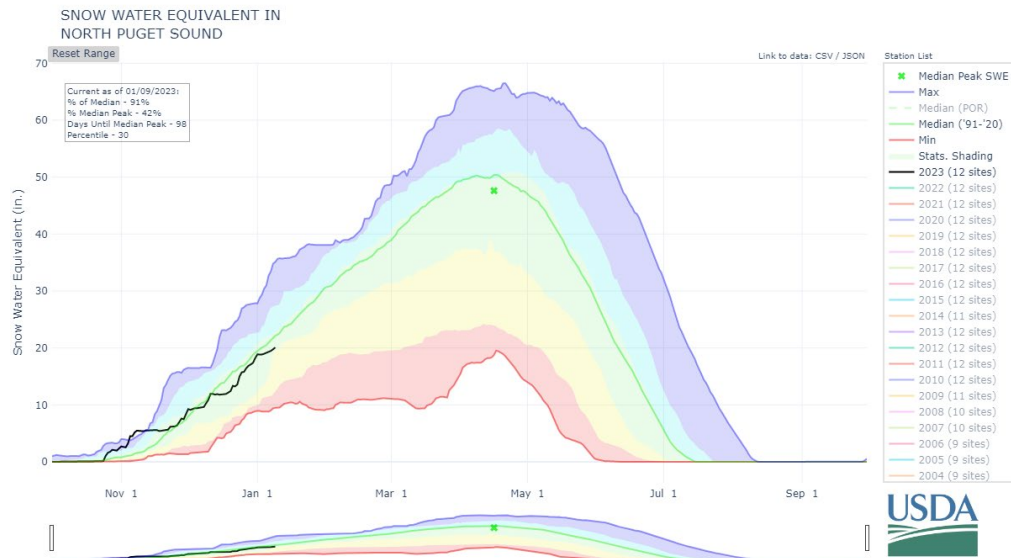
North Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Thunder Ck nr Newhalem	APR-JUL	215	240	255	106%	270	290	240
	APR-SEP	315	340	355	108%	370	395	330
Skagit R at Newhalem	APR-JUL	1400	1640	1800	103%	1960	2200	1740
	APR-SEP	1670	1930	2100	104%	2270	2530	2020
Baker R at Concrete	APR-JUL	620	725	800	104%	870	980	770
	APR-SEP	820	935	1010	102%	1090	1200	990

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

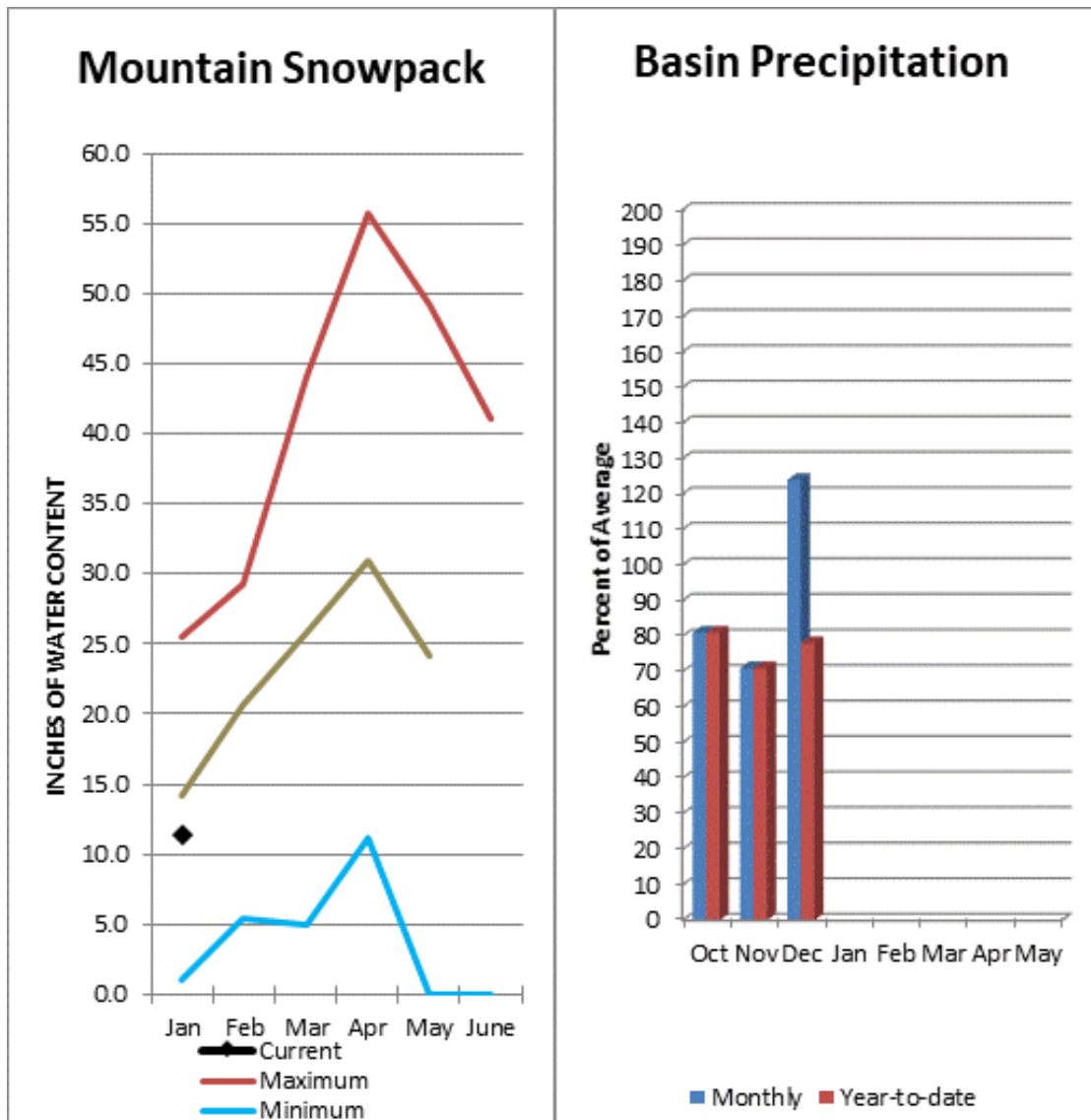
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Diablo Reservoir			85.7	90.6
Upper Baker	108.2	92.8	107.6	0.0
Gorge Reservoir			7.7	0.0
Ross	918.8	1200.0	1133.0	1434.7
Lake Shannon	118.0	109.6	105.0	0.0

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
North Puget Sound	14	96%	105%
Skagit	7	96%	107%
Nooksack	3	100%	94%
Baker	2	94%	109%



Olympic Peninsula River Basins



Olympic Peninsula snowpack averaged 81% of normal on January 1. December precipitation was 124% of normal. Precipitation has accumulated at 78% of normal for the water year.

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

Olympic Peninsula River Basins

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Olympic Streamflow Forecasts - January 1, 2023

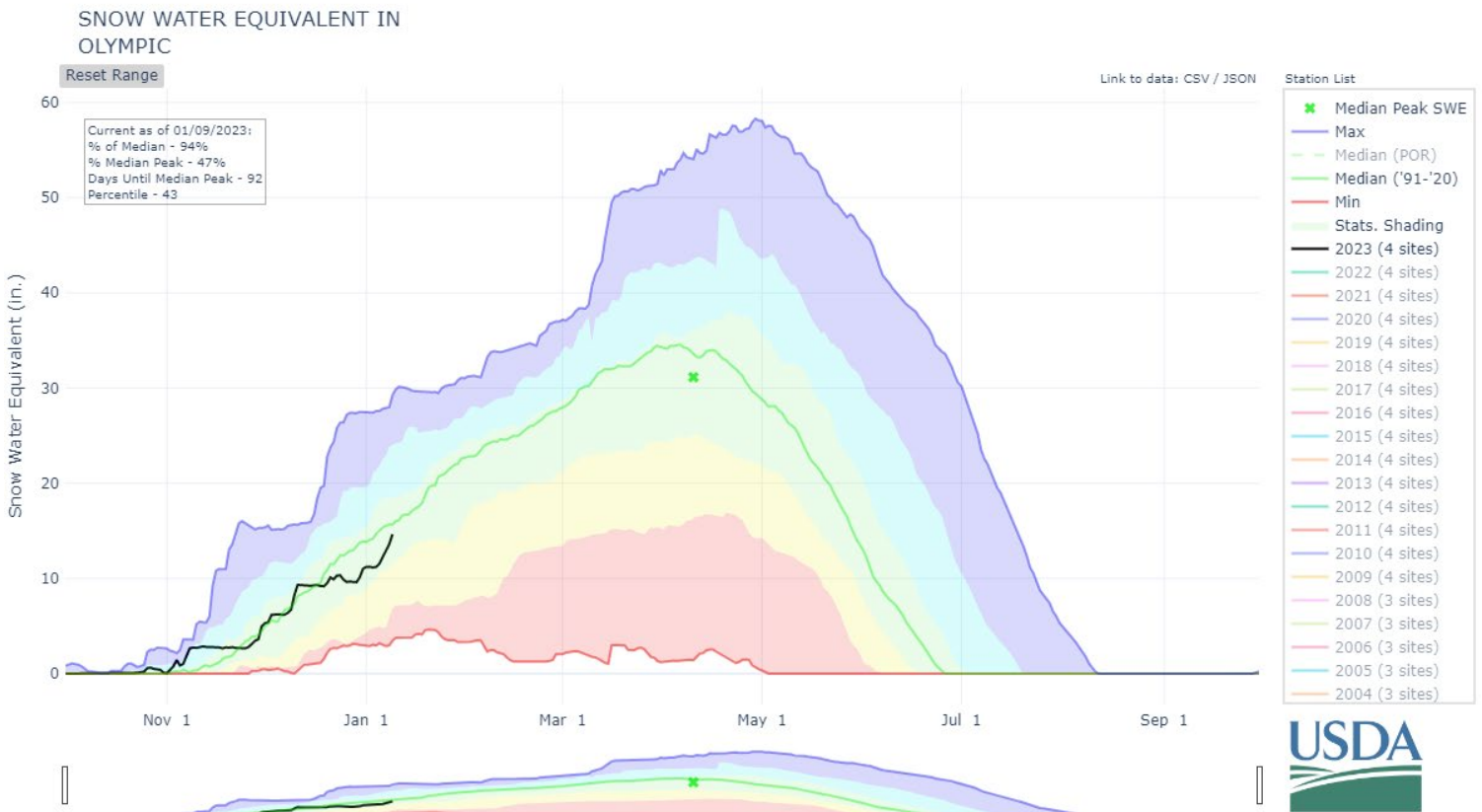
Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

Olympic	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Dungeness R nr Sequim	APR-JUL	83	105	120	101%	135	157	119
	APR-SEP	95	122	140	101%	158	185	139
Elwha R at McDonald Br nr Port Angeles	APR-JUL	270	335	385	104%	430	500	370
	APR-SEP	325	400	455	102%	505	580	445

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

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Olympic	4	81%	100%
Olympic	4	81%	100%



Issued by

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

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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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Washington Water Supply Outlook Report

**Natural Resources Conservation Service
Spokane, WA**

