

Washington Water Supply Outlook Report February 1, 2023



*Old burn scars and fire damaged trees, North Fork Salmon Creek, Okanogan, CO., WA
Photo Credit: Amanda Philipps, NRCS 1/30/2023*

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

**Scott Pattee
Water Supply Specialist
Natural Resources Conservation Service
2005 E. College Way, Suite 203
Mt. Vernon, WA 98273-2873
(360) 488-4826**

or

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

How forecasts are made

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

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

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

"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

February 2023

General Outlook

After the very encouraging snowstorms in December, January flat lined, receiving only 63% of normal total mountain precipitation for the month. The state received several resuscitative events that represented hope. However most carried little precipitation with warm temperatures that hampered true to normal snow accumulations. Fortunately, most of these events were followed by cold snaps, locking the moisture into the snowpack, a benefit to spring runoff. As recreationists look to the next couple of months to help prolong the season with fresh powder, water managers are hoping to continue to build the snow water content for downstream use later in the year.

The most recent forecast through late-February shows a probability for below normal temperatures and slightly above normal precipitation. NWS 3-month (Feb-Mar-Apr) forecast indicates below normal temperatures and above normal precipitation which is indicative of the forecasted Enso La Nina #3. The US Drought Monitor continues to show improvement each month with only a trace of DO which stretches from the central part of the state up through and over the northern tier. (See maps on page 4)

Snowpack

The February 1 statewide SNOTEL readings were 92% of normal, down from 113% on January 1. The lowest readings in the state were at 72% of the 30-year median for February 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	94	100
Newman Lake	105	85
Lower Pend Oreille	91	99
Kettle	120	94
Omak	177	80
Methow	104	104
Conconully Lake	165	76
Central Columbia	87	97
Upper Yakima	93	92
Lower Yakima	95	81
Ahtanum Creek	111	87
Walla Walla	97	105
Lower Snake	100	88
Cowlitz	94	104
Lewis	123	117
White	92	104
Green	94	98
Puyallup	114	123
Cedar	94	104
Snoqualmie	97	112
Skykomish	87	101
Skagit	80	107
Nooksack	80	86
Olympic Peninsula	72	90

Precipitation

Precipitation accumulation was below normal across most of the state. Statewide Water-year average dropped to 83% of normal as of February 1. The Olympics saw the highest monthly precipitation at 121% of normal however warm temperatures did little to help snow accumulation in the Hurricane Ridge area. Waterhole and Buckinghorse SNOTELs reported near normal whereas, on the east side of the peninsula, Mount Crag and Dungeness SNOTELs reported 150-160% of normal. SNOTEL collects all form of precipitation including, rain, snow, sleet, and hail.

RIVER BASIN	JANUARY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	44	78
Lower Pend Oreille	57	77
Upper Columbia	83	92
Central Columbia	60	80
Upper Yakima	47	80
Naches	51	82
Lower Yakima	95	101
Klickitat	85	94
Walla Walla	52	94
Lower Snake	53	93
Lower Columbia	74	88
South Puget Sound	50	84
Central Puget Sound	45	77
North Puget Sound	54	75
Olympic Peninsula	121	88

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 369,200-acre feet, 85% of median for the Upper Reaches and 91% of median for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 49,000-acre feet, 46% of median and 21% of capacity; and Ross Lake within the Skagit River Basin at 84% of average and 59% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF MEDIAN
Spokane	21	46
Lower Pend Oreille	39	96
Upper Columbia	59	86
Central Columbia	36	77
Upper Yakima	44	85
Naches	55	91
Lower Snake	40	93
North Puget Sound	59	84
South Puget Sound	N/A	23

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

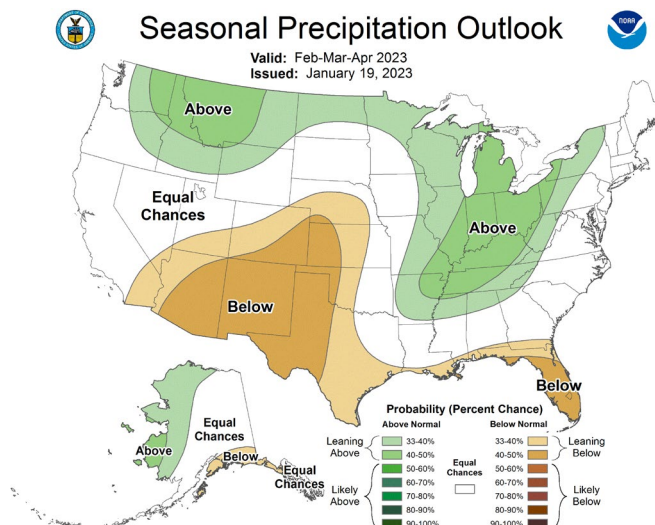
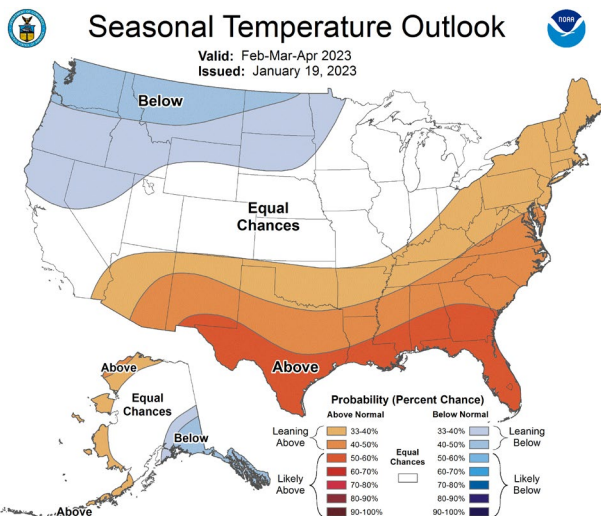
Streamflow

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	74-85
Lower Pend Oreille	85-96
Upper Columbia	83-102
Central Columbia	78-86
Upper Yakima	82-90
Lower Yakima	85-125
Naches	86-88
Klickitat	90-95
Lower Snake-Walla Walla	82-97
Lower Columbia	101-110
South Puget Sound	92-98
Central Puget Sound	89-104
North Puget Sound	95-100
Olympic Peninsula	92-96

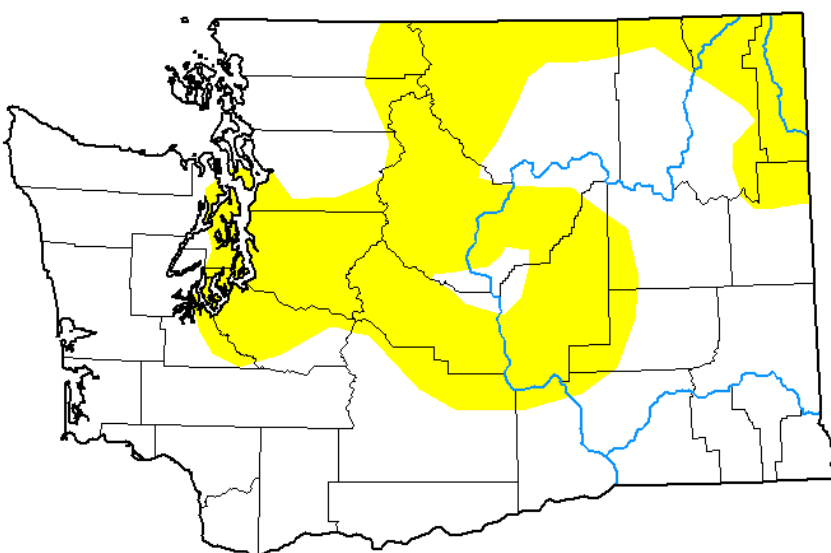
STREAM	PERCENT OF AVERAGE JANUARY RUNOFF
Priest River - near Priest River	59
Kettle at Laurier	66
Columbia at Birchbank	73
Spokane at Spokane	62
Similkameen at Nighthawk	63
Okanogan near Tonasket	75
Methow at Pateros	76
Chelan at Chelan	61
Stehekin near Stehekin	45
Wenatchee at Pashastin	52
Cle Elum near Roslyn	62
Yakima near Parker	66
Naches near Naches	40
Grande Ronde at Troy	82
Snake below Lower Granite Dam	76
Columbia River at The Dalles	67
Lewis at Merwin Dam	84
Cowlitz below Mayfield Dam	61
Skagit at Concrete	74
Dungeness near Sequim	79

Climate



U.S. Drought Monitor Washington

January 31, 2023
(Released Thursday, Feb. 2, 2023)
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>

Author:

Rocky Bilotta
NCEI/NOAA



droughtmonitor.unl.edu



Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

Program Contacts

Washington:

Roylene Comes-At-Night
State Conservationist
Spokane State Office
W. 316 Boone Ave., Suite 450
Spokane, WA 99201-2348
phone: 509-323-2961
roylene.rides-at-the-door@wa.usda.gov

Scott Pattee
Water Supply Specialist
Washington Snow Survey Office
2005 E. College Way, Suite 203
Mount Vernon, WA 98273-2873
phone: 360-488-4826
scott.pattee@wa.usda.gov

Oregon:

Matt Warbritton
Lead Hydrologist
Oregon Data Collection Office
1201 NE Lloyd Blvd., STE 900
Portland, OR 97232
Phone: 503-307-2829
scott.oviat@or.usda.gov

Julie Koeberle
Forecast Hydrologist
National Water and Climate Center
1201 NE Lloyd Blvd., STE 800
Portland, OR 97232
phone: 503-414-3035
julie.koeberle@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):

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

USDA-NRCS Agency Homepages

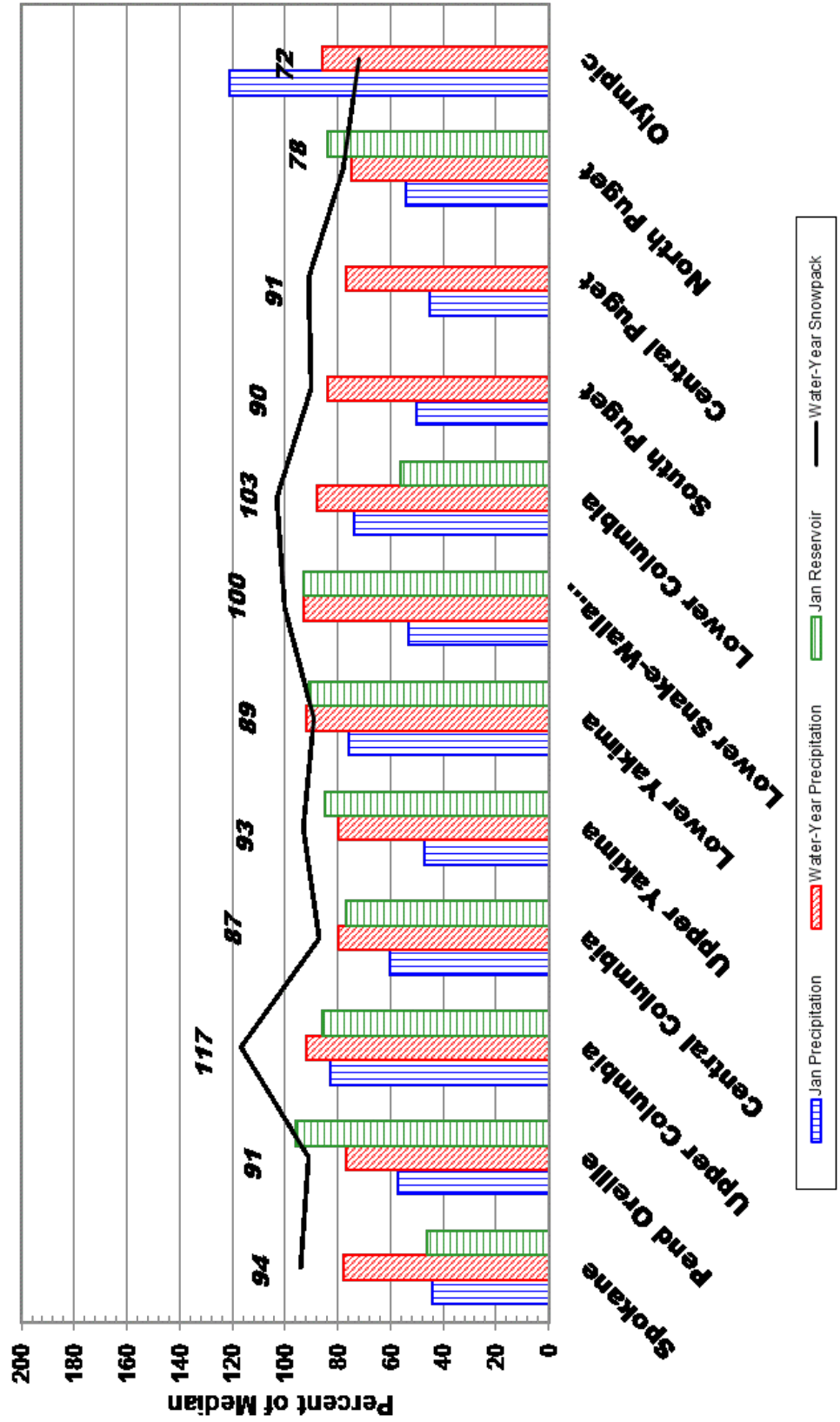
Washington:

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

NRCS National:

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

February 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](#).

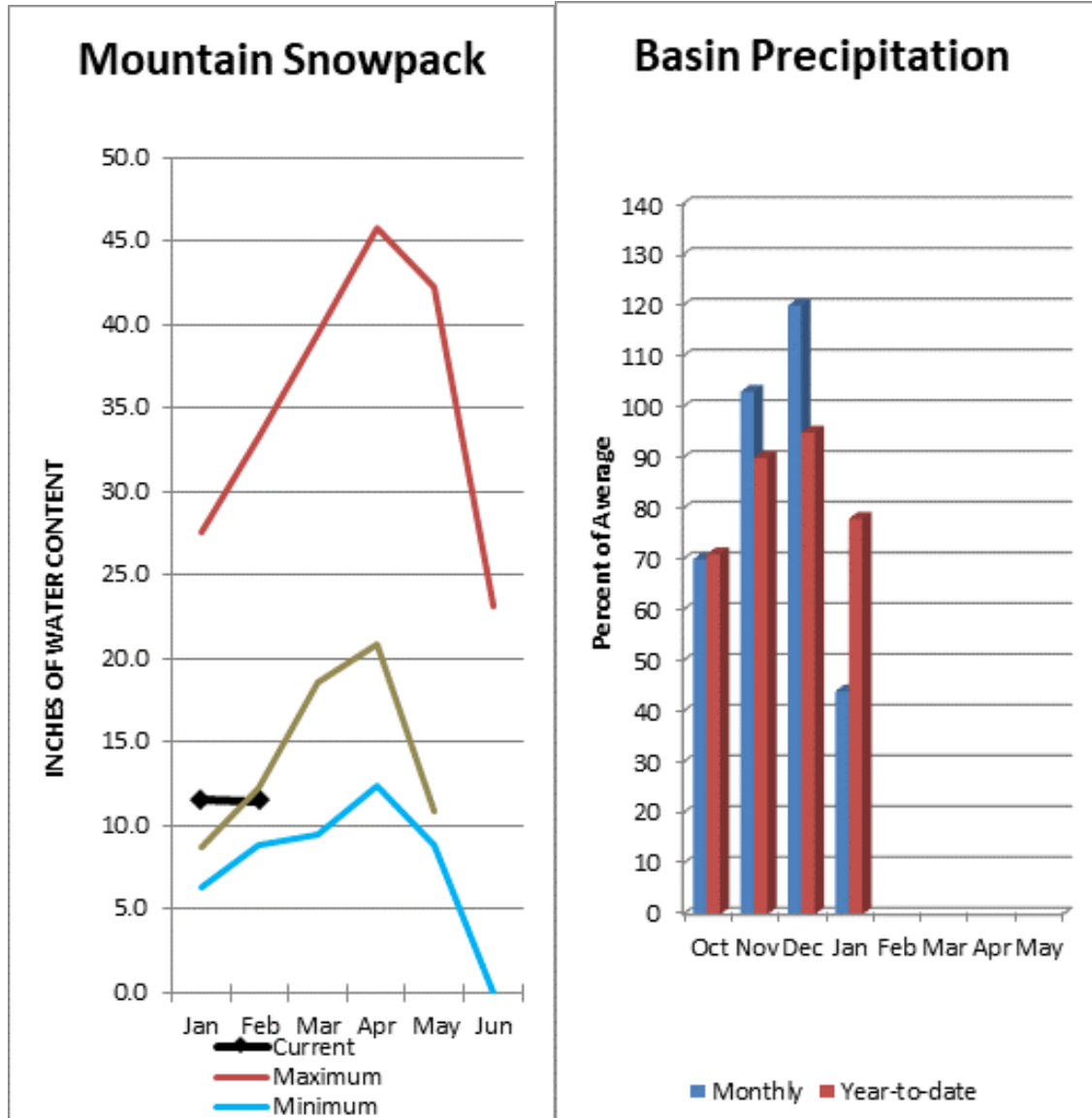
Details of this conference are still being finalized, including formats, platforms, and opportunity for vendor participation.

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 94% of normal and precipitation is 78% of normal for the water year. Precipitation for January was 44% of normal. Reservoir storage is currently at 46% of normal.

Data Current As of: 2/6/2023 1:22:49 PM

Spokane Streamflow Forecasts - February 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	1210	1830	2250	83%	2670	3290	2720
	APR-SEP	1370	2000	2430	85%	2870	3500	2870
Spokane R nr Post Falls ²	APR-JUL	995	1600	2000	80%	2410	3010	2510
	APR-SEP	1060	1670	2080	81%	2490	3100	2570
NF Coeur d'Alene R at Enaville	APR-JUL	280	465	590	83%	715	905	715
	APR-SEP	305	495	625	83%	750	940	750
Chamokane Ck nr Long Lake	MAR-JUL	7.3	14.1	20	74%	27	39	27
St. Joe R at Calder	APR-JUL	535	750	890	85%	1040	1250	1050
	APR-SEP	585	800	950	85%	1100	1320	1120

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 January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Coeur d' Alene	49.0	68.0	106.7	238.5

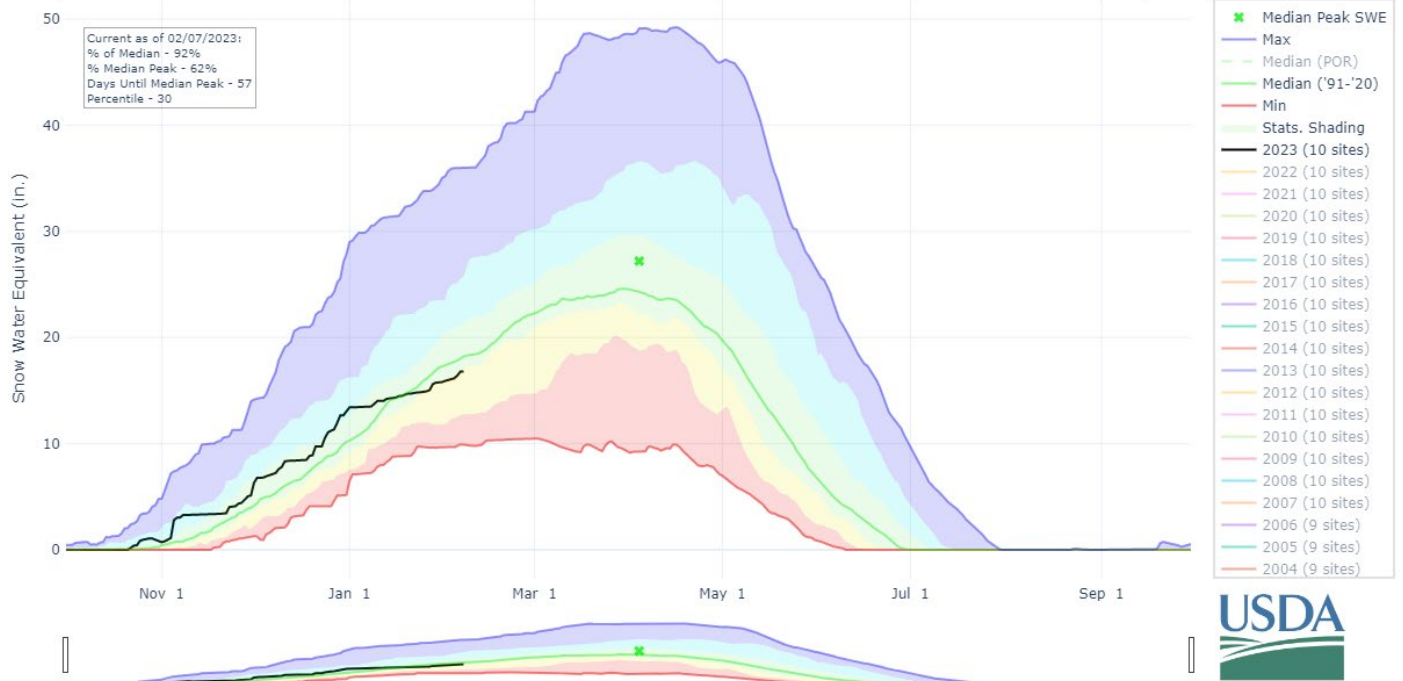
Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Spokane	18	94%	100%
Newman Lake	4	105%	85%

SNOW WATER EQUIVALENT IN SPOKANE

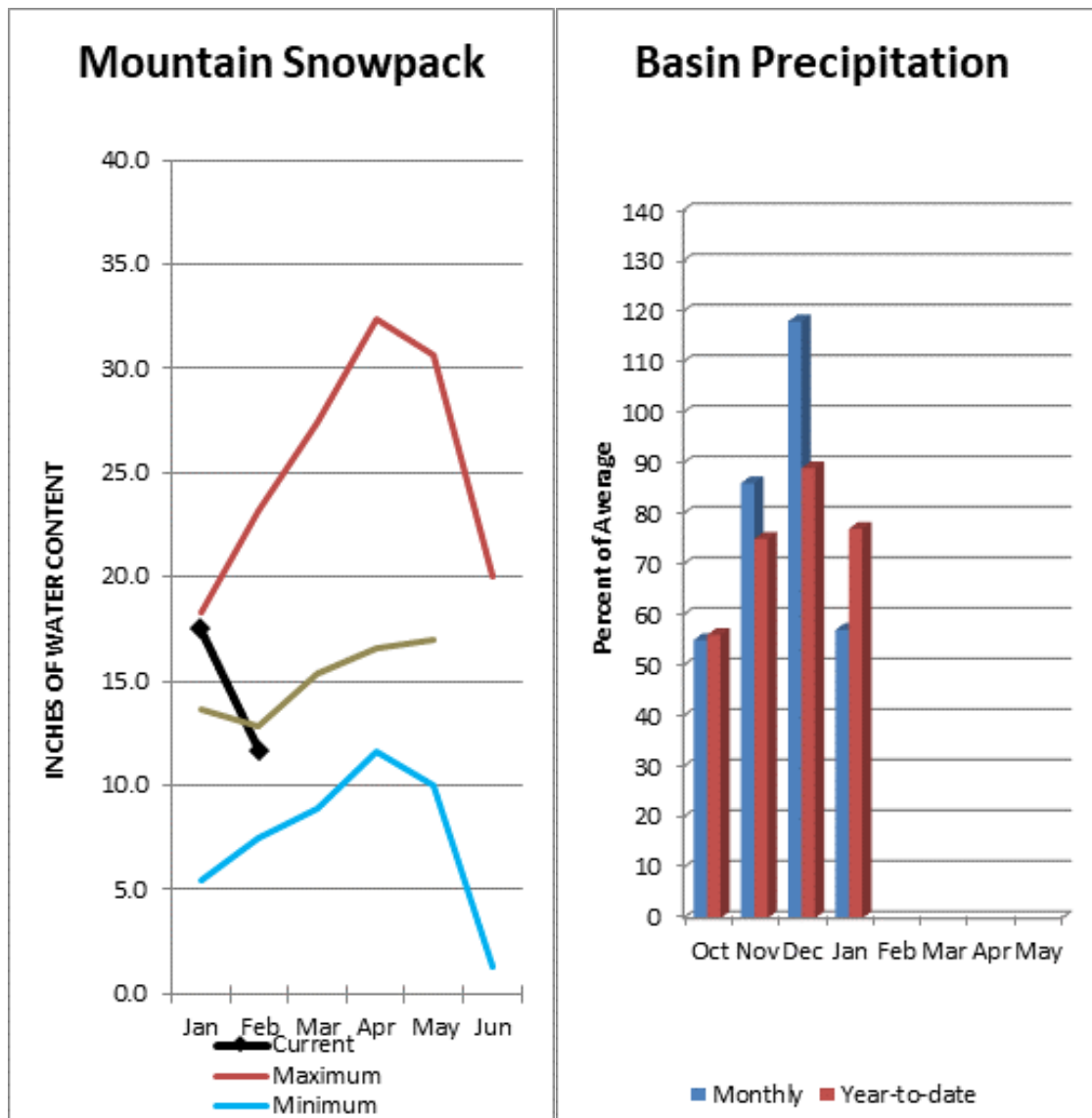
Reset Range

Link to data: CSV / JSON

Station List



Lower Pend Oreille River Basins



February 1 snow cover was 91% of normal in the Pend Oreille Basin River Basin and precipitation during January was 57% of normal, bringing the year-to-date precipitation at 77% of normal. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 96% of normal.

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

Lower Pend Oreille River Basins

Data Current As of: 2/6/2023 1:22:51 PM

Lower Pend Oreille Streamflow Forecasts - February 1, 2023

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

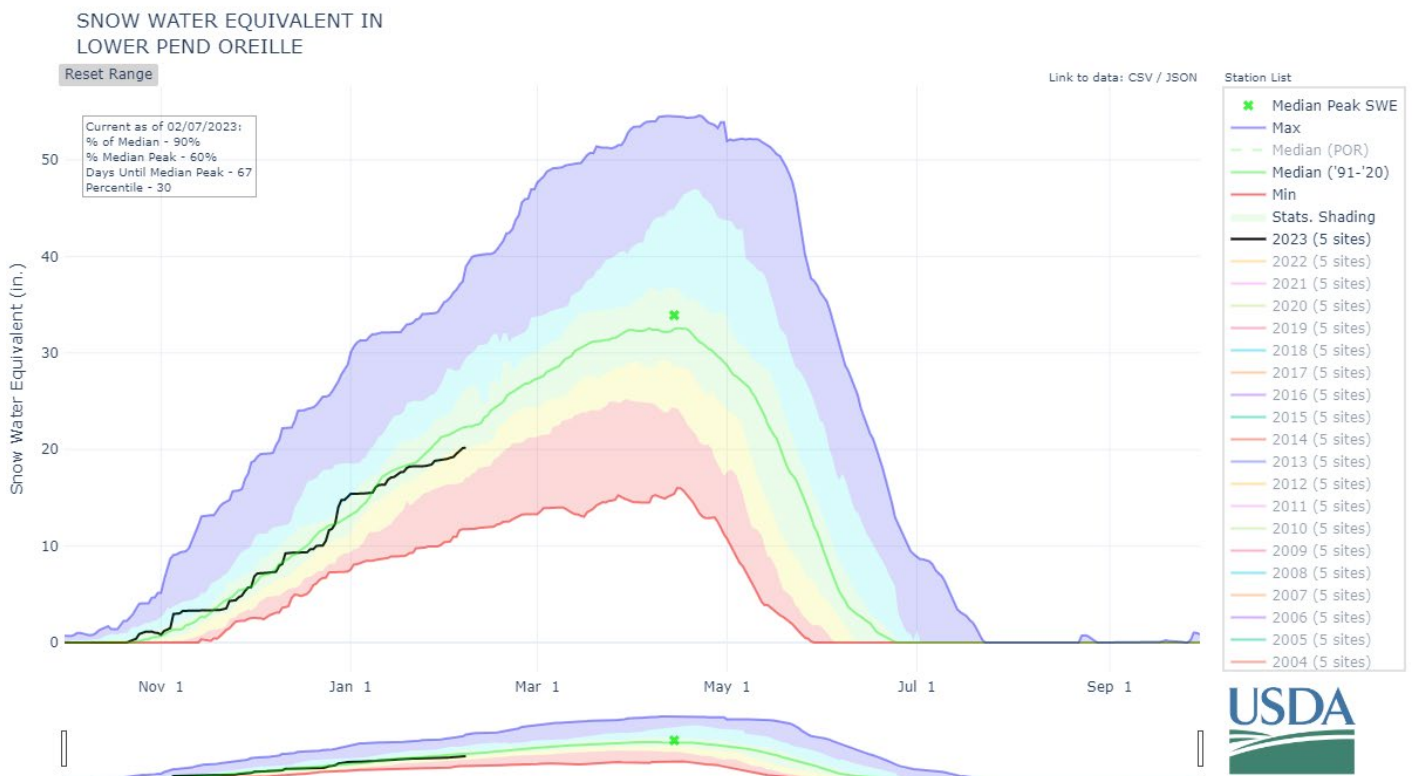
Lower Pend Oreille	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Pend Oreille Lake Inflow ²	APR-JUL	7500	9610	11000	94%	12500	14600	11700
	APR-SEP	8250	10500	12000	95%	13500	15700	12600
Pend Oreille R bl Box Canyon ²	APR-JUL	7680	9770	11200	96%	12600	14700	11700
	APR-SEP	8490	10700	12200	96%	13700	15900	12700
Priest R nr Priest River ²	APR-JUL	435	605	715	85%	825	995	840
	APR-SEP	460	635	750	85%	865	1040	880

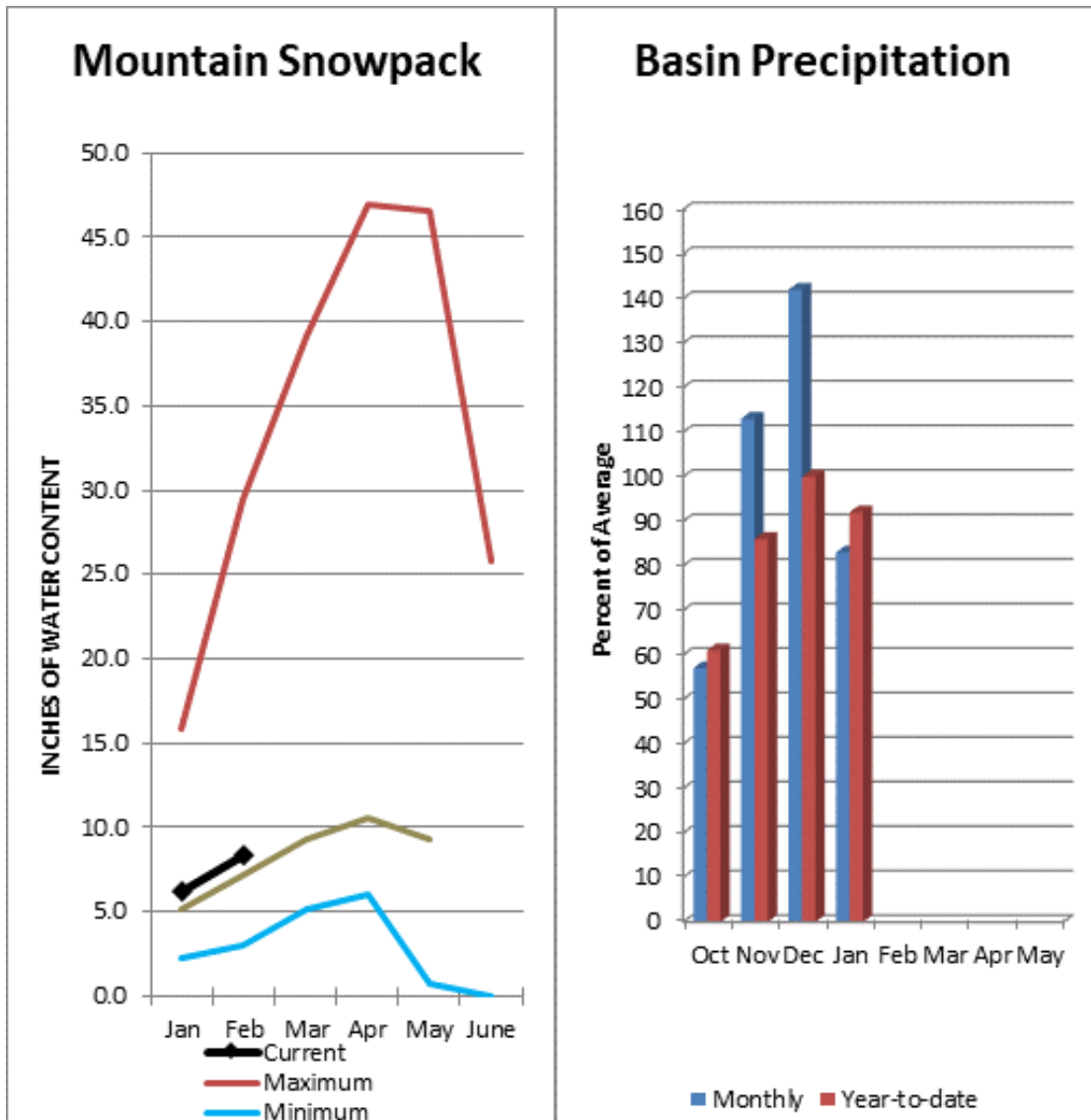
1) 90% And 10% exceedance probabilities are actually 95% And 5%

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

Reservoir Storage End of January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Priest Lake	50.1	51.8	55.3	119.3
Lake Pend Oreille	611.1	534.3	630.8	1561.3

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Lower Pend Oreille	15	91%	99%
Sullivan	1	80%	90%





February 1 snow cover on the Upper Columbia basins was 117% of normal and January precipitation was 83% of normal, with precipitation for the water year at 92% of normal. Combined storage in the Conconully Reservoirs was 86% of normal.

Upper Columbia Streamflow Forecasts - February 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	950	1100	87%	1250	1470	1260
	APR-SEP	800	1030	1180	88%	1330	1560	1340
Methow R nr Pateros	APR-JUL	510	680	800	89%	920	1090	895
	APR-SEP	560	745	870	90%	995	1180	965
Okanogan R nr Tonasket	APR-JUL	805	1140	1380	91%	1610	1940	1520
	APR-SEP	835	1200	1450	90%	1700	2060	1620
Kettle R nr Laurier	APR-JUL	1250	1610	1860	101%	2100	2460	1840
	APR-SEP	1300	1670	1920	98%	2170	2540	1950
Colville R at Kettle Falls	APR-JUL	46	88	116	101%	144	186	115
	APR-SEP	28	87	127	102%	167	225	124
Columbia R at Grand Coulee-NWS ²	APR-JUL	32700		41900	80%		53400	52600
	APR-SEP	39100		50100	83%		64100	60600
Okanogan R at Malott	APR-JUL	815	1170	1410	91%	1650	2000	1550
	APR-SEP	840	1220	1480	88%	1740	2120	1680

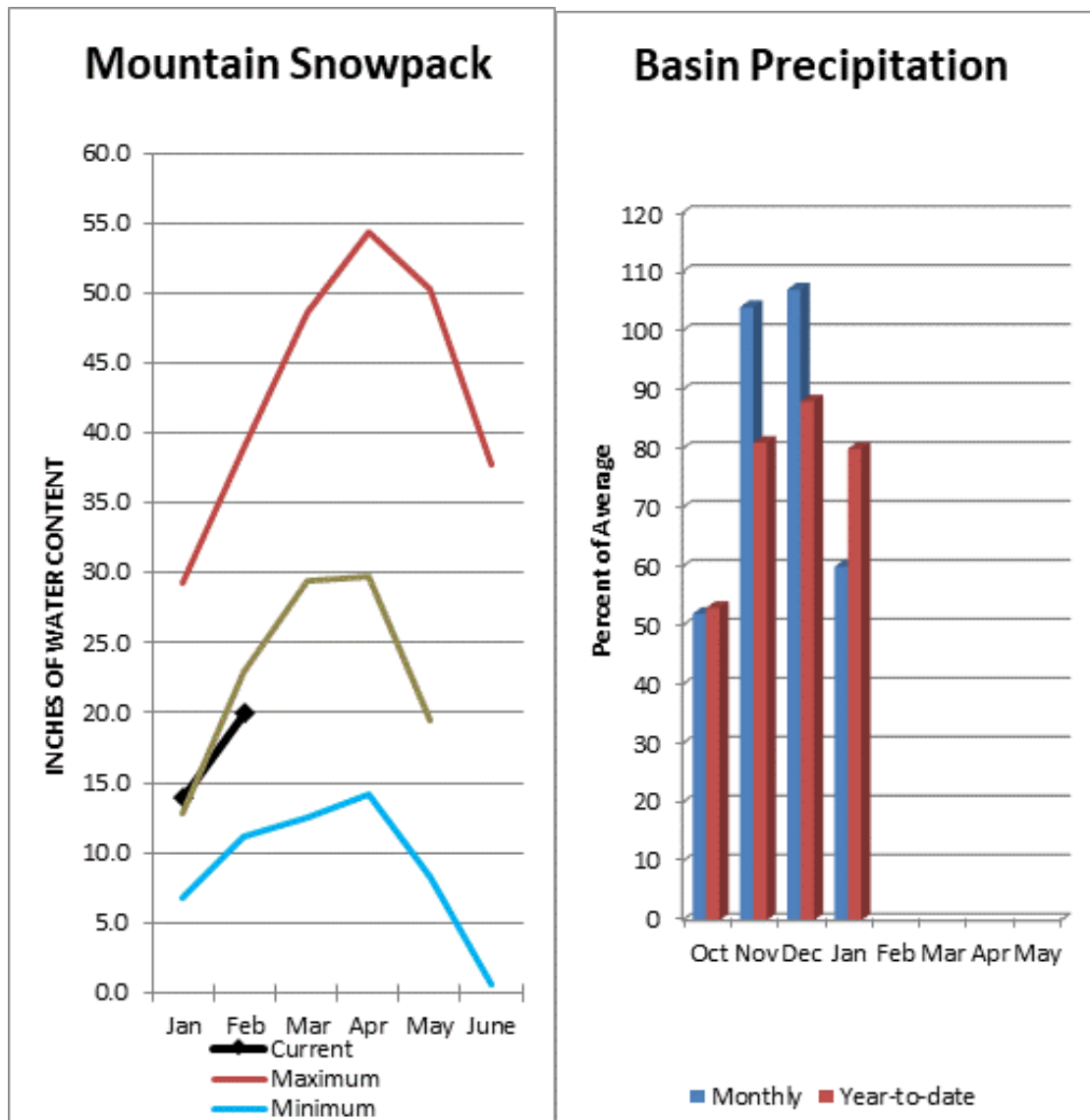
1) 90% And 10% exceedance probabilities are actually 95% And 5%

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

Reservoir Storage End of January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Conconully Lake (Salmon Lake Dam)	6.5	3.3	7.8	10.5
Conconully Reservoir	7.4	5.0	8.4	13.0

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Upper Columbia	49	117%	93%
Toats Coulee	2	136%	102%
Sanpoil	5	161%	80%
Omak	5	177%	80%
Methow	7	104%	104%
Kettle	12	120%	94%
Concully Lake	1	165%	76%
Colville	3	111%	90%

Central Columbia River Basins



February 1 snowpack in the Central Columbia River basins was 87% of normal. Precipitation during January was 60% of normal in the basin and 80% for the year-to-date. Reservoir storage in Lake Chelan was 77% of the median.

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

Central Columbia River Basins

Data Current As of: 2/6/2023 1:22:55 PM

Central Columbia Streamflow Forecasts - February 1, 2023

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

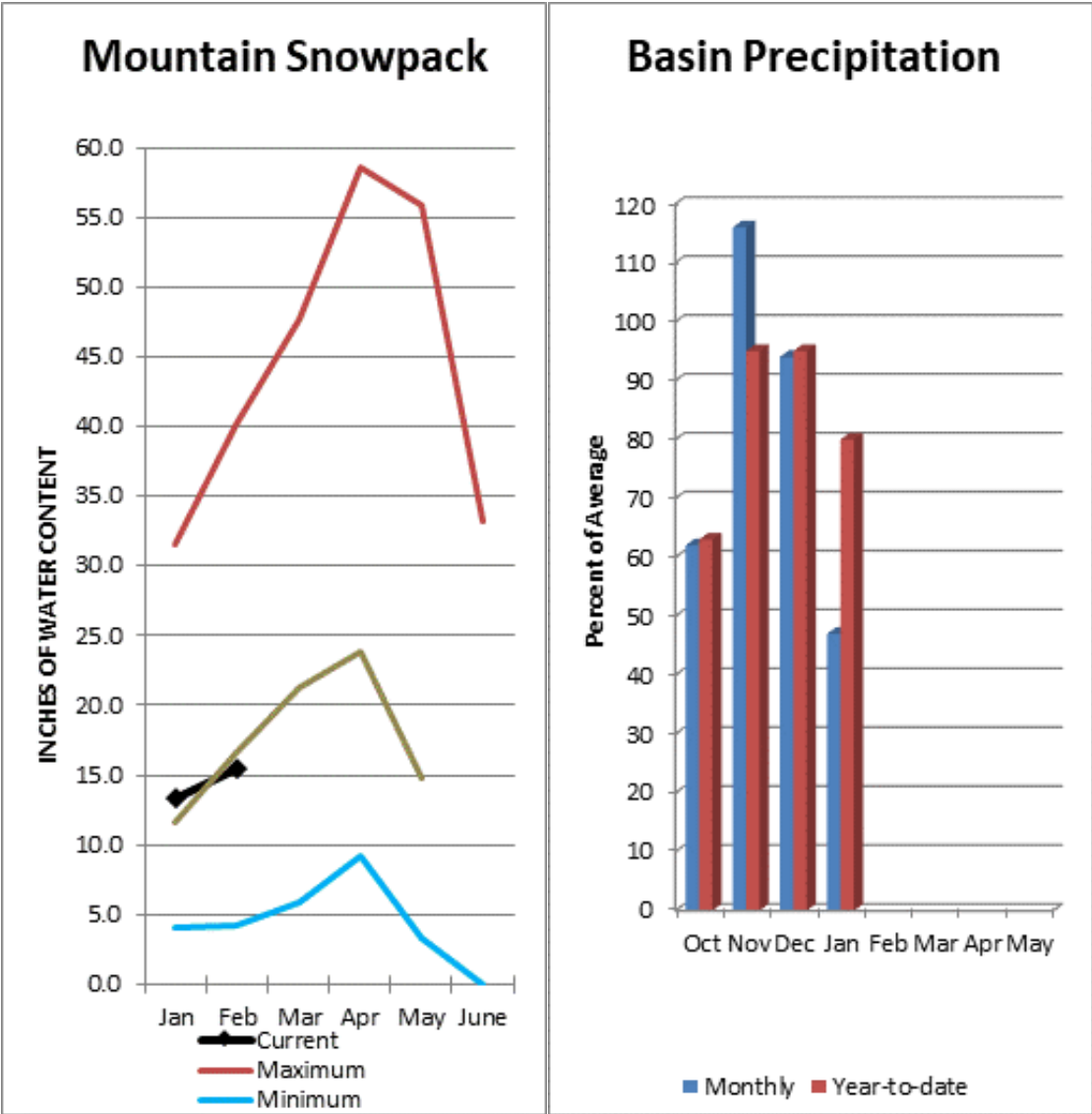
Central Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Wenatchee R at Plain	APR-JUL	575	730	835	78%	940	1090	1070
	APR-SEP	615	785	900	78%	1020	1190	1160
Chelan R at Chelan ²	APR-JUL	670	810	905	87%	1000	1140	1040
	APR-SEP	735	895	1000	85%	1110	1270	1170
Stehekin R at Stehekin	APR-JUL	470	560	625	87%	685	780	715
	APR-SEP	540	645	715	86%	785	890	835
Icicle Ck nr Leavenworth	APR-JUL	154	198	230	79%	255	300	290
	APR-SEP	165	215	245	79%	280	330	310
Wenatchee R at Peshastin	APR-JUL	800	1000	1130	78%	1270	1470	1440
	APR-SEP	845	1070	1220	79%	1370	1590	1540
Entiat R nr Ardenvoir	APR-JUL	115	152	178	81%	205	240	220
	APR-SEP	123	165	193	82%	220	260	235
Columbia R bl Rock Island Dam-NWS ²	APR-JUL	35200		45400	79%		59300	57600
	APR-SEP	41900		54000	82%		70600	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 January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Chelan	241.7	425.6	314.3	677.4

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Central Columbia	11	87%	97%
Wenatchee	7	85%	99%
Stemilt	1	121%	87%
Lake Chelan	3	78%	97%
Entiat	1	124%	97%
Colckum	1	149%	73%



February 1 snowpack was 93% of normal. Precipitation was 47% of normal for January and 87% for the water-year. February 1 reservoir storage for the Upper Yakima reservoirs was 85% of normal.

Upper Yakima River Basin

Data Current As of: 2/6/2023 1:22:59 PM

Upper Yakima Streamflow Forecasts - February 1, 2023

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

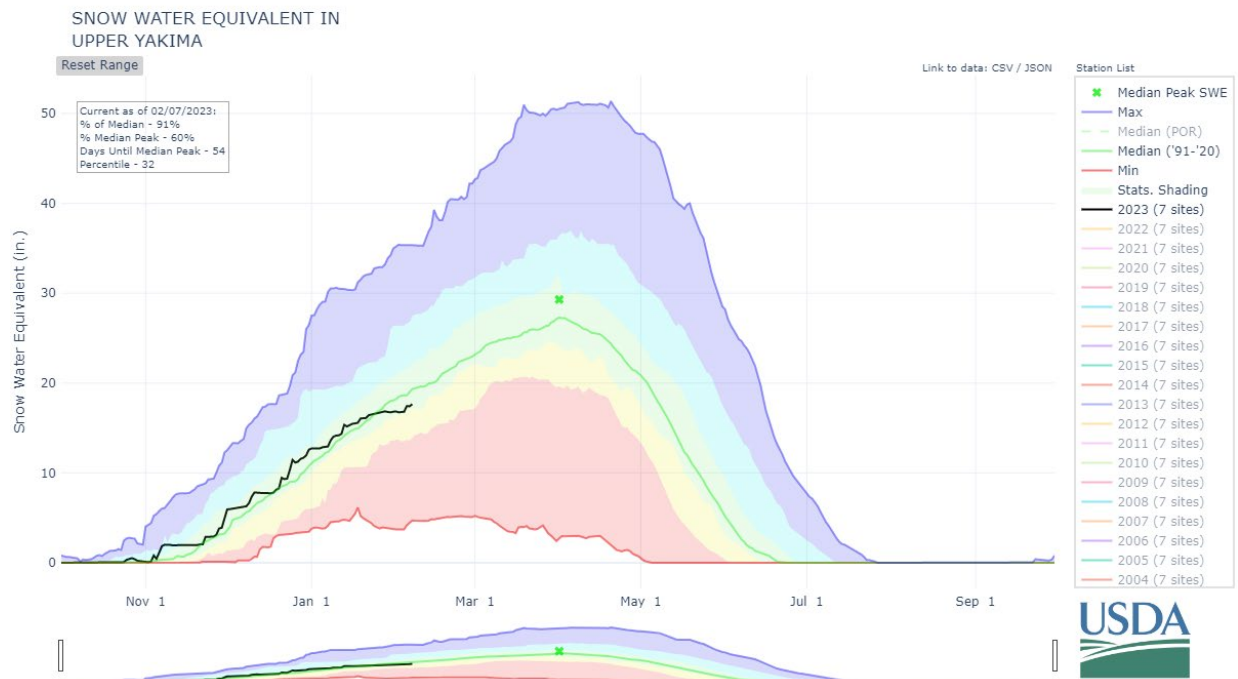
Upper Yakima	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Kachess Reservoir Inflow ²	APR-JUL	53	74	88	89%	102	123	99
	APR-SEP	61	83	97	90%	112	133	108
Teanaway R bl Forks nr Cle Elum	APR-JUL	52	85	107	82%	129	162	131
	APR-SEP	54	87	110	82%	132	165	134
Keechelus Reservoir Inflow ²	APR-JUL	61	85	102	91%	119	143	112
	APR-SEP	69	95	112	89%	130	156	126
Cle Elum Lake Inflow ²	APR-JUL	230	290	330	86%	370	430	385
	APR-SEP	250	315	360	86%	405	470	420

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

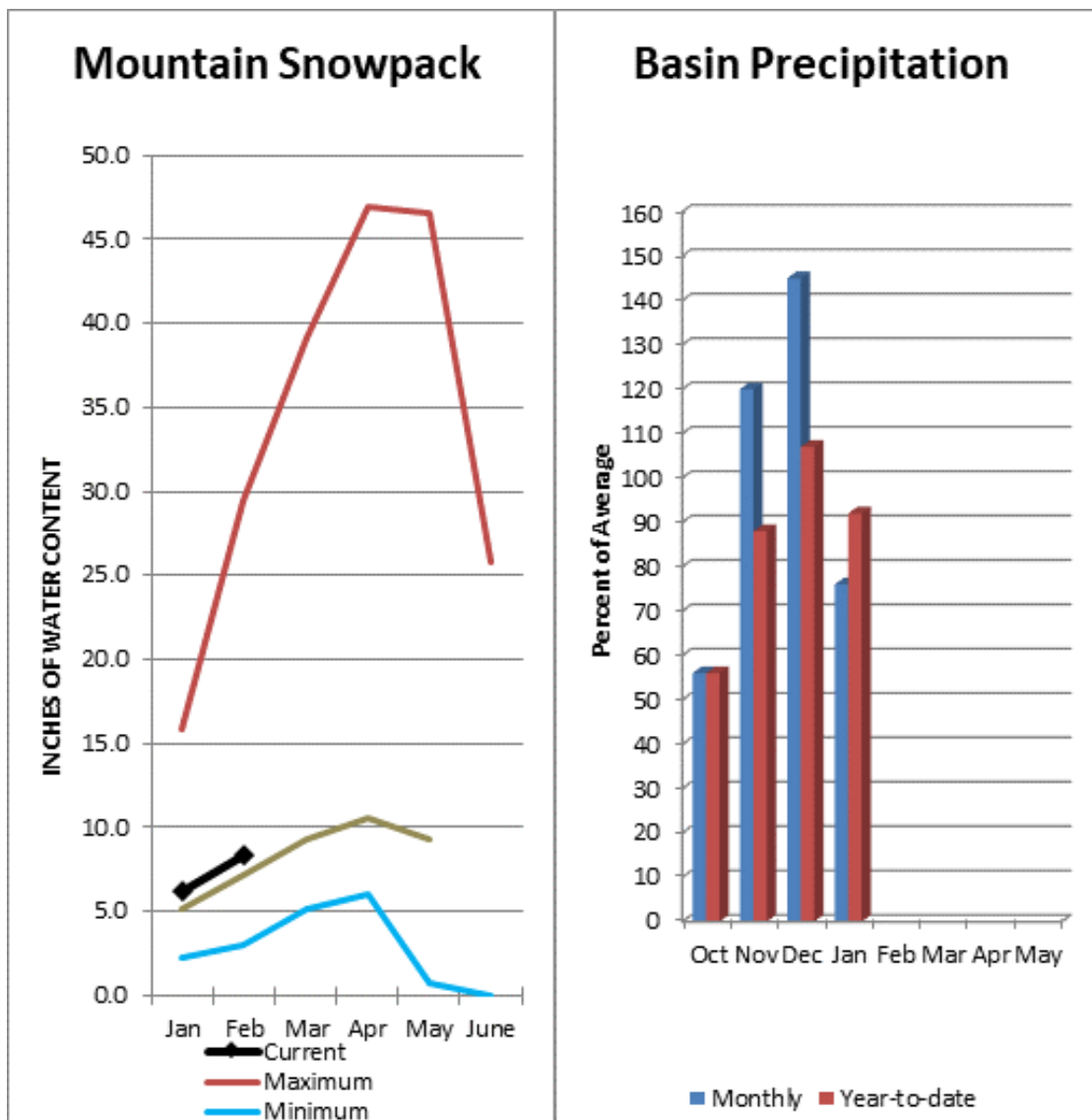
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Cle Elum	175.6	274.5	208.1	436.9
Keechelus	58.9	120.2	84.3	157.8
Kachess	134.7	181.4	143.5	239.0

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Upper Yakima	7	93%	92%
Upper Yakima	7	93%	92%



Lower Yakima - Naches River Basin



February 1 combined basin snowpack was 89% of normal. January precipitation was 73% of normal and 92% for the water-year. February 1 reservoir storage for Bumping and Rimrock reservoirs was 91% of the median.

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

Lower Yakima – Naches River Basins

Data Current As of: 2/6/2023 1:22:57 PM

Lower Yakima Streamflow Forecasts - February 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	880	1230	1460	84%	1700	2040	1730
	APR-SEP	985	1360	1610	85%	1860	2230	1890
Ahtanum Ck at Union Gap	APR-JUL	14	25	32	123%	40	51	26
	APR-SEP	16.1	27	35	125%	42	53	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 February 1, 2023	# of Sites	% Median	Last Year % Median
Lower Yakima	3	95%	81%
Simcoe-Toppenish	1	115%	87%
Satus	1	71%	72%
Ahtanum	2	111%	87%

Naches Streamflow Forecasts - February 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	57	75	87	87%	99	117	100
	APR-SEP	60	80	94	87%	107	128	108
Rimrock Lake Inflow ²	APR-JUL	125	153	172	89%	191	220	194
	APR-SEP	147	181	205	87%	225	260	235
Naches R nr Naches ²	APR-JUL	380	525	625	87%	720	865	720
	APR-SEP	415	575	685	88%	795	955	775
Bumping Lake Inflow ²	APR-JUL	63	84	97	85%	111	131	114
	APR-SEP	68	90	105	86%	121	143	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 January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Rimrock	112.2	141.0	125.6	198.0
Bumping Lake	15.9	17.5	15.1	33.7

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Naches	9	83%	95%
Naches	9	83%	95%

Klickitat Streamflow Forecasts - February 1, 2023

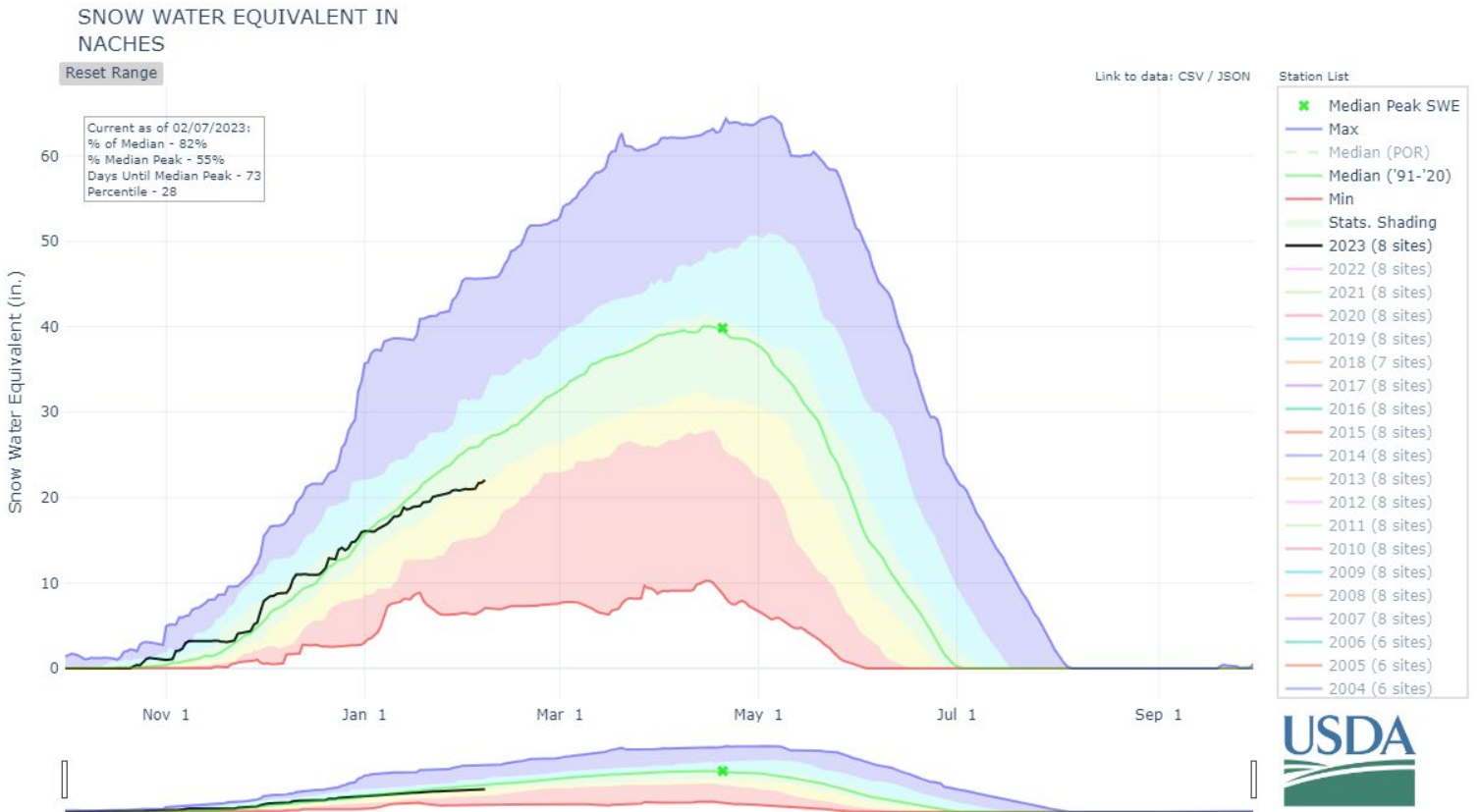
Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

Klickitat	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Klickitat R nr Glenwood	APR-JUL	76	101	119	90%	136	161	132
	APR-SEP	85	112	131	90%	149	176	145
Klickitat R nr Pitt	APR-JUL	275	370	430	95%	495	590	455
	APR-SEP	345	450	520	95%	595	700	545

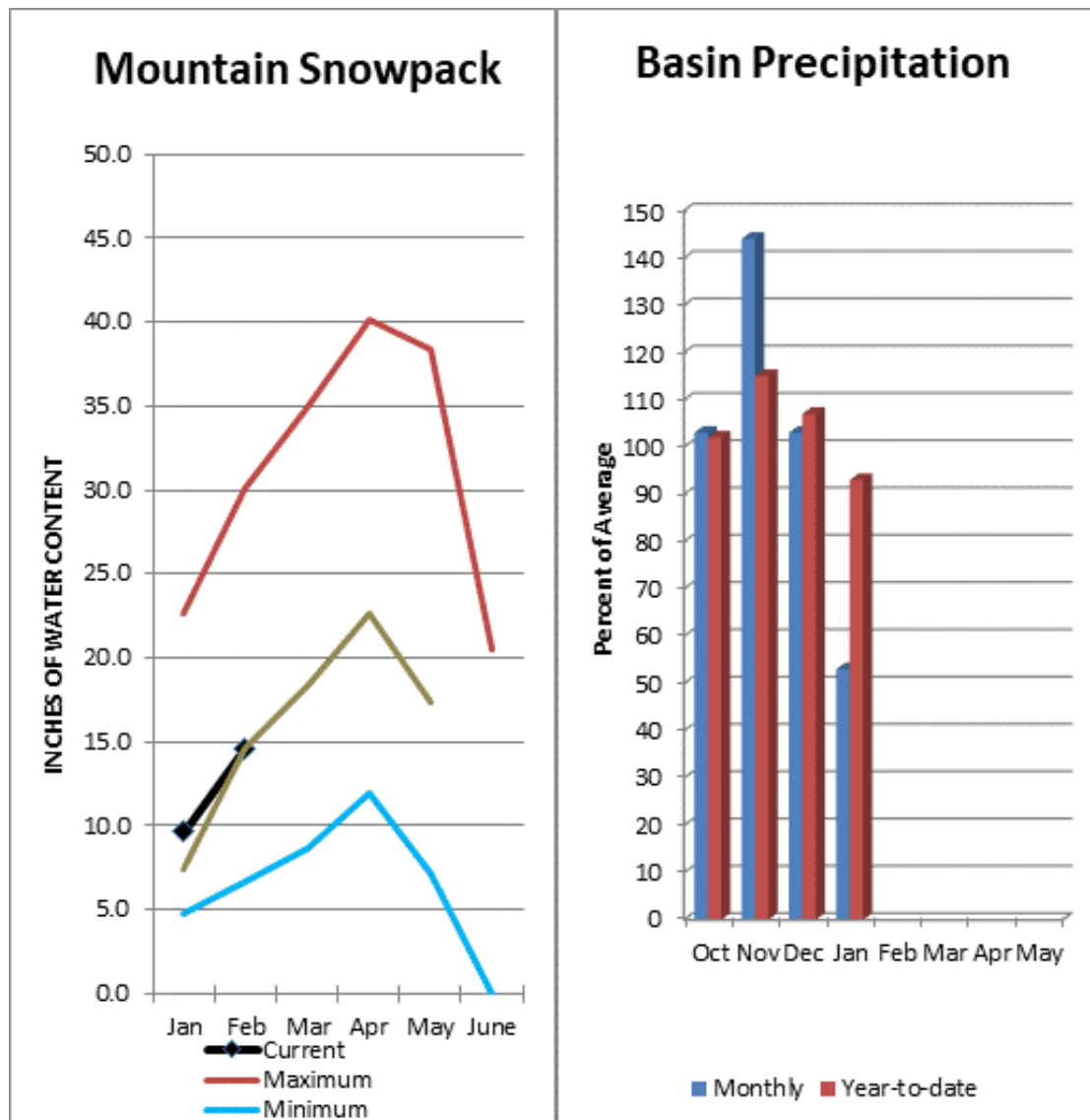
1) 90% And 10% exceedance probabilities are actually 95% And 5%

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

Watershed Snowpack Analysis February 1, 2023		# of Sites	% Median	Last Year % Median
Klickitat		4	98%	92%
Klickitat		4	98%	92%



Lower Snake – Walla Walla River Basin



February 1 snowpack readings were 100% of normal. January precipitation was 53% of normal, bringing the year-to-date precipitation to 93% of normal. Reservoir storage was 93% of the median.

Lower Snake – Walla Walla River Basin

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

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

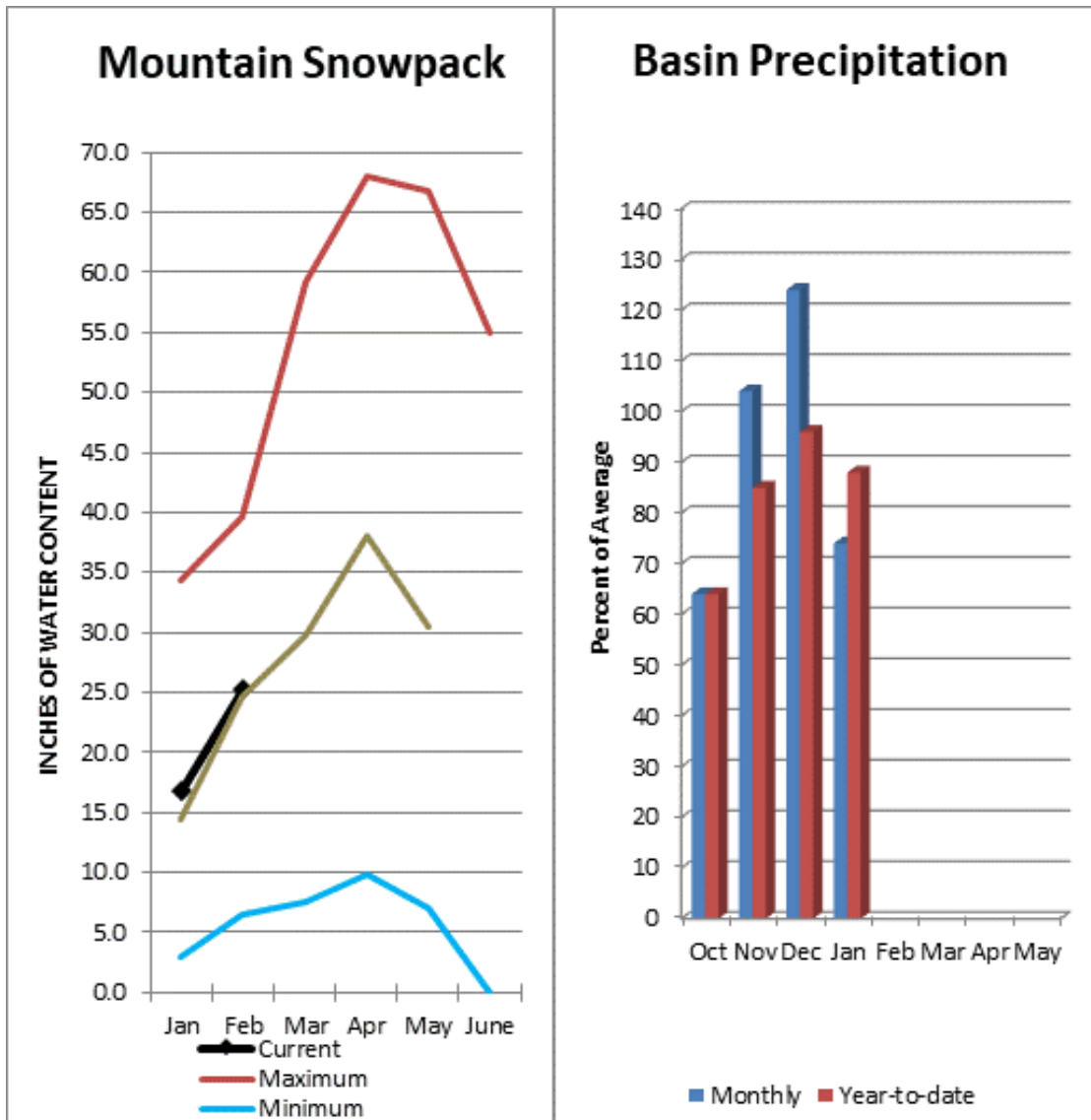
Lower Snake-Walla Walla	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Catherine Ck nr Union	APR-JUL	40	53	61	94%	69	82	65
	APR-SEP	44	56	65	94%	73	86	69
Snake R bl Lower Granite Dam-NWS ²	APR-JUL	10700		15500	79%		21300	19700
	APR-SEP	12700		17800	82%		24100	21800
Mill Ck nr Walla Walla	APR-JUL	13.9	20	24	96%	29	35	25
	APR-SEP	17.3	24	28	97%	32	39	29
SF Walla Walla R nr Milton-Freewater	MAR-JUL	52	63	70	99%	78	89	71
	APR-SEP	52	61	68	97%	74	84	70
Lostine R nr Lostine	APR-JUL	84	96	105	94%	113	125	112
	APR-SEP	89	103	112	93%	121	134	120
Grande Ronde R at Troy	MAR-JUL	935	1230	1420	90%	1620	1910	1580
	APR-SEP	790	1050	1220	90%	1390	1650	1350
Imnaha R at Imnaha	APR-JUL	153	205	240	92%	280	330	260
	APR-SEP	167	220	260	95%	300	355	275
Asotin Ck at Asotin	APR-JUL	15.5	23	29	88%	36	48	33
Bear Ck nr Wallowa	APR-JUL	41	53	61	94%	70	82	65
	APR-SEP	44	57	65	96%	74	86	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 January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Wallowa Lake	14.9	14.9	16.0	37.5

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Lower Snake-Walla Walla	23	100%	88%
Walla Walla	5	97%	105%
Grande Ronde	21	100%	88%
Asotin	2	83%	160%



February 1 snow cover for Lower Columbia was 103% of normal. January precipitation was 74% of normal and the water-year was 88%.

Lower Columbia Streamflow Forecasts - February 1, 2023

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

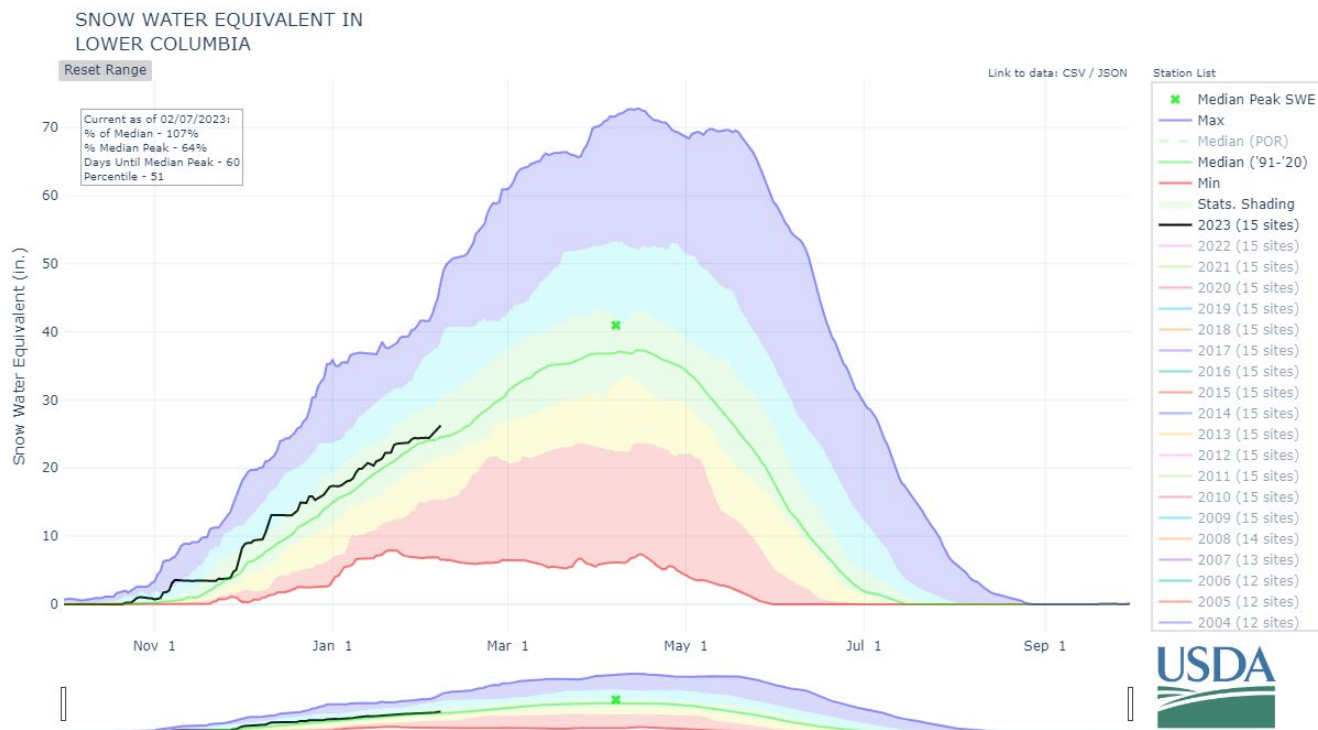
Lower Columbia	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Cowlitz R bl Mayfield ²	APR-JUL	1090	1390	1590	99%	1790	2090	1600
	APR-SEP	1270	1580	1800	101%	2020	2330	1790
Lewis R at Ariel	APR-JUL	815	980	1090	106%	1200	1370	1030
	APR-SEP	940	1110	1230	107%	1350	1530	1150
Cowlitz R at Castle Rock ²	APR-JUL	1500	1960	2280	108%	2600	3060	2120
	APR-SEP	1750	2230	2560	110%	2890	3370	2330

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

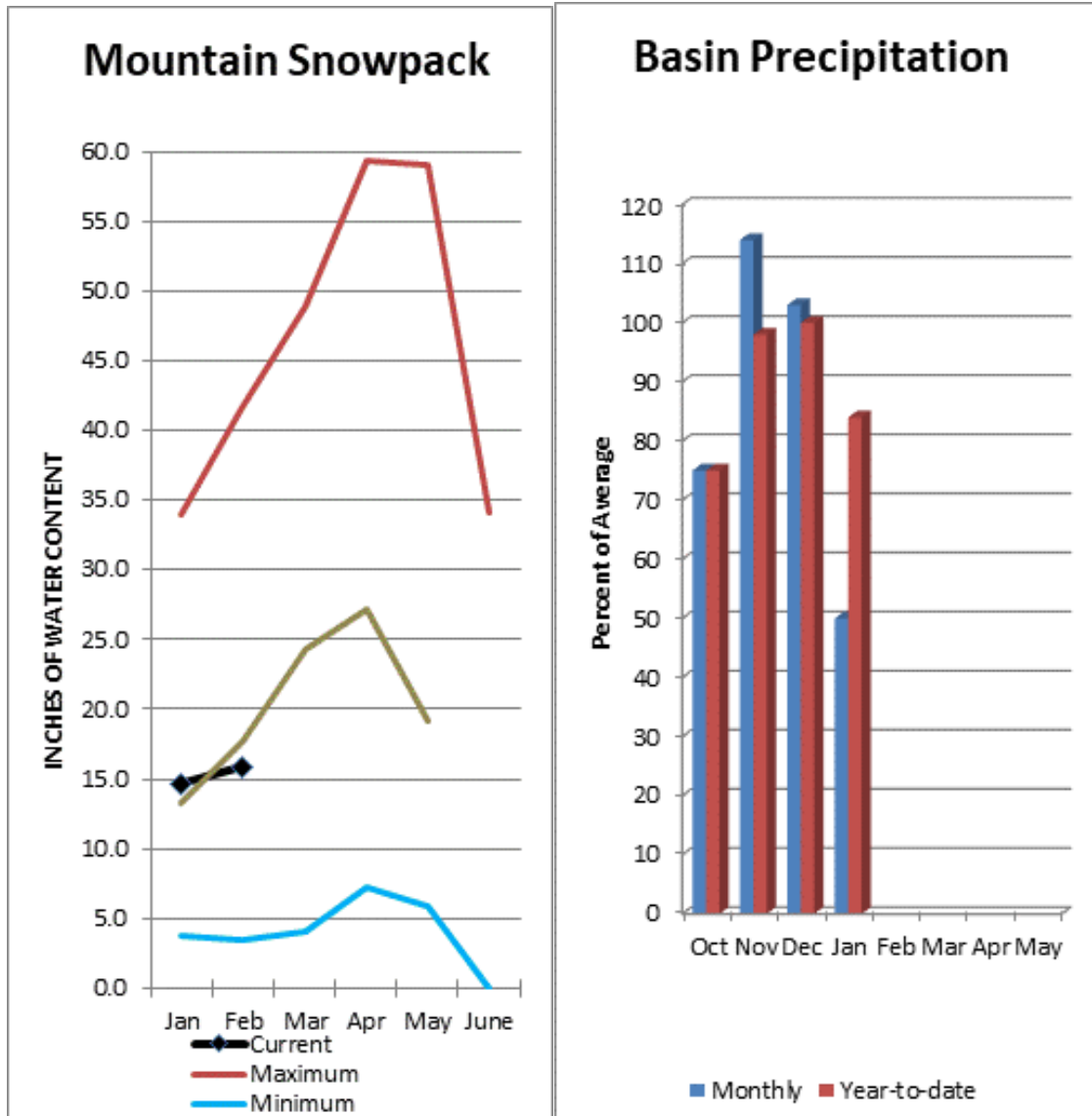
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Mayfield		125.5	128.2	0.0
Merwin			396.6	0.0
Yale			356.5	0.0
Mossyrock Dam (Riffe Lk)	489.9	871.8	880.8	0.0
Swift			632.7	0.0

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Lower Columbia	15	103%	109%
Lewis	8	123%	117%
Cowlitz	9	94%	104%



South Puget Sound River Basins



February 1 snowpack was 90% of normal for the South Puget Sound. January precipitation was 50% of normal, bringing the water year-to-date to 84% of normal for the basins.

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

South Puget Sound River Basins

Data Current As of: 2/6/2023 1:23:09 PM

South Puget Sound Streamflow Forecasts - February 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	APR-JUL	100	189	230	98%	270	360	235
	APR-SEP	118	210	250	98%	290	380	255
White R nr Buckley ¹	APR-JUL	290	365	400	93%	435	510	430
	APR-SEP	350	440	480	92%	520	610	520

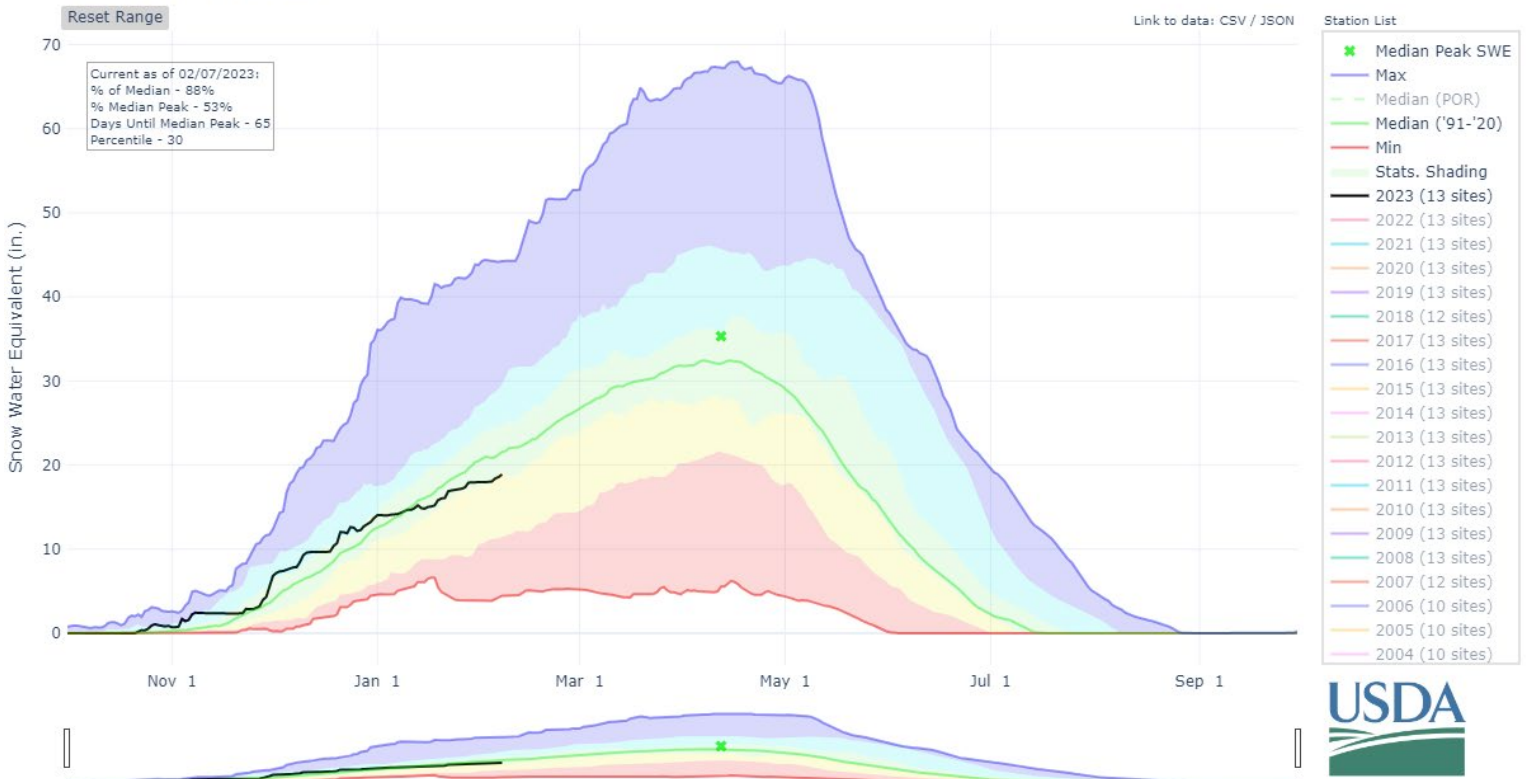
1) 90% And 10% exceedance probabilities are actually 95% And 5%

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

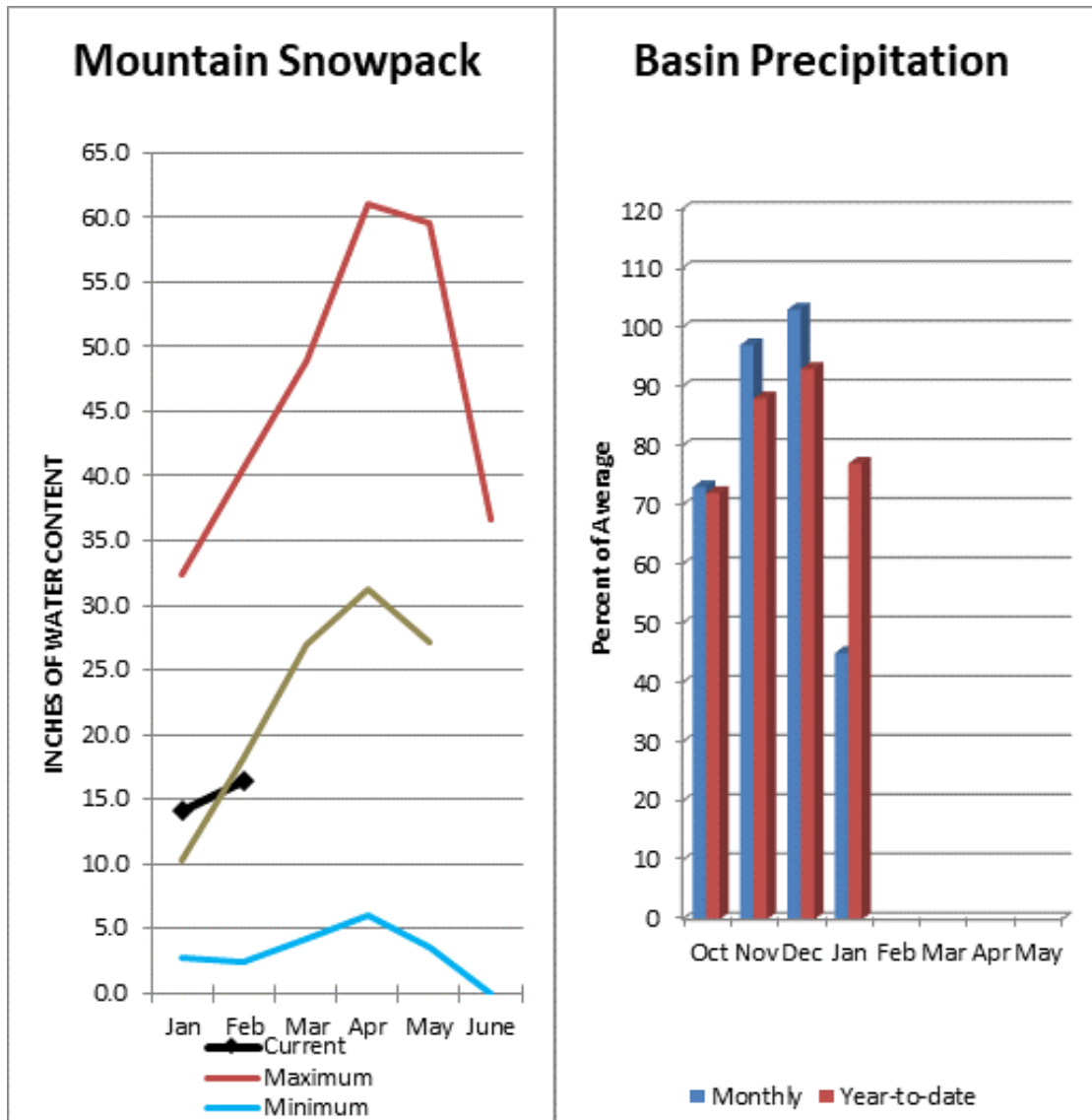
Reservoir Storage End of January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Howard Hansen	0.5	0.7	2.0	0.0

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
South Puget Sound	15	90%	100%
White	6	92%	104%
Puyallup	2	114%	123%
Green	8	94%	98%

SNOW WATER EQUIVALENT IN SOUTH PUGET SOUND



Central Puget Sound River Basins



February 1 median snow cover in Central Puget Sound was 91%. Basin-wide precipitation for January was 45% of normal, bringing water-year-to-date to 77% of normal.

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

Central Puget Sound River Basins

Data Current As of: 2/6/2023 1:23:06 PM

Central Puget Sound Streamflow Forecasts - February 1, 2023

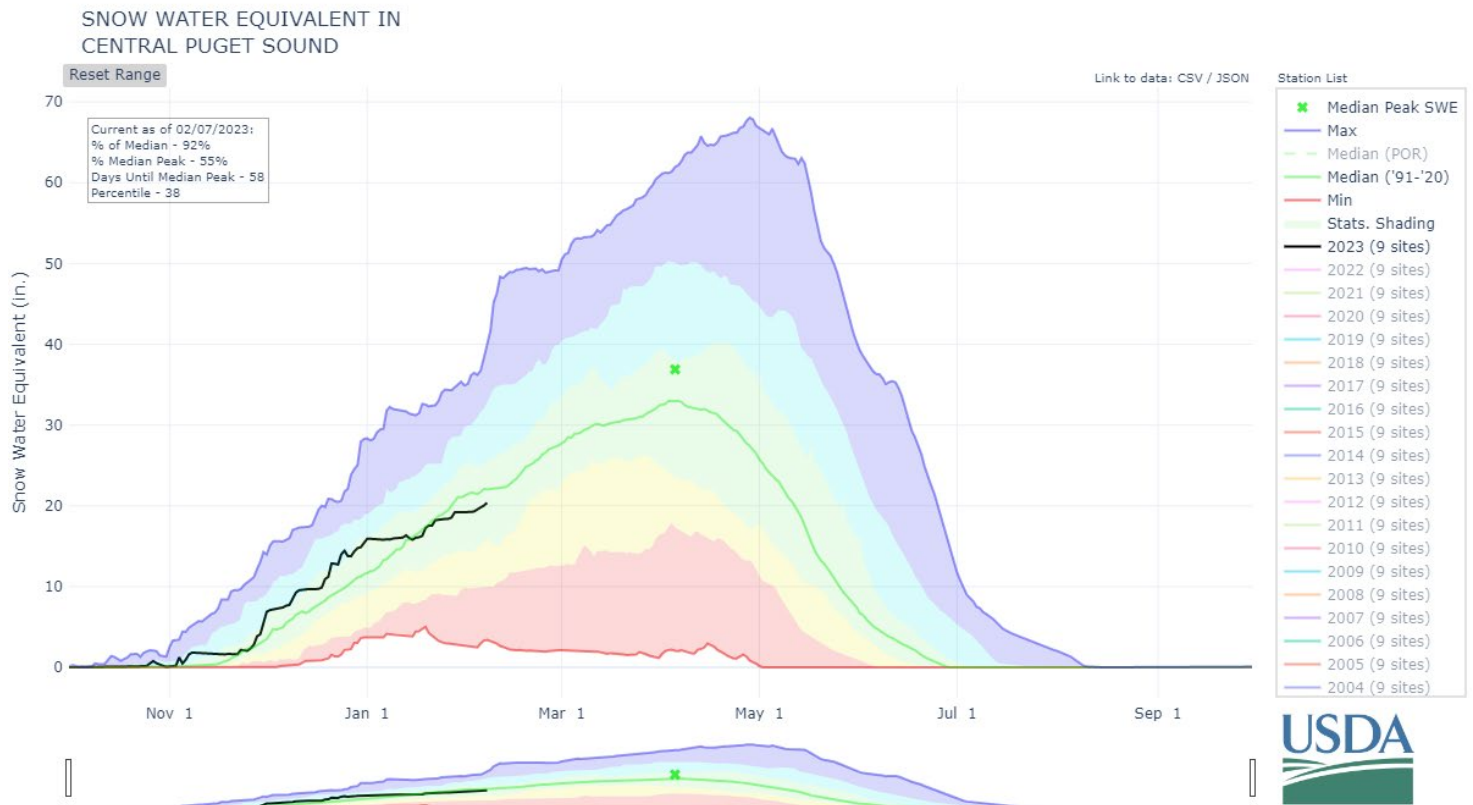
Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

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	14.7	18.9	22	105%	25	29	21
	APR-SEP	17.9	22	25	104%	28	33	24
SF Tolt R nr Index	APR-JUL	7.1	10	11.9	89%	13.9	16.8	13.4
	APR-SEP	8.6	11.6	13.7	89%	15.8	18.8	15.4
Rex R nr Cedar Falls	APR-JUL	17.4	22	25	109%	29	33	23
	APR-SEP	19	24	27	104%	31	36	26
Cedar R nr Cedar Falls	APR-JUL	43	59	70	97%	81	98	72
	APR-SEP	48	65	76	99%	87	104	77

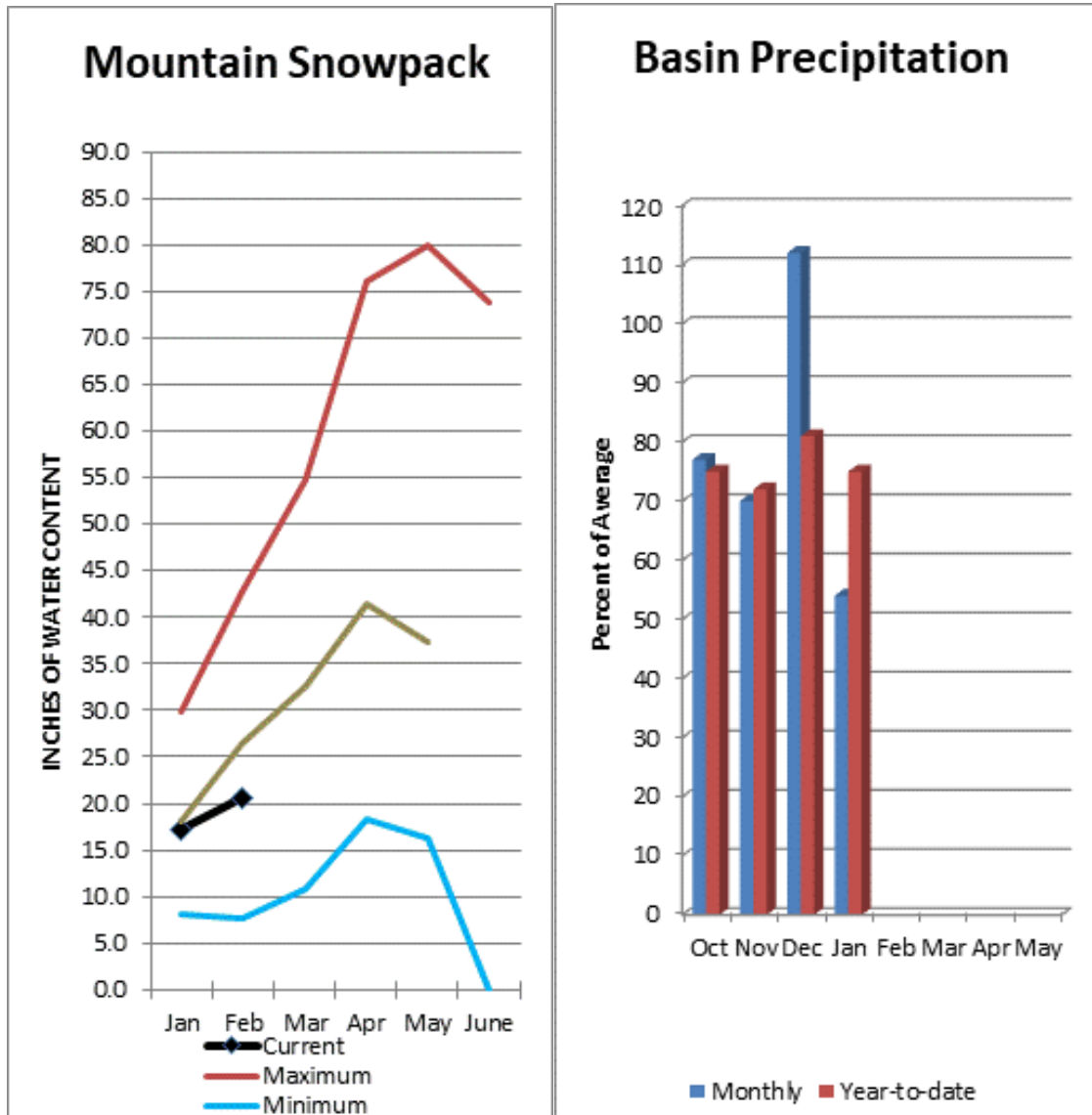
1) 90% And 10% exceedance probabilities are actually 95% And 5%

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

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
Central Puget Sound	10	91%	103%
Tolt	2	91%	104%
Snoqualmie	4	97%	112%
Skykomish	3	87%	101%
Cedar	7	94%	104%



North Puget Sound River Basins



February 1 median snow cover in North Puget Sound was 78%. Basin-wide precipitation for January was 54% of normal, bringing water-year-to-date to 75% of normal. February 1 Basin-wide reservoir storage was 84% of normal.

North Puget Sound River Basins

Data Current As of: 2/6/2023 1:23:04 PM

North Puget Sound Streamflow Forecasts - February 1, 2023

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

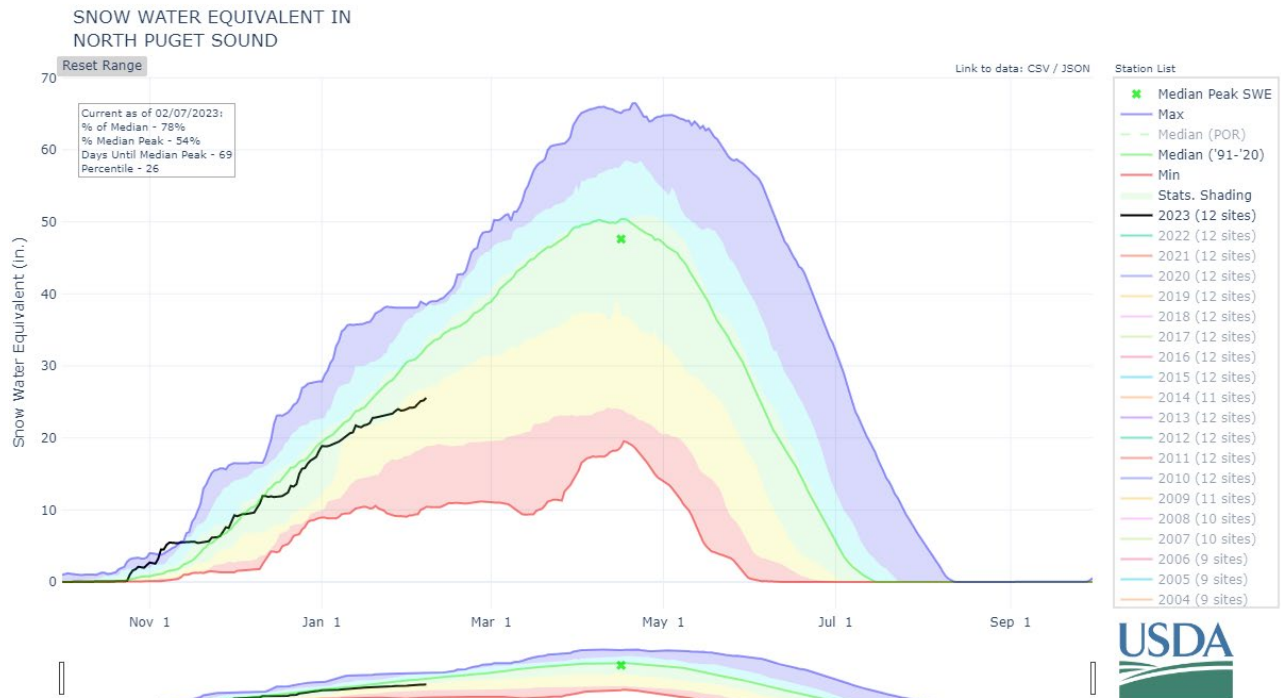
North Puget Sound	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Thunder Ck nr Newhalem	APR-JUL	200	220	235	98%	250	270	240
	APR-SEP	295	315	330	100%	345	365	330
Skagit R at Newhalem	APR-JUL	1260	1470	1610	93%	1750	1960	1740
	APR-SEP	1510	1750	1910	95%	2070	2310	2020
Baker R at Concrete	APR-JUL	585	675	735	95%	795	885	770
	APR-SEP	785	885	950	96%	1020	1120	990

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

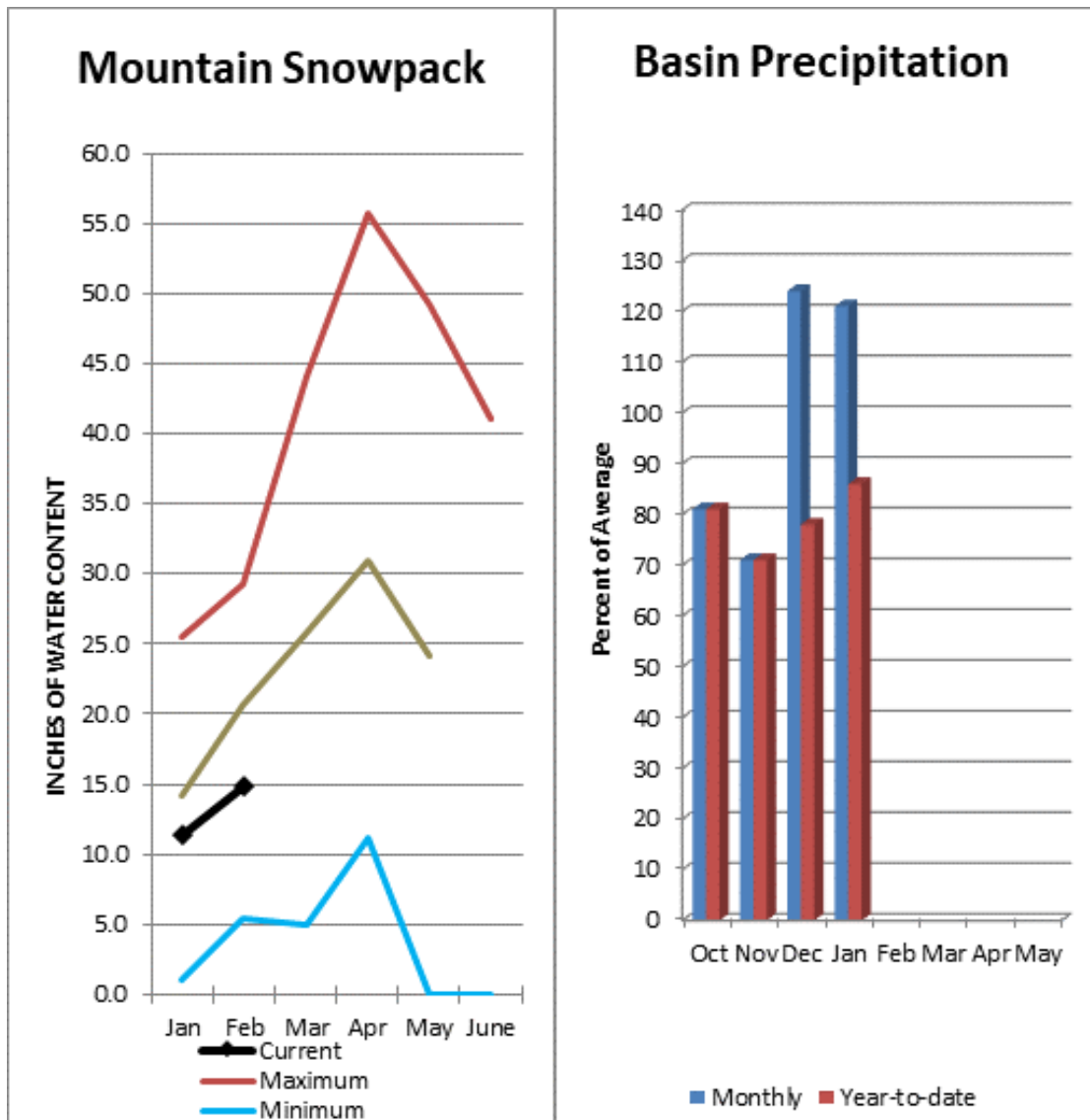
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of January, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Diablo Reservoir			86.1	90.6
Upper Baker	88.8	94.8	100.2	0.0
Gorge Reservoir			7.8	0.0
Ross	843.9	1079.3	995.6	1434.7
Lake Shannon	74.1	88.3	100.0	0.0

Watershed Snowpack Analysis February 1, 2023	# of Sites	% Median	Last Year % Median
North Puget Sound	15	78%	100%
Skagit	8	80%	107%
Nooksack	3	80%	86%
Baker	2	73%	101%



Olympic Peninsula River Basins



Olympic Peninsula snowpack averaged 72% of normal on February 1. January precipitation was 121% of normal. Precipitation has accumulated at 86% of normal for the water year.

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

Olympic Peninsula River Basins

Data Current As of: 2/6/2023 1:23:11 PM

Olympic Streamflow Forecasts - February 1, 2023

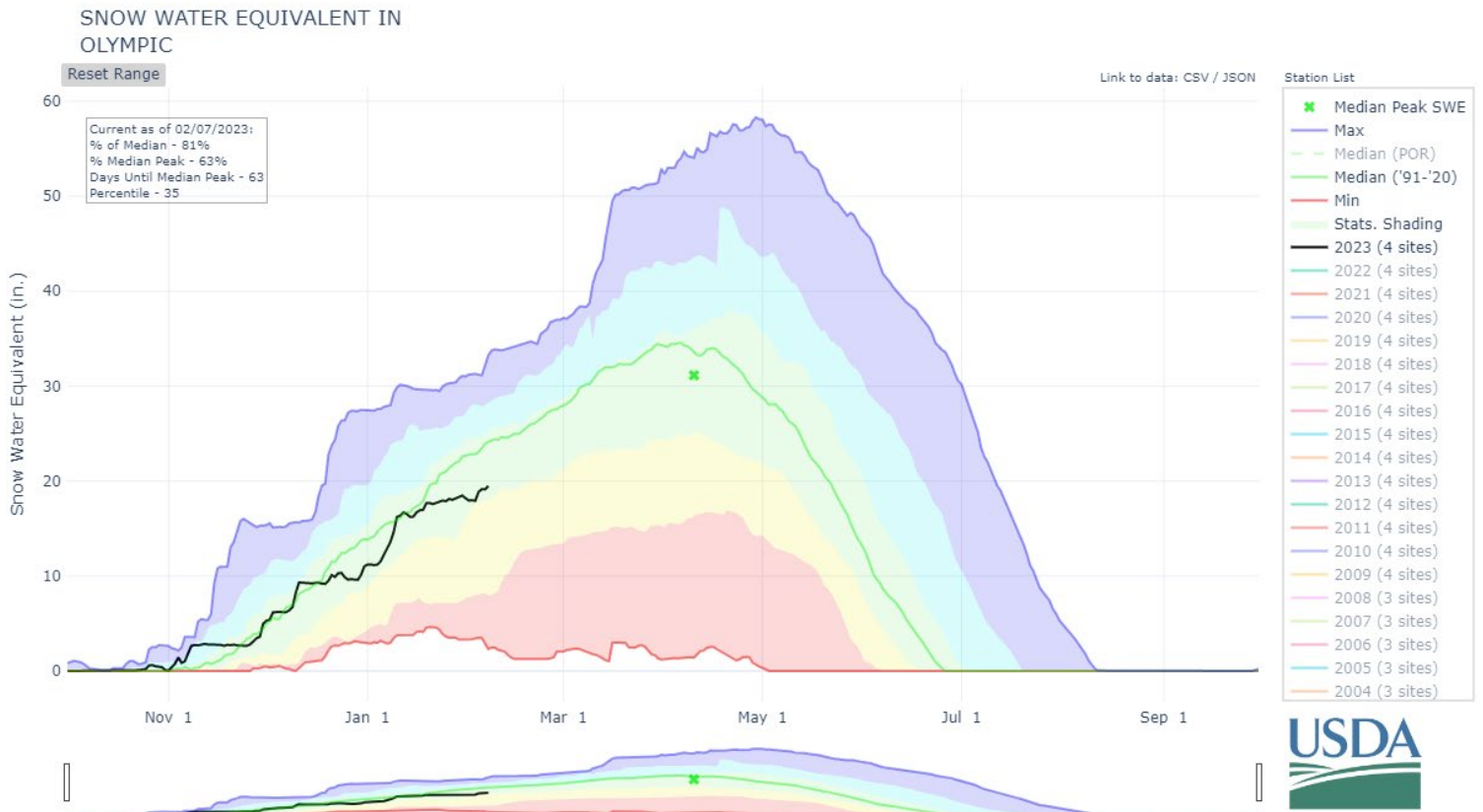
Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

Olympic	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Dungeness R nr Sequim	APR-JUL	78	101	116	97%	131	154	119
	APR-SEP	80	112	133	96%	154	186	139
Elwha R at McDonald Br nr Port Angeles	APR-JUL	230	300	350	95%	400	470	370
	APR-SEP	280	360	410	92%	465	540	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 February 1, 2023	# of Sites	% Median	Last Year % Median
Olympic	7	72%	90%
Olympic	7	72%	90%



Issued by

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

Released by

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

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

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

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



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



Washington Water Supply Outlook Report

**Natural Resources Conservation Service
Spokane, WA**

