



Washington Water Supply Outlook Report

January 1, 2024



Clouds begin to part over Lichtenberg mountain in the central WA cascades. Stevens Pass, a near-by SNOTEL site, reported snowpack at 71% of median on January 1st.

Photo taken by Josh Lipkowitz, Northwest Avalanche Center (January 3rd, 2024)

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Conditions Overview

Summary

Winter kicked off with the development of a strong El Niño (access climate.gov for more information) and a series of atmospheric river events that impacted the Northwest coast starting December 2nd. The first such storm brought significant snow accumulation to the Cascades and Olympic Peninsula, while 2 proceeding storms brought warmer temperatures and rain, even at higher elevations. After a weaker atmospheric river passed through on December 8, there was little additional precipitation during December, with temperatures remaining anomalously warm and water year-to-date (WYTD) precipitation below normal. Most of the state is in a moderate to severe [snow drought](#) as of January 1. Several SNOTEL sites in Washington recorded the lowest or second lowest January-1st snowpack on record, with snowpack at several more sites ranking in the top 5 lowest on record. Statewide snowpack as of January 1st is near its lowest on record since 1985.

Conditions so far this winter are consistent with historical tendencies for moderate to strong El Niño events—the Pacific Northwest historically tends to be drier and warmer than normal, with lower snowpack in the Cascades and Olympics. The last very strong events dating back to the 1950s resulted in drier conditions in the northern Washington Cascades, with more variability elsewhere and with variable snowpack conditions between each event. There is currently a [54% chance](#) the current El Niño will develop into a historically strong event.

**Note that basin conditions outlined in this report include data from stations within the SNOTEL and SNOLITE network, and/or cooperator weather stations.*



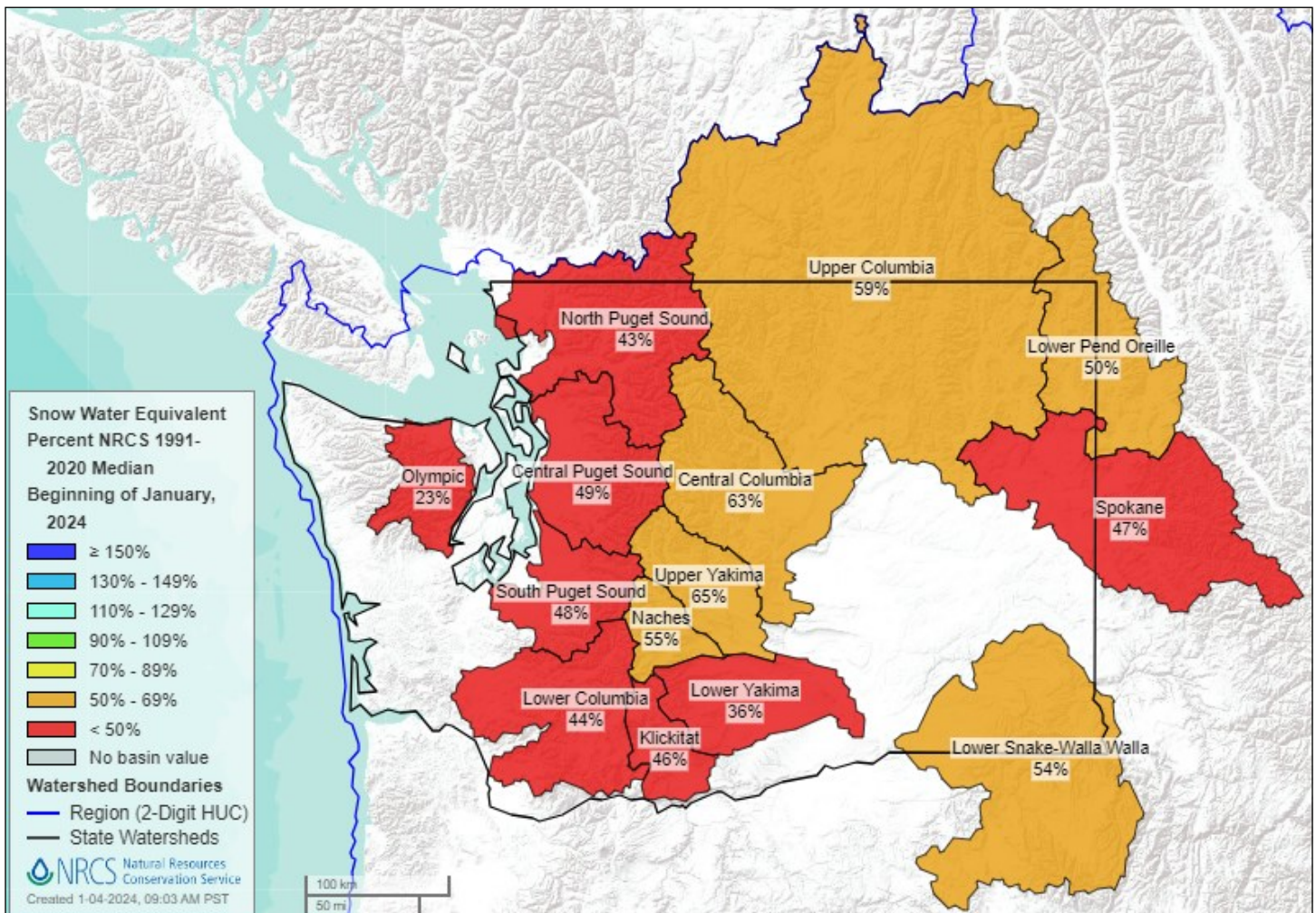
Wet snowballs roll downslope over the Paradise river near Mt. Rainier. Paradise, a nearby SNOTEL site, reported snowpack at 59% of median on January 1st.

Photo taken by Remo Cocco, Mt. Rainier Nordic Patrol (December 31st, 2023)

Snowpack

Statewide snowpack is well-below normal, with several sites recording their lowest or second lowest January-1st snowpack on record. Statewide, snowpack at the start of the year is the 3rd lowest on record since 1985. This is a result of mostly below-normal water year-to-date precipitation, but also above-normal temperatures throughout December such that a higher proportion of precipitation fell as rain instead of snow, even at higher elevations in the mountains. After the atmospheric rivers that impacted the region in early December, little snow accumulation occurred in the latter half of the month.

Snowpack is generally well-below normal along the windward slopes of the Cascades, with values ranging from 0-78% of normal. Along the leeward slopes and extending to northeast WA, snowpack is well to moderately-below normal with values ranging from 10-90%.

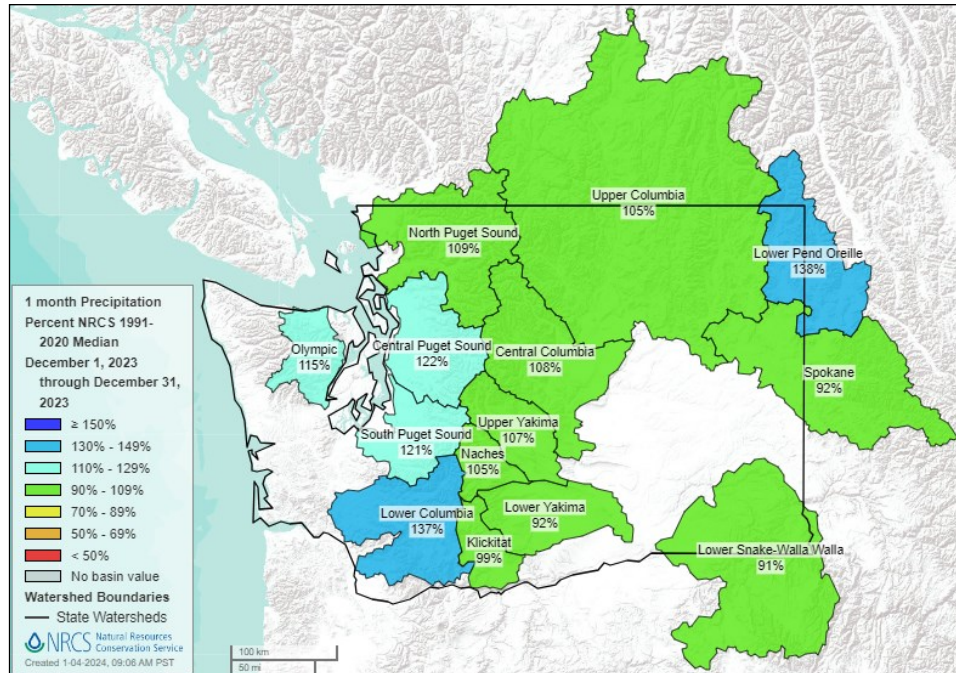


Basin snowpack (% of median) as of January 1.

Precipitation

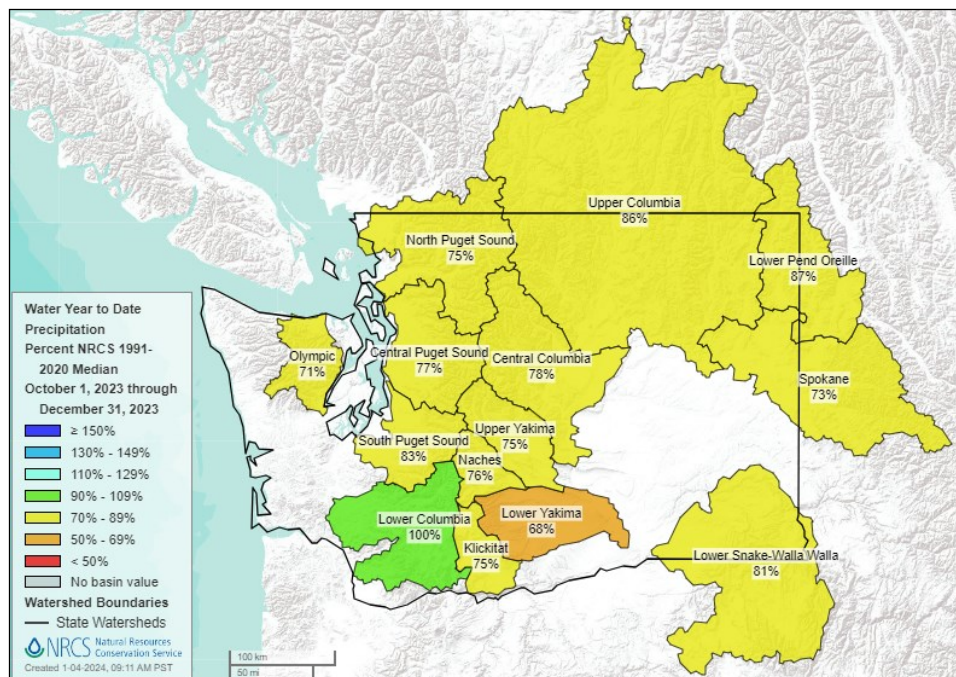
Statewide, WYTD precipitation is below normal, with some SNOTEL sites around Mt. Rainier and Mt. St. Helens near to above normal. SNOTEL sites near and south of Mt. Rainier generally have a higher WYTD precipitation as percent of normal ranging from 47-141%, while sites to the north in the Cascades and in the Olympics are generally lower from 55-94%. WYTD precipitation at sites east of the Okanogan River are near normal.

Precipitation deficits still persist for much of the Washington Cascades, which continue to adversely impact drought conditions there. Deficits accumulate across water years and can significantly impact current and future drought conditions, in addition to summer water supplies.



Monthly

Basin monthly precipitation (% of median) as of January 1



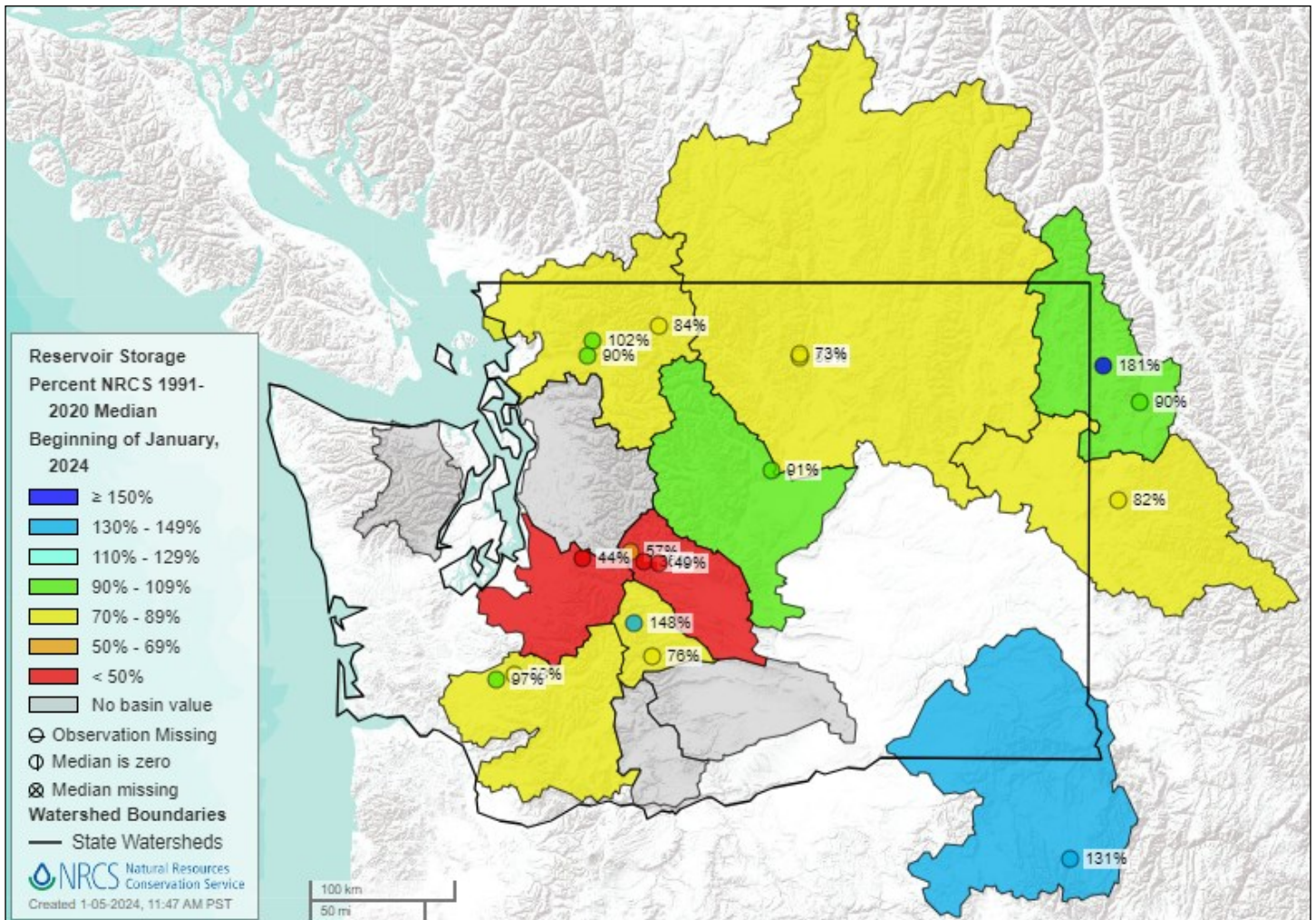
Water Year

Basin water-year precipitation (% of median) as of January 1

Reservoirs

Volumetric storage for reservoirs across Washington is variable with some increase in storage since the start of the WY (Oct. 1) due to storm impacts in early December. Storage at reservoirs near and along the I-90 corridor, including Howard Hansen, is below to well-below normal. Volumetric storage at Howard Hansen is the lowest on record for January 1. Elsewhere, reservoir storage is below to above normal. Storage volumes at reservoirs in northern Washington are below to near normal (73-102% of normal) and below to above normal in the southern Washington Cascades (76-148%).

Reservoir operators control for a variety of factors when choosing to store or release water, including flooding, irrigation, fisheries, and other water needs. These management needs may impact storage values for a reservoir.



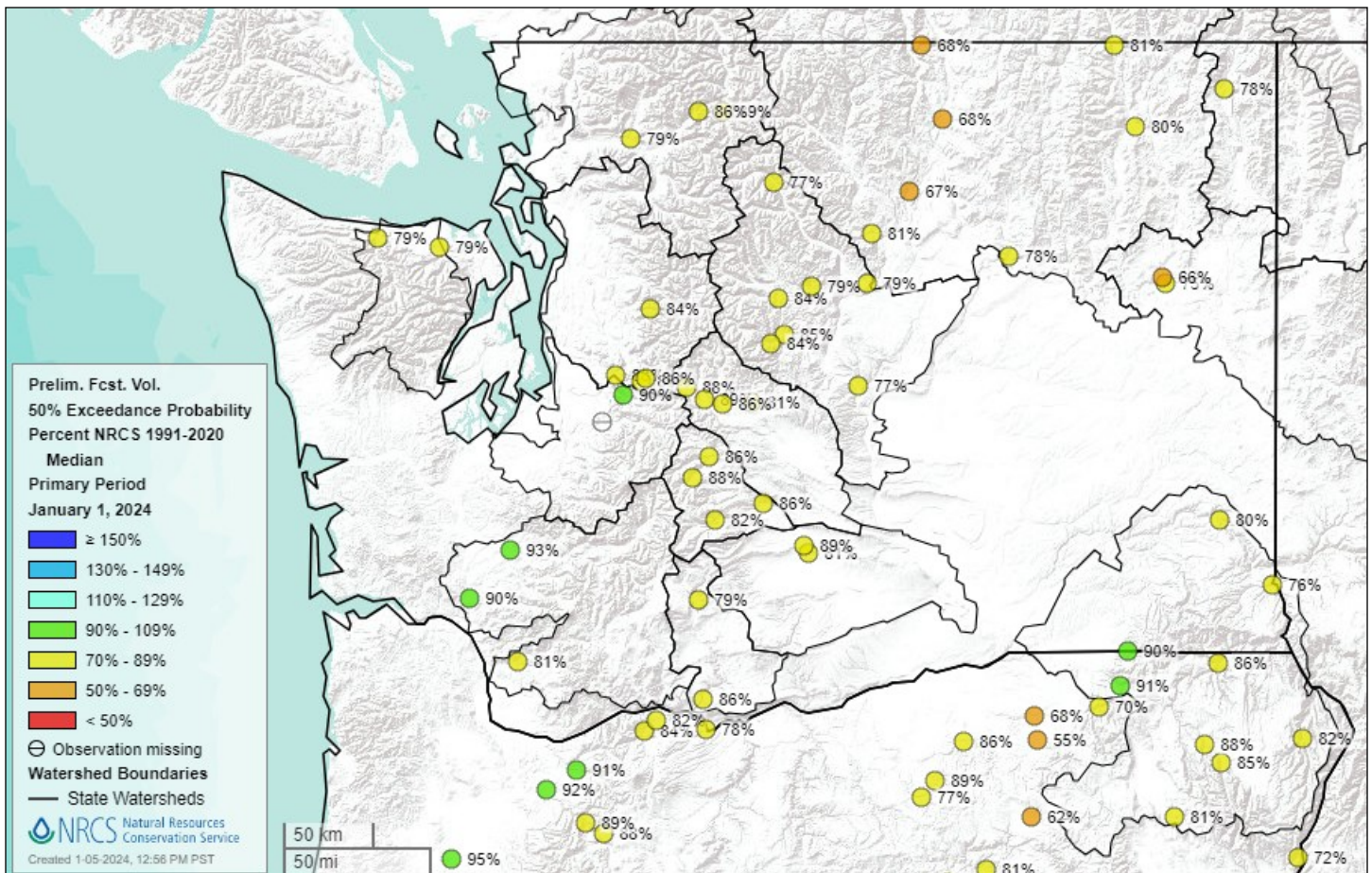
Reservoir storage (% of median) as of January 1

Streamflow

Volumetric streamflow for most of Washington is mostly near to well-above normal. Streamflows along the eastern Cascades are generally above to well-above normal and near to above normal along the western Cascades. On the Olympic Peninsula, volumetric streamflow for the Elwha and Dungeness Rivers are near normal. In northeastern Washington, streamflows are near to above normal.

Streamflow forecasts statewide are generally below normal for January 1. In the western Cascades, forecasts tend to be a higher percent of normal compared to forecasts east of the Cascades. This is in part because most runoff in basins along the western Cascades is generally rain-dominated early in the season, and less so east of the crest. Most of the snow-accumulation season is ahead, thus January-1 forecasts are comparatively low skilled because there isn't a strong relationship between January-1 conditions and late spring-summer streamflow.

View the map for December observed streamflow [here](#).



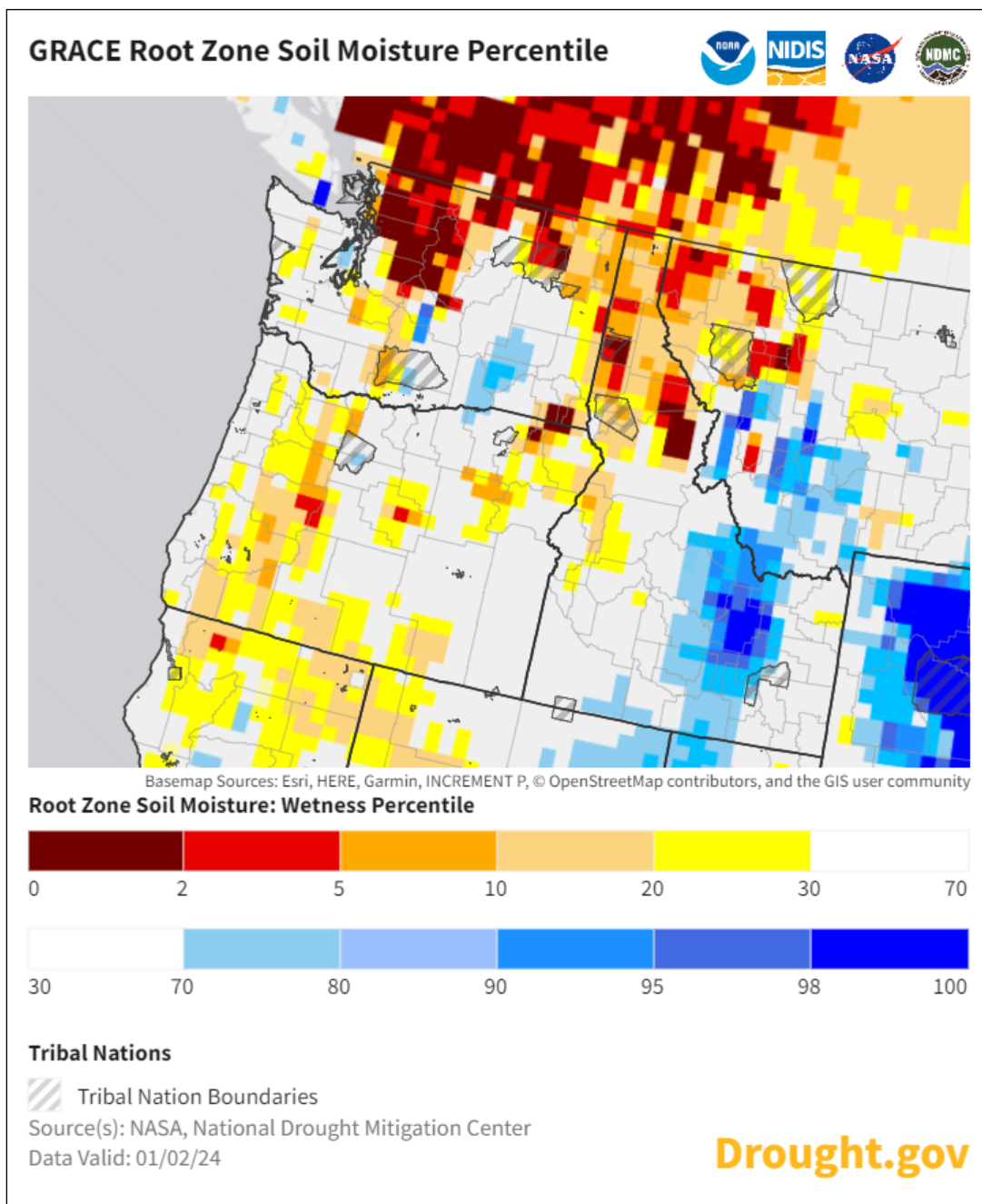
Streamflow forecasts (% of normal) for the primary period as of January 1

At the beginning of the water year, 74% of the state was in some drought category, and 43% of the state in severe to extreme drought (D2-D3).

Soils

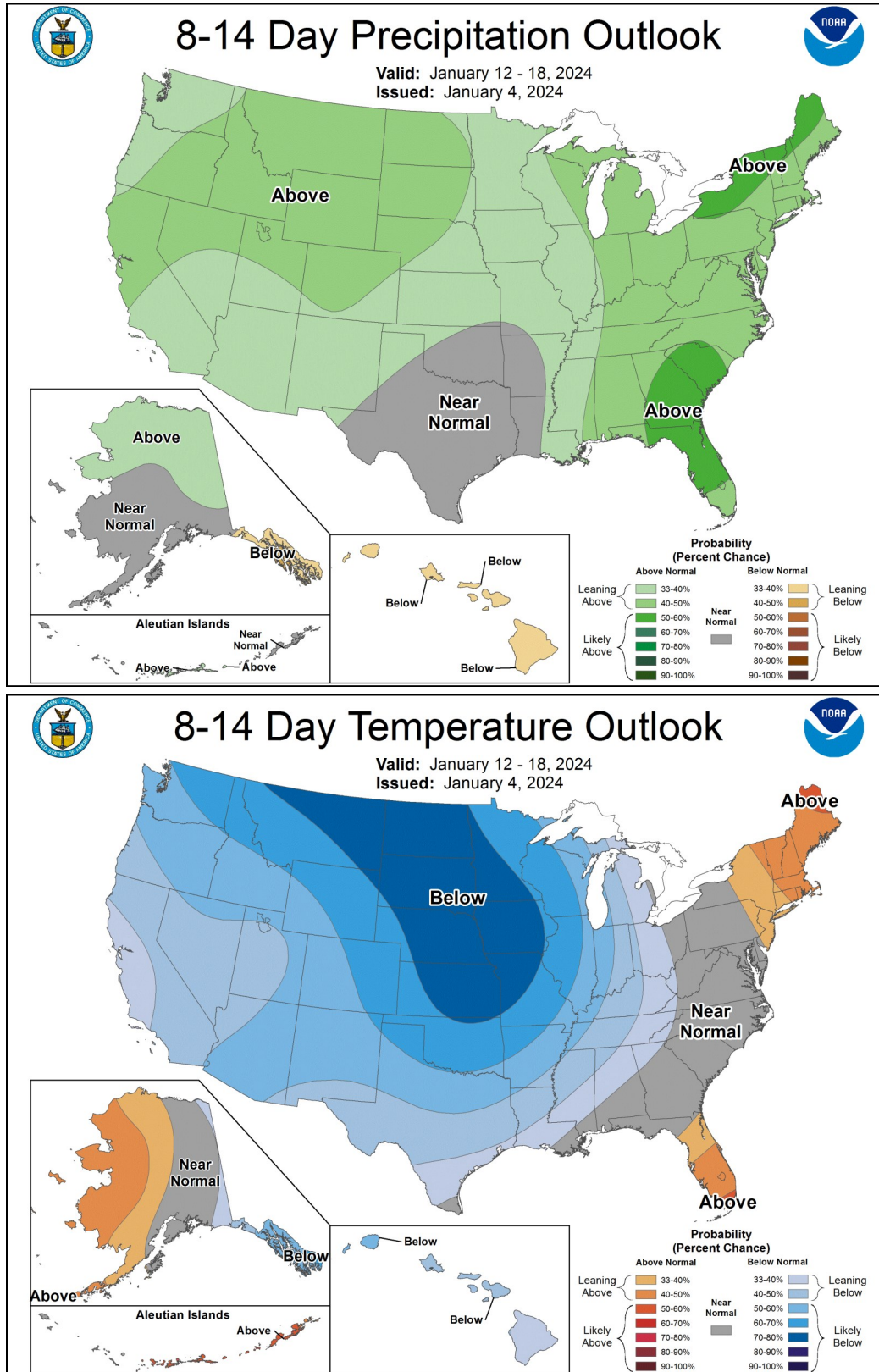
The NASA GRACE product for root-zone soil moisture indicates drier conditions for much of the central and northern Washington Cascades and in northeastern Washington. Regions with notable low root-zone soil moisture are the North Cascades and within and adjacent to the eastern portion of the Colville Tribal Confederation.

Soil moisture conditions are useful in assessing current drought and future drought potential. In addition, soil moisture is generally a good indicator of the efficiency of snowmelt runoff into streamflow in the spring. Drier soils tend to absorb more water from snowmelt than wetter soils, thus less melt is translated into streamflow (i.e. low efficiency). Soil moisture is generally restored each year during the late fall and early winter before precipitation falls predominantly as snow. Therefore, early-season soil moisture can be essential for increasing runoff efficiency in the spring.



8-14 Day Outlook

The Climate Prediction Center's 8-14 Day Outlook calls for greater chance of below-normal temperatures and above-normal precipitation throughout Washington.

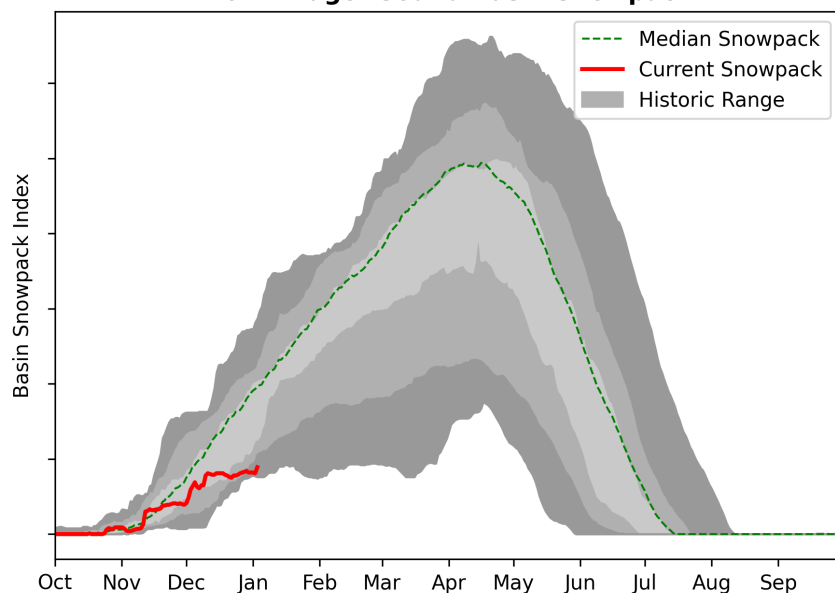


<https://www.cpc.ncep.noaa.gov/>

North Puget Sound Basin Summary

SNOWPACK

North Puget Sound Basin Snowpack

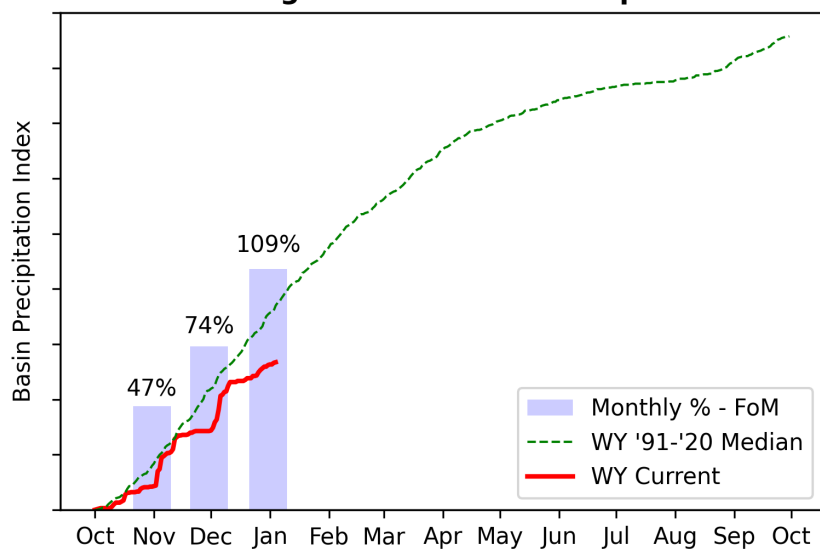


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 43% below median. This is slightly lower than December 1 when the basin snowpack was 53% of median.

PRECIPITATION

North Puget Sound Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is above normal at 109% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 75% of median.

RESERVOIR STORAGE

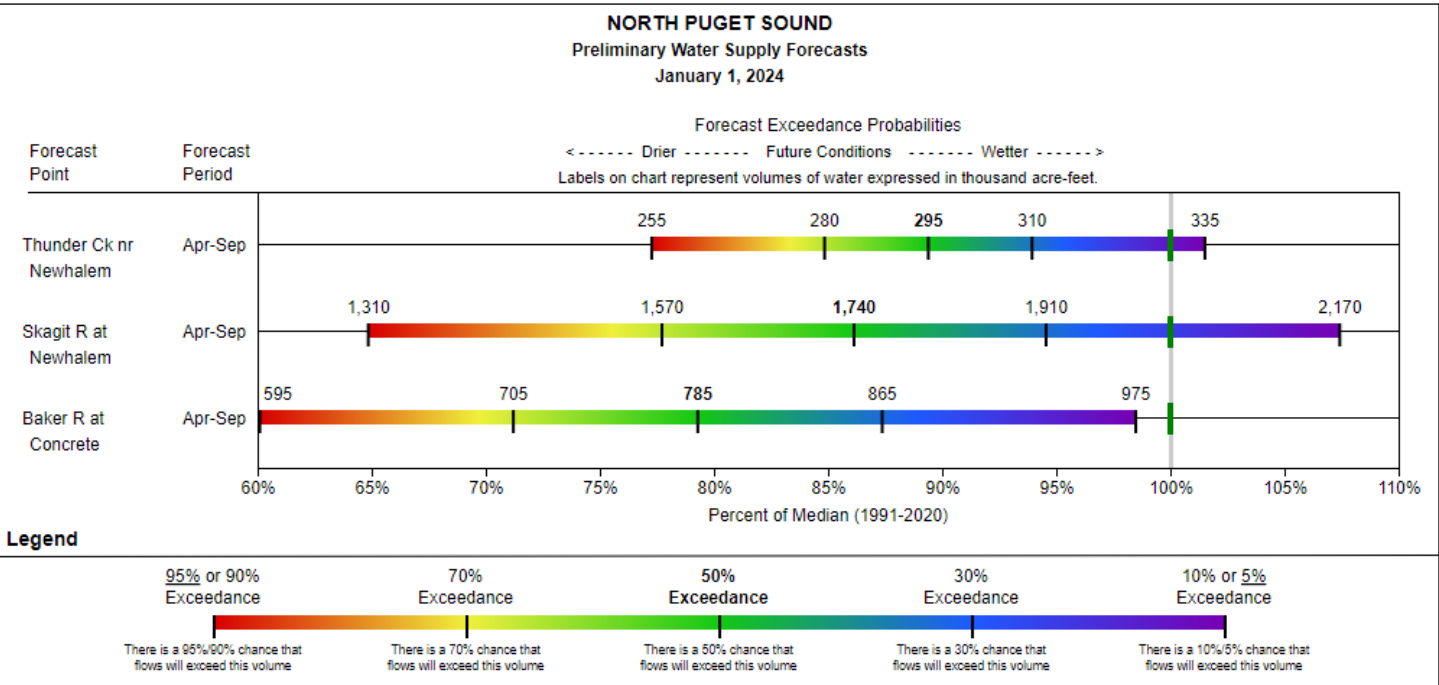
As of January 1, storage at Upper Baker Reservoir is 102% of median. Volumetric storage at Lake Shannon is 90% of median, and 84% of median at Ross Lake.

North Puget Sound	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Upper Baker	109.6	112.2	107.6					102%	104%
Lake Shannon	94.0	111.5	105.0					90%	106%
Ross	949.5	919.7	1133.0	1434.7	66%	64%	79%	84%	81%
Basin Index					66%	64%	79%	86%	85%
# of reservoirs					1	1	1	3	3

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 79% to 89% of median.

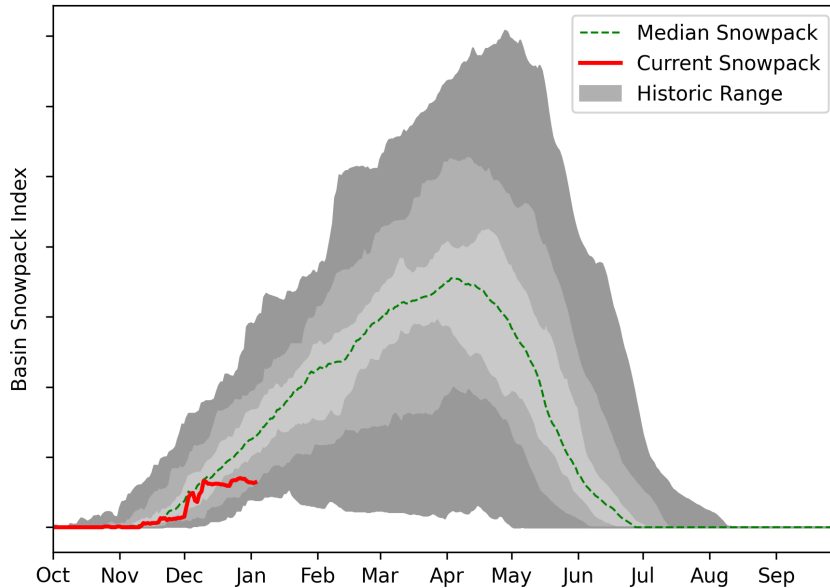
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Central Puget Sound Basin Summary

SNOWPACK

Central Puget Sound Basin Snowpack

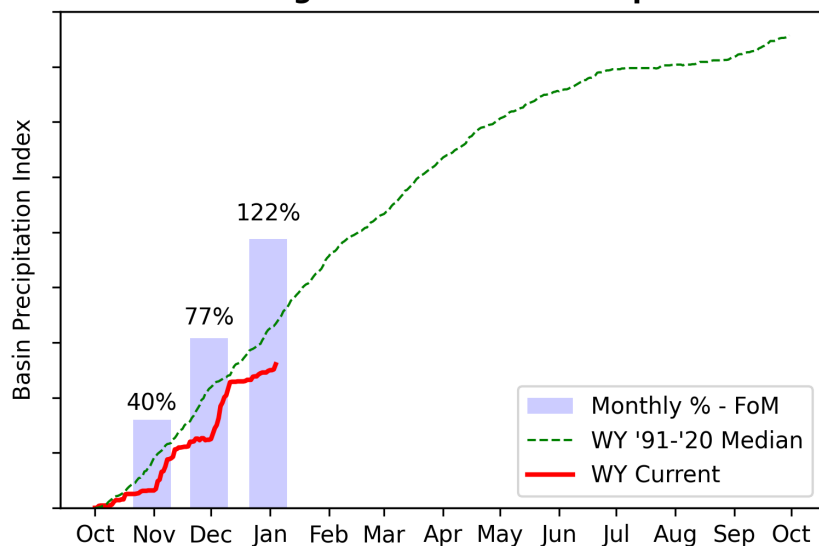


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 49% below median. This is slightly higher than December 1 when the basin snowpack was 40% of median.

PRECIPITATION

Central Puget Sound Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

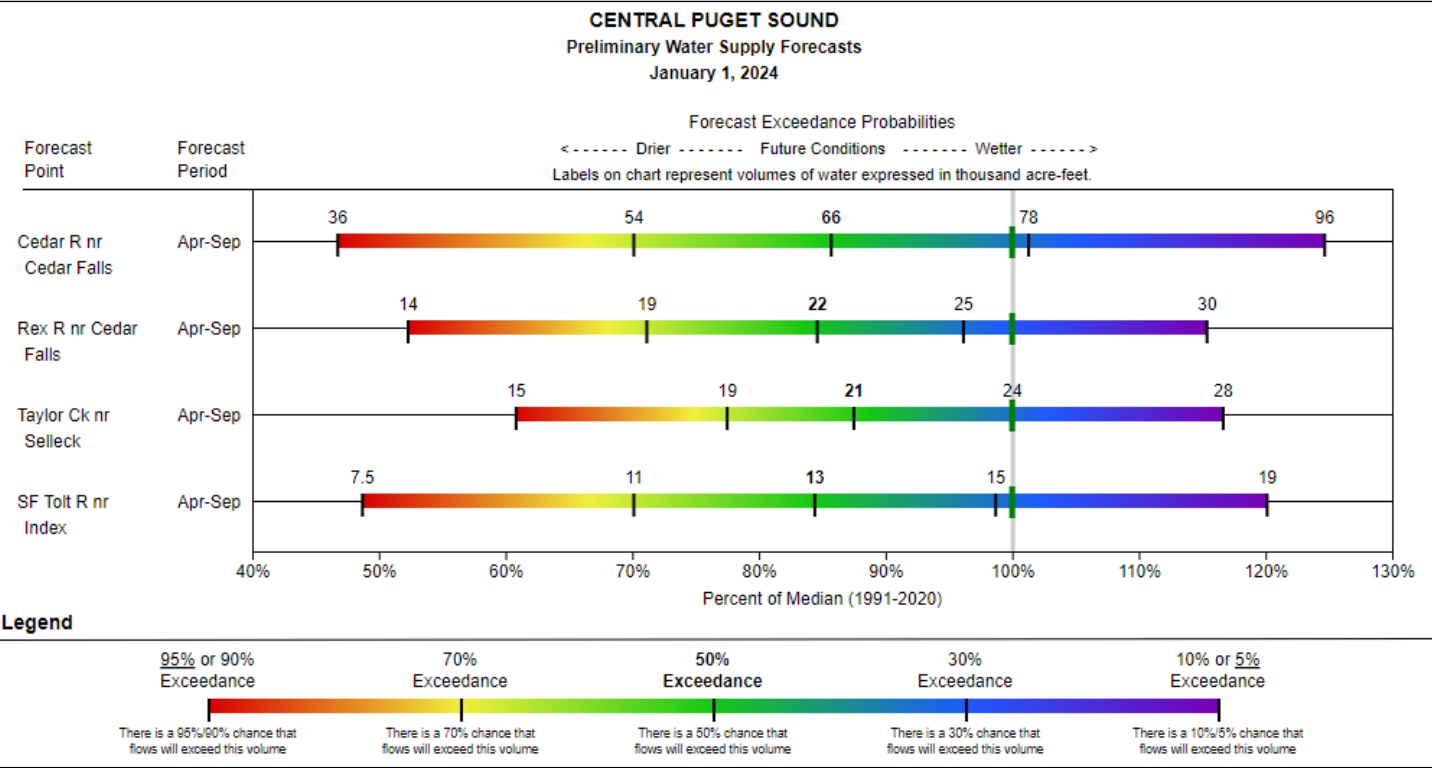
FoM = First of Month

December precipitation is above normal at 122% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 77% of median.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 84% to 88% of median.

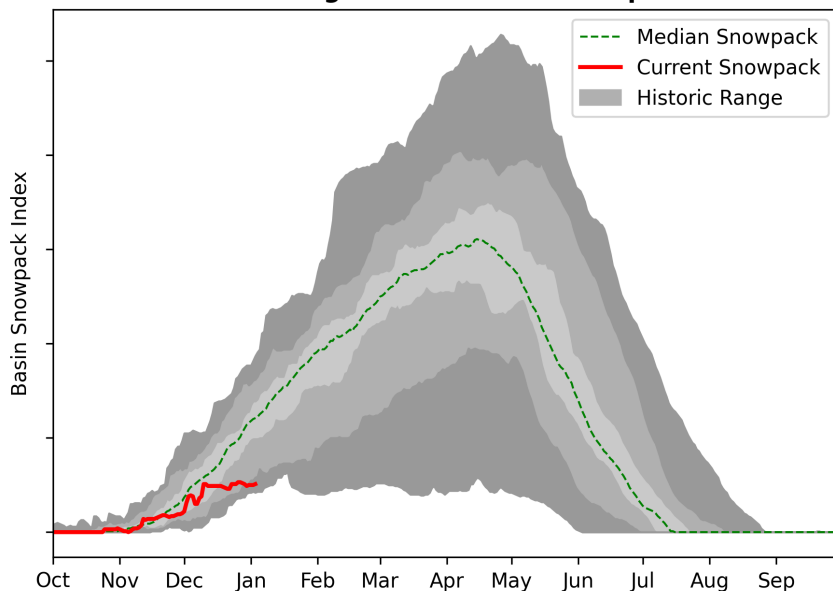
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



South Puget Sound Basin Summary

SNOWPACK

South Puget Sound Basin Snowpack

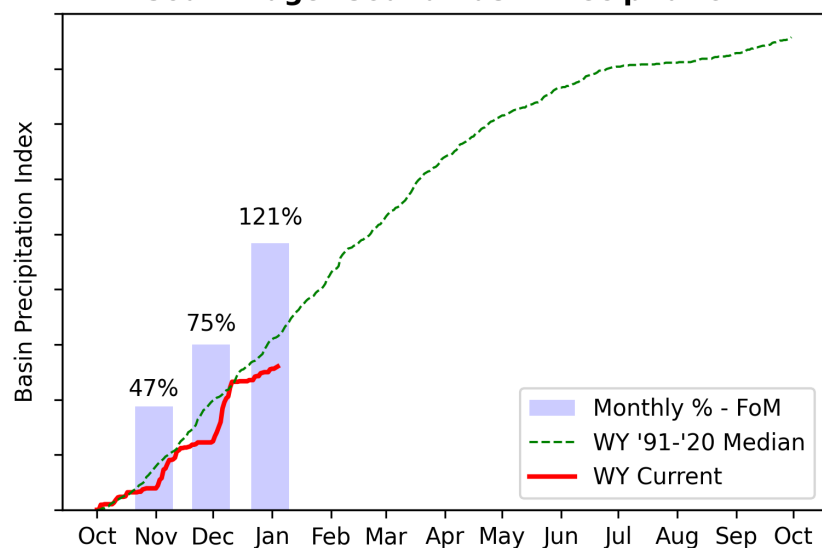


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 48% below median. This is lower than December 1 when the basin snowpack was 60% of median.

PRECIPITATION

South Puget Sound Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is above normal at 121% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 83% of median.

RESERVOIR STORAGE

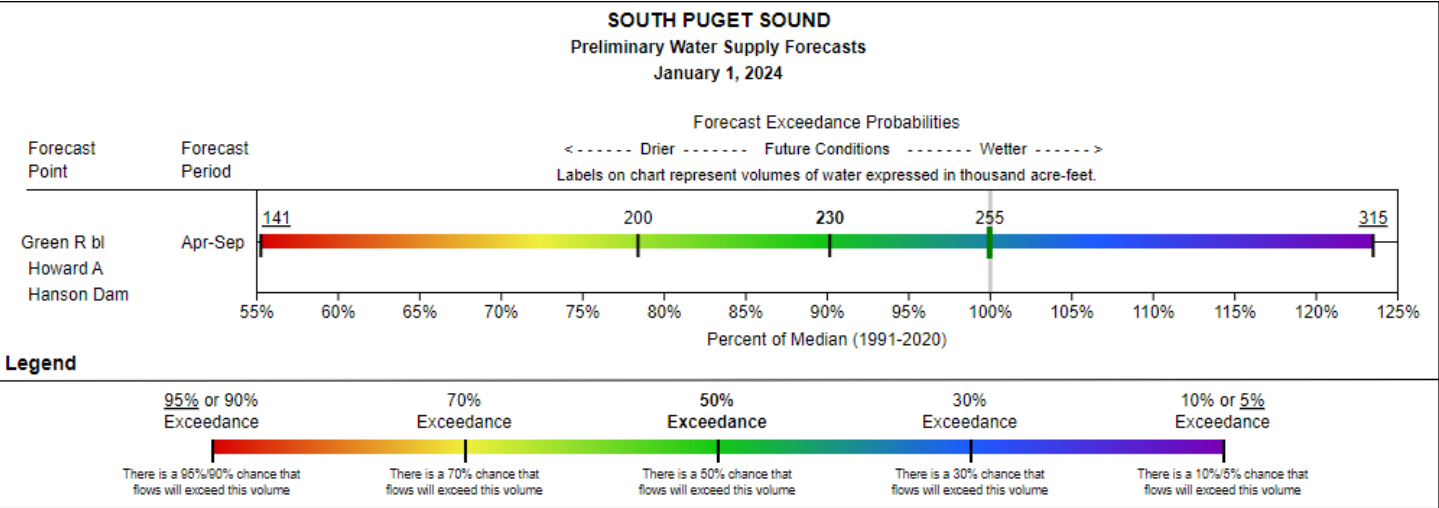
As of January 1, storage at Howard Hansen Reservoir is below normal at 44% of median.

South Puget Sound	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Howard Hansen	0.9	2.6	2.0					44%	132%
Basin Index					%	%	%	44%	132%
# of reservoirs					0	0	0	1	1

STREAMFLOW FORECAST

The April through September streamflow forecast for Green R bl Howard Hanson Dam is 90% of median. The White R nr Buckley forecast point was discontinued and a new one, White R bl Clearwater R Buckley, been established. The April through September 50% exceedance volume is 445 KAF.

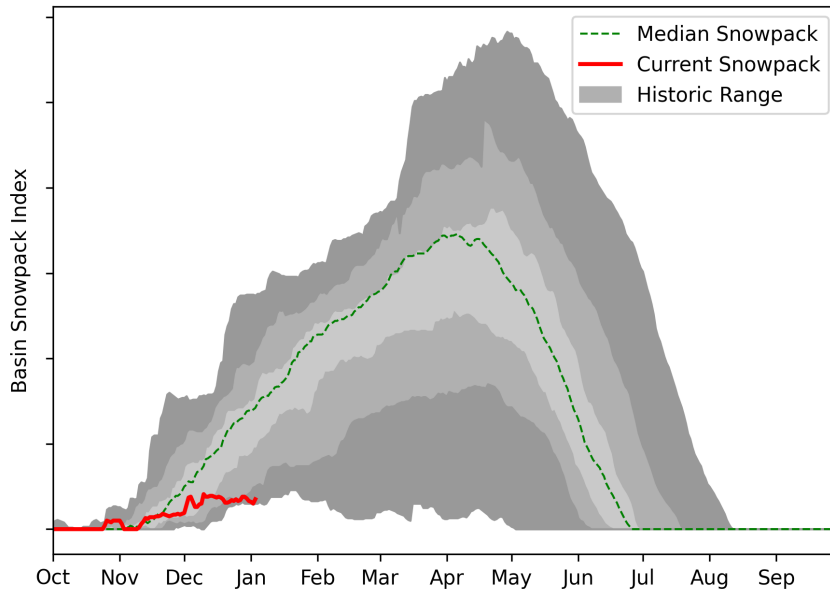
For data in tabular format, non-primary period data, and data for the new forecast point above, please view the basin data reports [here](#).



Olympic Basin Summary

SNOWPACK

Olympic Basin Snowpack

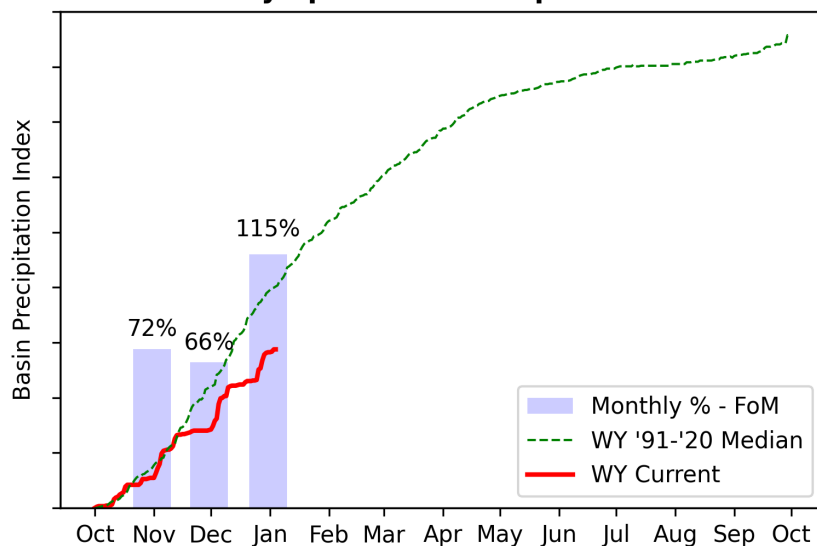


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 23% below median. This is lower than December 1 when the basin snowpack was 38% of median.

PRECIPITATION

Olympic Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

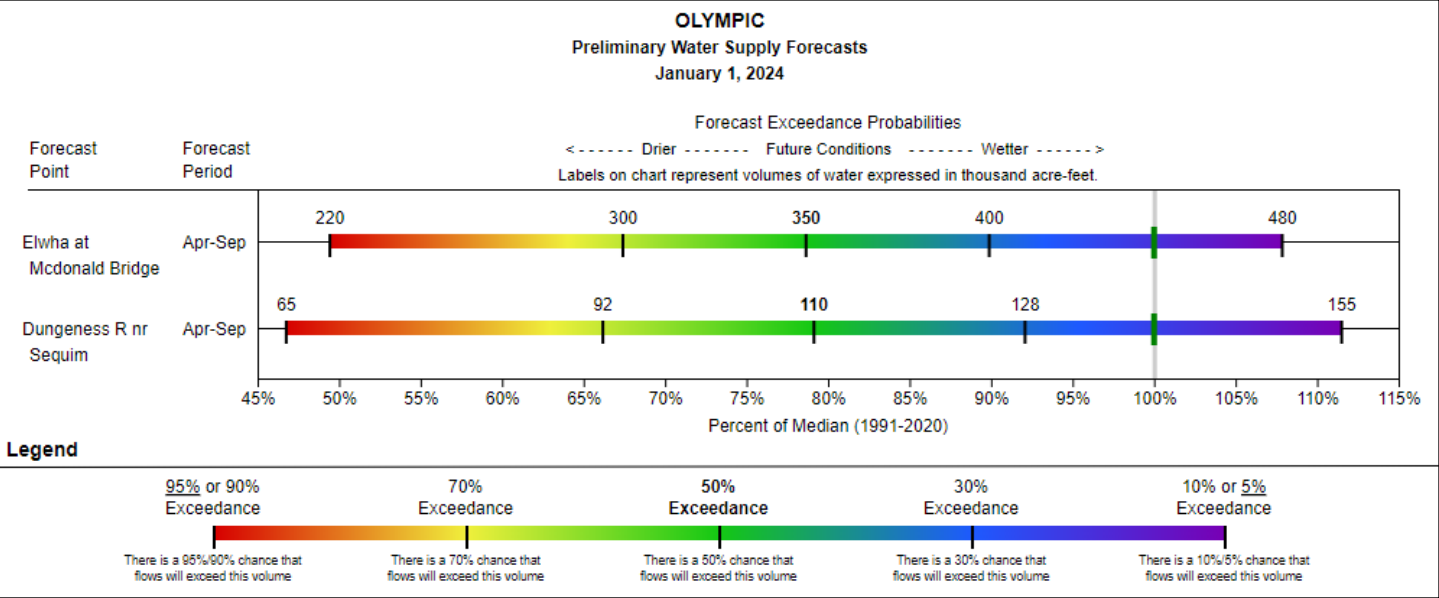
FoM = First of Month

December precipitation is above normal at 115% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 71% of median.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal at 79% of median.

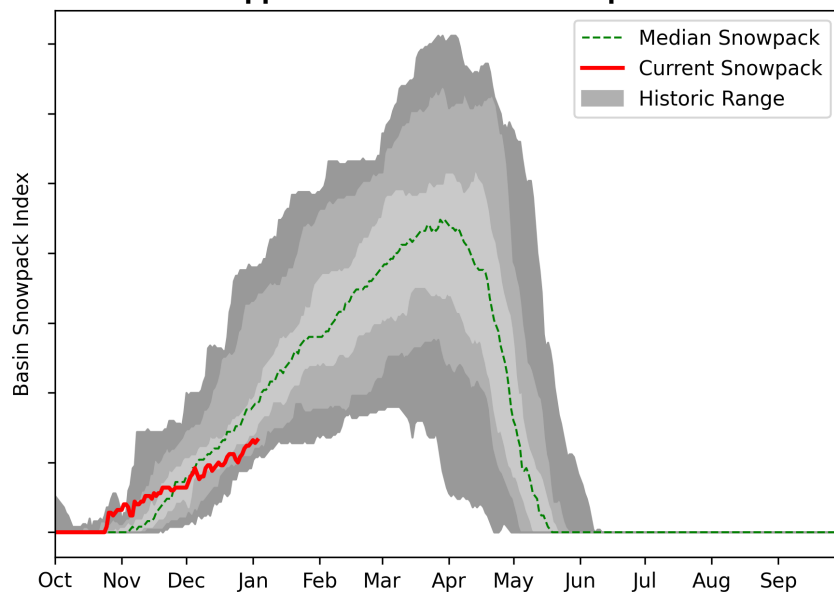
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Upper Columbia Basin Summary

SNOWPACK

Upper Columbia Basin Snowpack

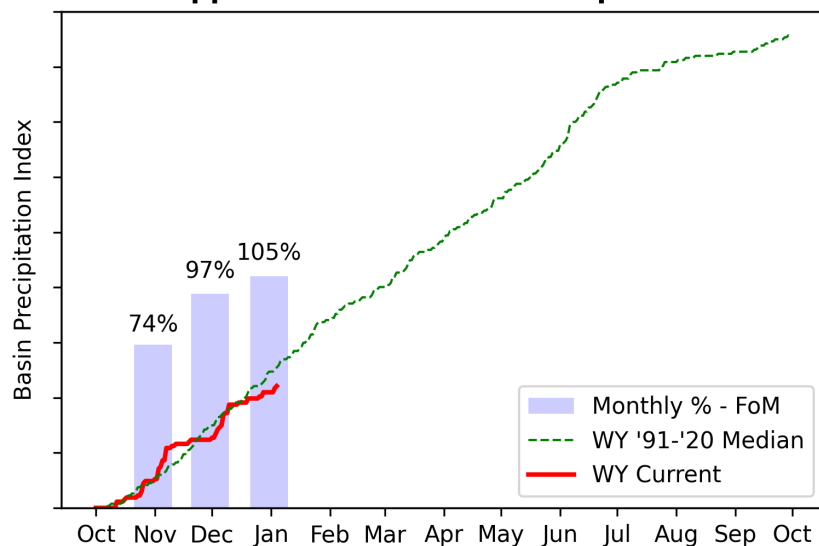


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 60% below median. This is slightly higher than December 1 when the basin snowpack was 58% of median.

PRECIPITATION

Upper Columbia Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is slightly above normal at 105% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 86% of median.

RESERVOIR STORAGE

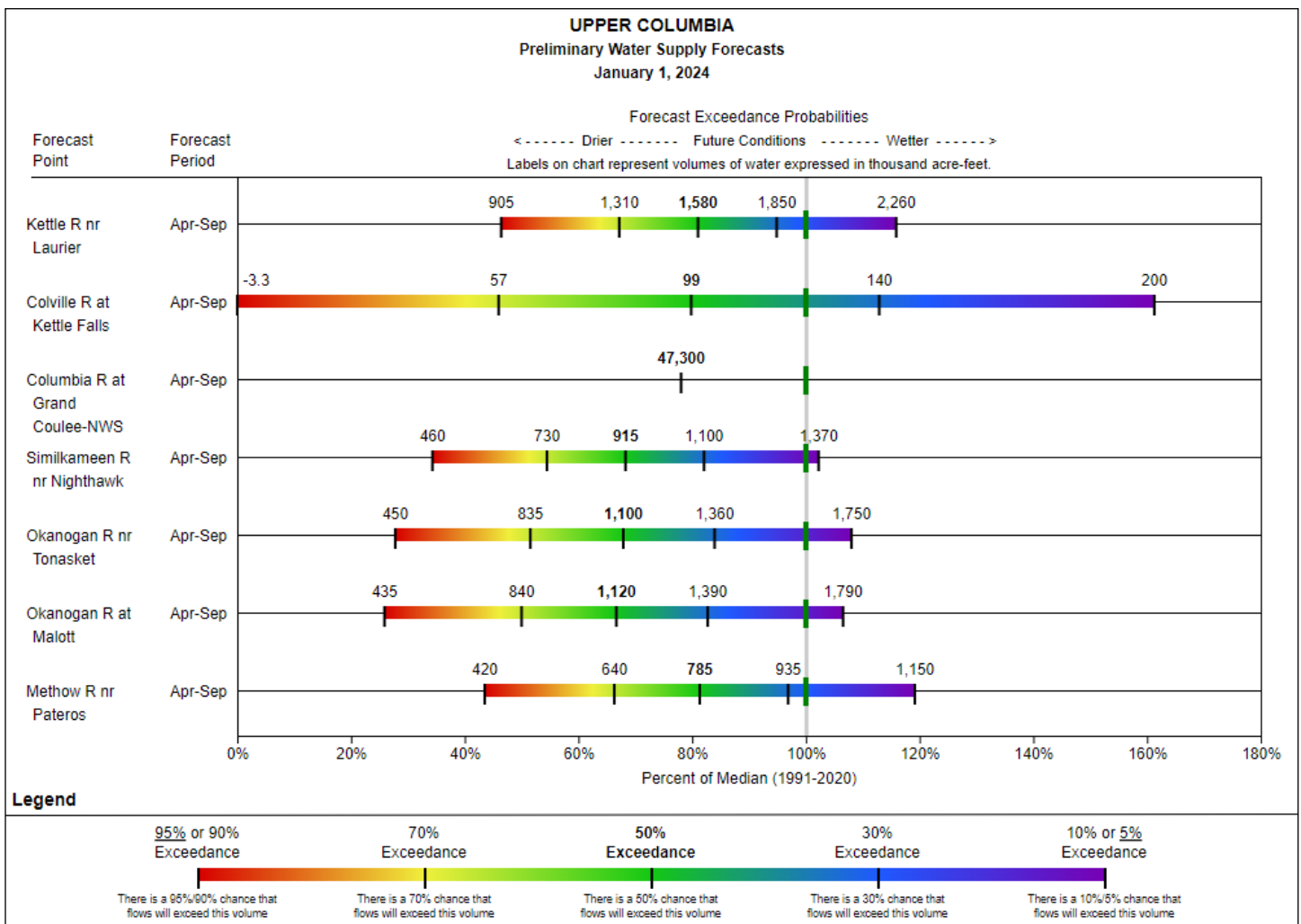
As of January 1, storage at Conconully Reservoir is below normal at 89% of median. Volumetric storage at Conconully Lake (Salmon Lake Dam) is 73% below normal.

Upper Columbia	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Conconully Lake (Salmon Lake Dam)	5.6	6.4	7.7	10.5	53%	61%	73%	73%	83%
Conconully Reservoir	6.8	7.0	7.6	13.0	52%	54%	58%	89%	92%
Basin Index					53%	57%	65%	81%	88%
# of reservoirs					2	2	2	2	2

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 67% to 81% of median.

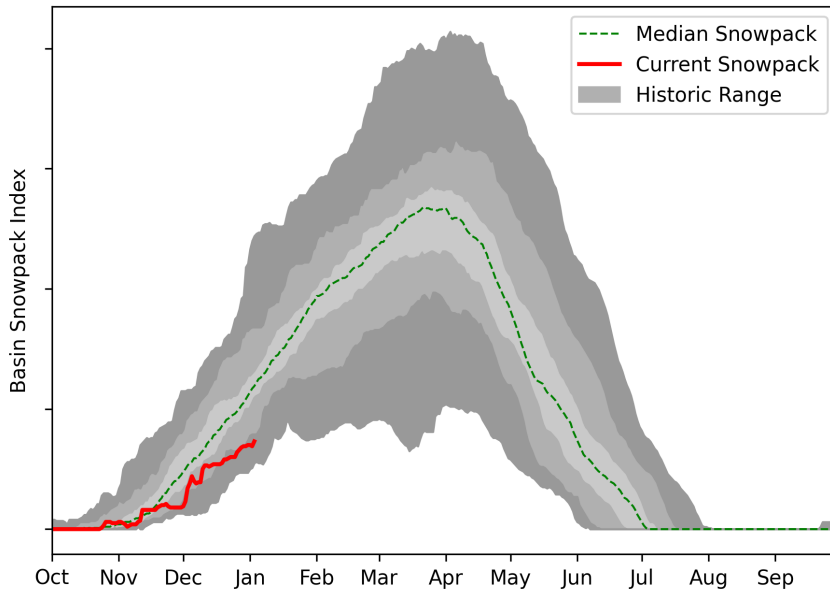
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Central Columbia Basin Summary

SNOWPACK

Central Columbia Basin Snowpack

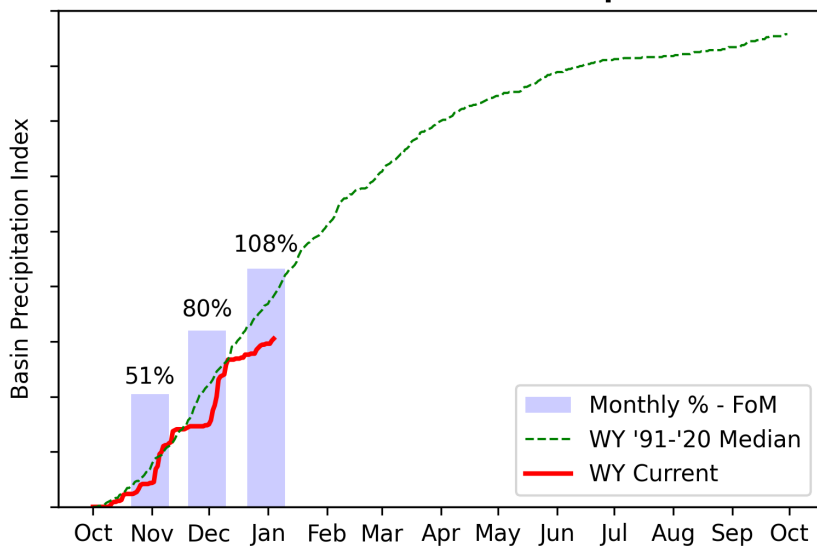


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 63% below median. This is higher than December 1 when the basin snowpack was 44% of median.

PRECIPITATION

Central Columbia Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is above normal at 108% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 78% of median.

RESERVOIR STORAGE

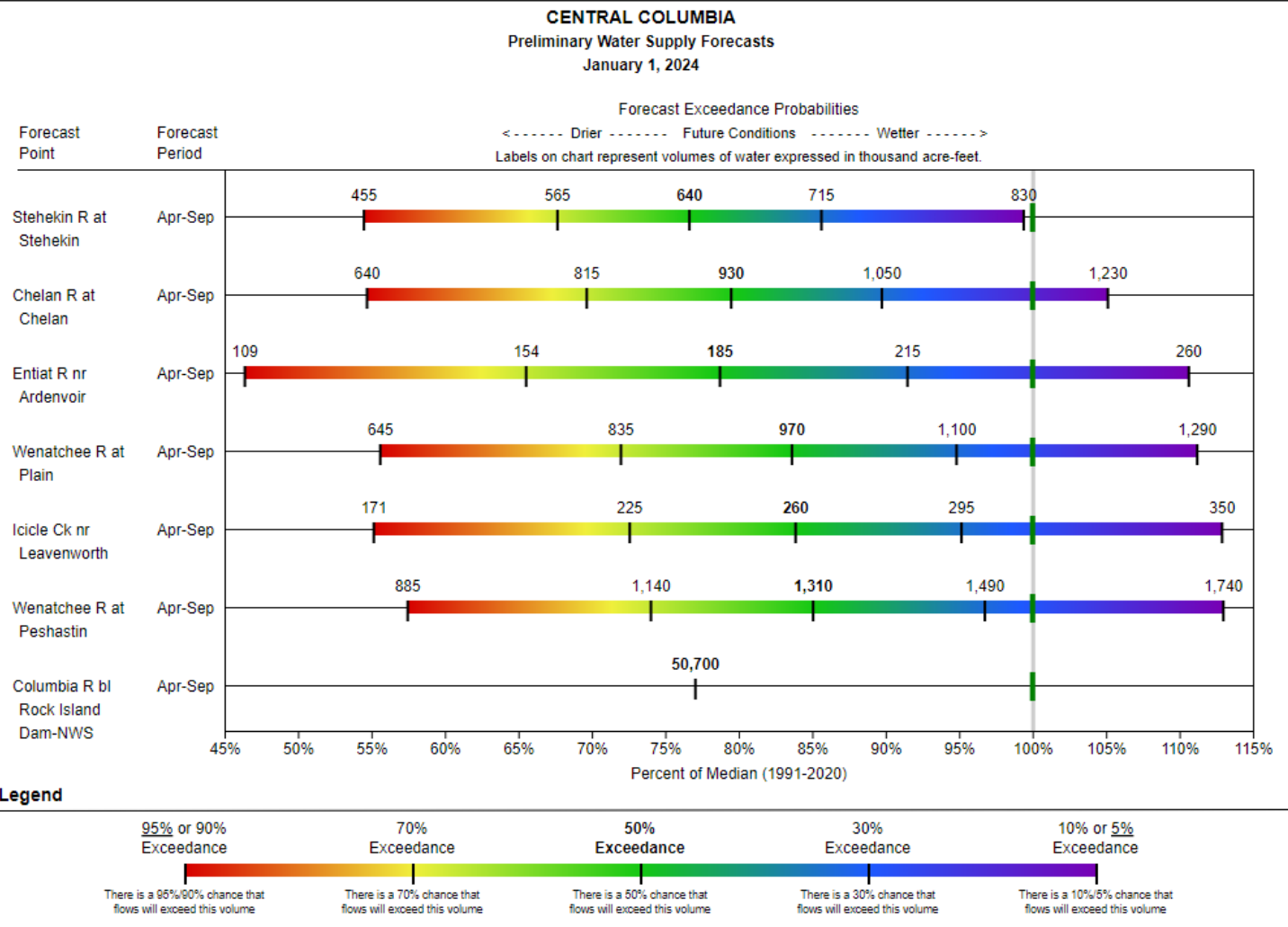
As of January 1, storage at Lake Chelan is below normal at 91% of median.

Central Columbia	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Lake Chelan	351.4	306.2	386.8	677.4	52%	45%	57%	91%	79%
Basin Index					52%	45%	57%	91%	79%
# of reservoirs					1	1	1	1	1

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 77% to 85% of median.

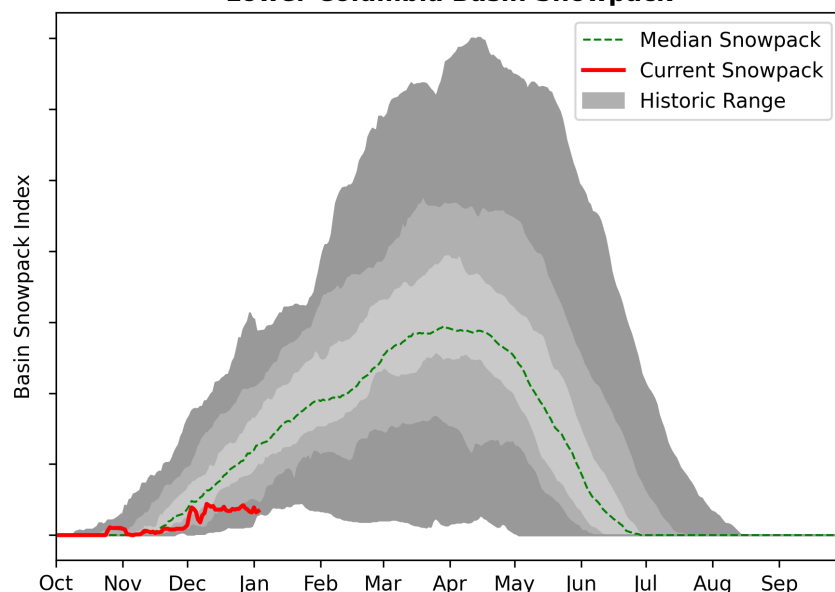
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Lower Columbia Basin Summary

SNOWPACK

Lower Columbia Basin Snowpack

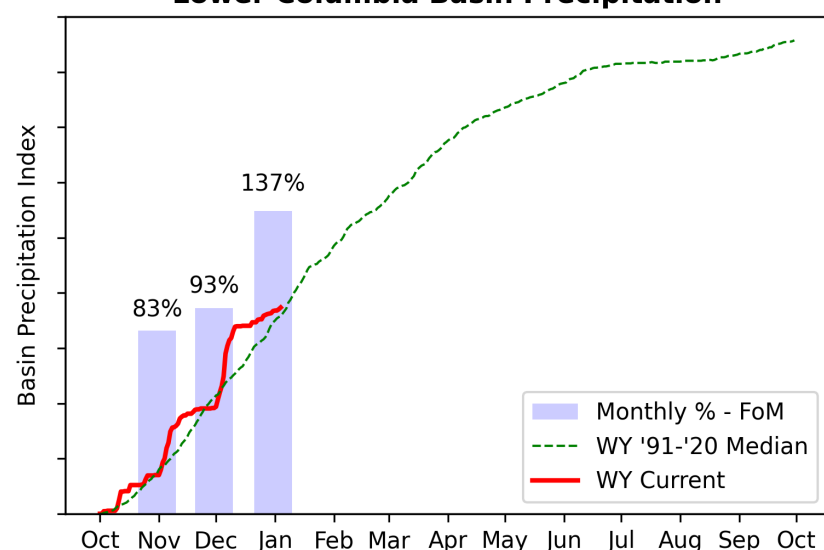


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 44% below median. This is lower than December 1 when the basin snowpack was 50% of median.

PRECIPITATION

Lower Columbia Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is above normal at 137% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 100% of median.

RESERVOIR STORAGE

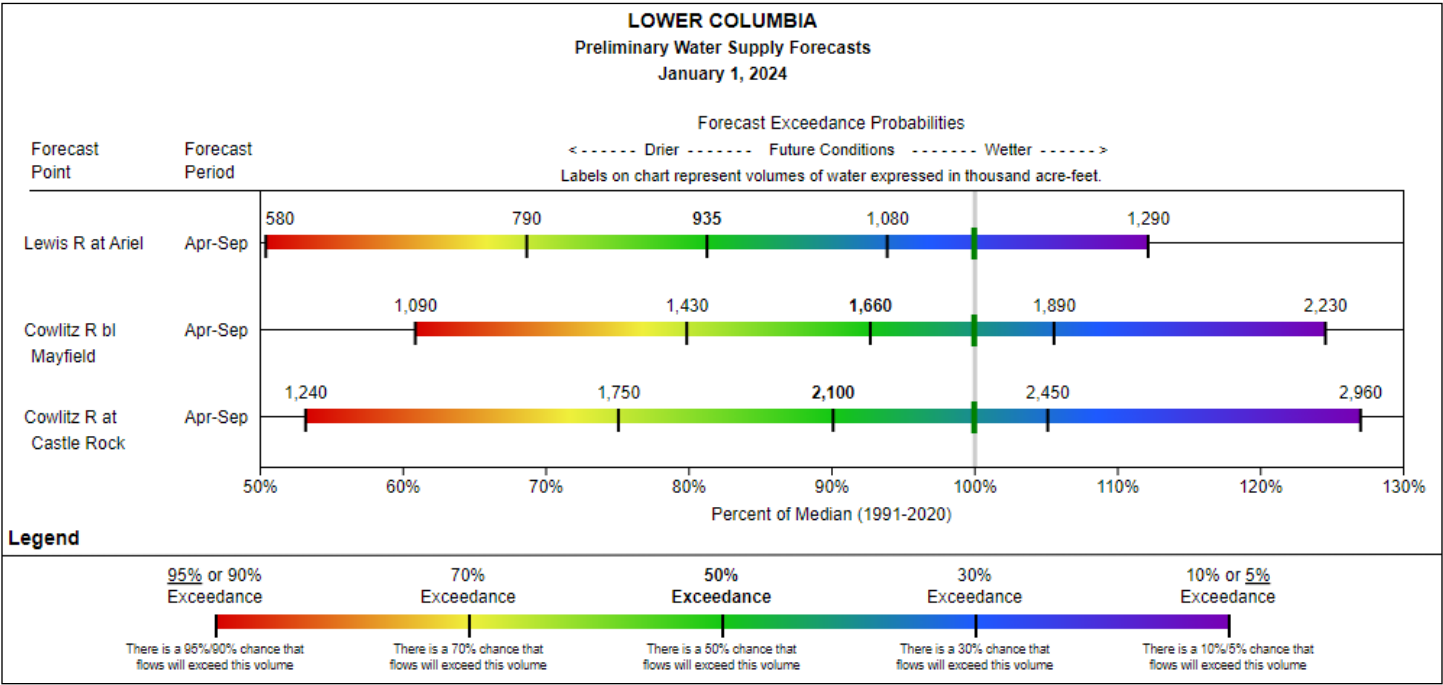
As of January 1, storage at Mossyrock Dam (Riffe Lake) is below normal at 88% of median. Volumetric storage at Lake Chelan is slightly below normal at 97% of median.

Lower Columbia	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Mayfield	124.3	127.3	128.2					97%	99%
Mossyrock Dam (Riffe Lk)	720.7	548.4	822.2					88%	67%
Basin Index					%	%	%	89%	71%
# of reservoirs					0	0	0	1	2

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 81% to 93% of median.

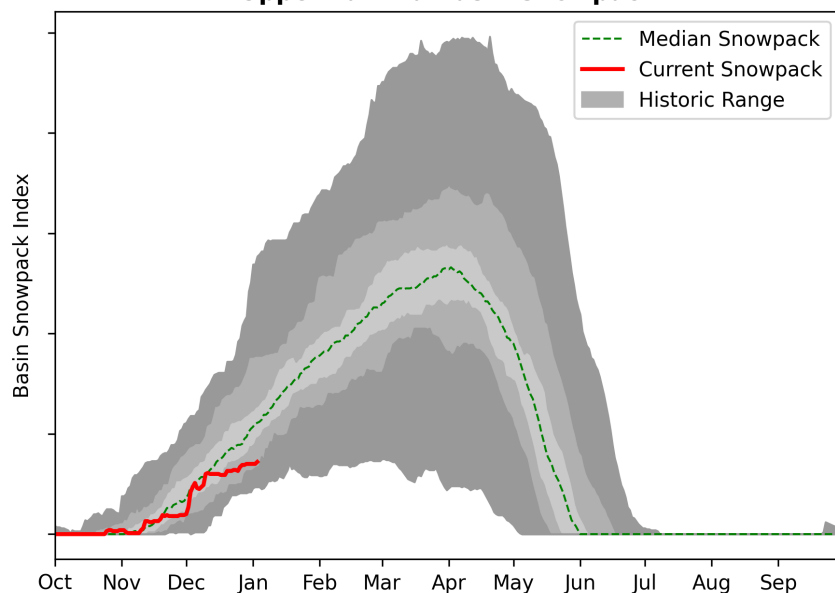
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Upper Yakima Basin Summary

SNOWPACK

Upper Yakima Basin Snowpack

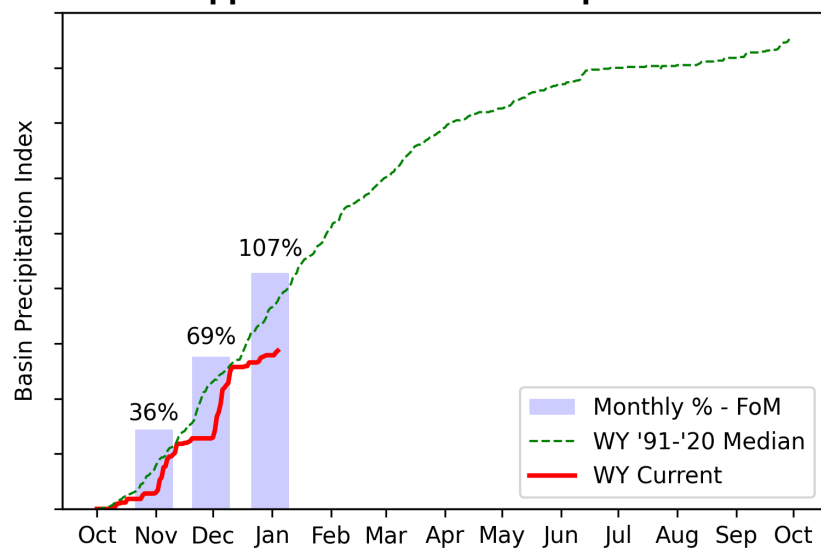


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 65% below median. This is higher than December 1 when the basin snowpack was 47% of median.

PRECIPITATION

Upper Yakima Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is above normal at 107% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 75% of median.

RESERVOIR STORAGE

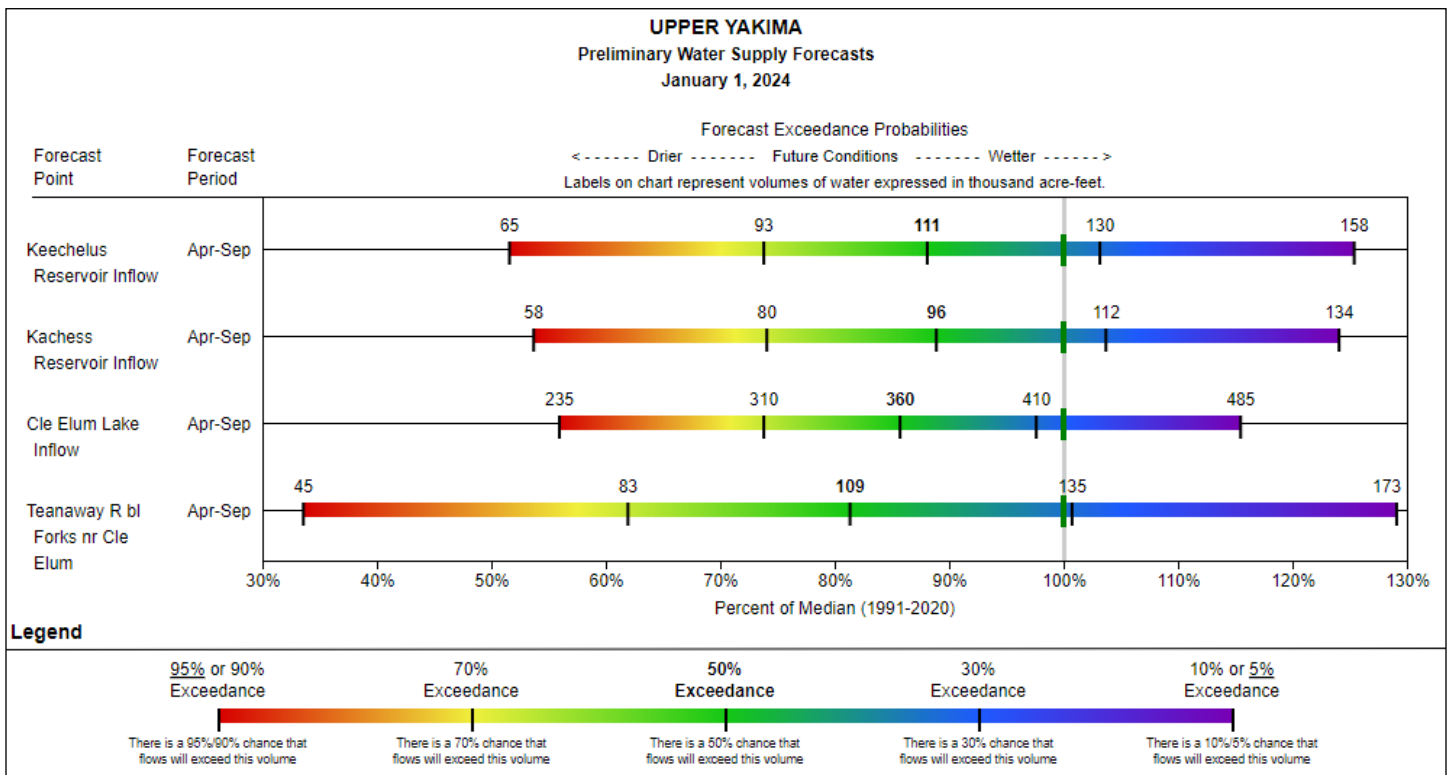
As of January 1, storage at Keechelus Reservoir is below normal at 57% of median. Volumetric storage at Lake Shannon is Cle Elum Reservoir is 49% of median, and 36% of median at Kachess Reservoir.

Upper Yakima		Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Keechelus		41.6	54.4	72.5	157.8	26%	34%	46%	57%	75%
Cle Elum		84.9	162.8	174.2	436.9	19%	37%	40%	49%	93%
Kachess		47.0	127.4	129.1	239.0	20%	53%	54%	36%	99%
Basin Index						21%	41%	45%	46%	92%
# of reservoirs						3	3	3	3	3

STREAMFLOW FORECAST

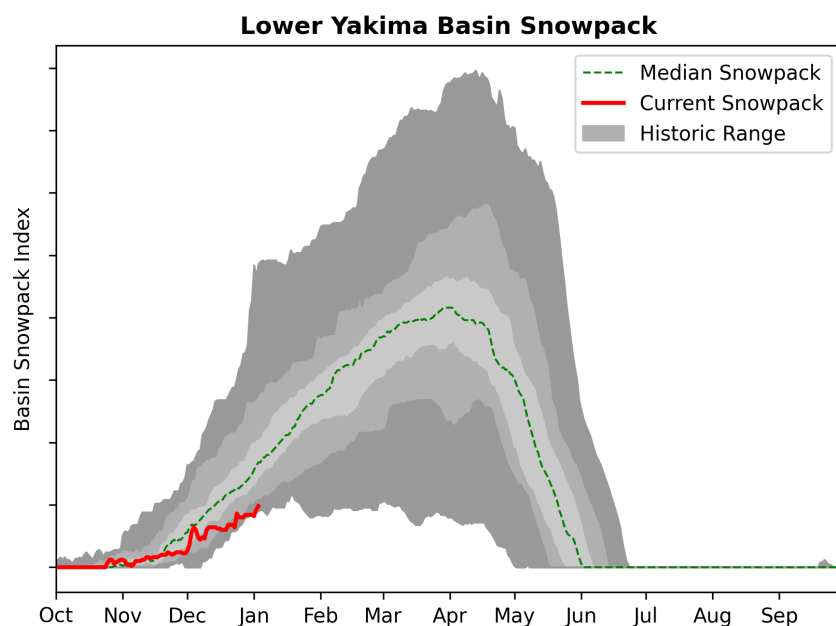
The April through September streamflow forecasts in the basin are below normal and range from 81% to 89% of median.

For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Lower Yakima Basin Summary

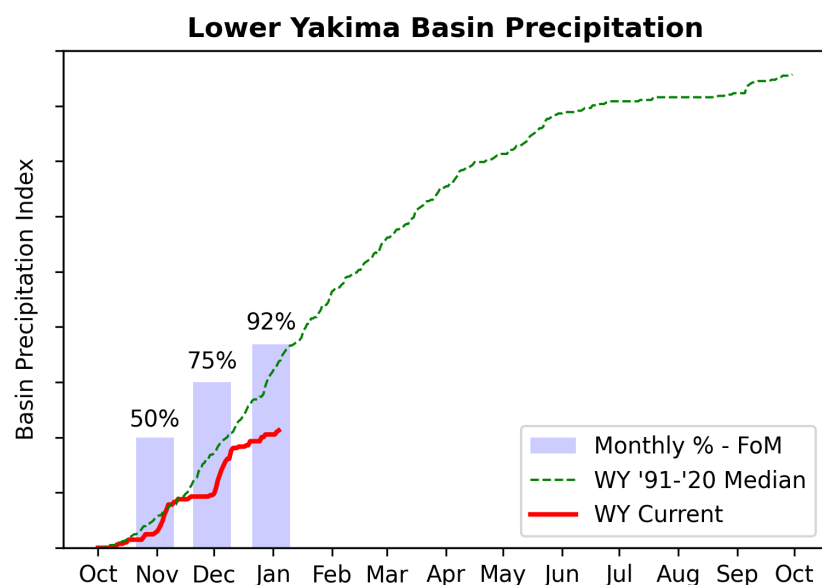
SNOWPACK



► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 36% below median. This is lower than December 1 when the basin snowpack was 41% of median.

PRECIPITATION



► View precipitation for individual sites by accessing the basin data report [here](#).

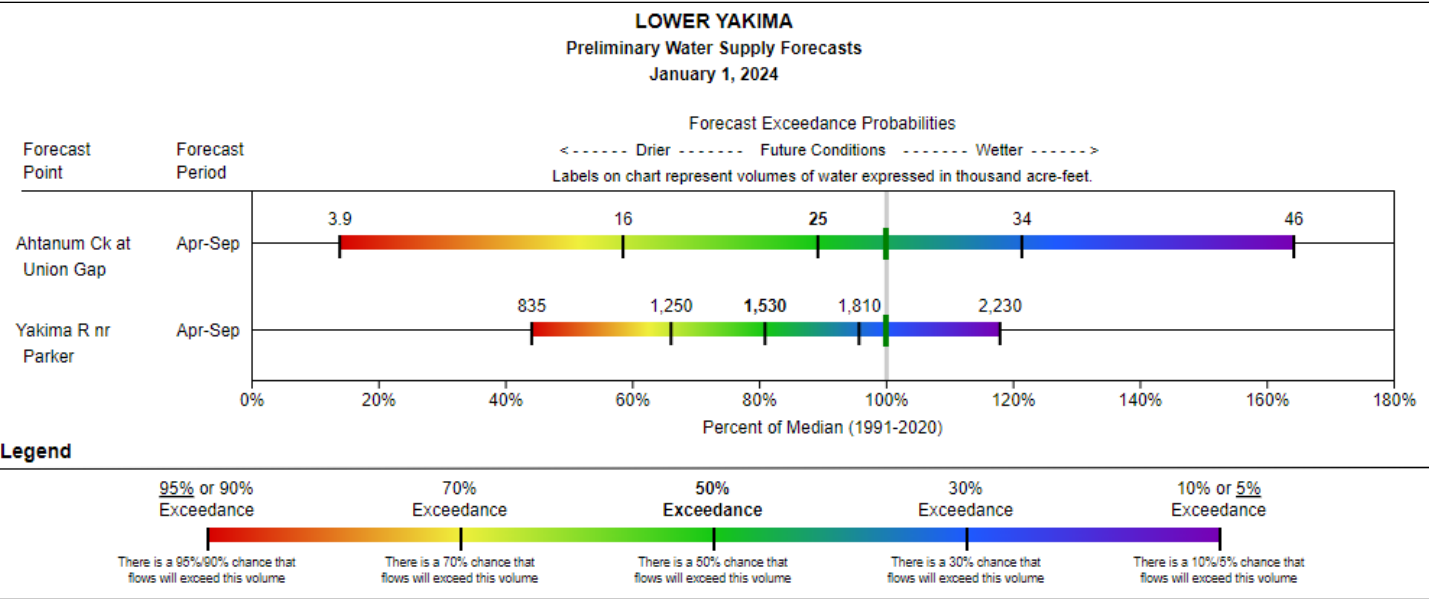
FoM = First of Month

December precipitation is slightly below normal at 92% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 68% of median.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 81% to 89% of median.

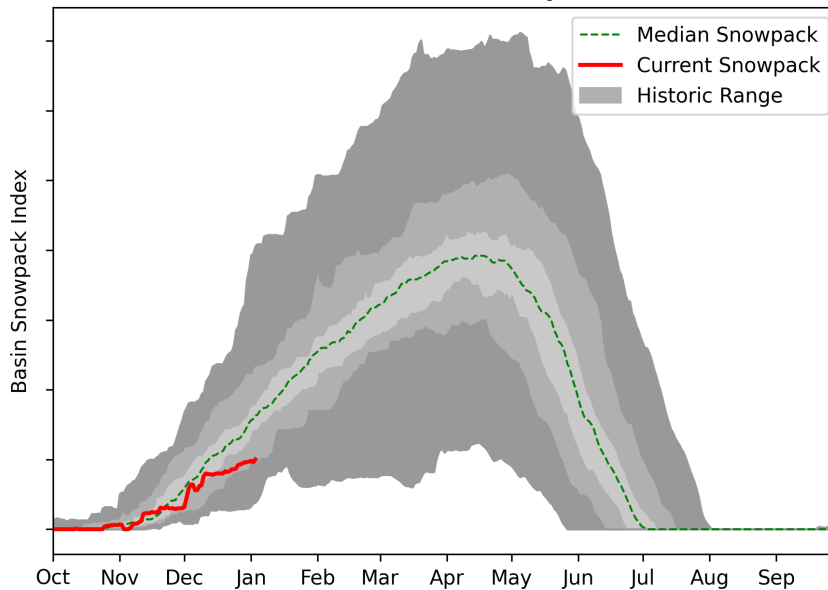
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Naches Basin Summary

SNOWPACK

Naches Basin Snowpack

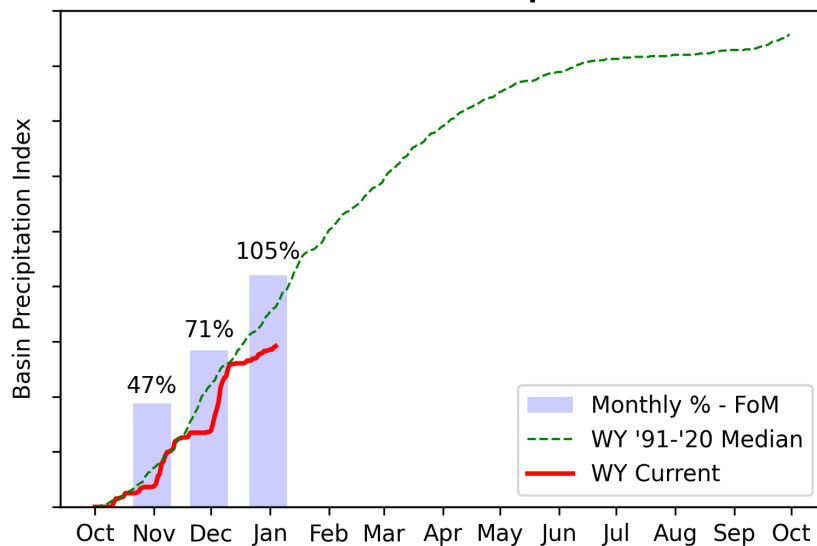


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 55% below median. This is slightly lower than December 1 when the basin snowpack was 56% of median.

PRECIPITATION

Naches Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is slightly above normal at 105% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 76% of median.

RESERVOIR STORAGE

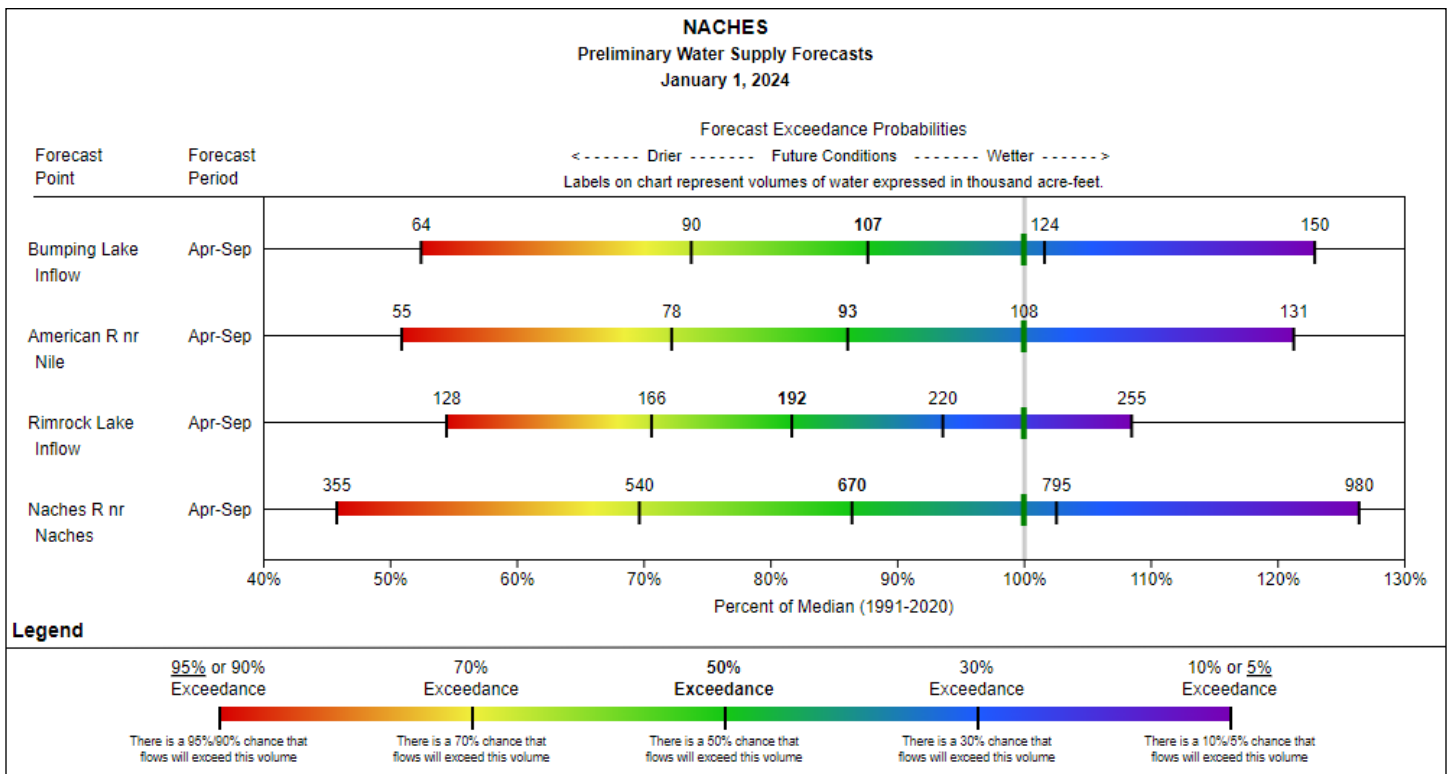
As of January 1, storage at Bumping Lake is above normal at 148% of median. Volumetric storage at Rimrock Lake is below normal at 76% of median.

Naches	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Rimrock	73.0	97.2	95.9	198.0	37%	49%	48%	76%	101%
Bumping Lake	21.7	14.4	14.7	33.7	64%	43%	44%	148%	98%
Basin Index # of reservoirs					41% 2	48% 2	48% 2	86% 2	101% 2

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 82% to 88% of median.

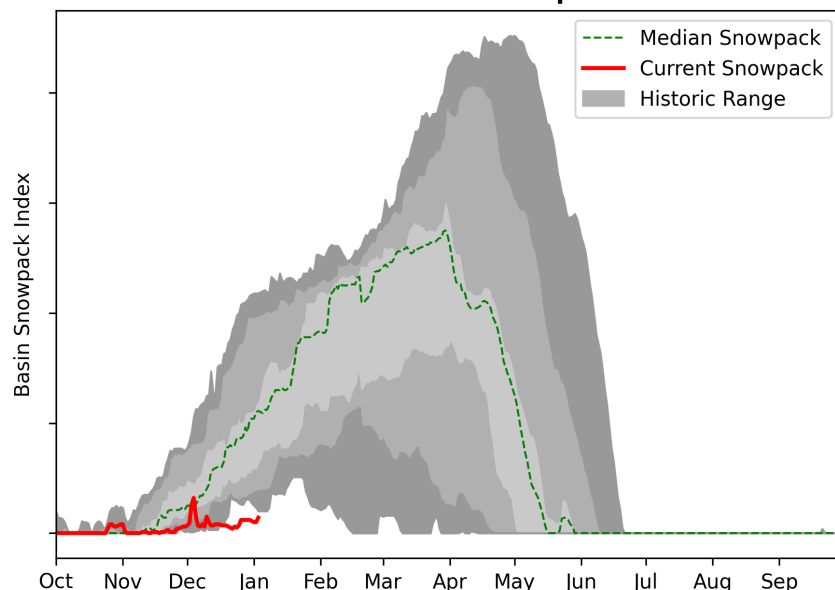
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Klickitat Basin Summary

SNOWPACK

Klickitat Basin Snowpack

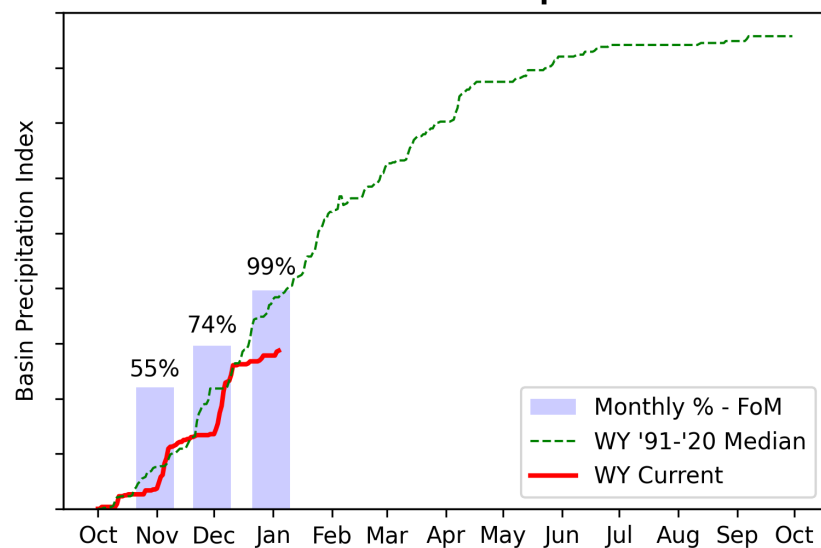


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 46% below median. This is higher than December 1 when the basin snowpack was 37% of median.

PRECIPITATION

Klickitat Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

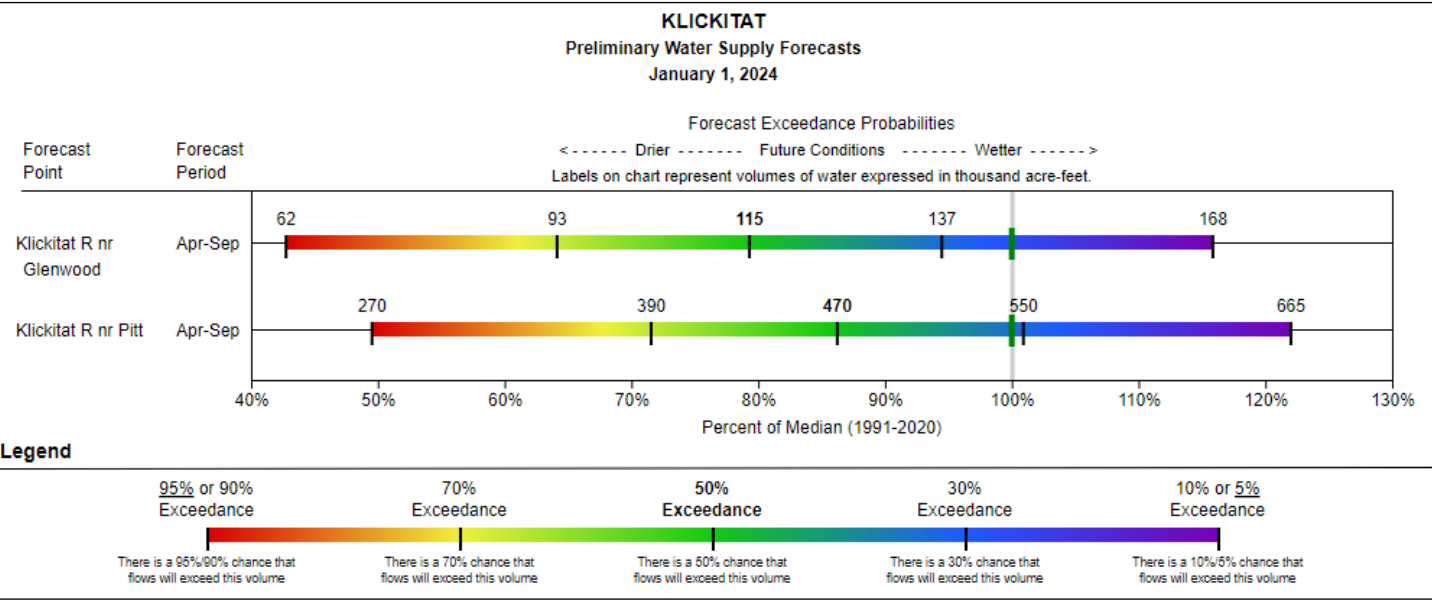
FoM = First of Month

December precipitation is near normal at 99% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 75% of median.

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 79% to 86% of median.

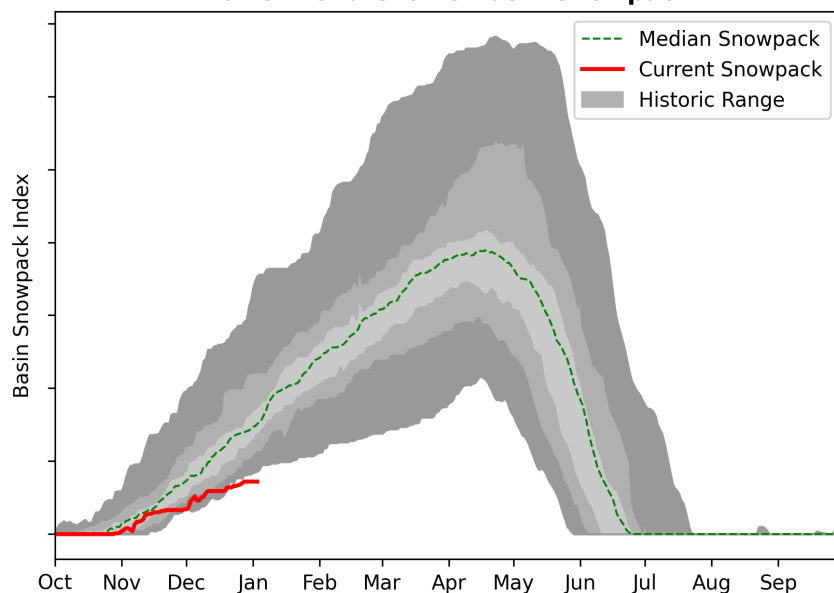
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Lower Pend Oreille Basin Summary

SNOWPACK

Lower Pend Oreille Basin Snowpack

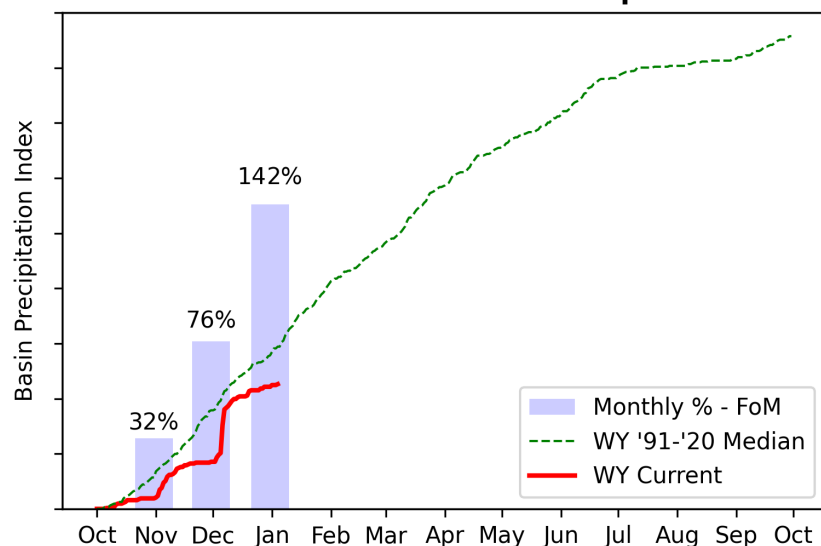


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 49% below median. This is lower than December 1 when the basin snowpack was 57% of median.

PRECIPITATION

Lower Pend Oreille Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is above normal at 142% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 87% of median.

RESERVOIR STORAGE

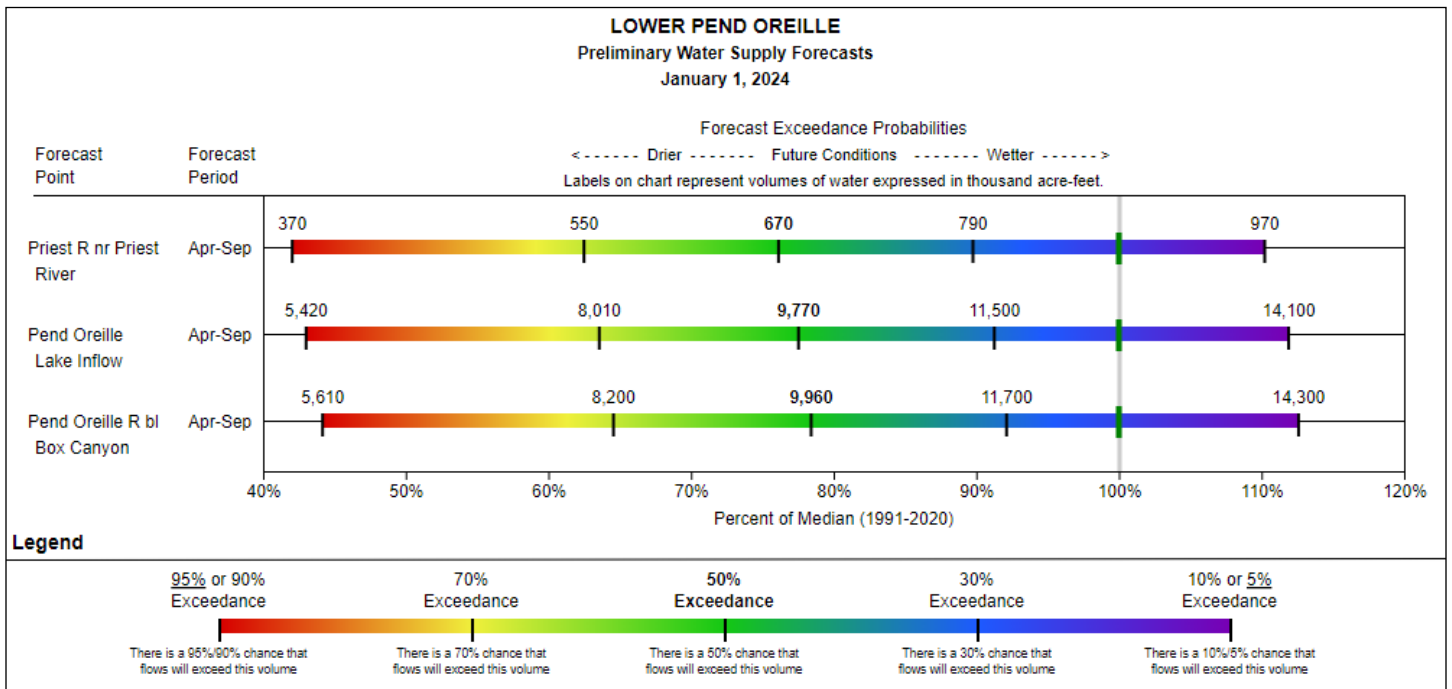
As of January 1, storage at Priest Lake is above normal at 181% of median. Volumetric storage at Lower Pend Oreille Lake is below normal at 90% of median.

Lower Pend Oreille	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Lake Pend Oreille	559.6	544.8	620.0	1561.3	36%	35%	40%	90%	88%
Priest Lake	100.5	46.6	55.6	119.3	84%	39%	47%	181%	84%
Basin Index					39%	35%	40%	98%	88%
# of reservoirs					2	2	2	2	2

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 76% to 78% of median.

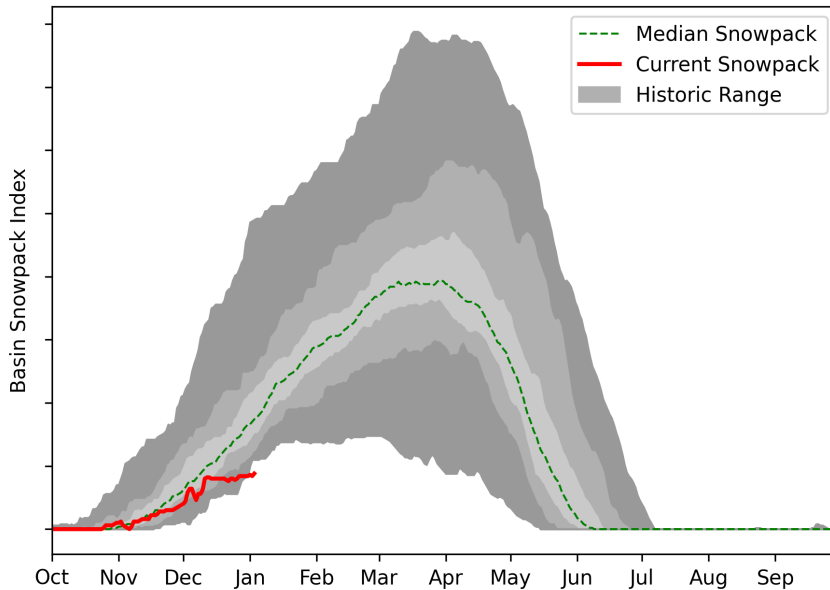
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Spokane Basin Summary

SNOWPACK

Spokane Basin Snowpack

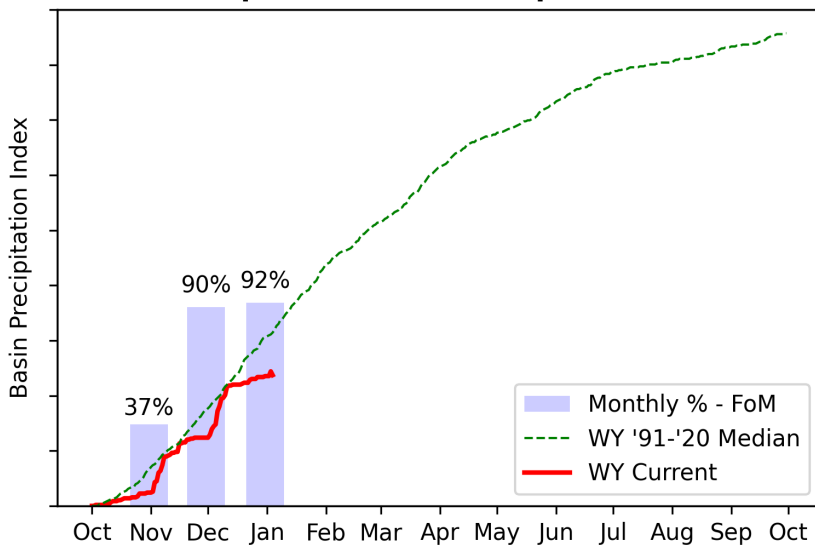


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 47% below median. This is lower than December 1 when the basin snowpack was 56% of median.

PRECIPITATION

Spokane Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is below normal at 92% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 73% of median.

RESERVOIR STORAGE

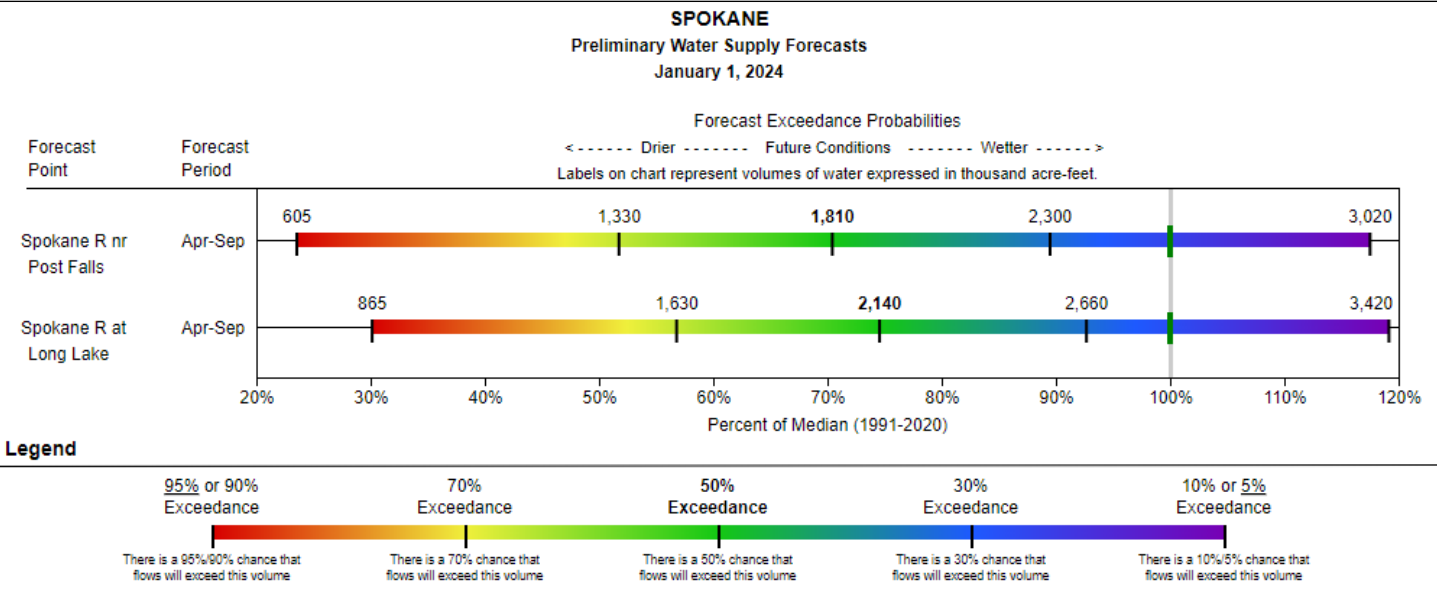
As of January 1, volumetric storage at Lake Coeur d’ Alene is below normal at 82% of median.

Spokane	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Lake Coeur d’ Alene	58.4	76.9	70.8	238.5	24%	32%	30%	82%	109%
Basin Index					24%	32%	30%	82%	109%
# of reservoirs					1	1	1	1	1

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 66% to 75% of median.

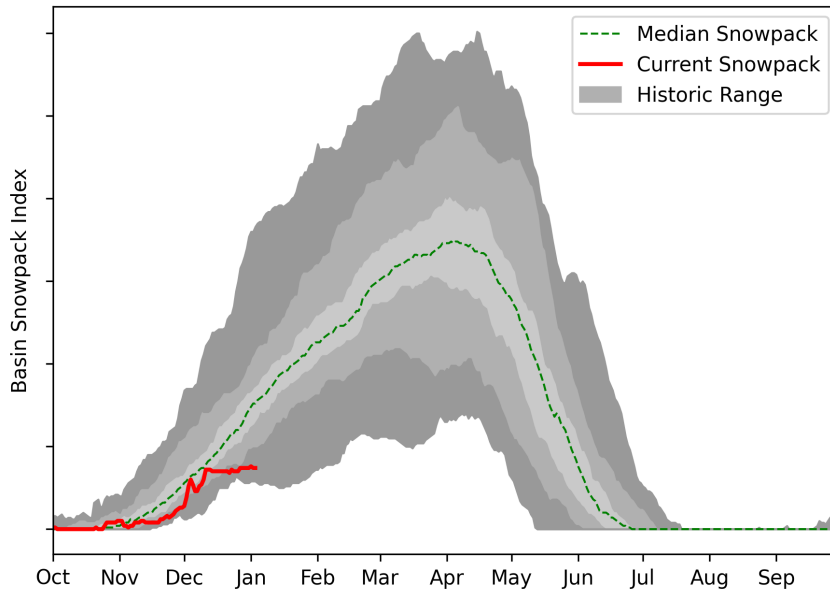
For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Lower Snake-Walla Walla Basin Summary

SNOWPACK

Lower Snake-Walla Walla Basin Snowpack

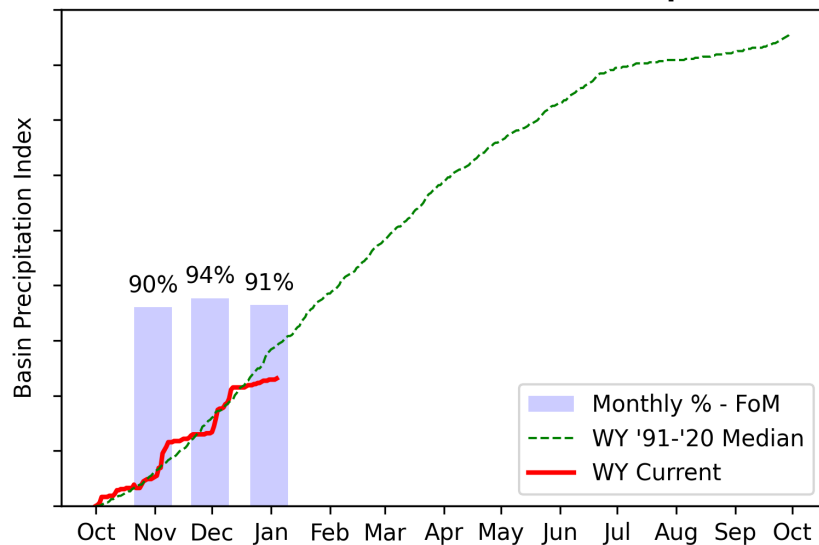


► View snowpack for individual sites by accessing the basin data report [here](#).

As of January 1, the basin snowpack is 54% below median. This is higher than December 1 when the basin snowpack was 47% of median.

PRECIPITATION

Lower Snake-Walla Walla Basin Precipitation



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

December precipitation is below normal at 91% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 81% of median.

RESERVOIR STORAGE

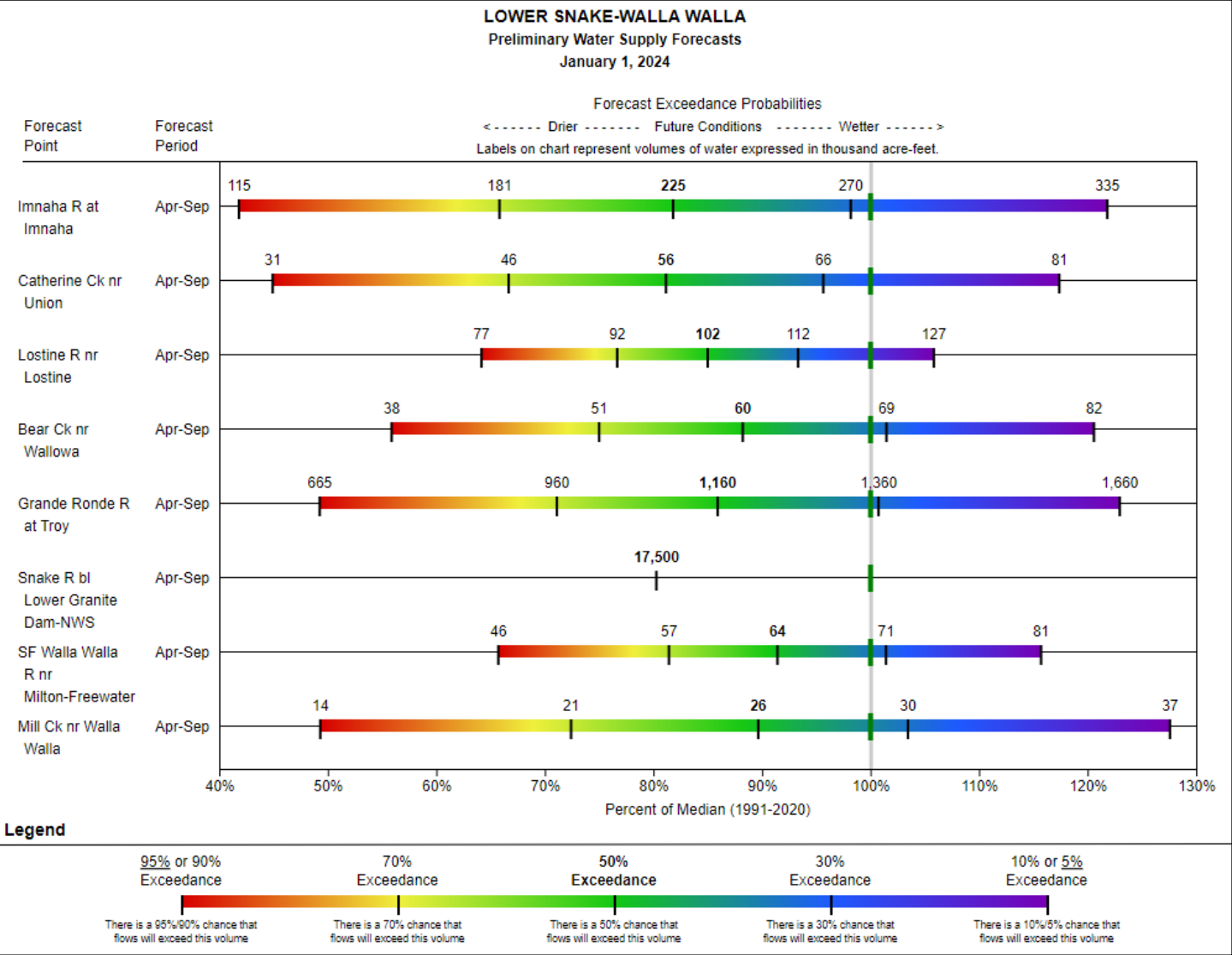
As of January 1, volumetric storage at Wallowa Lake is above normal at 131% of median.

Lower Snake-Walla Walla	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Wallowa Lake	19.7	18.8	15.0	37.5	52%	50%	40%	131%	125%
Basin Index # of reservoirs					52%	50%	40%	131%	125%
					1	1	1	1	1

STREAMFLOW FORECAST

The April through September streamflow forecasts in the basin are below normal and range from 76% to 91% of median.

For data in tabular format, in addition to non-primary period data, please view the basin data reports [here](#).



Additional Resources

[Development and Interpretation of Seasonal Water Supply Forecasts](#)

For more water supply and resource management information, contact:

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