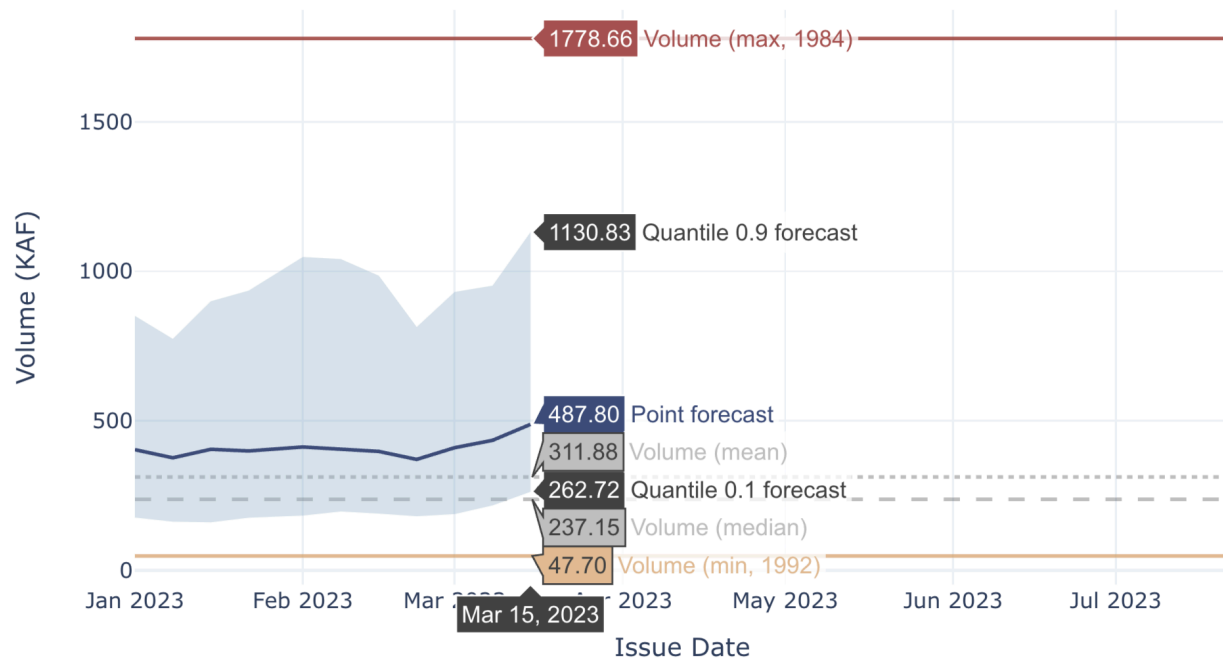


Water Supply Forecast - Owyhee River Below Owyhee Dam

Issue Date: 2023-03-15

Forecast Period: Apr-Jul

Figure 1: Water supply forecast and uncertainty bounds



The water supply forecast for April-July 2023 at Owyhee River Below Owyhee Dam is above normal, at 206% of median (488 KAF), with 10th and 90th percentile forecasts ranging from 111% to 477% (263 to 1131 KAF). The 10th percentile forecast indicates a very high likelihood of exceeding normal levels, as this estimate surpasses the 1981-2020 median. The 90th percentile forecast suggests that, in an extreme scenario, water supply could reach up to 477% of median, though this is still well below the record high set in 1984.

Compared to the previous forecast, there is a noticeable upward trend starting in early March 2023. This trend is largely driven by the increase in precipitation and snowpack (relative to normal), as shown in the explainability table in the next section. The upper uncertainty bound (90th percentile) also gets wider starting in early March 2023 while the lower uncertainty bound (10th percentile) remains steady. Generally, the uncertainty bound range will get smaller as we get closer to the seasonal month period because we get a better picture of snowpack accumulation, which majorly translates into water supply volume. However, for this location, a higher snowpack amount estimate can translate into a broader range of possible water supply outcomes, increasing the uncertainty, and resulting in a wider upper uncertainty bound (90th percentile).

Table 1: Feature (predictor) of water supply and explainability

Feature	Issue Date: 2023-03-15					Previous Issue Date: 2023-03-08			
	Value	% Feature contribution				Value	% Feature contribution		
		Q0.5	Q0.1	Q0.9	Rel		Q0.5	Q0.1	Q0.9
Base		38.8%	44.9%	39.1%	1.72		41.0%	56.7%	40.5%
Snowpack		41.2%	16.6%	57.3%	0.82		36.5%	25.0%	50.8%
SNOTEL/CDEC	138%	21.2%		29.3%	0.94	122%	18.0%	18.8%	24.7%
UA-SWANN	188%-288%	13.9%	1.8%	28.0%	0.83	158%-247%	12.9%		26.1%
ERA5-Land	334%	6.0%	14.8%		0.54	246%	5.5%	6.2%	
Precipitation		5.6%	10.1%	3.6%	0.79		8.2%	3.8%	8.8%
SNOTEL/CDEC	123%	0.8%		1.7%	0.35	112%	0.8%	3.8%	0.5%
UA-SWANN	101%-125%	4.8%	10.1%	1.9%	0.98	92%-114%	7.4%		8.3%
Drought		2.9%	9.2%		0.42		3.3%	4.1%	
PDSI	0.08	2.1%	6.4%		0.43	0.10	2.1%	1.3%	
Soil water	87%-112%	0.8%	2.8%		0.40	85%-92%	1.2%	2.8%	
Others		6.2%	5.8%		1.75		6.0%	10.5%	
Temperature	-2.04	0.3%	0.4%		0.70	-7.58	0.2%	0.3%	
Snow cover	73% (32%)	0.9%	2.5%		0.75	86% (47%)	0.7%	2.8%	
Snow albedo	113%	0.1%	0.1%		0.06	113%	0.1%	0.2%	
Leaf area index	0.55-0.70	5.0%	2.7%		4.71	0.54-0.70	5.0%	7.2%	
SEAS51 Forecast		5.2%	13.5%		0.57		4.9%		
Snowpack	502%-754%	1.2%	6.3%		0.25	502%-754%	0.9%		
Precipitation	96%-99%	2.2%	4.0%		1.15	96%-99%	1.9%		
Temperature	-5.08; -4.84	1.9%	3.1%		0.68	-5.08; -4.84	2.0%		

The forecast output is mostly driven by snowpack where all three data sources report above-normal conditions, ranging from 138% to 334%. Drought indicators, PDSI, is classified as “incipient wet”, and soil water volume for all layers ranges from 87% to 112% of normal. Interestingly, leaf area index is one of the predictors with the highest contributions besides snowpack, where its relative contribution is 4.71 times higher than the average of all sites.

Based on SEAS51 forecast, monthly precipitation in March 2023 is expected to be slightly below normal. However, the average temperature at the end of March 2023 is forecasted to be cooler than normal. This indicates that snow accumulation will continue in most areas, in line with higher-than-normal snowpack projections.

For the uncertainty bounds, the 90th percentile forecast is only driven by precipitation and snowpack measurements from SNOTEL/CDEC and UA-SWANN data. On the other hand, the 10th percentile forecast is driven by all predictors without SNOTEL/CDEC data. The wider upper uncertainty bound is mostly driven by the increase in snowpack estimate, with its contribution to the output increasing from 50.8% to 57.3% compared to the previous issue date.