## Forecast summary for 2023-03-15 – Owyhee River Below Owyhee Dam

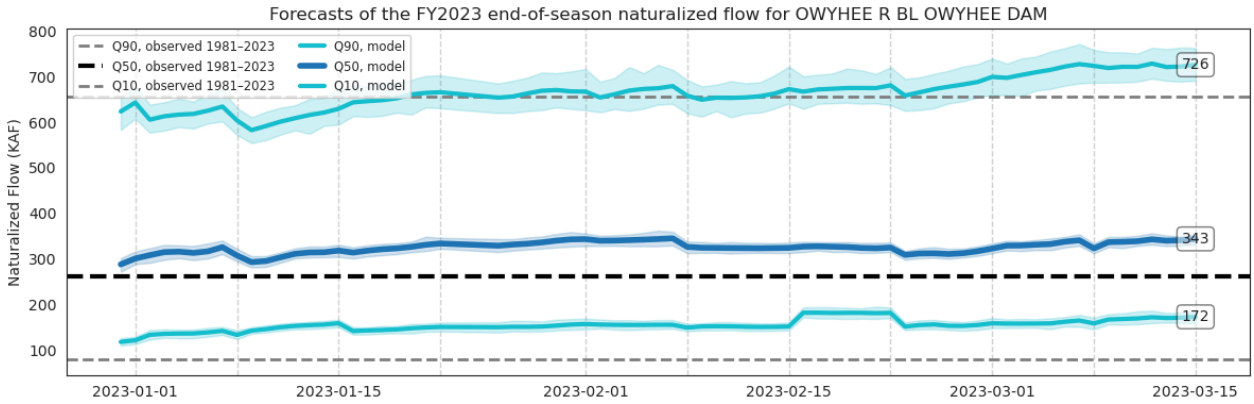


*Figure 1. Model forecasts and observed quantiles. Shading indicates the ensemble range.*

The forecast year 2023 at Owyhee River Below Owyhee Dam is predicted to be slightly wetter than normal (Fig 1). Especially the median (Q50) forecasts have been very consistent from the beginning of January, predicting around 340 KAF values. At this moment the 80% prediction uncertainty range is still rather large – almost as wide as the climatological 80% range, but all predicted quantiles are above their corresponding climatological ones. The increasing Q90 model quantile implies a small possibility of extreme wet end-of-season flow.

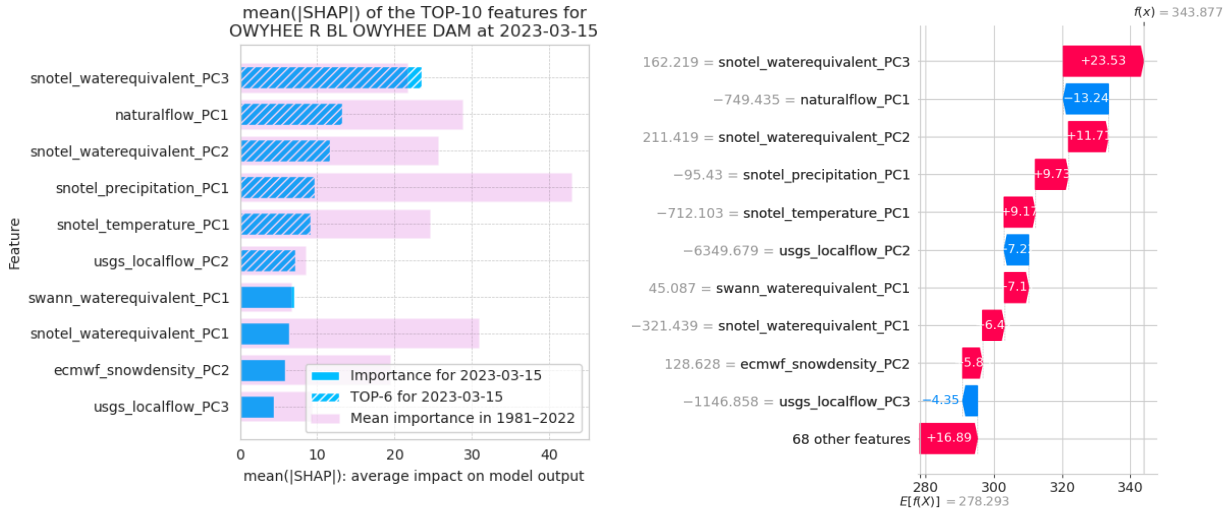


*Figure 2. Left: the mean(|SHAP|) feature analysis. Right: the contribution of features to the issue date forecast relative to the long term mean.*

Above normal forecasted flow values can be explained mostly by the above normal snow water equivalent (Figs 2, 3 and 4), which has grown above average conditions throughout the water year and recently surpassed the Q99 climatological quantile. Precipitation amounts have not been exceptional, but temperatures have been below normal and below freezing, allowing the snowpack to develop.

The dry conditions in early and mid winter, manifested in the Palmer Drought Severity Index and low flow conditions in rivers (Figs 2, 3 and 4) have dampened the extremity of the forecasts. As the falling precipitation is stored in the solid format, it does not alleviate the moisture deficit in the ground especially in the eastern part of the catchment (Fig 4). Thick snowpack will increase

the naturalized flow amounts during and after the melting season, but how much the currently low ground storages can absorb the meltwater is still uncertain. Difficulties to predict the future precipitation for the about to begin target flow accumulation season also keep the predicted uncertainty range wide (Fig 1).

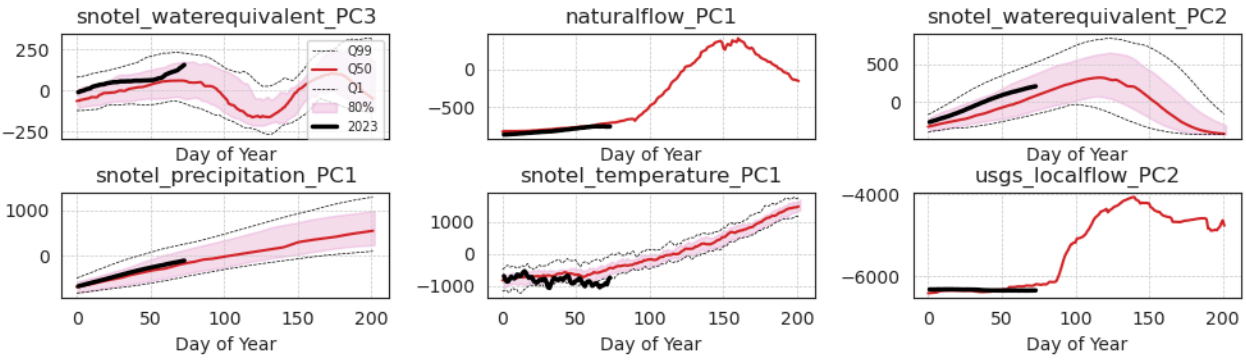


*Figure 3. The forecast year time series and the climatological distributions of the TOP-6 most important features contributing to the forecasts of the current issue date.*

The SHAP analysis (Fig 2) shows that the ECMWF seasonal forecast predicts snowy conditions also for the remaining season, which partly explains the above normal forecasted streamflow values, even though the already existing thick snowpack plays a much more important role.

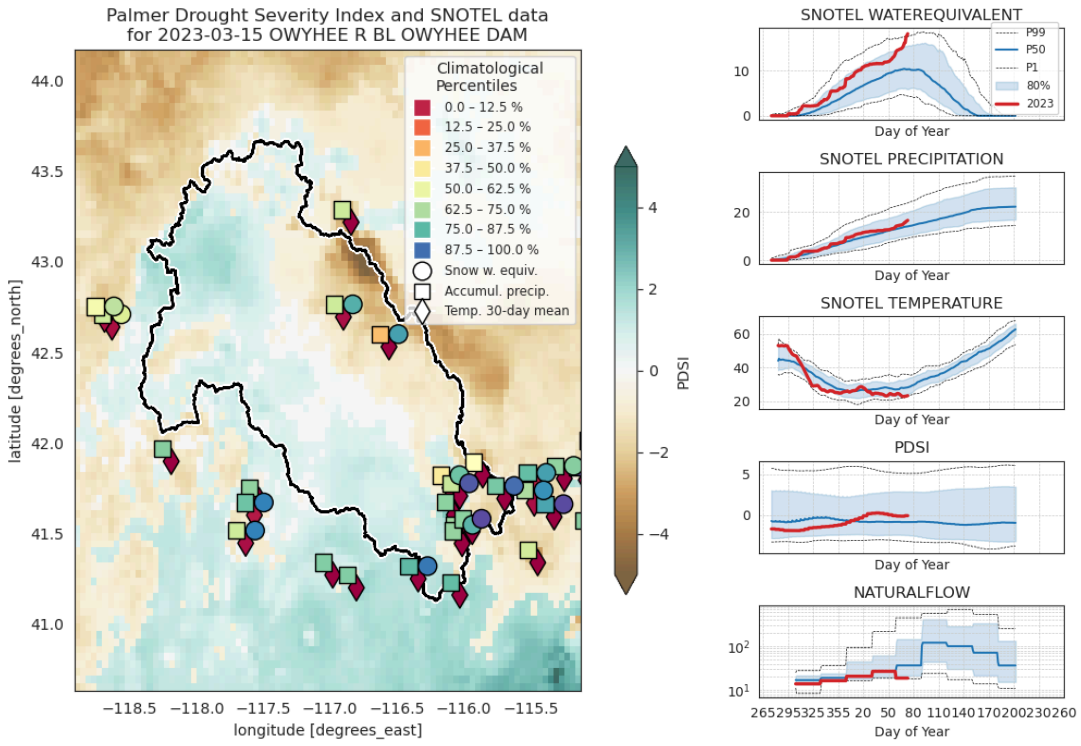


*Figure 4. Left: the PDSI and SNOTEL data for the current issue date. Right: climatological quantiles and data for the current forecast year for the key data sets.*