## Forecast Explanation: pueblo\_reservoir\_inflow 2023-05-15

The model estimates the following range for naturalized seasonal volume (KAF) of pueblo\_reservoir\_inflow on 2023-05-15, {10th quantile: 187, median: 253, 90th quantile: 359} (Fig 1). The prediction is similar to historical values for the median and the upper and lower bounds moved towards the median in recent weeks (Fig 2, Fig 5-9). The predictions for each month within the streamflow season are slightly below historical values, as is the observed monthly volume for April (Fig 4). The biggest driver for the change in the current prediction is an increase in the accumulated water estimate (UASWANN), increasing 0.9 std from the previous (Fig 5). The fact that all observed values of the major features are within 0.5 std of the historical average supports a prediction of streamflow volume close to the historical median. (Fig 2,3&6).

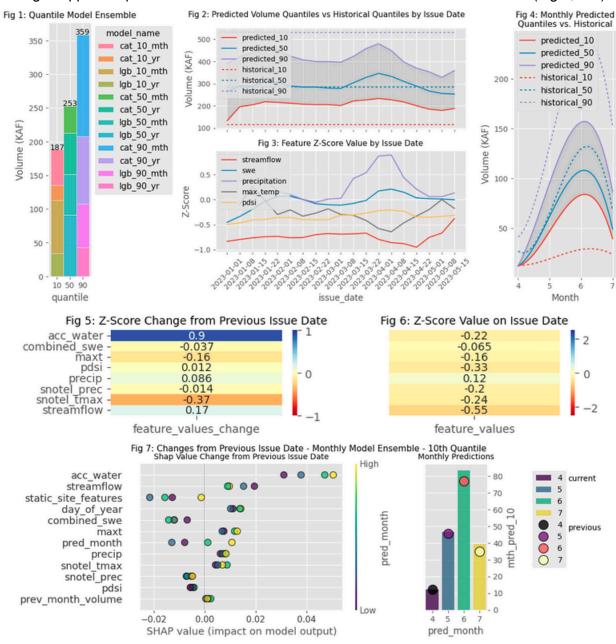


Fig 8: Changes from Previous Issue Date - Monthly Model Ensemble - 50th Quantile Shap Value Change from Previous Issue Date Monthly Predictions acc water 4 current 100 static\_site\_features 0 5 00 combined swe 6 80 **(100)** streamflow 7 month snotel tmax 4 pred previous 0 maxt 60 5 precip 6 pred\_month 40 pdsi day\_of\_year prev\_month\_volume snotel\_prec 0 Low -0.02-0.010.00 0.01 0.02 4 5 6 SHAP value (impact on model output) pred month Fig 9: Changes from Previous Issue Date - Monthly Model Ensemble - 90th Quantile Shap Value Change from Previous Issue Date Monthly Predictions High - 160 streamflow 000 4 current acc water 140 5 static\_site\_features day\_of\_year 6 120 100 6 7 month snotel\_tmax 4 pred previous pdsi 5 80 precip 6 pred month 60 7 snotel prec 40 prev\_month\_volume maxt 20 combined\_swe Low 0 -0.01 0.00 0.01 0.02 0.03 0.04 4 5 6 SHAP value (impact on model output) pred month Fig 10: Yearly Model Shap Values - 10th Quantile (log Volume KAF) Fig 11: Yearly Model Shap Values - 50th Quantile (log Volume KAF) 0 = static\_site\_features 12.117 = prev\_month\_volume 12.117 = prev month volume 0 = static\_site\_features 0.119 = precip 0.119 = precip-0.065 = combined swe -0.065 = combined\_swe -0.328 = pdsi -0.201 = snotel prec -0.161 = maxt -0.548 = streamflow135 = day\_of\_year 135 = day\_of\_year -0.548 = streamflow -0.328 = pdsi-0.201 = snotel\_prec -0.161 = maxt-0.236 = snotel\_tmax -0.236 = snotel\_tmax -0.223 = acc\_water 5.600 5.625 5.650 5.675 5.700 5.725 5.750 5.775 5.800  $\mathcal{E}[f(x)] = 5.681$ 5.75 5.85 5.90 6.10 Fig 12: Yearly Model Shap Values - 90th Quantile (log Volume KAF) Fig 13: Snotel SWE Deviation (Correlated Stations) on 2023-05-15 0 = static\_site\_features 12.117 = prev\_month\_volume 0.119 = precip 135 = day\_of\_year -0.548 = streamflow-0.161 = maxt-0.223 = acc\_water -0.065 = combined\_swe -0.328 = pdsi-0.201 = snotel\_pred 6.24 6.26 6.28 6.30 6.32 E[f(X)] = 6.308 6.22