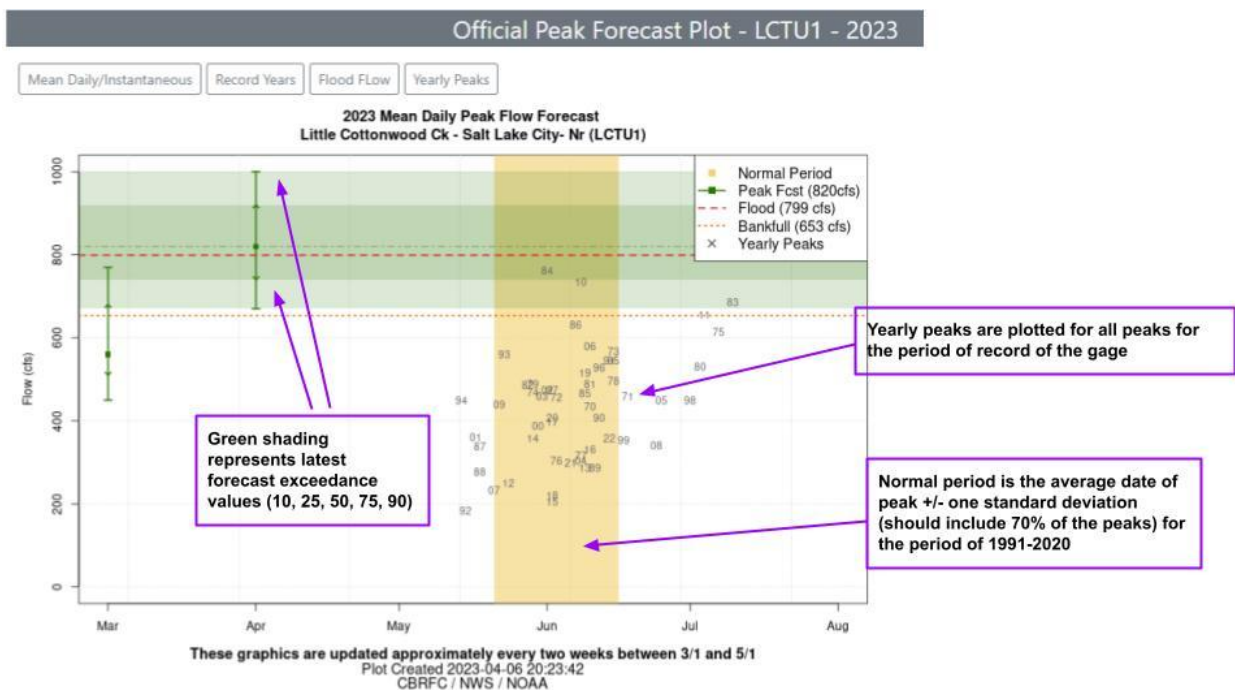


Special Peak Flow Forecast Help

Special forecasts are accessible from the drop down menu at the top of the CBRFC webpage. These forecasts are provided once or twice a month from March through May 1. These locations require more interaction from the hydrologist than the peak flow forecasts that are updated daily, mostly because they are below diversions or reservoirs.

As with other peak flow forecasts, they represent the maximum mean daily flow (the highest average flow for an entire day during the run off season) at a point during the April through July period, unless otherwise noted. Some locations also have the instantaneous peak flow forecast if a good relationship exists between the two. The user can toggle between mean daily and instantaneous forecasts from the button at the top of the plot.



Background and Definitions

Average Peak and Normal Time of Peak

The Average Peak and Normal Time of Peak (defined as the average date of peak plus/minus one standard deviation which should include approximately 70% of the peaks) for a given gage are all derived from 1991 through 2020 data whereas the Historic Peak is derived from the period of record, including the most recent years, after reservoir regulation began.

Flow extremes, Not Supply

Peak flow forecasts are fundamentally different from water supply volume forecasts. Although the watershed snowpack is a principal component in both analyses, peak flows are not a supply

question at all. Rather, peak flows characterize runoff extremes by predicting maximum mean daily flow at a single point during the spring snowmelt season. This extreme is related to the water supply volume, but the relationship is not direct or constant from year to year. As such, peak flow forecasts contain much more uncertainty than water supply volume forecasts.

Regulated vs. Natural Flows

An even more fundamental limitation is that peak forecasts describe regulated (actual or observed) in-stream flow well into the future, something difficult to do considering the quantity and changing nature of diversions in the Colorado River and Great Basin watersheds. (Note: supply forecasts deal with hypothetical "natural" flow - that which would have resulted in the absence of regulation). The Colorado Basin River Forecast Center routinely forecasts regulated streamflow, but only for several days into the future. Further into the future the ability to forecast reservoir regulation becomes more limited.

Different Uses and Users

Peak flow forecasts are used for different purposes than water supply volume forecasts. Users of these forecasts would include river recreationists, flood control agencies, emergency service directors, wildlife managers and anyone interested in the combined effect of watershed yield and human regulation on the actual (observed) in-stream maximum mean daily flows at a site.

Flood Flows

The National Weather Service defines flood flow as the flow at which damage to structures begins to occur. Overbank flow may occur but still be below the defined flood flow. Flood flows contained in this document change from year to year due to such channel processes as deposition and scouring. Therefore, the flood flows that follow should only be applied to the current runoff season. It should also be noted that they are instantaneous flows and not maximum mean daily flows. It should be noted that flood flows are not defined for all points. This does not mean flooding can not occur.

Forecast Probabilities

Peak flow forecasts are presented in terms of probabilities or, more specifically, exceedance probabilities. The 50% exceedance level means there are equal chances of being below the value or above the value (i.e., 50 chances out of 100 of being exceeded). The other exceedance probabilities associate the likelihood of exceeding other levels. In general, a close bunching of the exceedance forecasts indicates low variability and that the user can have a high degree of confidence in the forecast information. Conversely, a large spread in the exceedance forecasts indicates high variability.

Modeling Techniques

The peak flow forecasts that follow have been derived using a combination of (1) physically-based conceptual models and (2) statistical regression models. The conceptual model is the National Weather Service River Forecasting System in the Ensemble Streamflow Prediction (ESP) mode. Since the conceptual model requires reservoir operation plans for up to five months into the future, ESP application is limited to basins where regulation is minimal (mostly in the headwater areas). The farther downstream a forecast point is, the more likely it is that a statistical regression was used between natural snowmelt runoff volume and the observed maximum mean daily flow to generate the forecast. Such an approach performs better when the correlation between regulated and unregulated flow is strong and is constant from year to year.

We estimate, where possible, an instantaneous flow for each mean daily flow forecast. These instantaneous flows are estimated from a historical regression analysis at each point. For more information view the [regression plots](#).

Notes

- Peak flow forecasts on the Green River below Flaming Gorge Reservoir are based on USBR planned regulation
- Peak flow forecasts on the San Juan below Navajo Reservoir are based on USBR planned regulation
- Peak flow forecasts on the Gunnison below Crystal Reservoir are based on USBR planned regulation
- Peak flow forecasts account for CUWCD planned operations
- Peak flow forecasts on the Animas at Farmington are affected by the Durango Pumping Plant
- Runoff period March-June
- Peak flow forecasts are unregulated and do not account for upstream regulation. Forecast peaks will not be what is observed in the river. Peak statistics reflect regulated peaks and should not be compared to peak flow forecasts.
- Peak flow forecasts are regulated forecasts based on upstream diversions.