

Flaming Gorge Technical Working Group

May 15, 2018 Hydrology Summary

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This hydrologic update provides information regarding current conditions and fulfills the requirements detailed in the 2005 Flaming Gorge Final Environmental Impact Statement (FEIS) in Section 2.5.3 related to an operational plan for Flaming Gorge Dam (“Hydrology Summary”). The Hydrology Summary is to describe the current hydrologic classification of the Green River and Yampa River Basins, including the most probable runoff patterns for the two basins.

Hydrologic determinations for both the Yampa River Basin and Green River Basin above Flaming Gorge have been made and are unlikely to change unless significant, unexpected precipitation occurs in either basin. The Green River Basin above Flaming Gorge Reservoir is expected to receive 1,000,000 acre-feet in the April through July runoff period, placing it in the average (below median) hydrologic classification. The Yampa River Basin is expected to receive 841,000 acre-feet for the same April through July runoff period, placing it in the moderately dry hydrologic classification. These projections are based off of the Colorado River Forecast Center’s May Final Forecast.

Snow water equivalent (SWE) as of May 13, 2018, for the Upper Green River and Yampa/White River Basins are 90 and 51 percent of median, respectively. Flaming Gorge SWE is similar to 2003 and 2006, while Deerlodge SWE is similar to 2001 and 2017. The Tower snotel site, used as a reference point for Yampa snowpack and runoff, currently has 34.7 inches of SWE (69 percent of median). On May 14, 2017 the Tower SNOTEL measured a SWE of 42.7 inches during a runoff season where the Yampa yielded 1,069 kaf (84% of 40-year average, Maybell + Lily).

SNOTEL tracking graphs, with analogous years, are provided in Figure 1 for the Upper Green River Basin above Flaming Gorge and Figure 2 for the Yampa River at the Deerlodge Park, CO gage.

**Colorado Basin River Forecast Center
Upper Green Group**

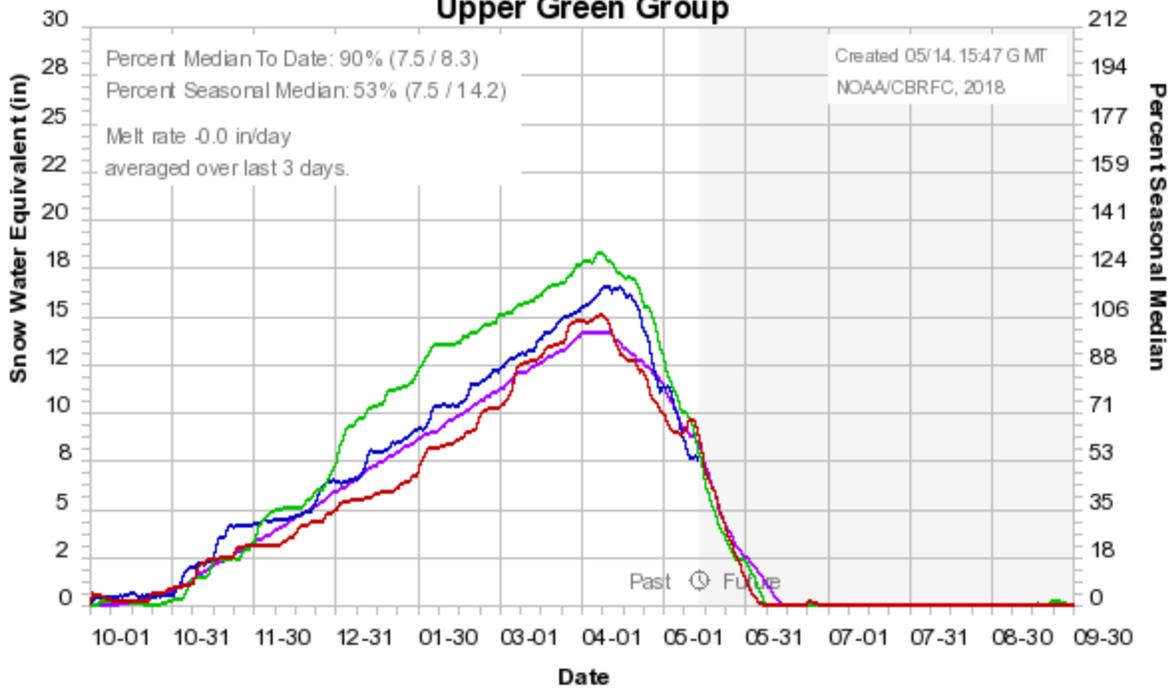


Figure 1 - Upper Green River Basin SNOTEL Tracking. 1981-2010 percent of median compared against 2018 YTD Snow Water Equivalent (SWE), and analog years 2006 and 2003.

**Colorado Basin River Forecast Center
Yampa abv Deerlodge Group**

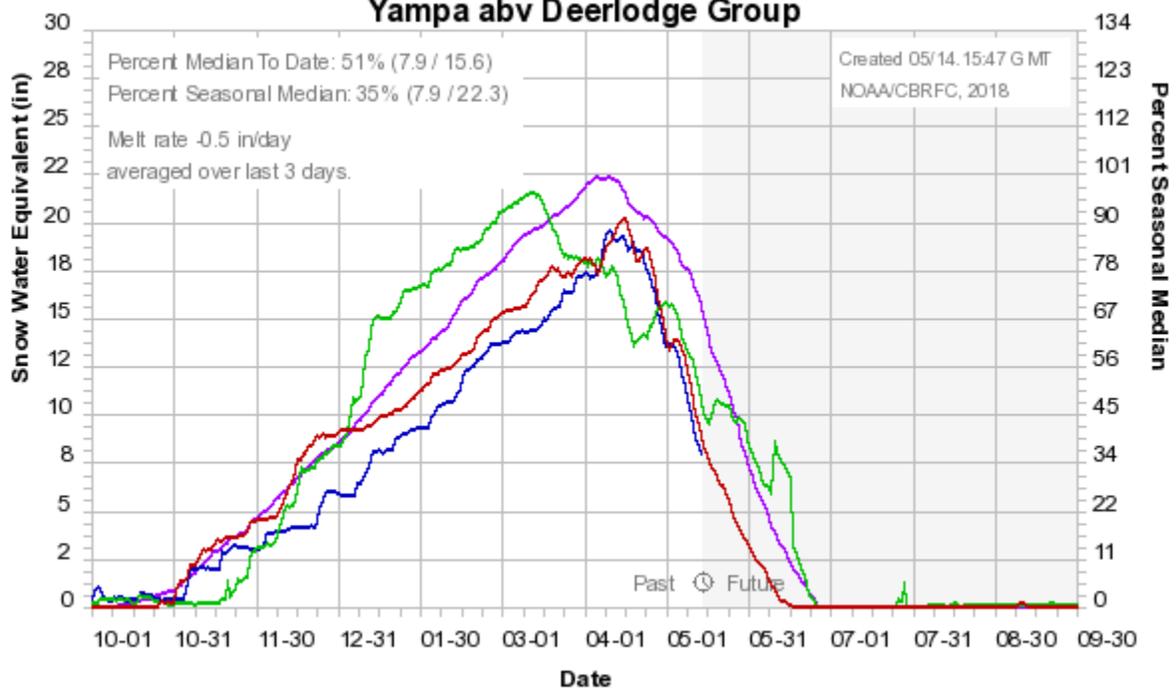


Figure 2 - Yampa River above Deerlodge SNOTEL Group. 1981-2010 percent of average SWE compared against 2018 YTD, and analog years 2001 and 2017.

10-Day Streamflow Forecasts

Observed data from the Deerlodge Park gage indicates that the Yampa River saw a peak flow of around 9,000 cfs, May 12-13. The following, Figure 3, illustrates 10-day forecasted flow values for the Yampa River at the Deerlodge Park gage, May 14 through May 24, 2018.

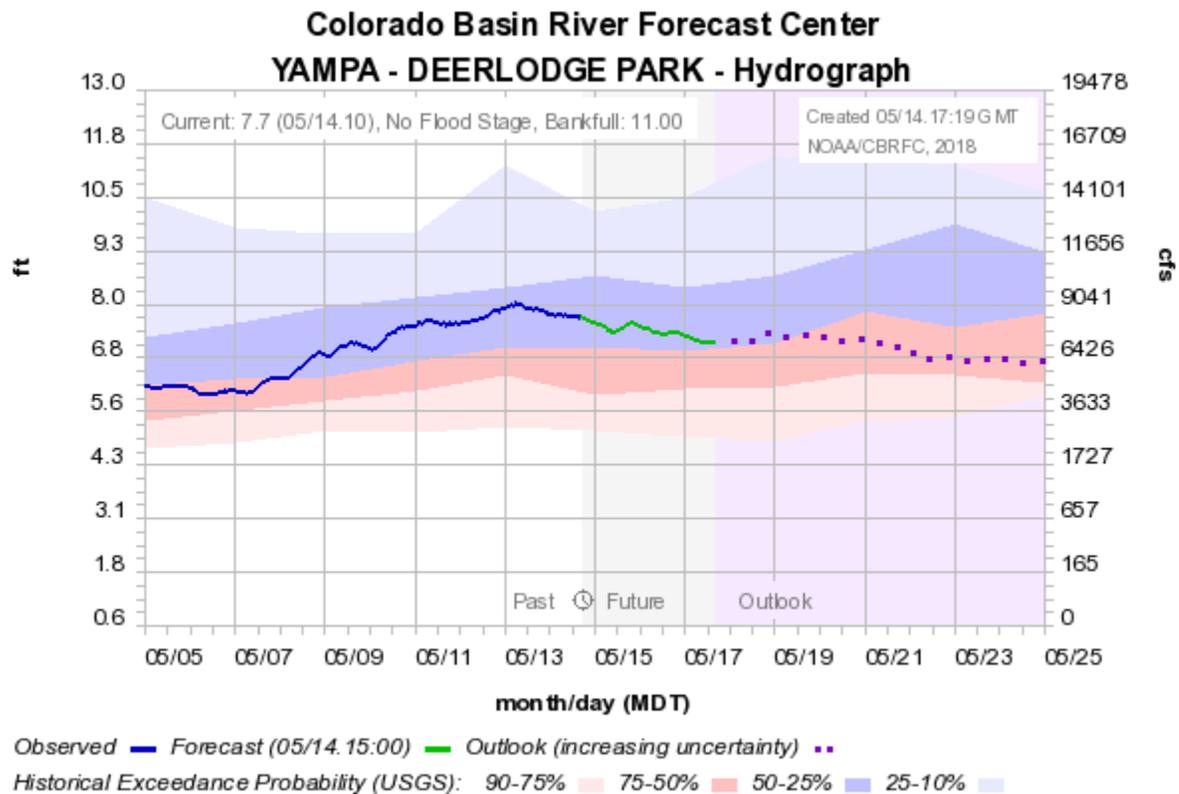


Figure 3 - Streamflow forecast for the Yampa River, May 14 - May 24, 2018.

A 10-day deterministic flow for the Green River at the Jensen, UT gage is provided in Figure 4. Please note that increased flows from Flaming Gorge are not represented in the Figure 4.

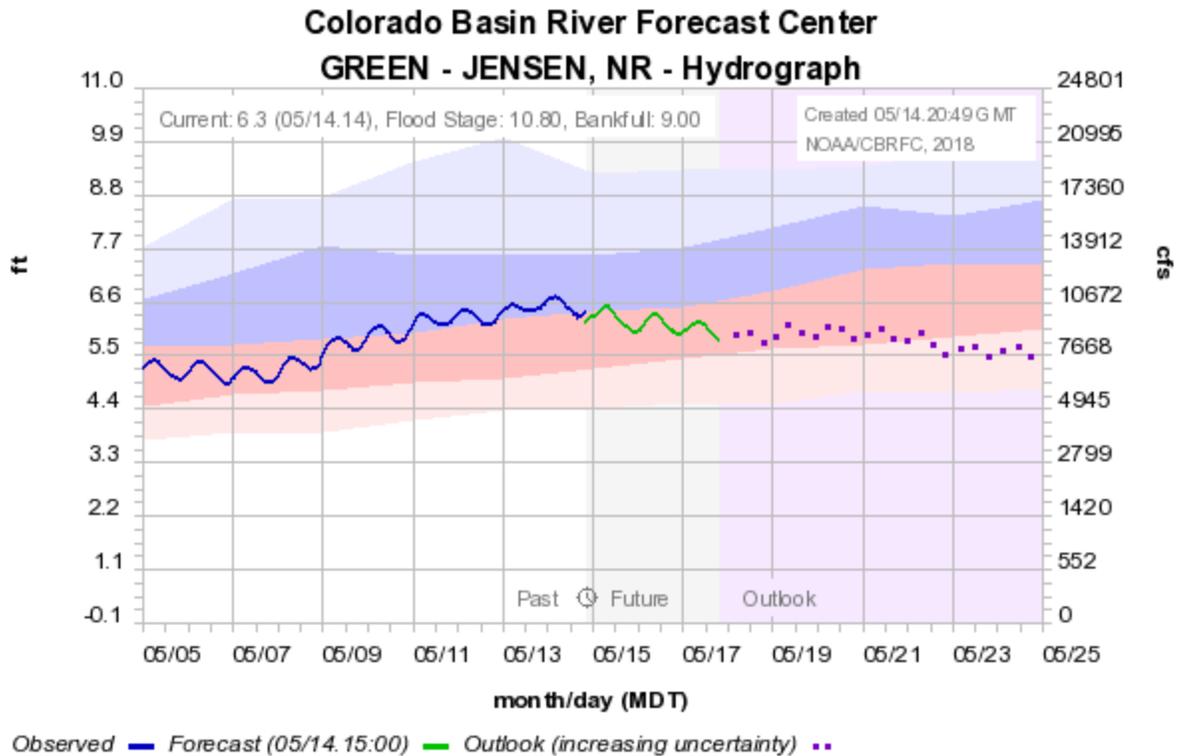


Figure 4 - Streamflow forecast for the Green River at the Jensen, UT gage for the period May 14 - May 24, 2018.

Larval emergence update

Light trap sampling is currently being performed and updates may forthcoming as results become available. The most recent update on the process to-date is as follows:

The FGTWG has developed several methods to estimate presence of razorback sucker larvae in advance of their actual presence. These approximations provide information only, and like many prediction methods are subject to uncertainty and actual presence of larvae in light trap captures remains the key endpoint to trigger flow releases. Information used includes past similar years of streamflow and water temperatures related to first presence, the presence and number of adult fish in the vicinity of spawning areas, and captures of adult fish that may be approaching spawning readiness, all of which provide useful information.

Another method used to estimate presence of larvae before it occurs includes analysis of prior years of information related to river warming and peak flow timing of the Yampa River, the main contributor of flow in the middle Green River. In general, later peak flows result in later first presence of razorback sucker larvae. This is in part because higher flows are typically cooler, and because water temperatures contribute importantly to governing the rate of biological processes, cooler flows also result in later first presence of larvae. The opposite is also then true, that lower and earlier peak flows are typically associated with warmer water, and results in earlier first presence of larvae. The average first presence date is near the end of May, typically 27-31 May, but first presence dates in the past ranged from 7 May (2015), a low flow and warm year, to 24 July (2011), a high flow and cold year.

Peak flows are expected to be below average in 2018 due to lower than average snow pack levels, which normally would result in earlier first presence, although sustained cool air temperatures have reduced snow melt and water temperatures, which extends the first presence date later into the year. Our best information

this year indicates that first presence will still be in later May, but slightly earlier than normal, perhaps in the range of 20-24 May. These dates can change rapidly, based changes in snowpack levels, warming rates, and air temperatures throughout the larger geographic area of the Green River basin. These dates should not be used for planning purposes and provide information only. Updated information will be provided regularly throughout the spring season.