RECLAMATION
Managing Water in the West

Flaming Gorge Technical Working Group

May 18, 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 1,120,000 acre-feet in the April through July runoff period (May mid-month forecast), 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 17, 2018, for the Upper Green River and Yampa/White River Basins are 79 and 46 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 30.7 inches of SWE (63 percent of median). On May 18, 2001 the Tower SNOTEL measured a SWE of 42.7 inches during a runoff season where the Yampa yielded 790 kaf (62% of 30-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.

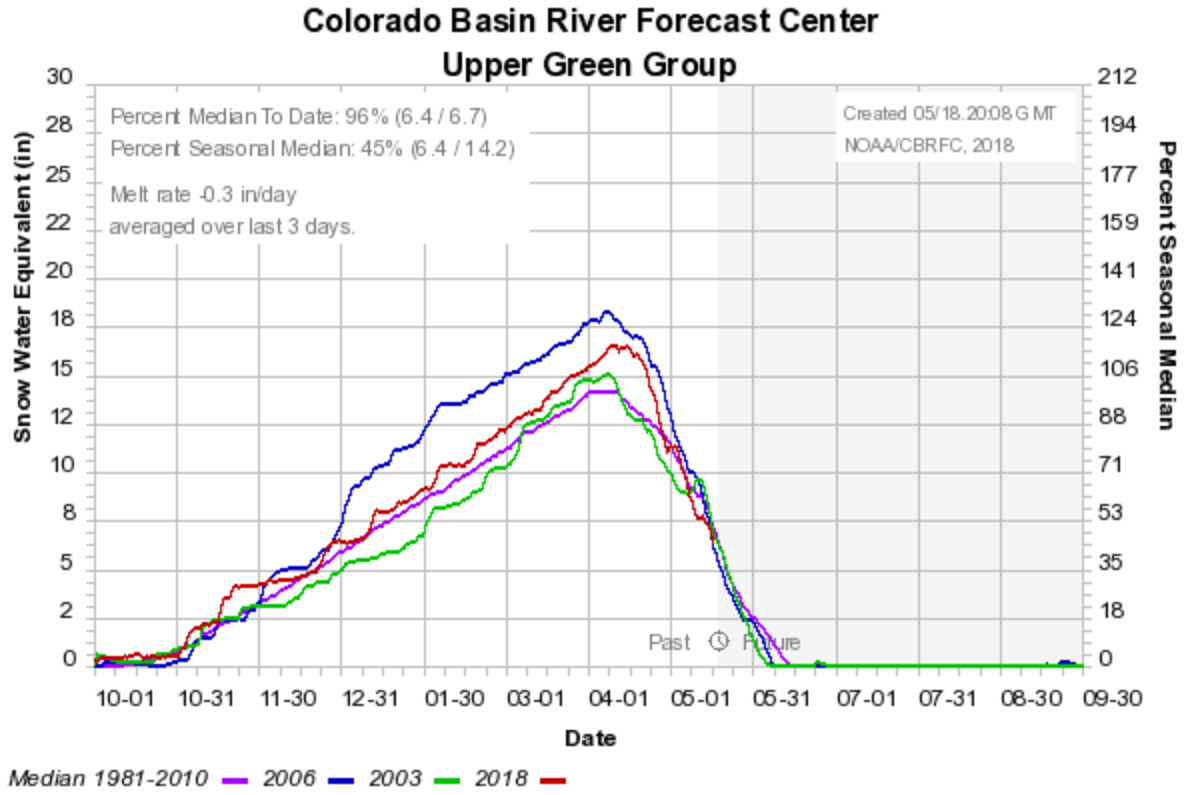

Figure 1 - Upper Green River Basin SNOTEL Tracking. 1981-2010 percent of median compared against 2018 YTD Snow Water Equivalent (SWE), and analog years 2006 and 2003.

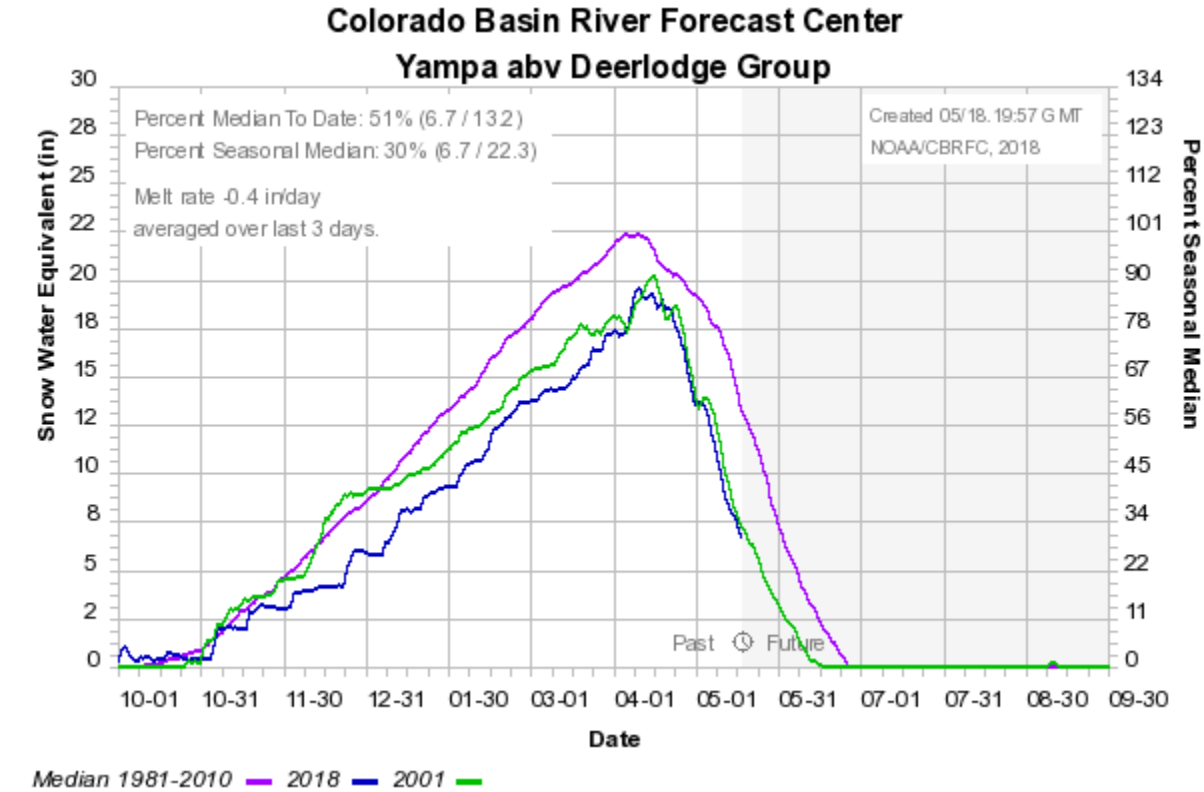

Figure 2 - Yampa River above Deerlodge SNOTEL Group. 1981-2010 percent of average SWE compared against 2018 YTD, and analog years 2001 and 2017.

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 18 through May 29, 2018.

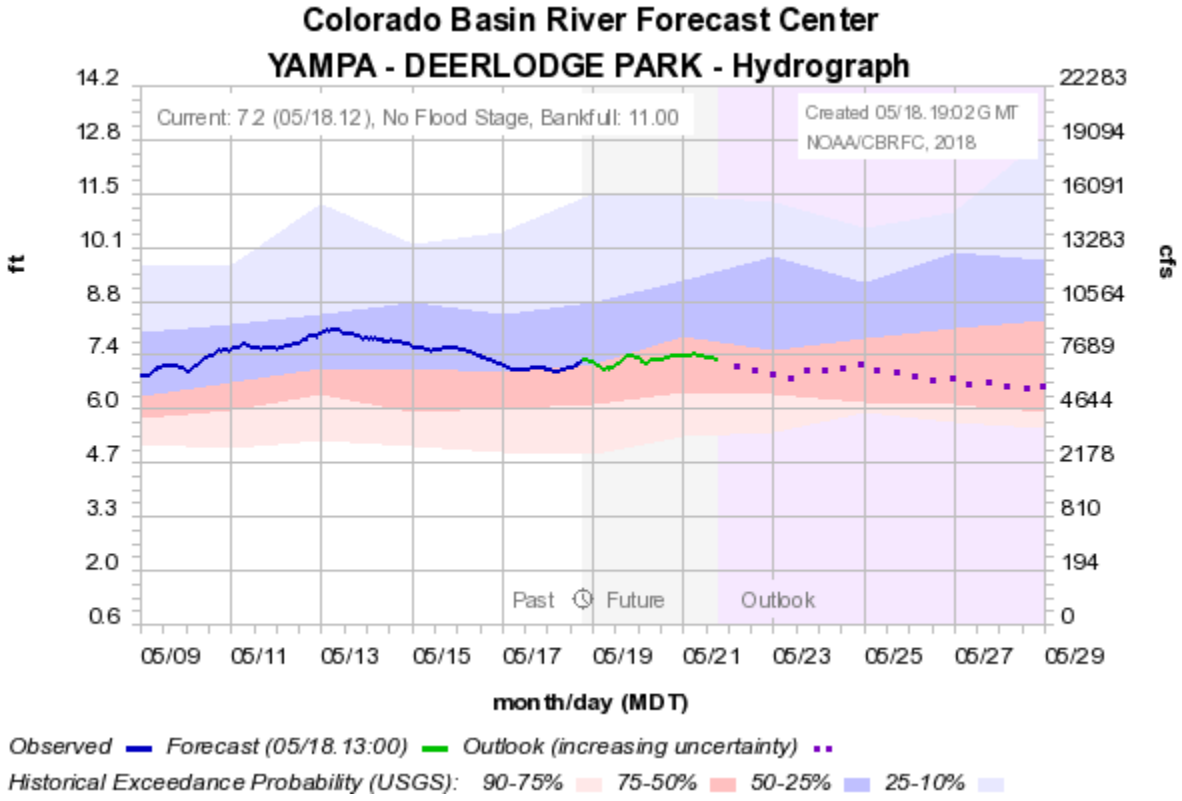

Figure 3 - Streamflow forecast for the Yampa River, May 18 - May 29, 2018.

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.

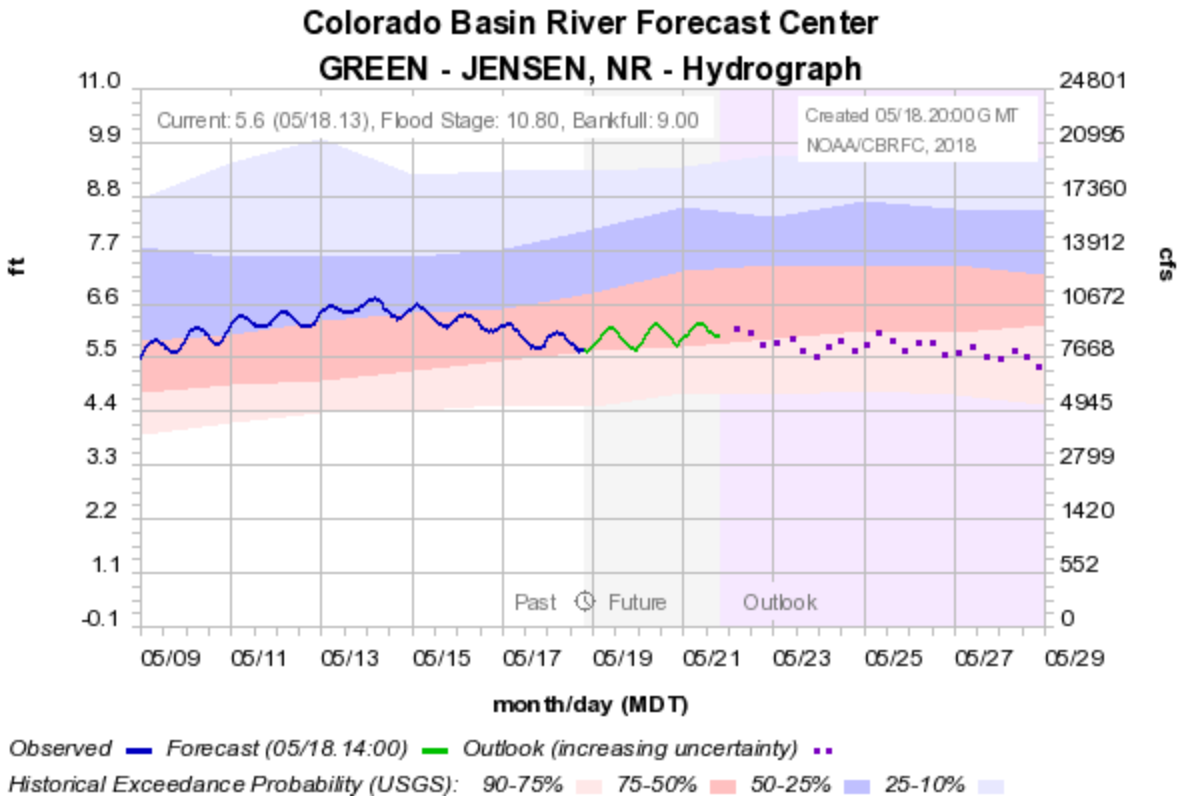

Figure 4 - Streamflow forecast for the Green River at the Jensen, UT gage for the period May 18 - May 29, 2018.

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:

This email updates the group on recent information regarding light trap sampling in the middle Green River. Light trap sampling and detection of razorback sucker larvae is used as a trigger to consider timing of spring releases from Flaming Gorge Reservoir. Those increased flows serve to connect river-floodplain connections and entrain razorback sucker larvae into floodplain wetlands, where their survival and growth are enhanced through the summer. Growth and survival are enhanced because floodplain wetlands are food-rich and warmer than the main channel Green River, and in managed wetlands that have screens to exclude large-bodied nonnative fishes (Stewart Lake and Johnson Bottom), they have lower predator fish densities that also increases larvae survival.

Light trapping by the Vernal office of the US Fish and Wildlife Service has been ongoing since 8 May. Last week and early this week no larvae were detected. Yesterday, Bruce Haines and Dave Beers of that office captured and identified two possible razorback sucker larvae in traps at the outlet of Stewart Lake, a typical location where early season razorback sucker larvae are first captured. The other sentinel site, Cliff Creek, had no razorback sucker larvae. The tentative identification was due to their small size, early development (protolarvae stage, the earliest and indicate just post-hatching) and complete lack of

pigment, an important characteristic for reliable identification. Because of the tentative nature of the identification, lack of fish at Cliff Creek, and lack of other suckers such as flannelmouth sucker that typically are present when razorbacks first appear, we decided to wait until this morning's samples and further confirmation.

This morning, Bruce Haines reported only a single razorback larva from Stewart Lake light traps, an older and reliably identified mesolarvae stage fish, plus a couple flannelmouth suckers. No larvae were captured at Cliff Creek. Our Green River, Jensen gauge water temperature data, which is used, in part, to predict razorback sucker first emergence, showed that this is the second coolest spring prior to first emergence in terms of degree day accumulation on record since 1992, a 27-year period. A conclusion from these data is that the emergence, while it may have started, may be in the early phases. The typical pattern of emergence is for a few early fish to emerge and be captured, followed by a higher abundance a week or more after first presence. We also typically observe fish at both Cliff Creek and Stewart Lake at the time when larvae are more abundant.

Conversations among Bruce Haines, Tom Chart, Don Anderson, Kevin Bestgen, and Jerry Wilhite, with Jed Parker copied on yesterday's information, led to a suggestion that it may be advantageous to wait a couple more days to trigger Flaming Gorge flows. Yampa River flows (7140 cfs at 9:15 AMtoday), an important piece of the equation in this decision as well, are forecast to maintain or increase slightly over the next few days based on the river forecast center. If light trapping over the weekend shows additional larvae available for entrainment, perhaps it would be beneficial to consider releasing flows early next week. That would allow the biggest pulse of water into wetlands at a time when larvae abundance is increasing, which may enhance their abundance and survival to the autumn time period.

If members of the FGTWG would like to convene a call later today to discuss the available information and alternative proposals for release schedules, we can certainly do that. Knowing not everyone will be available for such a call, this message provides the information to everyone if various parties want to weigh in or ask questions via email. Minimally, we should plan a call for early Monday morning (9 AM), 21 May, to discuss weekend light trapping results, and a release strategy moving forward.