Trinity River Restoration Program

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VIA ELECTRONIC MAIL ONLY

Memorandum

To: James Lee, Science Coordinator, Interdisciplinary Team Coordinator

From: Seth Naman, Flow Work Group Coordinator

Subject: Water Year 2022 Winter Flow Variability Recommendations

The Flow Work Group (FWG) met on three different occasions in the fall of 2021 (10/19, 11/9, 11/19) to develop winter flow recommendations for water year (WY) 2022 based on the guidelines outlined in TRRP's Winter Flow Environmental Assessment (EA). The EA contains a suite of actions that result in shifting different water volumes in different water year types from the spring period to the winter period in order to accomplish several different biological objectives. The flow actions outlined in the EA cover three different time periods, the flow synchronization period (December 15 to February 15), and two elevated baseflow periods (February 15 to April 15 and March 15 to April 15). The EA defines the water volumes that are to be utilized dependent on water year type (Table 1) as well as the hydrologic triggers and methods to determine the volumes released based on water year type (Figure 1). To develop our recommendations, the FWG used a method to distribute the water volumes that uses one flow component for the flow synchronization period, and six different flow components for the elevated baseflow period. For the elevated baseflow period, a new flow scheduling workbook facilitated the process by allowing the different flow components to be added together, depending on precipitation events and water year designations in February and March.

Table 1. Water volumes shifted in acre feet (af) to winter period for each forecasted water year type (from Table 2-2 of EA).

Water Year Type	ROD Water Volume (af)	ROD Volume Shifted to Winter Period under Proposed Action (af)	Percent ROD Volume Shifted from Summer to Winter under Proposed Action
Critically Dry	369,000	60,000	16%
Dry	453,000	80,000	18%
Normal	647,000	120,000	19%
Wet	701,000	180,000	26%
Extremely Wet	815,000	220,000	27%

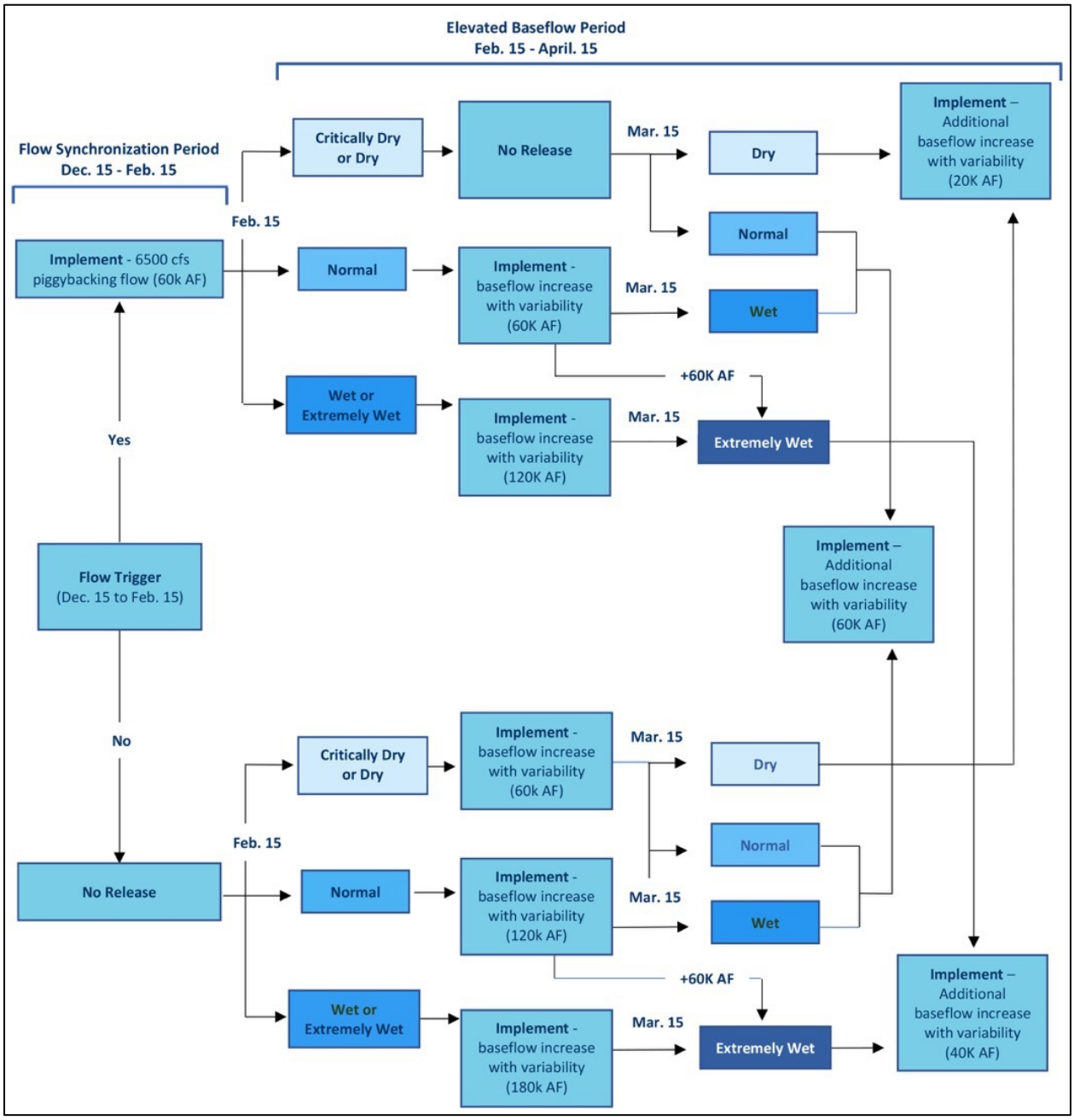

Figure 1. Decision tree for implementing winter flow actions (from figure 2-2 of the EA).

For the flow synchronization period, one possible alternative with a peak of 6,500 cubic feet per second (CFS; daily average) was developed as a recommendation. This peak flow can occur anytime within the December 15 to February 15 time period, depending on when a storm event raises predicted flows at the Trinity River above North Fork Trinity River gage to 4,500 CFS or greater. Due to the constraints on the allocated volume during this period (60 thousand acre-feet (TAF)), and with the objective to maximize geomorphic benefits, the FWG chose this single

peak which has the maximum flow that was analyzed in the EA. A possible alternative for the flow synchronization period that was discussed, but not chosen was a flow release from Lewiston Dam that contained multiple peaks with lower peak flow magnitudes.

For the elevated baseflow period, the FWG reviewed pre-Lewiston Dam hydrographs from the Trinity River at Lewiston gage, and developed recommendations for the six different flow components based on the natural shapes and ecological functions present in the historical record. Additional considerations included current Trinity River channel form and floodplain elevations, results from TRRP's invertebrate studies, as well as modeling and information provided in the EA. One key consideration in the FWG discussions of the hydrographs in the historical record was the general trend of increasing baseflows throughout the early spring months leading into the peak snowmelt period. The FWG, in considering the ecological functions of the river and the pre-Lewiston Dam record, believed that it was important to capture this key hydrograph element in our recommendations. Given the above considerations, the FWG is recommending three hydrograph components for three different water year volumes (60 TAF, 120 TAF and 180 TAF) that are the same shape, but scaled to meet these flow volumes for the February 15 to April 15 time period (Figure 2). For the March 15 to April 15 time period the FWG is recommending three hydrograph components for three different water year volumes (20 TAF, 40 TAF and 60 TAF) that are the same shape, but scaled to meet these flow volumes (Figure 2).

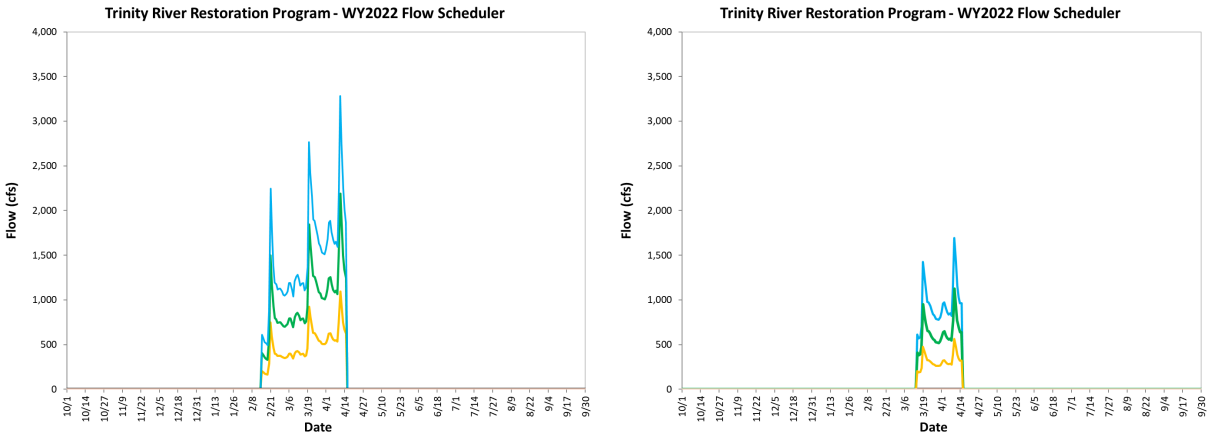

Figure 2. Example hydrograph components for the February 15 to April 15 time period (60 TAF, 120 TAF; 180 TAF; left) and the March 15 to April 15 time period (20 TAF; 40 TAF; 60 TAF; right).

The resulting hydrograph shapes contain the trend of increasing spring baseflow that is present in the historical record, modest and appropriately spaced peaks to aid in invertebrate ecological processes and salmonid food production, and flows that will provide increased channel margin habitat and floodplain inundation. The flows would be joined together with TRRP's spring flows that begin on April 15 to ensure a coherent and seamless flow release from Lewiston Dam for water year 2022 (Figure 3; Figure 4). These recommended flow actions are expected to aid in overall river health, benefitting ecological processes that will help accomplish TRRP's goals.

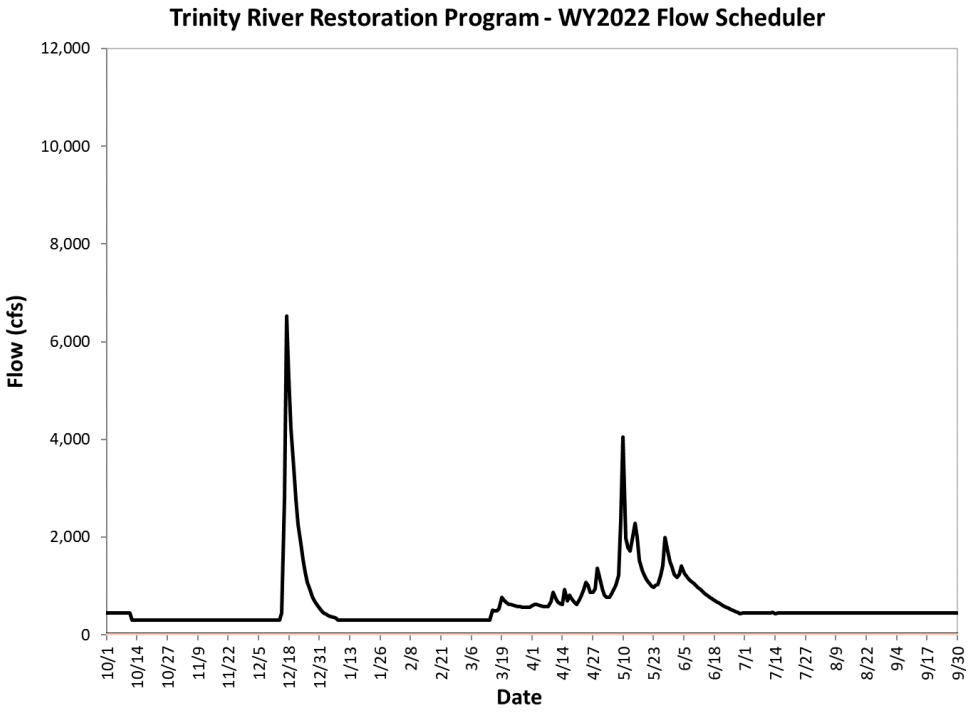

Figure 3. Example WY 2022 hydrograph for a dry water year with a 60 TAF winter flow synchronization event, and a 20 TAF elevated baseflow.

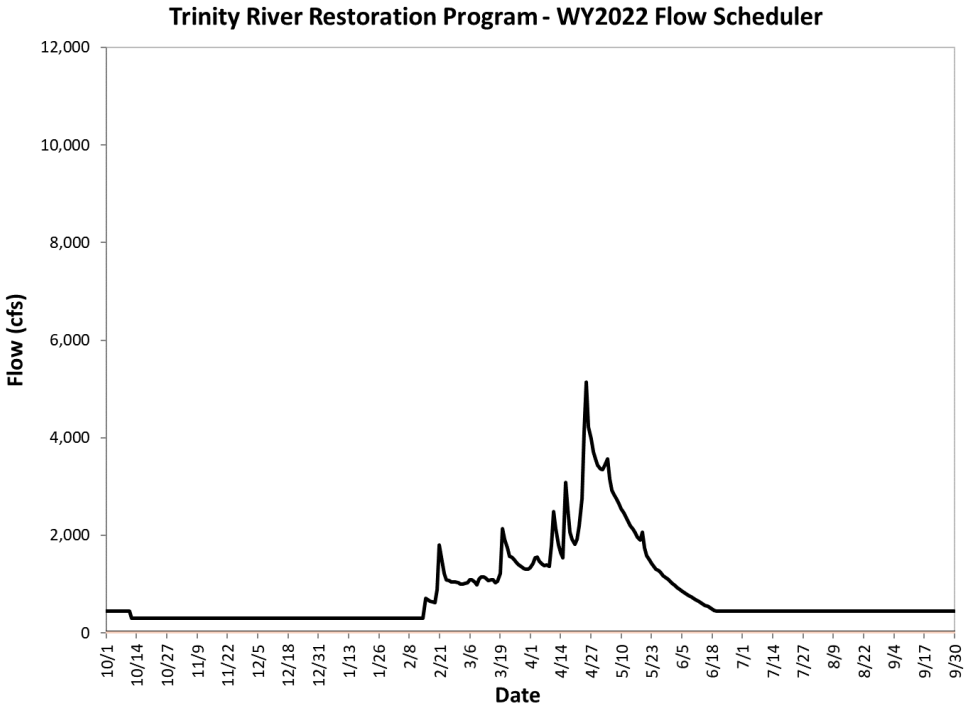

Figure 4. Example WY 2022 hydrograph for a normal water year with a 120 TAF winter flow elevated baseflow.

The FWG is recommending:

1. A single peak flow event of 6,000 CFS (daily average) for the flow synchronization period (December 15 to February 15)
2. One hydrograph covering the February 15 to April 15 time period scaled to three different flow volumes
3. One hydrograph covering the March 15 to April 15 time period scaled to three different flow volumes

The FWG looks forward to our upcoming discussions with the Interdisciplinary Team, and the upcoming implementation of this exciting new flow release methodology that we think marks a significant step toward river restoration.