

Summary of Flow Calculations and Frequently Asked Questions for the Teton River



Background

The new floodplain maps for the Teton River show a larger floodplain and floodway. Due to the significant number of homes shown at risk with the new maps, community leaders asked DNRC and FEMA for additional explanation and evaluation of the study data.

The information used to develop the flows is publicly available on DNRC's website. The following is a summary of the flow calculations and answers to questions that have been posed to the DNRC.

How were the flows calculated?

This summary focuses on three locations on the Teton River

- 1) the USGS (U.S. Geological Survey) gage below the South Fork of the Teton River,
- 2) the USGS gage near Dutton, and
- 3) the Choteau area, which is between these two USGS gages

USGS gages are important for floodplain studies because they give a direct measurement of the flows in the river over a long period of time. The DNRC project website has a recording of our April 30th presentation that has more details on how flood flows are calculated at these gages.

- 1) At the USGS gage below South Fork, where the Teton River leaves the mountains, the flow used in the new study is 23,000 cfs (cubic feet per second). To give that number some context, the 1964 flood in the Teton River had a flow of 56,000 cfs at this same location. However, with modern methods for floodplain mapping, combined with the long gage record on the Teton River, it was determined that the 1964 event was too large to be used for regulatory floodplain maps.
- 2) The drainage area at the USGS gage on the Teton River below South Fork is 110 square miles. However, at the USGS gage on the Teton River near Dutton, even though the drainage area is 1,238 square miles, the flood flow only increases to 26,800 cfs. This relatively small increase in flood flow between these two gages is the primary way that the new maps account for several questions that have been asked by community members. More details for specific questions are given below.
- 3) There is no USGS gage on the Teton River right at Choteau, so the flow used at that location is interpolated between these two gages based on the total drainage area of the watershed right at Choteau, which is 193 square miles. Even though the drainage area at Choteau has almost doubled compared to the USGS gage below South Fork, there is only a small increase in the flood flow to 23,800 cfs.

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How have the community's questions and concerns been accounted for?

Flow loss between the USGS Gage at South Fork and Choteau

One question that's been asked is whether the flood flow should decrease between the South Fork gage and Choteau, to account for things like water draining into the gravel in the valley. With the information available, the flood flows have almost no increase to the flows between the gage and Choteau, even with drainage area almost doubled, and this captures the same effect as the suggested decrease. There would need to have been another long gage record on the Teton River right at Choteau to potentially demonstrate a decrease in flood flow.

Deep Creek

Another question is whether the flows at the gage near Dutton are impacted by Deep Creek, which flows into the Teton River downstream of Choteau. The relatively small increases to the flood flows between the two USGS gages means that drainages that flow into the Teton River below Choteau, like Deep Creek, do not have a significant impact on the flood flow calculation at the Dutton gage.

Comparison to the current flood maps and comparison to the Sun River

Another question is why the flows calculated on the Teton River have increased relative to the 1984 study, but the flow calculated for the Sun River flows did not change as much. The answer to this question is the flow calculations for each river are based on a history of flow measurements taken from each of the rivers. Because the rivers are independently studied, flows calculated for the Sun River do not influence the flow calculations used to develop the flow rate on the Teton River.

Next Steps

DNRC has evaluated all available stream flow and flood history information, and there is no additional data that would lead to a change in the flow calculation using the established methods for developing floodplain maps. The flood study process is expected to proceed using the current flow calculations to map the flood risk from the Teton River.

Some revisions to the maps that don't depend on the flow calculations, such as the placement of the floodway, are currently being reviewed and are not available to distribute at this time. Any such revisions will be shared with the community as soon as they are available.

Any potential changes to the flow calculations would be resolved through the formal appeal process, with the appeal period estimated in mid-2025. An appeal that could initiate revisions to the maps would have to include additional technical information that demonstrates why the current flow calculations should be revised.