

Teton River Runoff Forecast March 1, 2021



Snowpack Conditions

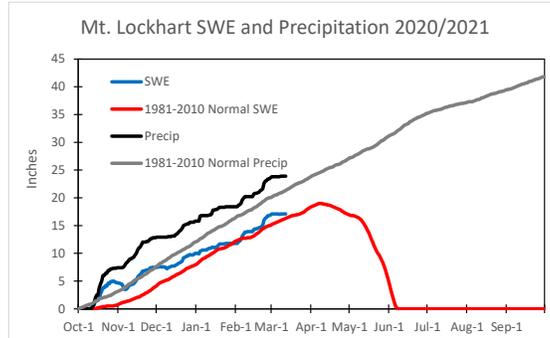


Figure 1: Mt. Lockhart (Elev. at 6400 ft) SWE and precipitation.

Double-click to enlarge

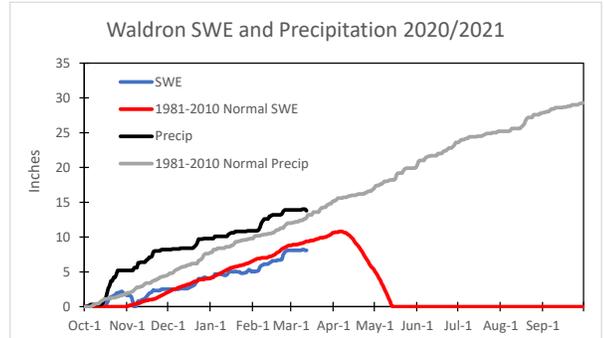


Figure 2: Waldron (Elev. at 5600 ft) SWE and precipitation.

Double-click to enlarge

– Snowpack conditions (Snow Water Equivalent or SWE) at the Natural Resource Conservation Service (NRCS) [Mt. Lockhart and Waldron SNOTEL](#) sites are **trending normal to below normal** as of March 1. **Mt. Lockhart is at 105% of the median** (Figure 1) and **Waldron is at 86% of the median** (Figure 2). SWE started out much higher than normal in the fall and early winter but has since declined beginning in January. Precipitation has been far above normal at high and low elevations but is not being stored as snowpack likely because of higher than normal temperatures in the mountains. February's cold spell and record winter storm succeeded in restoring snowpack to almost normal levels, improving what would have been a below average year. However, drought conditions may develop depending on temperatures at high elevations over the next two months. As of March 1, the mountains should have accumulated almost (80%) of the winters total snow.

Streamflow Conditions

– The United States Geological Survey (USGS) gage [06102500](#) Teton River Below South Fork near Choteau (TRSF) is still in winter baseflow. This gage is operated seasonally by USGS and is typically brought online on or before April 1st.

Weather Outlook

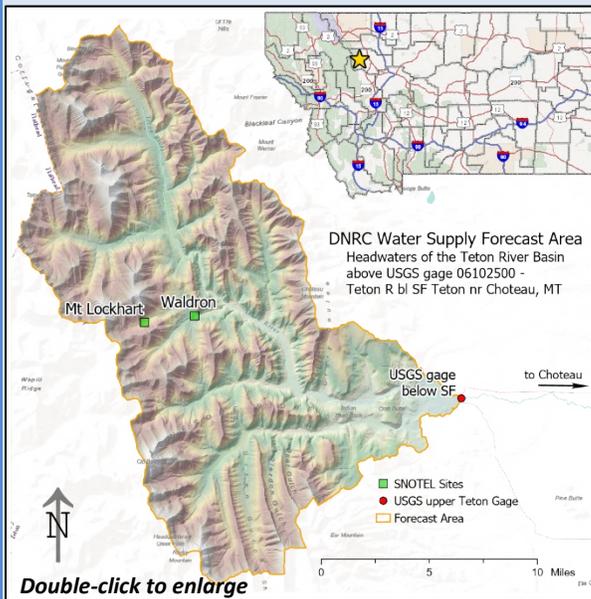
– The National Weather Service (NWS) **one-month outlook indicates normal precipitation and normal temperatures** for Central Montana, with an equal chance of being slightly above or below average. The El Niño Southern Oscillation (ENSO) index, is a measure of whether equatorial Pacific Ocean conditions known as El Niño (warm and dry for Montana) or La Niña (cold and wet) could develop and influence weather along the Rocky Mountain Front. Currently, La Niña conditions exist with colder sea surface temperatures. La Niña has contributed to the wet conditions so far this year but is projected (~60% chance) to transition to ENSO-neutral between April and June, meaning **La Niña may continue to influence Montana weather in the near-term but less so by May**.



Disclaimer: The DNRC snowmelt runoff forecast follows NRCS methodology using statistical best practices and professional judgment. Like any forecast it contains uncertainty. Please consider the stated error and documentation associated with each model when using the predicted flow in your decision-making process.

Contact Info: Todd Blythe,
Hydrologist DNRC
406-444-4571
todd.blythe@mt.gov

Forecast Area



Runoff Forecast

– DNRC’s March 1 runoff forecast predicts an **above normal volume of 51,751 acre-feet** (Figure 3) of water from snowmelt. ****This is the estimated flow only from snowmelt****. Current information indicates that the 2021 runoff from accumulated snowpack is predicted to be like conditions observed in 2017 and 2020. The **error associated with the March forecast is +/- 48 %**, meaning the prediction could vary from below normal, to wet conditions (Figure 3). The error range in March is highest because the mountains can still accumulate snow for the next several months.

If there is a normal amount (7.5 inches) of rain from April 1 – July 31, the total runoff is predicted to be 64,956 acre-feet. This is **16,370 acre-feet more than normal**. Any excess rain (i.e. more than 7.5 inches) could increase the volume substantially (Figure 4). If it rains 11.5 or more inches from April 1 to July 31, 2021 could be a wetter year than 2019 or 2020. For reference, both 2019 and 2020 had more than 12 inches of rain from April 1 – July 31. The **effects of excess rain are visualized in Figure 4** as inches above normal.

Forecast Period is April 1 – July 31

All predicted and displayed values are calculated for this period.

On a normal year, **48,586 acre-feet** of water flows by the TRSF gage from April 1 – July 31 (based on the median of the total annual flow from 1999 to 2020). **Approximately 34,076 acre-feet (or 70%) of this flow is from snowmelt** built up at high elevations during the winter and spring. The remainder of flow is from rain events between April 1 and July 31. The median rainfall in the forecast area during this period is 7.5 inches but can vary considerably. **The median rainfall (7.5 in) produces about 13,205 acre-feet of runoff based on DNRC rainfall runoff model estimates.**

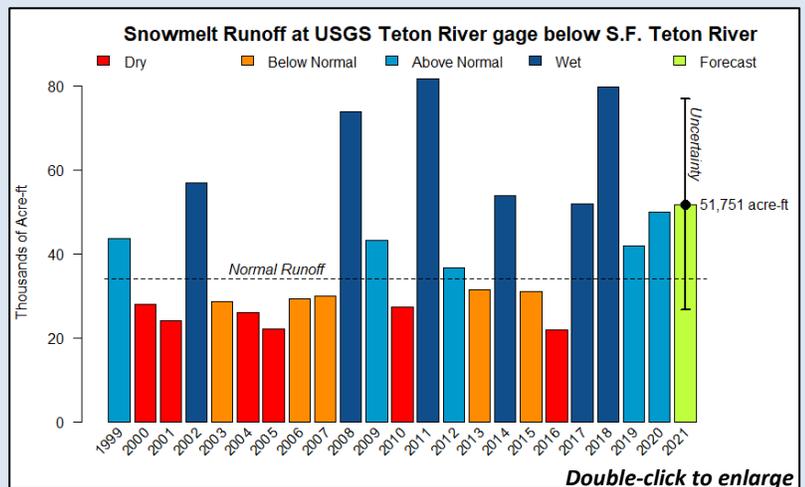


Figure 3: Historical snowmelt runoff and 2021 prediction.

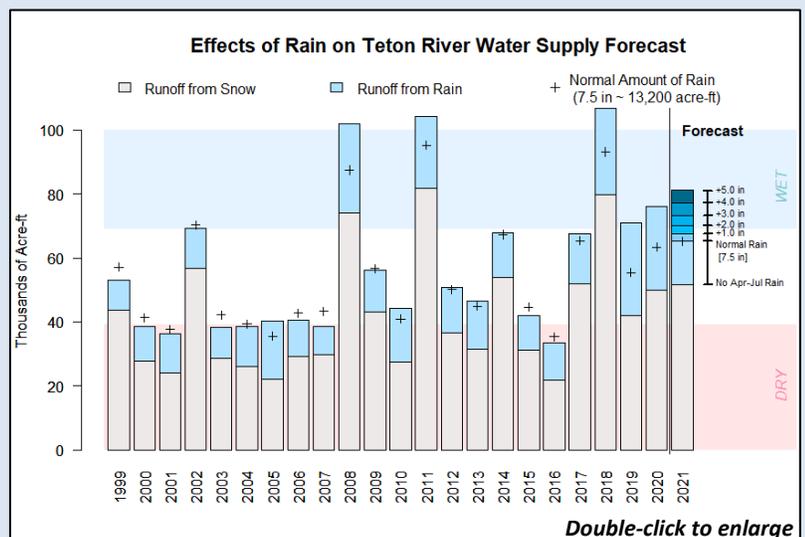


Figure 4: Proportion of flow from snowmelt vs. rain and the effects of April 1 – July 31 rain on predicted flow.



Disclaimer: The DNRC snowmelt runoff forecast follows NRCS methodology using statistical best practices and professional judgment. Like any forecast it contains uncertainty. Please consider the stated error and documentation associated with each model when using the predicted flow in your decision-making process.

Contact Info: Todd Blythe,
Hydrologist DNRC
406-444-4571
todd.blythe@mt.gov