

River Watch Items for the September 2022 UWP Board Meeting

- River Watch items of interest:
 - Samples at 10 River Watch sites were collected between 1 and 6 September 2022. The East Fork of Dallas Creek sample (Blue Lake) will likely be collected the week of 12 September.
 - Our pH meter has been having problems. The sensor condition has been below average, so River Watch sent a new sensor. The new sensor would not achieve a proper calibration, so we have reverted to the old sensor for this month's lab analysis.

- The sampling site at Potters Ranch provides a good example of why a composite sample (multiple sampling locations across a stream) is preferable to a grab sample (one sample location at the edge of a stream). Figure 1 shows the Uncompahgre River upstream of the CR3 bridge where a composite bucket sample is collected. The river channel at this site changes frequently. Last year the main channel came around the right side of the gravel bar.



Figure 1. Uncompahgre River on 9/1/22 at the CR3 bridge, the Potters Ranch River Watch site. Main channel on the left still had suspended material from monsoon rains. Source of the channel on the right is a spring-fed ditch coming into the river at the red arrow.

- Precipitation, streamflow and reservoir storage during the Southwest Monsoon:
 - The Southwest Monsoon typically increases precipitation over western Colorado during the summer months, with the timing and duration of the monsoon varying markedly from year to year. This water year the monsoon began in late June when the Gunnison Basin had about 92% of its median precipitation. The monsoon has continued through August and its impact on enhanced convective precipitation boosted the Gunnison Basin to 103% of its median precipitation on September 4th. Basin-wide precipitation increased by

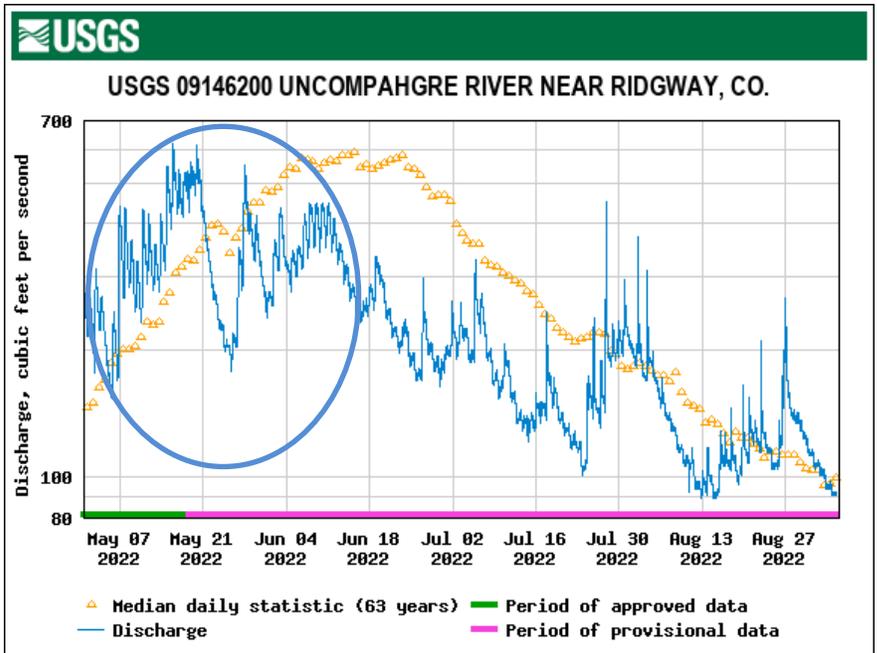


Figure 2. Streamflow graph for the USGS gauge near Ridgway for the period from 1 May to 3 Sept 2022. Blue oval encloses the period of spring runoff.

6.5 inches during the 2022 monsoon period, accounting for 20.6% of the total water year precipitation. Based on the median precipitation curve for the basin, this is almost exactly the percentage of the water year total typically accumulated between 15 June and 15 September. At the Idarado SNOTEL site the 2022 monsoon had contributed about 36% (11.5 inches) of the water year total of 29.8 inches as of 3 September, with the median monsoon contribution being only 20.6%.

- The impact of monsoon precipitation can be seen in the streamflow graph for the USGS gauge near Ridgway in Figure 2. The blue oval in Figure 2 encloses the period of peak spring runoff which, compared to the median flow values, produced peak flows 2-3 weeks earlier than normal. The short-term flow peaks after 18 June, several greater than 300 cfs, were due to monsoon storms. However, until late July streamflow remained below the median curve (yellow triangles in Fig. 2). In late July and again in late August two series of strong monsoon storms produced streamflow that exceeded the median curve. By September when dry weather set in over the western U. S., streamflow subsided to values close to the median.

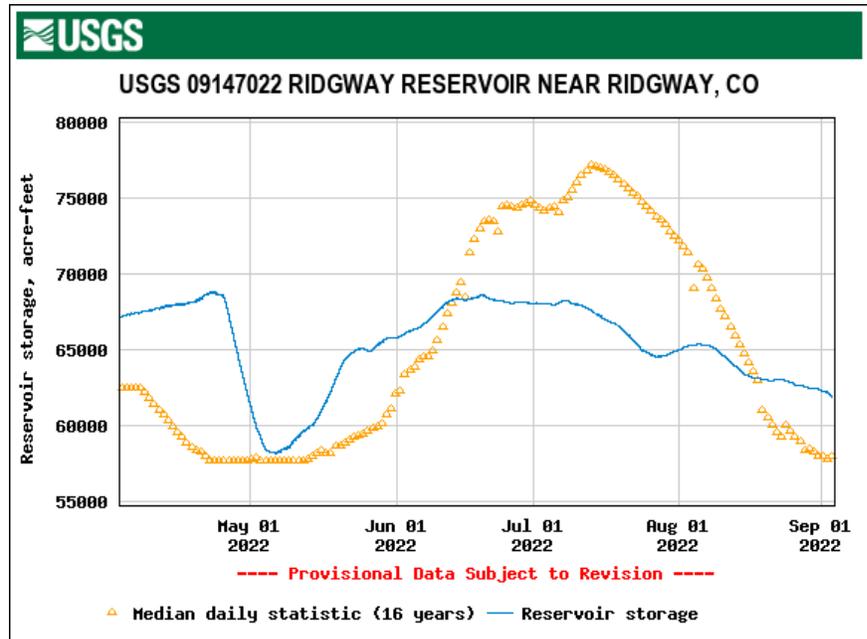


Figure 3. Ridgway Reservoir storage (blue line) for the period 3 April to 3 September 2022. Yellow triangles are median values based on the past 16 years of data.

By September when dry weather set in over the western U. S., streamflow subsided to values close to the median. However, as seen in Figure 1, sediment was still being carried into the Uncompahgre several days after the monsoon rains had ended.

On smaller streams like Dallas Creek and Cow Creek, streamflow was generally below median or average values until near the end of July, then increased to values at or above the medians through the end of August.

- Ridgway Reservoir storage from May to September 2022 is shown in Figure 3. As seen by comparison with median storage values, the temporal trend in 2022 was highly abnormal due to emergency releases of 800 cfs from late April to early May. About 10,000 acre-feet of storage was lost during this period. Without this loss storage might have peaked much closer to the typical maximum near 77,000 acre-feet. Further, because releases following the emergency release were also atypical, the impact of monsoon storms on storage is not readily apparent, except for a modest increase at the end of July which matches a broad streamflow peak on the Uncompahgre in Figure 2.
- Metals data from TMDL sites monitored by UWP River Watch:
 - In 2021 UWP volunteers added four River Watch sites (five counting Blue Lake) to collect metals data where data were insufficient to complete a TMDL study by WQCD. This data recently became available in the River Watch database for all of 2021. Figures 4 through 7 show concentrations of cadmium (Cd), copper (Cu), zinc (Zn), and iron (Fe) at the five sites for June through November 2021.

Dissolved cadmium concentrations are shown in Figure 4. At Commodore Gulch and Imogene Creek concentrations exceeded the hardness-based chronic Table Value Standard (TVS) for aquatic life for all six months. At Commodore the acute TVS was also exceeded for all six months. The very high Cd concentration at Commodore in November was likely due to the very low flow at that time of year. Although Cd concentrations were all relatively high, the standard exceedance was also due in part to hardness values being quite low, ranging from 27 to 84 mg/liter of CaCO₃.

Dissolved copper concentrations are shown in Figure 5. At Commodore Gulch the chronic and acute aquatic life standards were exceeded for all six months. At Gray Copper Gulch, Imogene Creek and Red Mtn Creek the chronic and acute standards were exceeded in June, and the chronic standard was exceeded on Red Mtn Creek in July. Copper concentrations at the E. Dallas Creek site were all below the MDL for copper. As with its cadmium concentration, the high copper concentration at Commodore in November was likely due to very low flow.

Dissolved zinc concentrations are shown in Figure 6. Chronic and acute aquatic life standards were exceeded for all six months at Commodore Gulch and Imogene Creek. The Red Mtn Creek site exceeded the chronic standard in June. As with copper, zinc concentrations at the E. Dallas Creek site were all below the MDL for zinc.

Total iron concentrations are shown in Figure 7. The aquatic life chronic standard for iron was exceeded at Gray Copper Gulch in September, October, and November; at Commodore Gulch in November; and at Red Mtn Creek in October.

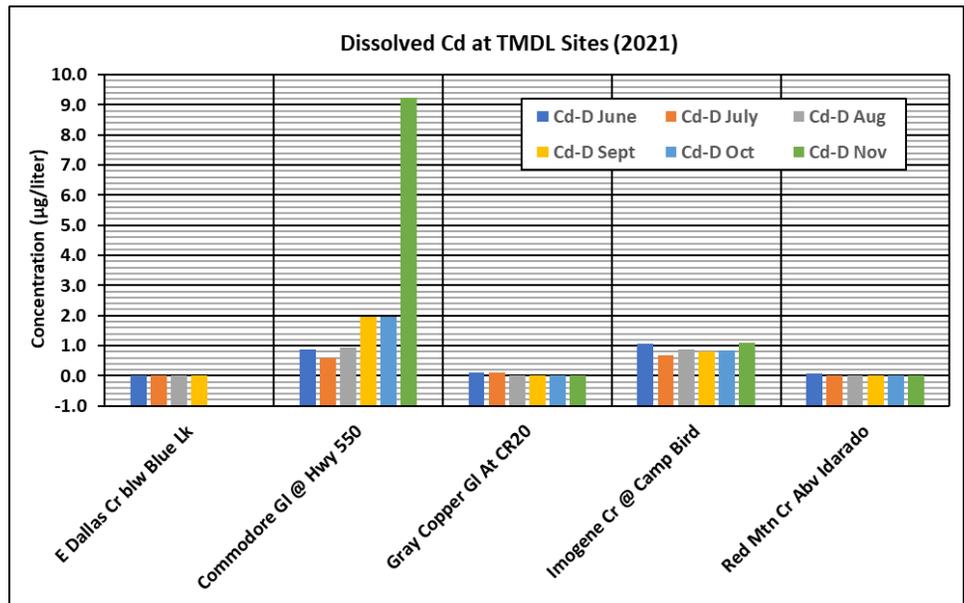


Figure 5. Dissolved cadmium concentrations for June through November 2021 at five River Watch sites.

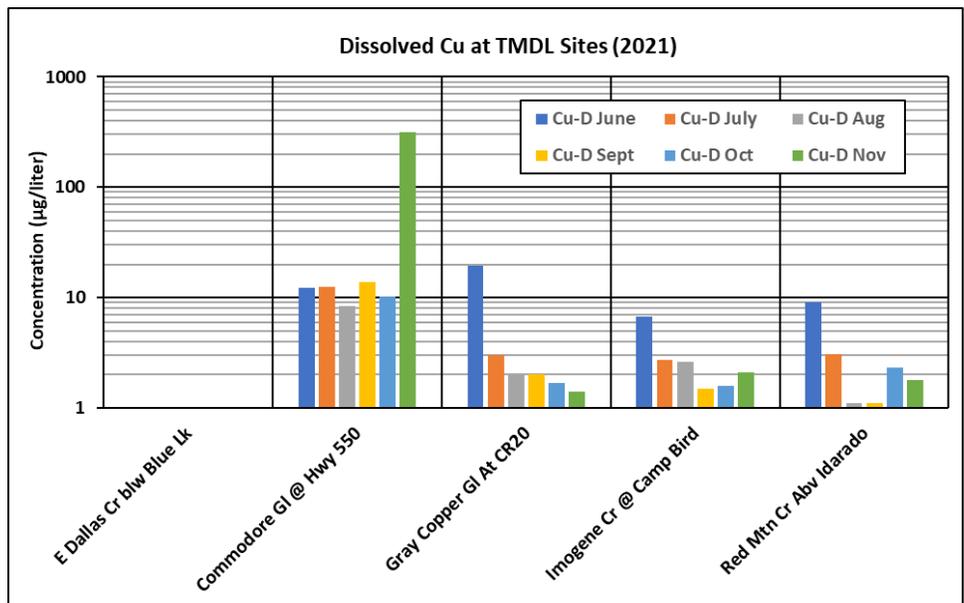


Figure 4. As in Fig. 4, except showing dissolved copper concentrations. At E. Dallas Cr no values were greater than the MDL for copper.

The combined River Watch data sets from 2021 and 2022 should be sufficient to complete the TMDL study and also sufficient to complete WQCD's next assessment of impairment in these stream segments.

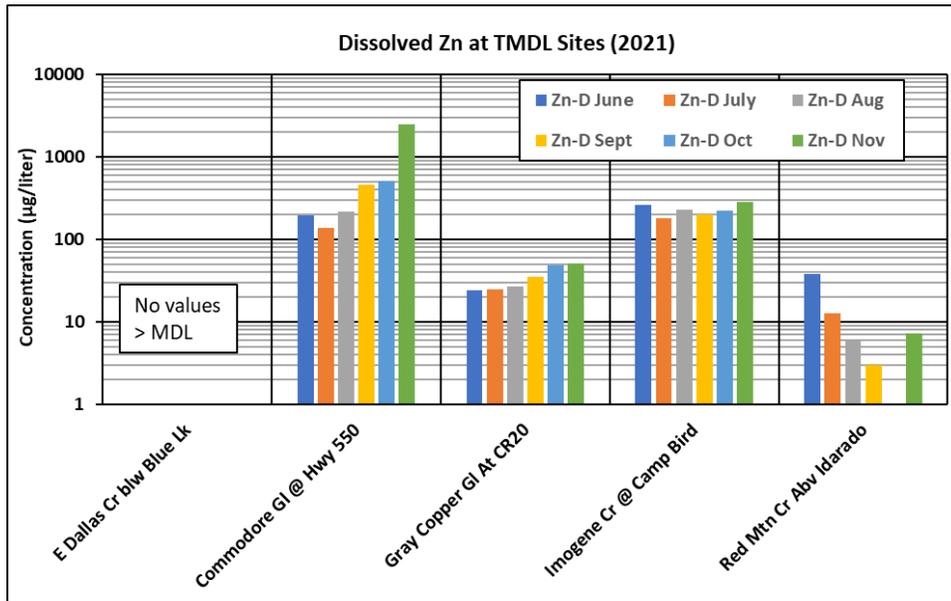


Figure 6. As in Fig. 4, except showing dissolved zinc concentrations.

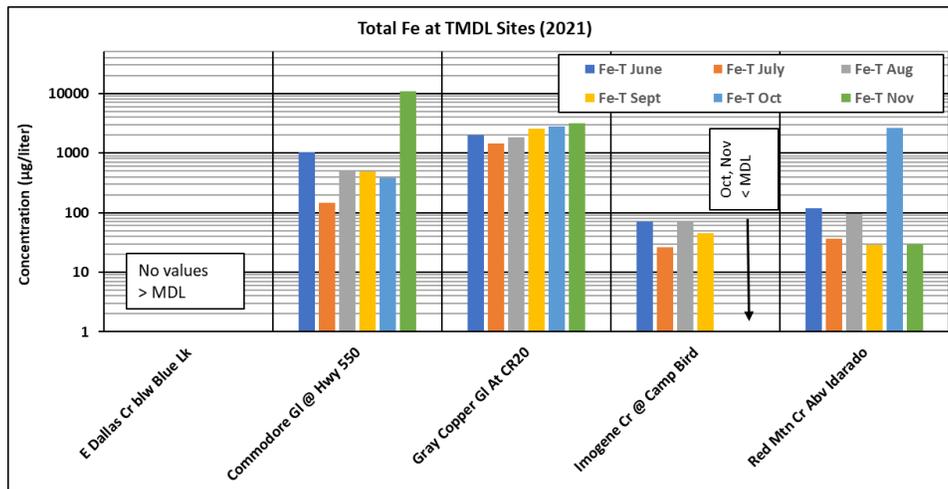


Figure 7. As in Figure 4, except showing total iron concentrations.