

River Watch Items for the June 2022 UWP Board Meeting

- River Watch items of interest are as follows:
 - We added our five TMDL sites this month, plus high flow nutrient samples, so it was a busy sampling period. Standard and nutrient samples were collected on May 30th, May 31st, June 2nd, and June 5th. Nutrient samples need to be kept cold in ice chests, so the May samples were shipped on June 1st, and the June samples were shipped on June 6th. Between mid-May and early June there have been several streamflow peaks on the Uncompahgre. We missed sampling during the highest flow between the 15th and 19th of May, but still sampled in relatively high flow in late May and early June.
 - River Watch has acquired a new Inductively Coupled Plasma Mass Spectrometer (ICP-MS) capable of detecting much lower mass concentrations of metals, compared to the older ICP-OES which differentiated metals by their optical emission spectra. This acquisition is quite important because, for some metals, the detection and reporting limits of the OES model were much higher than chronic standards for aquatic life. For example, the method detection limit (MDL) of the OES for lead (Pb) was 1.9-2.4 µg/liter while the chronic standard is about 0.42 µg/liter. With the ICP-MS the detection limit for Pb is 0.00001 µg/liter. From now on all detection limits of the ICP-MS for the metals sampled by River Watch will be well below aquatic life chronic standards.

- Comments on streamflow from 1 April through 10 June:
 - Streamflow from the USGS gauge near Ridgway is shown in Figure 1. Several flow peaks beginning in mid-May are evident, well above 30-yr medians. The highest flow period was 14 to 20 May which had the season maximum of 593 cfs on 16 May. Late May and early June had subsequent flow peaks, mostly below 420 cfs. Current daily maxima are 370-400 cfs, about 150 cfs below 30-yr medians.
 - The USGS gauge below Ridgway Reservoir had the non-standard profile shown in Figure 2. Following the “emergency” releases of 800 cfs in April, releases dropped below 200 cfs for much of May, and are now up to about 250 cfs. By 10 June median flows were above 400 cfs.
 - The USGS gauge on Dallas Creek revealed that the very low flows in April and early May, which were at times 30-40 cfs below historical medians, increased briefly to 20-30

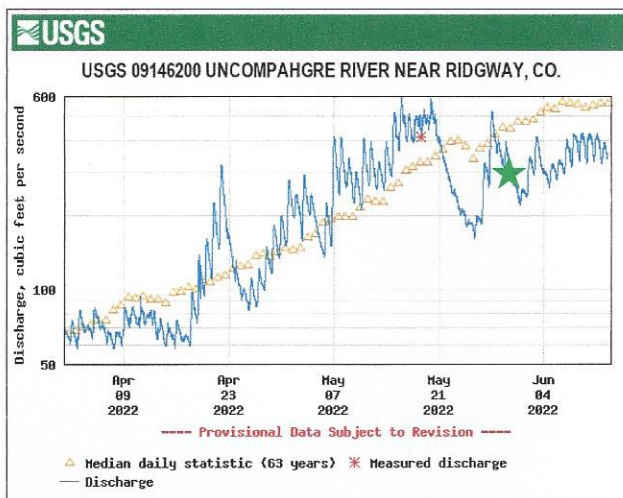


Figure 1. Streamflow at USGS gauge near Ridgway from 4/1 to 6/12/2022. Triangles show 30-yr median values. Green star shows the River Watch sampling event.

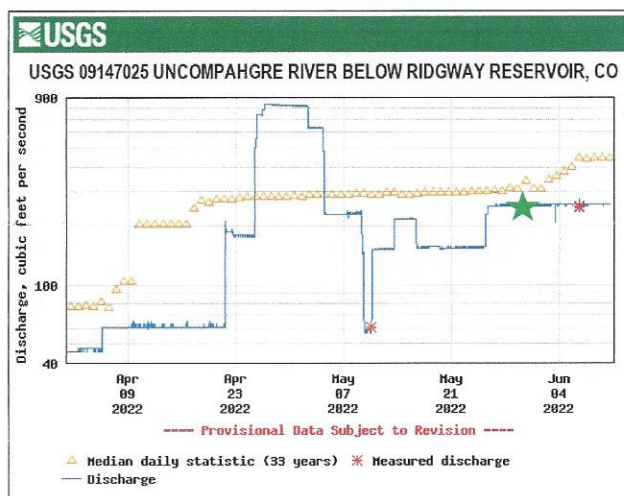


Figure 2. As in Figure 1 except showing streamflow at the USGS gauge below Ridgway Reservoir from 4/1 to 6/10/2022.

cfs between 17 and 21 May. Since then, flow has fluctuated between 4 and 20 cfs (on 10 June) with medians generally increasing from 15 to 30 cfs over the same period.

- The Colorado streamflow gauge on Cow Creek showed that peak flow was between 7 and 21 May. The maximum of ~275 cfs was attained on 15 May. Current daily flow is now about 75 cfs, with the long-term average being about 250 cfs.
- Some River Watch related excerpts from “Rationales for Proposed Changes to Segments and Parameters in Regulation 93 (303d List), WQCD February 2021”.

In the Standards Attainment Assessment Summaries in this document, each stream segment is described, its use classifications are listed, an attainment summary is given, the water quality stations are listed, and tables of attainment assessments are provided for acute and chronic standards. The data period of record for the assessments was 2015 through 2019. For mainstem Uncompahgre River segments, plus Canyon Creek and Red Mountain Creek, the primary data sources were River Watch (90+%) and WQCD. For segments like Mineral Creek, Sneffels Creek, Governor Basin, Imogene Creek, Dallas Creek, Cow Creek, and others, the main data sources were WQCD, UWP and USGS. Following are a few of the segments I've reviewed to date.

- **Mainstem of Dallas Creek, Segment COGUUN11_G:** Although the UWP River Watch volunteers have been monitoring this segment since May 2019, metals data had not been entered into the database at the time of the call for data, so only seven measurements of temperature, hardness, alkalinity, and pH were available. Based on two WQCD measurements of total Arsenic, mean of 0.92 µg/liter, which far exceeded the Water Supply standard of 0.02 µg/liter, arsenic was retained on the 303d impairment list. Note that River Watch data would not have been useful since the MDL for arsenic was 5.8 µg/liter. Winter season water temperature has been put on the Monitoring and Evaluation List, based on observations in 2012 and 2013 (recall Ashley mentioning that a recording temperature sensor will be installed at the USGS gauging station).
- **Mainstem of Cow Creek from the confluence with Nate Creek to the Uncompahgre, Segment COGUUN10a_C:** Results were about the same as with Dallas Creek with only two sets of metals measurements available from WQCD sources. River Watch metals data had not reached the RW database. Based on two WQCD measurements of total Arsenic, mean of 0.96 µg/liter, which far exceeded the Water Supply standard of 0.02 µg/liter, arsenic was retained on the 303d impairment list.
- **Mainstem of the Uncompahgre River between Cascade Creek and Dexter Creek, Segment COGUUN03b_A:** The River Watch site at the USGS gauge below Ouray (Site 3586) accounted for 90% of the available measurements between 2015 and 2019. Two metals, dissolved cadmium and copper, had TDMLs from 2010, but both were found to attain aquatic life standards in this assessment cycle and will be removed from the 303d list. WQCD found chronic standards computed from the average hardness of low flow samples were greater than the 85th percentile of 47 concentration measurements for both metals. I obtained the same result by comparing each concentration measurement to its hardness-based Table Value Standard (TVS) and finding that only 12.8% of cadmium samples and 8.9% of copper samples were greater than chronic standards, where 15% is required for non-attainment status.

Both pH (aquatic life) and arsenic (water supply) were proposed to be added to the 303d list. The pH non-attainment was based on the 15th percentile, 6.27, of 54 measurements being less than the minimum aquatic life pH standard of 6.5. (My analysis indicated 23.2% of pH values were less than 6.5). Arsenic was added to the 303d list based on the median (2.05

µg/liter) of six samples from a WQCD site being 100 times greater than the water supply standard of 0.02 µg/liter. In WQCD terms this is called “overwhelming evidence”.

In this stream segment total iron has a site-specific standard of 2971 µg/liter for aquatic life. The median of 47 samples was 3108 µg/liter (I calculated 3169 µg/liter from 48 samples). This indicates non-attainment and WQCD recommended retaining total iron in the 303d list category “impaired with TMDL”.

Finally, WQCD proposed retaining dissolved manganese on the 303d list for water supply. In contrast to most other metal standards, the water supply standard for manganese is based on measurements from 1995-1999, which had a value (not sure if this is a mean, median, or other statistic) of 414 µg/liter. This was compared to 2015-2019 data which had a 74th percentile (also not sure why the 74th percentile is used) value of 448.8 µg/liter.

- **Mainstem of Canyon Creek from its inception to the Uncompahgre River, Segment COUUN09_C:** The primary data source was the River Watch Camp Bird Road Site 4134 which accounted for about 93% of measurements, except for metals like As and Pb whose River Watch MDLs were much higher than the chronic standards. WQCD proposes adding pH to the 303d list based on the 15th percentile of pH in the current assessment being 6.04, compared to the minimum aquatic life standard of 6.5. Looked at a different way, about 32% of pH values were less than the minimum standard, where < 15% are required for attainment.

Dissolved zinc is currently on the 303d list for non-attainment of the aquatic life standard. WQCD proposes retaining zinc on the 303d list due to exceeding the aquatic life acute standard twice within a 3-year period. My analysis of the 2015-2019 data found 15.1 % of dissolved zinc concentrations exceeded hardness-based chronic aquatic life TVS, which would also suggest non-attainment of chronic standards.