River Watch Items for April 2022 UWP Board Meeting

- River Watch items of interest as follows:
  - River Watch sampling for April 2022 was accomplished between the 2nd and the 7th. No problems were encountered.
  - River Watch is preparing to ship supplies for high-flow nutrient samples. For the UWP group sampling will be in June.
  - Our postponed River Watch site visit has been rescheduled for April 20th.
  - River Watch has announced two 2022 trainings, one at CSU Mountain Park 6-8 August, and one 13-16 October in Cedaredge, CO.
- Streamflow from 1 March through 1 April is summarized as follows:
  - With intermittent storms and warmer periods streamflow fluctuated quite a bit through the month. At the USGS gauge near Ouray flow jumped from 30 cfs to >130 cfs during a warm period at the end of March. Flow then settled back to about 40 cfs by 1 April when the median flow is 49 cfs.
  - The USGS gauge near Ridgway followed a pattern similar to Ouray with a peak of 125 cfs near the end of March, then dropped to about 66 cfs on 1 April when the median is also 66 cfs.
  - The USGS gauge below Ridgway Reservoir showed a constant release of 46 cfs throughout March (same as January and February). The median for March increased from 50 cfs to about 75 cfs by the end of the month.
  - The USGS gauge on Dallas Creek had highly variable flow, generally about 15-18 cfs with peaks of 30-40 cfs. By 1 April flow was about 15 cfs, well below the median of 27 cfs.
  - After having issues with icing in January and February the Colorado state gauge on Cow Creek seemed to report reasonable flow values in March. Flow was below 20 cfs until 25 March then increased to 60 cfs during the warm period. By 1 April it was back to 20 cfs when the average is 36 cfs.
- Snow water totals generally increased in March in the Gunnison Basin. Overall, the basin snowpack increased slightly from 104% of its 30-year median in early March to 108% on 1 April. The highest snow totals were found on the north side of the basin. The Columbine Pass SNOTEL had a peak in SWE (21.7") on 18 March, then dropped to 20.1" of SWE on 1 April, 125% of its 30-year median. Through March the Red Mtn Pass SNOTEL gained 2.9" of SWE (19.3" total) but dropped in percentage from 95% to 87% of its long-term median. The Idarado SNOTEL increased slightly from 80% to 84% (11.4" SWE) of its median.
- Nutrient data examples from 2020-2021: UWP River Watch volunteers have been collecting samples for nutrient analysis since June of 2020. Typically, samples are collected during high flow in June and low flow in November. A state lab analyzes samples for total suspended solids (TSS), ammonia, chlorides, sulfates, and nitrates-nitrites. To date there is data from four sampling events in the River Watch database (June 2020, Nov 2020, and June 2021 for the six lower UWP sites; and Oct 2021 for the five high altitude UWP sites). Figure 1 shows nitrate-nitrate concentrations for the six lower sites from sampling events in June and November 2020 and Figure 2 shows nitrate-nitrite concentrations for the five higher sites from samples collected in October 2021. Note the years are different, but the October and November events represent conditions with low streamflow. In Figure 1 June concentrations exceeded those in November possibly due to more irrigation return flow in June. Figure 2 shows three higher altitude sites had nitrate concentrations greater than concentrations at all the lower sites in either June or November. This is somewhat unexpected since the sources of nitrates (irrigation runoff, fertilizers, waste treatment, etc.) might be more likely to produce greater concentrations at the lower altitude sites.

Figure 3 shows concentrations of four nutrient parameters from samples collected in June and November 2020, and June 2021 at the Potters Ranch River Watch site. Sulfate and chloride concentrations were highest during low flow in November. TSS concentrations were highest during the June runoff months, and nitrate/nitrite concentrations showed no significant differences between high and low flow months.

The Colorado Dept of Public Health and Environment (CDPHE) collects nutrient samples in the effluent of waste treatment plants, including the one in Ridgway. The effluent from the Ridgway waste treatment ponds enters the Uncompahgre River about a quarter mile downstream of the Ridgway Town River Watch site. The CR24 River Watch site is about two miles downstream of the wastewater discharge point. Figure 4 shows the nitrate-nitrite concentrations and loads from the three sites for a sampling event in November 2020. The loads in pounds/day were determined from coincident streamflow measurements (flow at Ridgway Town was estimated at 5 cfs less than CR24). Figure 4 shows that the nitrate concentration in the effluent was about 300 times greater than the concentrations upstream (Ridgway Town) and downstream (CR24) of the wastewater discharge point, but due to the very low effluent discharge rate there was no discernable impact on either downstream concentration or load at CR24.

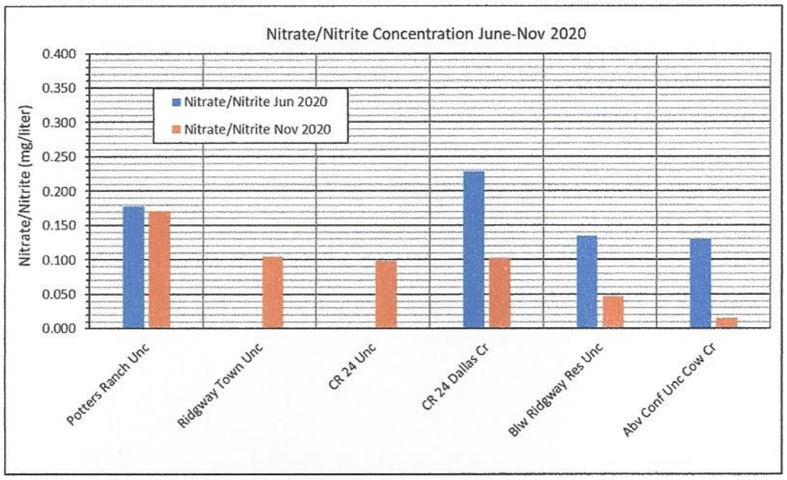

Figure 1. Nitrate-Nitrite concentrations at six UWP River Watch sites from June and November 2020 sampling events. Sites are ordered from upstream (Potters Ranch) to downstream (Cow Cr).

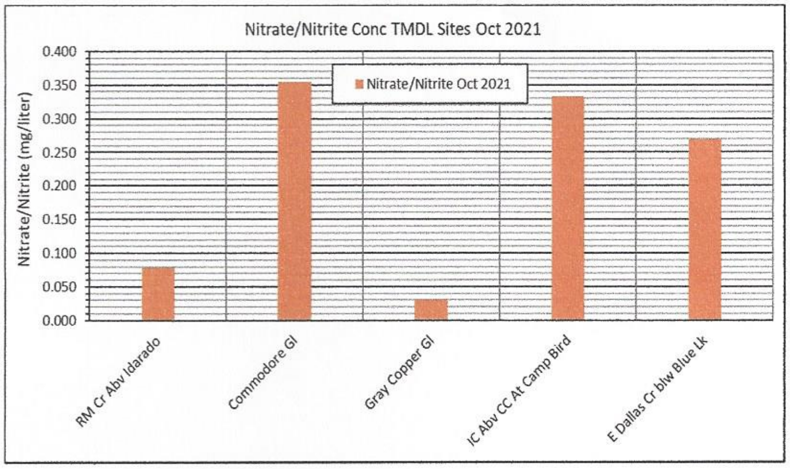

Figure 2. As in Figure 1, except showing nitrate-nitrite concentrations at five high altitude UWP River Watch sites in October 2021. IC refers to Imogene Cr and CC refers to Canyon Cr.

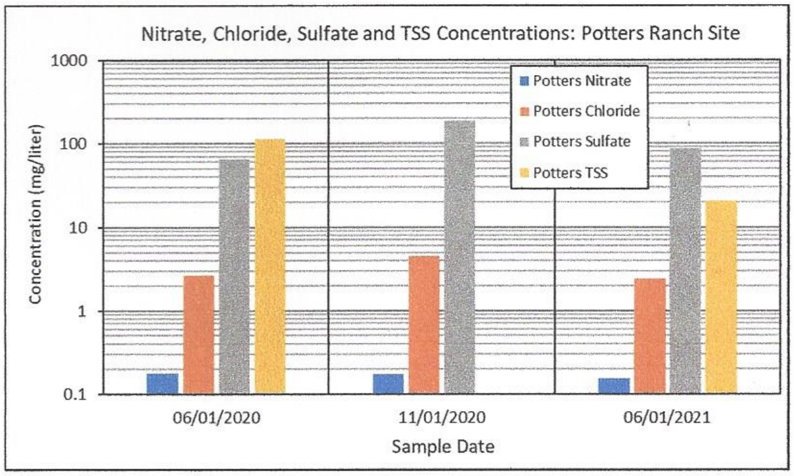

Figure 3. Nitrate, Chloride, Sulfate and TSS concentrations from three sampling events at the Potters Ranch site. The TSS value in November 2020 was zero.

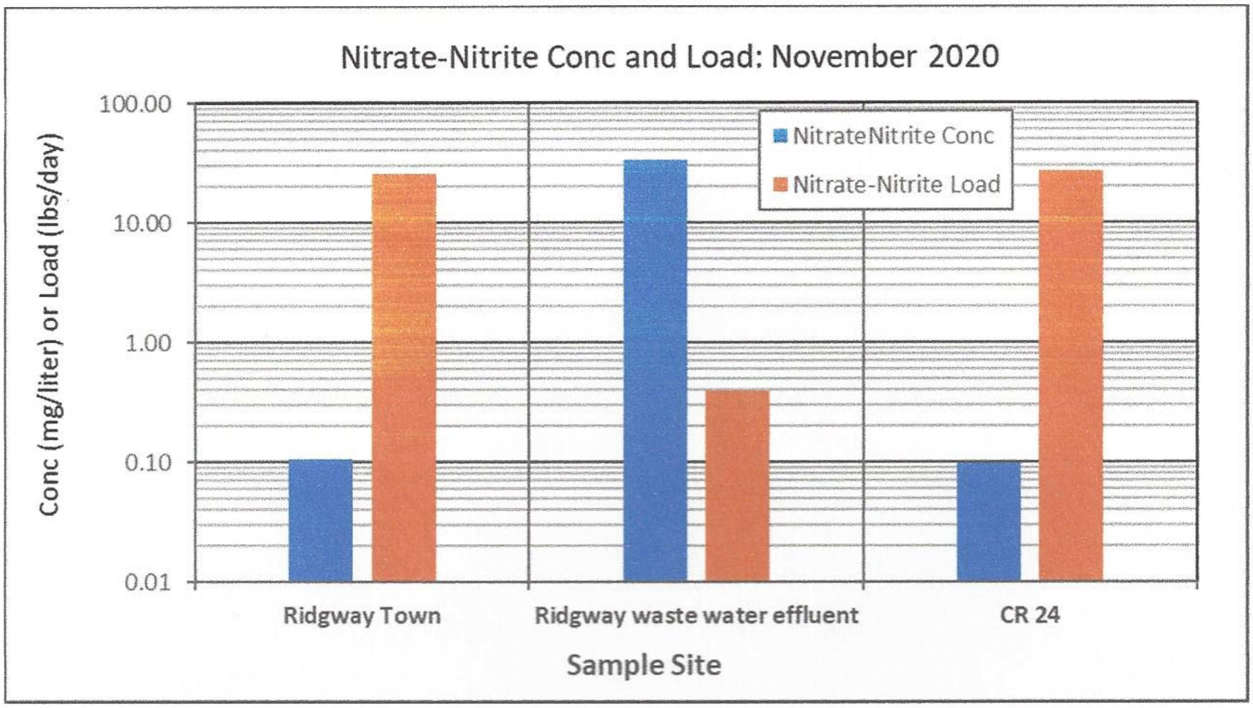

Figure 4. Nitrate-nitrite concentrations and loads for three sites on the Uncompahgre River near Ridgway, CO in November 2020.