

## **Coal Creek Nutrient Summary**

Prepared for the Coal Creek Watershed Coalition (CCWC) and the Town of Crested Butte

Prepared by Alpine Environmental Consultants LLC

---

### **Applicable Water Quality Standards**

The maximum allowable concentration of nitrate in domestic water supplies is 10 mg/L as Nitrogen (N). The maximum allowable concentration of nitrite in domestic water supplies is 1 mg/L as N; where nitrate plus nitrite concentrations cannot exceed 10 mg/L as N (Regulation 31 page 52).

The State of Colorado is in the process of applying numeric criteria for nutrient control to protect aquatic life and other uses. At this time interim criteria have been adopted for total nitrogen and total phosphorus; the interim criteria will be effective from May 31, 2017 to May 31, 2022. Although the interim criteria are not effective yet, they provide a useful benchmark to assess potential water quality issues. For total nitrogen and total phosphorus the criteria are 1.25 mg/L and 1.10 mg/L, respectively, for cold rivers and streams which includes Coal Creek and the Slate River (Regulation 31 page 65).

### **Nutrient Concentrations in Coal Creek**

From November 2000 to February 2016 approximately 90 samples were collected by the United States Geological Survey (USGS) from Coal Creek and analyzed for nutrient concentrations, which includes nitrate, nitrite, total nitrogen, total phosphorus and others.

From 2000 to 2016 dissolved nitrate concentrations ranged from less than 0.008 to 0.494 mg/L as N. During the same time period nitrite concentrations ranged from less than 0.001 to 0.002 mg/L as N. Total nitrogen concentrations ranged from less than 0.08 to 0.68 mg/L as N. Total phosphorus concentrations ranged from less than 0.004 to 0.033 mg/L as P. A substantial number of the nutrient results were reported as “estimated concentrations” (see note below).

The Coal Creek Watershed Coalition (CCWC) has collected total nitrogen and total phosphorus samples since 2012. CCWC’s results, approximately 25 samples, corroborate the data from USGS that is nutrients do not appear to be a significant water quality issue in the Coal Creek Watershed.

### **Nutrient Concentrations in the Slate River**

Ninety-nine nutrient samples were collected from 1995 to 2010 by several organizations in the Upper Slate River Watershed (headwaters to the pedestrian bridge, but not Coal Creek). Nitrate and nitrite concentrations were less than the applicable standard in all cases (see USR WQDA&S by AEC, 2011).

More recently, selected locations in the Slate River, Oh-Be-Joyful Creek, and Redwell Creek were sampled for nutrients in 2011, 2013, 2014, and 2015. The nitrogen concentrations measured in 2015 were very low- at times below method detection limits or an estimated result. All 2015 results were less than the total nitrogen criterion. Although nitrate and nitrite were not sampled directly, the total nitrogen concentrations, which include nitrate and nitrite, were less than the nitrate and nitrite standards. Nutrient concentrations measured in 2011, 2013, and 2014 were also very low.

There is no sample collection planned for 2016 however, CCWC and partners will sample in the Upper Slate River Watershed in 2017 as reclamation projects are implemented.

### **Current Sample Practices**

In the Coal Creek Watershed CCWC collects samples from approximately six locations per year and alternates the analysis types to manage the cost of sampling (e.g. even years are phosphorus and odd years are nitrogen). USGS samples on a bi-monthly basis in Coal Creek near the confluence with the Slate River. Currently CCWC and others are not regularly collecting samples in the Upper Slate River Watershed. The Town of Crested Butte staff monitor the waste water treatment facility's discharge, along with upstream and downstream locations in the Slate River to satisfy permit requirements. Please direct further questions about the facility's monitoring practices to Town Staff. Their sample plan may include nutrient monitoring.

### **Conclusions**

Nitrate and nitrite concentrations in Coal Creek and the Slate River Watersheds are typically very low and are currently well below the domestic water supply standards. Total nitrogen and total phosphorus concentrations are also very low and are less than the interim standards for nitrogen and phosphorus.

If the Town or other stakeholders are interested in collecting additional data, beyond the "general purpose" data collected by USGS, CCWC and others, we need to develop more specific questions to justify the need for additional monitoring. If pursued such monitoring efforts should incorporate other monitoring data sets (e.g. data collected at the Town's WWTF).

---

"Estimated results": indicates that the laboratory was able to positively identify the substance in the sample, but could not precisely report the quantity in the sample due to limitations in technology or laboratory practices. The detection limits generated by the laboratories referenced in this memo are suitable for evaluating water samples relative to state water quality standards (e.g. the detection limit is less than the applicable standard).