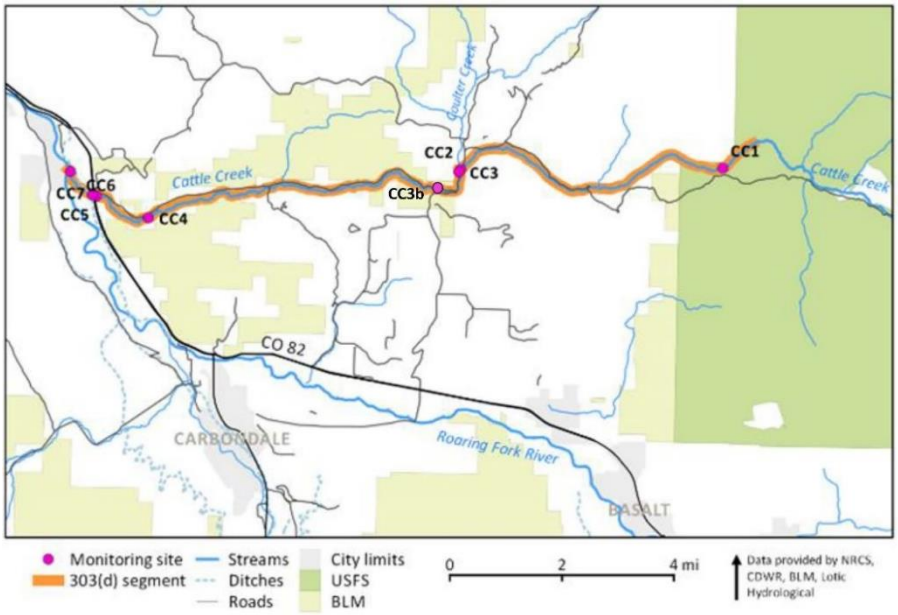
Cattle Creek Stream Health Evaluation Summary - 2017

Background:

In 2015, Roaring Fork Conservancy (RFC), with funding from Garfield County, embarked on an extensive study to better understand water quality impairments on Cattle Creek. Based on macroinvertebrate data, a 14.5-mile segment of Cattle Creek, from Bowers Gulch (near CC1) to the confluence with the Roaring Fork River (CC7) was placed on Colorado's 303(d) list for impaired waters.* Study goals included addressing the 303(d) listing and understanding the transition from high water quality near the headwaters to impaired water quality in the lower reach. In 2015, RFC collected and assessed chemical and biological data, conducted a land use analysis, and published results in the Cattle Creek 2015 Stream Health Evaluation.



Based on the 2015 findings, RFC initiated second and third rounds of monitoring in 2016 and 2017 with funding from Garfield and Eagle Counties. All monitoring was strategically designed to complement and enhance the 2015 data and provide additional information attuned to state standards. Results from the three-year study have informed RFC's initiative to address Cattle Creek's 303(d) listing, and provided a broader understanding of overall creek health and potential impacts to aquatic life.

**The Clean Water Act is the primary federal law governing water quality in the United States. Section 303(d) asserts each state is required to monitor waterways and document those which do not meet water quality standards. States must then prioritize impaired waters and develop remediation plans to improve water quality.*

Overview:

WATER CHEMISTRY:

- Basic water quality constituents, Dissolved Oxygen and pH, did not exceed state standards in 2017, however one temperature measurement exceeded the state maximum weekly average once in July at site CC3b just below County Road 100. Similar to previous years, Specific Conductance, Total Dissolved Solids, and Salinity exhibited noteworthy increases moving downstream.
- In 2017 phosphorus levels were generally elevated at the middle site (CC3b) compared to up and downstream sites and exceeded the state standard once in July. Previous years have also seen periodic exceedances and elevated levels at midstream sites. 2015 and 2016 also exhibited elevated levels at downstream sites and a peak in phosphorus levels during spring runoff, a timing which primarily suggests livestock and natural/soil impacts.


Site CC3b

- Nitrate concentrations in 2017 increased in a downstream direction, similar to previous years. Timing fluctuations, however, were slightly different from 2015 and 2016 where nitrate loading maintained relatively consistent rates throughout low flow periods, then dropped due to snowmelt dilution, exhibiting a potential correlation with septic system density.


RFC staff collect samples at CC1

- In 2016 and 2017, additional nutrients were included in the sampling regime (Ammonia & Total Inorganic Nitrogen), however no related exceedances of state standards were detected.
- Levels of E. coli exceeded state recreation standards at middle and downstream sites multiple times in 2017. Levels generally increased moving downstream. Similar to 2015 and 2016, the spatial pattern and timing of E.coli results suggests that grazing activities and streamside land management are likely primary, but not the only, contributors.
- Monitoring work in 2017 reinforced potential issues regarding nutrients and bacteria in Cattle Creek and exhibited some trends not seen in previous years.

Please note, these results do not justify legal designations of impairments.

MACROINVERTEBRATES:

- Macroinvertebrate samples collected in 2016 showed upstream and middle sites attaining state standards while the most downstream sites indicate impaired conditions.
- In 2017 RFC submitted 2016 Macroinvertebrate data to Colorado Water Quality Control Division to address the current 303(d) listing of the creek.

LAND USE:

- Land use analysis (conducted in 2015) identifies gradients of land use change that correlate with water quality and macroinvertebrate findings. The upper reaches of Cattle Creek are largely undeveloped and forested, supporting excellent water quality. A gradient of increasing impacts matches land use in a downstream direction from agricultural activities to residential and commercial development. These varied uses along the stream corridor lead to water quality impacts, signals of aquatic life stress, and riparian alteration, all playing a role in the steady downstream degradation of stream health.

FLOWS:

- Water withdrawals in the middle and upper watershed continue to remove significant streamflow to irrigate lands in Missouri Heights. Throughout the lower reach, streamflow remains at consistently low levels, which may exacerbate water quality issues due to the reduced dilution for existing stressors.
- During the winter of 2017 and 2018, the Glenwood Ditch Company made alterations to the Glenwood Ditch diversion structure on lower Cattle Creek. RFC staff worked with the Glenwood Ditch Company and Natural Resource Conservation Service to understand how this new structure will improve ditch conveyance, hydrology, and water quality of the creek.

Next Steps:

- Explore funding to continue water quality monitoring in 2018.
- Monitor the new Glenwood Ditch structure to assess improvements to Creek health.
- Partner with the Bureau of Land Management (BLM) to address riparian impacts and concerns along BLM property on Cattle Creek.
- Explore options to address low flows on the creek, particularly a voluntary coordinated spring flushing flow.
- Continue work with stakeholders to provide consultation and resources regarding riparian, septic, and other best management practices to improve stream health.


RFC Staff measuring flow at CC3b

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Roaring Fork Conservancy: Inspiring *people to explore value and protect our watershed since 1996.*