A History of the Coal Creek Watershed Coalition
2004-2021

Introduction

The Coal Creek Watershed Coalition (CCWC) held its first meeting in April, 2004 when Steve Glazer, a member of the High Country Citizens Alliance, asked representatives of the Town of Crested Butte (the Town), United States Forest Service-Gunnison District office (USFS), Upper Gunnison River Water Conservancy District (UGRWCD), Colorado Department of Natural Resources - Division of Reclamation, Mining and Safety (DRMS), Rocky Mountain Biological Laboratory (RMBL) and the Colorado Water Quality Control Division (WQCD) to discuss the Coal Creek watershed and, more specifically, the water quality issues at the Standard Mine. Since 2004, the CCWC has become a non-profit corporation, applied for and received many grants, gathered a large quantity of water quality data and conducted many reclamation projects in the Coal Creek, Upper Slate River, and Washington Gulch watersheds. The following is a brief summary of CCWC activities. A list of acronyms appears at the end.

Coal Creek

2004 – 2016 Standard Mine

Beginning in 2004, the U.S. Environmental Protection Agency (EPA) took a close look at many legacy hardrock mines in the vicinity of Crested Butte, including the Standard Mine. Because heavy metals from the Standard Mine were leaching into Elk Creek, which is a tributary to Coal Creek, and because the mine and Elk Creek are up-stream of the Town water intake on Coal Creek, and therefore could affect water quality for residents of the Town, the EPA decided to list the Standard Mine as a Superfund site. The goal of this listing was to improve water quality by minimizing contact between acid mine drainage and minerals, located either in the mine or in the mine tailings. Since listing the site, the EPA removed contaminated waste rock and tailings from Elk Creek to a nearby permanent repository to eliminate contact with the air and water. The USFS cooperated with the EPA in locating a suitable site for the repository and also participated in many other aspects of the Standard Mine project. The EPA re-established the Elk Creek stream channel through the site, re-established wetlands on either side of the creek and has investigated the many underground levels of the mine with help from DRMS and the U. S. Geological Survey. As a result of the investigations, a new mine tunnel was dug adjacent to the level 1 mine tunnel, and contaminated water in level 1 has been redirected to the new tunnel so the amount of water exiting level 1 can be controlled. EPA also plugged vertical mine connections between levels 3, 2 and 1 to minimize the amount of contaminated water exiting the mine because as water drained from level 3, at the top, to level 2 to level 1, at the bottom, heavy metal leached into the water. If, after monitoring the results of these actions, there is still substantial contaminated water leaving the site, the EPA may passively or actively treat the polluted water before it enters Elk Creek. (See Standard Mine Interim Monitoring Project, below)

2004 - 2005 Coal Creek Watershed Protection Plan **Cost: $42,613**

Because the amount of heavy metals in Coal Creek water exceeds the standards for aquatic life, the Town, with the assistance of the CCWC, hired a subcontractor (Stantec Consulting Inc.) to evaluate the Coal Creek watershed and create the Coal Creek Watershed Protection Plan with funding from the Nonpoint Source Program (NPS) in the Colorado Department of Public Health and Environment (CDPHE). In addition to evaluating the conditions of the watershed, the plan recommended 19 tasks to improve

water quality. CCWC and its numerous partners have accomplished many of those tasks and this History of the Coal Creek Watershed Coalition summarizes many of those completed tasks.

2004 – 2021 Water Quality Monitoring **Cost: $677,187**

Evergreen Analytical Laboratory donated over $3,000 of services to analyze water quality samples from Coal Creek for heavy metals in 2004. In 2005 the EPA sampled water quality to characterize the Standard Mine's impact in Elk and Coal Creeks. The analyses included information on metals, volatile organic compounds and nutrients.

In June 2006 the EPA and CDPHE trained volunteers to take water samples. Since 2006, CCWC, using contractors, and volunteers from the USFS, National Park Service, RMBL, U.S. Moly Corporation, Crested Butte Community School, Volunteers in Service to America, the Town and the public, has collected nearly 1,400 samples of water in the Coal Creek watershed. The samples have been taken at an average of 20 sites in Coal Creek and its tributaries, up to five times per year. EPA analyzed those samples for heavy metals. Water samples were also sent to the City of Gunnison laboratory to analyze the water for total coliform and *E. coli*. From 2010 to 2012 CCWC analyzed 20 samples for water quality at the Iron Fen, which is located between Elk Creek and the Town. In 2014 CCWC did a focused sampling for arsenic around the Irwin Y. CCWC uploaded the data into the Colorado Data Sharing Network (CDSN) for public use. CCWC also contracted with Bugs Unlimited to evaluate the health of the creek by indentifying and counting the number of macroinvertebrates (aquatic insects) in the creek at 8 sites in 2005, 2006, 2011 and 2013.

Detailed analysis of the early findings can be found in the Coal Creek Watershed Water Quality Reports from 2006 – 2009 and 2016. The water samples collected by CCWC have shown that levels of cadmium, copper, lead, manganese, and zinc exceed aquatic life water quality standards at some of the sites sampled. Manganese concentrations exceed the drinking water standard. However, the manganese drinking water standard is a secondary standard to protect against corrosion and scaling within distribution systems and other aesthetic issues, and does not indicate a risk to human health. Additionally, manganese is removed by the Town's drinking water treatment system.

Financial assistance for water sampling and analysis was provided by the NPS program, EPA, the Town, CDPHE-WQCD, DRMS, Gunnison County, Colorado Healthy Rivers Fund (CHRF) the U. S. Park Service, UGRWCD and Mt. Emmons Mining Company (MEMC). Poponi Contracting lead sampling efforts until 2011 when CCWC hired Alpine Environmental Consultants (AEC) to coordinate and ensure all sampling efforts are conducted appropriately. (Anthony Poponi was the Project Manager, and later the Executive Director of CCWC from 2006 through 2012.) (From 2012 to 2020, Zach Vaughter, who began as a Volunteer In Service to America (VISTA) volunteer, was the executive Director of CCWC. In 2020 Ashley Bembenek, who owns AEC, became the Executive Director of CCWC and Arable Earth, LLC (AE) has been leading sampling efforts since 2020)

2005 - 2009 Forest Queen Mine **Cost: $6,260**

In 2005 and 2006, an assessment team from the EPA collected soil, water and sediment samples at the Forest Queen Mine. The EPA assessment concluded there was potential for the contaminants associated with the mine to cause localized toxicity to aquatic organisms. In the summer of 2009,

funding from DRMS was used to collect additional sediment and water samples at the mine and in adjacent areas. Samples were collected from Coal Creek, tributaries to Coal Creek, man-made ponds, waste rock piles, soils at the site and sediment from the ponds. These water quality samples confirmed the EPA's findings of limited water quality impairments. With the exception of a few aluminum results in June, all detections were below chronic standards. Waste rock and sediment also contained evaluated levels of contaminants. High lead concentrations were reported at the former battery storage site. ACZ Laboratories analyzed the sediment samples and Poponi Contracting removed 63 abandoned batteries from the Forest Queen Mine adit. The batteries were transported to a reclamation facility for recycling.

2008 - 2015 Inactive Mine Characterization **Cost: $2,909**

CCWC hired summer field staff to collect water quality and sediment samples at four abandoned mine sites located in the Coal Creek watershed. These locations were identified by DRMS as potential sources of water quality impairment. Metal concentrations in water and sediment samples were relatively low and did not suggest additional action was required. DRMS and NPS funded this project.

2009 Coal Creek Riparian Assessment **Cost: $22,250**

CCWC hired Bio-Environs, LLC and Bugs Unlimited, LLC to work with Dr. Kevin Alexander, Ph.D., to do a Riparian Assessment of the Coal Creek watershed with funding from the Colorado Water Conservation Board (CWCB). Dr. Alexander's expenses are not included in the cost above. The Assessment identified the following priorities:

- Reclamation and restoration of the Forest Queen Mine and stream/riparian area
- Sawdust and trash removal, revegetation and restoration of water flow at the Ender Lumber Co. mill site, located near the Kebler Pass turnoff to the Ohio Creek Road
- Implementation of roadway best management practices (BMPs) and stream/riparian restoration along Coal Creek, between Splains Gulch and the Irwin Forks
- Restoration and engineering of the stream/riparian zone through the Town to produce a "greenbelt" and to improve human safety
- Cattle management and stream/riparian restoration on the Crested Butte Land Trust Confluence Parcel (confluence of Coal Creek and the Slate River)
- Noxious weed removal in the lower portion of the watershed to prevent the weeds from displacing native riparian plants, maintain biological diversity and maintain ecological functions of the riparian areas
- Removal of the coke ash that is covering vegetation in the riparian zone west of the Town
- Engineering of diversion structures to reduce riparian and instream disturbance from repeated ditch diversion maintenance with heavy equipment in the creek
- Flow management of the Keystone Mine outflow to reduce the erosive forces in the riparian area
- Reduction in the amount of sediment entering Coal Creek from the Kebler Pass Road
- Restoration of part of the Mount Emmons Iron Fen wetland and removal of the man-made diversion

CCWC and its numerous partners have accomplished many of those tasks since 2009. (See below)

2009 - 2015 Analysis and Evaluation of BMPs for Coal Creek **Cost: $5,510**

The Community Foundation of the Gunnison Valley and the NPS program provided financial assistance for Schmueser Gordon Meyer, Inc. and Poponi Contracting to analyze water pollution issues and develop BMPs to improve water quality in Coal Creek.

2009 - 2013 BMP implementation **Cost: $40,159**

With funding provided by the NPS program CCWC contractors including: East River Earthscapes, Poponi Contracting, Seeds of Life, Christopher Klein Construction, Zach Vaughter and Kelly Haun installed BMPs to reduce erosion and sedimentation caused by Kebler Pass Road and steep roadside slopes. Thirty check dams were installed in the Kebler Pass Road ditches, twenty ditch guards and approximately 7,000 sq. ft. of erosion control mats were installed on steep slopes adjacent to the Kebler Pass Road to address eroding areas and encourage grasses to grow. Three drain inlet filters were installed in stormwater inlets in the Town. During the summer study period, 1,539 pounds of sediment were collected from the check dams and inlet filters. A sample was analyzed for nitrogen and phosphorus content. The results indicated that phosphorus and nitrogen loads were reduced by approximately 3.74 and .29 pounds, respectively, during the three-month study. After Michael Blazewitz, of the Measurable Results Program, and AEC completed the "Measurable Results Project, Coal Creek Restoration Project, Crested Butte, CO, 2011 Monitoring Report" (MRP) it was determined that sediment mobilization and deposition from Kebler Pass Road was much lower than originally anticipated.

2010 Educational Signage along Coal Creek **Cost: $ 1,035**

Gunnison Ironworks and Dixie Graphics made five signs designed to educate the public about Coal Creek's ecosystem services, such as providing drinking water, aesthetic value, etc. CCWC erected the signs along Coal Creek in the Town. The project was paid for by the CHRF.

2011 - 2012 Pave Portion of Kebler Pass Road **Cost: $23,619**

Gunnison County Public Works provided most of the funding and did the work and the NPS program provided $23,000 plus administrative costs to chip-seal 1.9 miles of the Kebler Pass Road where it crosses through a large wetland near the Y at Irwin. The purpose of the chip-seal was to reduce sedimentation into Coal Creek and minimize the magnesium chloride being applied by the county from entering the creek where road buffers are minimal.

The MRP evaluated the results to see if the chip-seal was effective. Although the MRP determined that chip-sealing the gravel road surface created a net increase in the amount of runoff generated because paved roads do not allow water to infiltrate into the soil or sediment below, the increased runoff did not result in measureable increases in sediment production.

2011 - 2012 Riparian Workshop **Cost: $1,893**

A workshop was held to educate residents and homeowners to plant native vegetation, promote responsible stewardship of private property and promote residents' role in protecting and restoring these areas to protect and improve water quality along the riparian corridor of Coal Creek, within the Town. NPS provided the funding. There were 29 attendees and the UGRWCD repeated the workshop in Gunnison.

2011 - 2012 - Halazon Ditch Headgate Reconstruction **Cost: $20,265**

With funding provided by the Town and the Colorado Watershed Restoration Program (CWRP), CCWC hired Spalone Construction, Crane Associates, JCI Construction and Grand Junction WinWater to reconfigure the headgate and diversion for the Halazon Ditch, located west of the Town, to protect

water quality in Coal Creek. The reconfiguration should result in less heavy equipment entering the creek to reinforce the diversion each year.

2006 – 2009 Water Quality Reports **Cost: $4,993**

Poponi Contracting, Logan Reese, and Amy Weinfurter prepared annual water quality reports, based on water quality sampling in the Coal Creek watershed.

2011 - 2013 – Confluence Parcel Riparian Habitat Improvement **Cost: $11,243**

A fence was erected to keep grazing cattle off the banks of Coal Creek and out of the Slate River, near their confluence, to improve riparian habitat and reduce sedimentation. Since the fence was erected, vegetation at the site has recovered voluntarily.

In 2012 Alpine Ecological Resources LLC (AER) and Ecometrics completed a detailed study of Coal Creek within the Confluence Parcel. The 2012 study indicated that grazing impacts may not have been as severe as indicated in the 2009 Riparian Assessment report. The 2012 study also indicated there were some sediment transport issues and recommended moving the creek channel to the west, away from Gothic Road, to allow the stream to meander without compromising the road. The CCWC was given an Award of Excellence in Riparian Management from the Colorado Riparian Association in 2012 for the CCWC efforts at the Confluence parcel. Funding for these studies and activities was provided by the CWRP and NPS.

2011 - 2018 Mt. Emmons Gossan Assessment **Cost: $32,479**

The gossan is a naturally occurring feature composed of limonite and other iron oxides. It is located northeast of the Mt. Emmons Iron Fen. A fire in 1978 on the AMAX Mining Company property burned portions of the gossan. Forty years later, the remaining vegetation is sparse. The gossan contributes metal loading to Coal Creek. In 2011 the CCWC began assessment and design work to revegetate the gossan. AER, ACZ Laboratories, Western Native Seeds, Crane Associates, Dean Bennet Supply Company, Western Biochar, Andrew Arell, Zach Vaughter, Zach Guy, Bugs Unlimited and Poponi Contracting collaborated to evaluate the soils, surface water and groundwater of the gossan and then use high altitude seed mixes, biochar chips, and other supplies for test plot construction to evaluate different potential mixtures of seeds and fertilizers which would best help re-vegetate the gossan and reported the findings. NPS provided the funding.

2013 - 2014 TMDL Review **Cost: $2,190**

Total Maximum Daily Load (TMDL) is a regulatory term in the U.S. Clean Water Act, describing the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards. Alternatively, TMDL is an allocation of a water pollutant deemed acceptable to the subject receiving waters. TMDLs have been used extensively by the EPA while implementing the Clean Water Act by establishing maximum pollution limits for wastewater dischargers. Since the inception of CCWC, it has participated with the CDHPE, U.S. Energy (the former owner of the Keystone Mine), and others to decide what TMDLs are acceptable in Coal Creek. In 2012 CCWC hired AEC to represent it in the process by participating in discussions with CDPHE and U.S. Energy, to review the draft TMDL and review comments submitted by other parties.

2013 Ender Mill Site Revegetation Cost: $1,341

The Ender Lumber Company mill site is located at the top of the Coal Creek watershed, near Ohio Pass. The site had been used as a lumber mill, a garbage dump and a shooting range. The CCWC, AmeriCorps National Civilian Corps (NCCC) and the USFS cleaned up the site and created a limited parking area with funding from the USFS and Patagonia. USFS and NCCC expenses are not included in the above cost.

2013 Crested Butte Headgate Diversion Project Cost: $18,884

CCWC hired Crane Associates to design a new diversion structure and headgate, west of Town, for the Town water supply system. Prior to the project, Town crews entered Coal Creek annually with heavy equipment to create the diversion by pushing sediment, concrete and trees. The annual goal was to create a pond so water could be diverted into the Town system. After completion of the project, the site appears to be a rock garden, through which fish can swim, and the Town should not need to disturb the creek. Funding was provided by CWCB, UGRWCD and the Town. Lacy Construction provided equipment and the Town crews did the work under the guidance of Crane Associates.

2014 - 2021 Temporary Modifications & Site-Specific Standards for Coal Creek Cost: $65,143

The Colorado Water Quality Control Commission (WQCC) has the option to adopt temporary modifications to water quality standards (temp mods) in certain cases where instream water quality standards are not attained, and a discharger has a demonstrated or predicted permit compliance issue. Temp mods are reviewed at least every three years by the WQCC. Coal Creek has had temp mods for over 20 years. Since CCWC began, it has participated in the WQCC hearings on this subject. In 2014 the CCWC used donations to hire AEC to represent CCWC at the WQCC and help direct the discussion about revisions to the temp mods for Segment 12 - Coal Creek below the Town water supply intake.

The 2016 Memorandum of Understanding, signed by the Town, MEMC, CDPHE, Colorado Department of Natural Resources, and Gunnison County said the signatories would work to develop site-specific water quality standards for Coal Creek. The Town hired CCWC to be a technical advisor to the project because CCWC had already been working on the temp mods for Coal Creek. CCWC continued to sub-contract with AEC and Zach Vaughter, until he resigned from the CCWC, to be the technical resources required by the Town. In 2017 all parties agreed on cadmium standards in Coal Creek. Funding was provided by, CCWC, the Town, the Red Lady Coalition, Gunnison County and MEMC. Water quality standards may be set for other metals in the creek by the WQCC, soon.

2010 – 2016 Design and install BMPs below the Iron Fen Cost: $181,030

The Mount Emmons Iron Fen is a unique geologic feature that is estimated to be 10,000 years old and a natural source of metals to Coal Creek, Segments 11 and 12 (Segments 11 and 12 of the Gunnison River Basin). A tracer study was conducted during runoff in 2007 by University of Colorado researchers Dr. Joseph Ryan and others. The study found, that in this reach, aluminum, cadmium, copper, and zinc exceeded chronic aquatic life toxicity standards. Drinking water supply standards were not exceeded. The exceedances occurred downstream of the iron fen for aluminum, downstream of the gossan for cadmium, downstream of the tributary carrying the Mount Emmons treatment plant effluent drainage from the Keystone Mine property for copper, and over the entire reach for zinc. In 2011 and 2012, CCWC partnered with the USFS to assess a degraded part of the iron fen wetland that sits adjacent to the Kebler Pass Road. Between 2010 and 2012 AEC, Zach Vaughter and Bugs Unlimited took water

quality samples from Coal Creek, downstream of the Iron Fen and gossan. The EPA lab analyzed the samples which indicated increased levels of aluminum, cadmium, copper, iron and zinc. The University of Colorado's Outreach Committee funded the tracer study.

In 1986 Gunnison County dug a ditch to de-water the adjacent hill slope that continually sloughed material onto Kebler Pass Road. This sloughing required frequent and costly maintenance of the road. The ditch eliminated water flow to the hill slope, but also to the down gradient southwestern portion of the wetlands. This, in turn, adversely affected the natural processes of the lower portion of Iron Fen wetlands. The USFS and the CCWC created a restoration design, with the help of David Cooper, Ecologist, to allow natural sheet flow from the Iron Fen to reclaim the wetland down gradient of the ditch. The project constructed a drainage system on the hill slope, below the 1986 ditch, including culverts under Kebler Pass Road. The project is designed to prevent excessive stormwater run-off and minimize road maintenance, while sequestering metals in wetland vegetation and organic matter, thereby improving water quality in Coal Creek. The U.S. Natural Resources Conservation Service designed the initial drainage project and the USFS designed the final project with input from the U.S. Army Corps of Engineers and Gunnison County. Lacy Construction, McCollum Construction, and Al's Backhoe did the construction work. USFS and NPS provided funding for the project. The NRCS donated its engineering time to the project.

2014 McCormick Ditch Headgate and Diversion Project Cost: $15,391

Gravel had been used to create a diversion structure for the McCormick Irrigation Ditch. The diversion structure needed annual maintenance requiring the use of heavy equipment in Coal Creek. Below the diversion structure, Coal Creek was often dry in the late summers of the early 2000's because all remaining water was diverted into the McCormick Ditch. The CCWC hired Crane Associates to design a new diversion structure made of rocks that would allow some water to bypass the headgate. Town Public Works staff and Zach Vaughter, with volunteers, did the work. Funding was provided by the UGRWCD, the CWCB and the Gunnison Basin Roundtable. Lacy Construction donated some machinery and the rocks were purchased from United Companies.

2018-2021 Standard Mine Interim Monitoring Project (SMIMP) Cost $42,618

CCWC is monitoring the Standard Mine outflow in Elk Creek to help CDPHE and EPA determine the effectiveness of the Phase I remedial action (bulkhead and source water controls) and whether Phase II remedial action is required. Sample collection occurs throughout the summer and fall each year. Data analysis is on-going. Sampling will continue for three to five years. Sampling and analysis are paid for by the EPA through CDPHE.

2021 Water Quality Report, Coal Creek Cost $ 4,896

This report displays the findings and summarizes whether standards were met in three segments of Coal Creek for arsenic, cadmium, copper, lead, manganese and zinc in 2020-2021. Data analysis was done by AEC and AE. Donations, UGRWCD, the Town and DRMS paid for the analysis.

Slate River

2011 - Upper Slate River Watershed: Water Quality Data Analysis & Summary Cost: $6,788

Ashley Bembenek was hired by CCWC to do a water quality document search, organize data, evaluate data and prepare a report. The report summarizes water quality data, collected from 1995 to 2010, in the Upper Slate River watershed. The report was completed to inform the watershed planning process by identifying the most common water quality issues in the watershed.

2011 – 2013 Water Quality Monitoring in the Upper Slate River Watershed Cost: $23,314
The CCWC, Bugs Unlimited LLC, the U.S. Bureau of Land Management (BLM) and AEC collected water samples to test for heavy metals and e coli. The presence of macroinvertebrates was also evaluated. The CHRF funded the labor and CDPHE-WQCD and NPS funded the analysis.

2011 -2012 Upper Slate River Geomorphic Assessment Cost: $8,783
The CHRF provided funding for AER, EcoMetrics, Zach Vaughter and Poponi Contracting to identify potential sediment pollution sources and priorities for the Upper Slate River watershed.

2012 - 2014, 2021 Upper Slate River Watershed Plan Cost: $30,851
The NPS, DRMS, USFS, BLM and private donations provided funding to hire AEC and Aqua Ria Ltd. to create a watershed plan for the Upper Slate River watershed which addresses non-point source water pollution. The Upper Slate River Watershed Plan (USR Watershed Plan) will serve the CCWC as a guiding organizational document for the coming years by identifying priority projects that address water quality impairments and overarching watershed health in the Upper Slate River watershed. The plan was updated in 2021 to included findings from the 2018-2021 E. coli sampling and analysis, including samples taken from Washington Gulch. CDPHE and UGRWCD paid for the 2021 update.

2014 - 2015 Recruitment & Public Outreach for the Slate River Watershed Cost: $34,824
The CCWC recruited members of the public as well as representatives from local, state, and federal entities working in the Upper Slate River watershed. Quarterly stakeholder and public meetings were held to inform the public and stakeholders about the process and receive input on the USR Watershed Plan. These meetings allowed for public dialog during the planning process. CCWC developed organizational outreach materials, programs, and educational events surrounding development of the USR Watershed Plan. NPS paid for the outreach, as part of the watershed plan.

2014 - 2018 Redwell Basin Mapping, Water Quality Monitoring and Report Cost: $36,700
CCWC provided scientific assistance and field coordination of all basin-wide water quality monitoring and mapping in Redwell Basin, a portion of the Upper Slate River watershed Data analysis and data upload, to the State Data System, also occurred. The analysis found that after DRMS closed the drill hole in Redwell Basin, in the fall of 2013, metal concentrations in Redwell Creek, downstream of the drill hole, decreased by 20 to 60 percent. Metal concentrations in Oh-Be-Joyful Creek, downstream of Redwell Creek, decreased by 10 to 40 percent during high flow and by 30 to 70 percent during low flow. DRMS provided funding for labor and CDPHE-WQCD covered water quality analysis costs. Other partners included the USFS and the NPS program. AEC, Zach Vaughter, and Zach Guy provided the labor for this project.

2014- 2018 Portable Toilet at Musicians Camp Cost: $4,974
After CCWC counted as many as 100 tents and campers at the small, informal, dispersed camping area known as “Musicians Camp” along the Slate River, CCWC began providing portable toilets during the

summer months (June – September). Gunnison Construction & Septic provided the toilets that were paid for by the USFS, donations and the Town. Additional maintenance expenses were paid by the USFS.

2012-2021 Gunsight Processing Area Reclamation Cost: $504,186

The Gunsight Processing area is near the confluence of Oh-be-joyful Creek and the Slate River. In the 1970s ore from the Daisy Mine, on the north side of Mt. Emmons, was transported to the Gunsight Processing Area, on BLM property, for later processing. The processing never occurred but the ore remained. In the interim, Amax Corporation used the site to build a metal building and stored core samples from Mt. Emmons. In the early 2000s, some of the core samples were donated to the Colorado State University Geology program. In 2012 the owners of the Daisy Mine paid for the removal of the core samples and the building.

The site was an attraction to recreational users, and therefore, it was a potential human health risk. The ore on site was high in several metals. In 2017 CCWC and BLM supported DRMS in the reclamation of the site. The ore was wrapped in a liner and rock was placed on it. The site was re-vegetated and monitoring wells were installed to monitor the flow of ground water and minerals off the site. The project was funded by DRMS, NPS, BLM, the Town, and the Daisy Mine owners. AEC and Zach Vaughter worked with DRMS on the project and the NPS funding was obtained by CCWC. The Town delivered compost from its wastewater treatment plant to the site.

After reclamation, CCWC monitored the site during snowmelt and spring runoff. All reclamation best management practices performed as designed and there was no off-site runoff. In the summers since the reclamation, scentless chamomile has been found on site. CCWC organized weed removal days. Approximately 50 pounds of scentless chamomile were removed from the site in 2018. Contractors were hired by DRMS to spray for weeds. In late fall of 2018, portions of the site were re-seeded to help outcompete invasive species in the future. CCWC continues to monitor the site.

The groundwater data analysis was completed to support reclamation design. Groundwater flow patterns during 2017 suggest that the interceptor ditch installed upgradient of the repository should effectively isolate the repository from shallow groundwater and surface water runoff.

Two water quality sample events were conducted in July and September, 2018. In both instances, the site lacked water. The lack of water may be attributed to effective reclamation design, the 2018 drought, or both. The field work and groundwater analysis were funded through a DRMS grant.

2017-2018 Daisy Mine Pre-reclamation Field Report Cost: $3,585

AEC was hired by CCWC to collect sediment samples at the Daisy Mine, map the site, analyze mine waste at the site for minerals and develop a pre-reclamation field report about for the Daisy Mine. Sediment metal concentrations were measured by XRF in the fall of 2016. The field work and memo were funded through a DRMS grant. The field data were used to develop a preliminary reclamation design for the Daisy Mine site.

***2018-2021 E. coli* Monitoring in the Upper Slate River Watershed Cost $ 33,917**

CCWC sampled the Slate River near the confluences of Coal Creek and Washington Gulch for Escherichia coli. (*E. coli*.) The study found that Coal Creek, the Slate River from Coal Creek to downstream of Washington Gulch, and the mouth of Washington Gulch were likely impaired for *E. coli* based on the

primary contact recreation standard. In 2019 CCWC performed a more thorough monitoring for E. coli in the Slate River, Washington Gulch, Coal Creek and Wood Creek. Although some elevated levels of E. coli were found, particularly in Washington Gulch, no point source was found. The UGRWCD, USFS, BLM, U.S. National Park Service, Mt. CB Water and Sanitation District, and the Crested Butte wastewater treatment facility paid for the sampling. AEC, AE, and volunteers helped collect samples.

2018 Permanent Toilet at Musicians Camp **Cost: $29,372**

A permanent toilet was installed at the Musicians Camp in the upper Slate River watershed. The effort was directed by the USFS and UGRWCD provided one-half of the funding.

2020 Permanent Toilet in Washington Gulch Watershed **Cost: $41,670**

A permanent toilet was installed near the Washington Gulch Road, just inside the U.S. Forest Service boundary in the watershed. The effort was lead by the USFS, the Town and CCWC Board member, Tim Szurgot. Funding was provided by the Town, the National Forest Foundation and donors.

Acronyms

AE	Arable Earth
AEC	Alpine Environmental Consultants
AER	Alpine Ecological Resources LLC
BLM	U.S. Bureau of Land Management
BMP	Best Management Practices
CCWC	Coal Creek Watershed Coalition
CDPHE	Colorado Department of Public Health and Environment
CWCB	Colorado Water Conservation Board
CWRP	Colorado Watershed Restoration Program
CHRF	Colorado Healthy Rivers Fund
DRMS	Colorado Department of Natural Resources -Division of Reclamation, Mining and Safety
EPA	U.S. Environmental Protection Agency
MEMC	Mt. Emmons Mining Company
MRP	Measurable Results Project, Coal Creek Restoration Project, Crested Butte, CO, 2011 Monitoring Report
NPS	Colorado Non-point Source Program in the Colorado Department of Public Health and Environment
RMBL	Rocky Mountain Biological Laboratory
the Town	Town of Crested Butte
TMDL	Total Maximum Daily Load
UGRWCD	Upper Gunnison River Water Conservancy District
USFS	U. S. Forest Service (Gunnison District office)
WQCD	Colorado Water Quality Control Division in the Colorado Department of Public Health and Environment
WQCC	Colorado Water Quality Control Commission

Above costs do not include:

- The value of volunteer time
- Administrative costs to monitor grants that paid for many of these activities.