

2019

ANNUAL PROJECT REPORT

Water Quality Control Division



Foreword

Annual report

The Water Quality Control Division of the Colorado Department of Public Health and Environment is pleased to submit the Colorado Water Resources and Power Development Authority annual project report for the period of Jan. 1, 2019 through Dec. 31, 2019. This report covers all projects funded through the Water Quality Control Division's 2019 Colorado Water Resources and Power Development Authority (Authority) budget. This annual report is due by March 1 of each year.



Patrick Pfaltzgraff, director
Water Quality Control Division
Colorado Department of Public Health and Environment
March 1, 2020



Executive Summary

2019 CWRPDA projects

The State of Colorado receives federal funding for water and wastewater infrastructure projects within two state revolving loan funds (SRF), the Water Pollution Control Revolving Fund and the Drinking Water Revolving Fund. The agencies that have responsibility for administering the SRFs are the Water Quality Control Division (division) within the Colorado Department of Public Health and Environment (CDPHE), the Authority, and the Colorado Department of Local Affairs (DOLA), collectively the SRF agencies.

Outside of providing subsidized financing to eligible entities, the funds can also be used to further public health and environmental priorities. This report illustrates how the State of Colorado has used administrative fees from the funds to help advance these priorities by providing an overview of each clean water and drinking water project funded through this source. The division also works to leverage other funding sources and partners in order to move the needle further with respect to water priorities. As a result, there are a number of projects in this report that have received additional funding through other sources such as Environmental Protection Agency (EPA) Clean Water Act Section 319 Nonpoint Source grant funding, Colorado Parks and Wildlife, Department of Natural Resources, etc. The division's leveraging of these SRF funds for nonpoint source work is particularly important because national Section 319 guidance encourages states to utilize SRF funds for nonpoint source projects in order to maximize state investments in on-the-ground nonpoint source implementation projects that result in water quality improvements.

Shared Mission Statement

The mission of the Colorado State Revolving Funds and SRF agencies is to actively target and allocate affordable resources to projects and initiatives that result in public health, environmental, and community benefits while maintaining perpetual, self-sustaining revolving loan fund programs. The SRF agencies are dedicated to providing affordable financing to systems by capitalizing on all available funds to address high priority water projects related to public health and water quality issues to communities for projects they need and support. The SRF agencies will manage the funds in a manner to provide benefits for current and future generations.

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2019 annual project report



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Program focus & terms

Clean water projects focus on maintaining and improving the water quality of Colorado's rivers, lakes, and streams. Projects utilize regulatory tools that help identify and mitigate threats to water quality. Tools range from incentive programs, advance planning for prevention, and structured plans and limits for contaminants that threaten the quality of Colorado's waterways.

The safe drinking water program works to ensure that visitors and residents in Colorado always have clean and safe drinking water. The Water Quality Control Division aims to prevent waterborne disease and reduce chronic public health risk from drinking water sources.

Statutory Authority

Colorado's state-level governing act is the Colorado Water Quality Control Act, which outlines state water regulations under the Clean Water Act. The Clean Water Act is the primary federal law that governs water pollution nationwide, and the objective of this act is to restore and maintain the integrity of the nation's waters by preventing pollution. The act is administered by the EPA in coordination with state governments. The division's clean water program develops and implements water quality classifications and standards for surface water and groundwater under the Colorado Water Quality Control Act and the Clean Water Act.

Nonpoint Source Program

Unlike pollution that makes its way to waterbodies through pipes and other conveyances from sources such as wastewater treatment plants or stormwater in permitted urbanized areas, nonpoint source pollution occurs when rainfall or snowmelt running off over land and through the ground carries pollutants from many diffuse sources to waterbodies.

Nonpoint source pollution is not regulated in this state. Instead of utilizing regulatory mechanisms such as discharge permits, the state provides funding assistance to local communities to voluntarily address nonpoint source pollution. One of the sources for this funding assistance is an EPA's Clean Water Act Section 319 nonpoint source grant that the state receives annually. For instance, Colorado received \$1,950,000 under Section 319 to assist with these projects in 2019. In addition to the Section 319 nonpoint source grant, the state leverages other funding streams such as SRF and local matching funds to maximize the water quality improvement achieved through this incentive-based approach to reducing nonpoint source pollution.

Nonpoint source activities focus on local priorities that are identified in watershed plans. These watershed plans are required in order to utilize EPA CWA Section 319 grant funds in the most effective way for on-the-ground nonpoint source pollution reduction projects. Nonpoint sources of pollution are usually addressed using a combination of best management practices (BMPs) such as fencing and re-vegetation along a stream bank, education of local communities about opportunities to reduce nonpoint source pollution, and outreach to engage as many people as possible in promoting water quality improvement activities. This voluntary, practice-based approach empowers local communities to find solutions to address local water quality nonpoint source impacts.

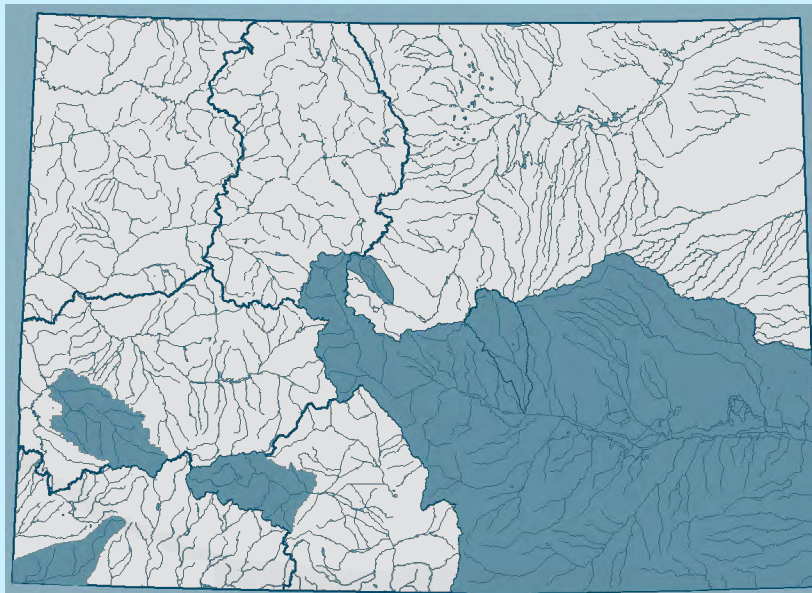
Program focus & terms

Total maximum daily loads

The Clean Water Act requires states to create a list of impaired waterbodies that do not meet water quality standards. This list is called the 303(d) list and is reviewed and approved by the Water Quality Control Commission and the EPA. The list is updated every two years.

A total maximum daily load (TMDL) is the maximum amount of a pollutant that a waterbody can receive and continue to meet water quality standards. Developing a TMDL is one way for a waterbody to be removed from the 303(d) list. TMDLs are usually developed for one particular part of a waterbody, though it can be an entire river or lake. They are only set for pollutant(s) that exceed water quality standards (such as zinc, selenium or sediment).

RIVER BASINS IMPACTED BY 2019 PROJECTS



Colorado Water Resources and Power Development Authority funded programs

PROGRAM LINE	TOTAL APPROPRIATION	BALANCE	PERCENT EXPENDED
Nonpoint source watershed planning	\$ 300,000	\$ 46,826	84%
Lower Ark River Basin WSP & project implementation	\$ 1,459,352	\$ 649,275	56%
Emergency/Disaster support (nonpoint source)	\$ 170,000	\$ 8,269	95%
Water quality standards support	\$ 1,252,310	\$ 233,999	81%
Mining activities	\$ 215,000	\$ 17,441	92%
Mine related TMDL implementation	\$ 212,000	\$ 17,104	92%
Statewide lakes/reservoir TMDL development & implementation support	\$ 700,000	\$ 122,615	82%
Source water assessment & protection	\$ 300,000	\$ 22,188	93%
Pursuing Excellence Program	\$ 261,150	\$ 12,470	95%
TOTALS	\$ 4,869,812	\$ 1,130,187	77%

NOTE: Projects that have remaining funds and are listed as completed in this report have reverted funds back to the program

Nonpoint Source - Watershed planning

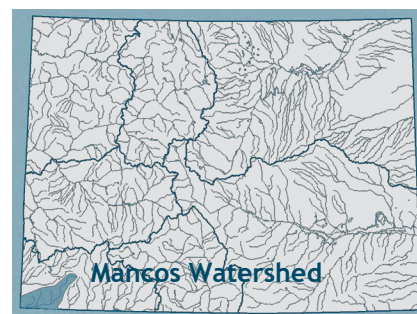
Mancos Watershed

Background

The Mancos Watershed Plan addresses priorities identified in the Colorado Nonpoint Source Management Plan. Metals pollution (largely copper and manganese) related to legacy mining and agriculturally-induced low flows impact the Mancos Watershed, located in the southwest corner of Colorado. The existing version of the watershed plan from 2011 successfully led to the construction of modernized farm irrigation water diversion structures to improve river flows and habitat for plants and animals. More information on the metals pollution from abandoned mines, which kills all life in the streams, is needed to facilitate reduction of mine pollution and improvement of water quality.



This project will identify which mines are causing the most pollution and potential structural BMPs for reducing pollution and improving water quality. As part of the watershed planning process, the contractor, Mancos Conservation District, will conduct stakeholder outreach and community education on the water quality sampling results through open meetings, email blasts, field tours and newspaper articles. The district will then work with stakeholders such as landowners, federal land managers and the Ute Mountain Ute Tribe to gather input on where to pursue implementation of voluntary BMPs at high priority abandoned mines. Outcomes and recommendations from these outreach efforts, as well as the data analyses, will be included in a final report.



Accomplishments

During the second year (2019) of this two-year project, the district completed two of three field water quality sample collection events and completed laboratory analysis of the samples. Fifteen stakeholder meetings were held to review and discuss water resource concerns based on landowner interviews. The stakeholder meetings also served to identify priority topics for developing outreach materials. The final report will provide information about the location of the highest priority abandoned mines and community endorsed strategies for reducing mine-related pollution and improving water quality.

PROGRAM LINE:

Nonpoint source watershed planning

CONTRACTING PERIOD:

February 2018 to March 2020

CONTRIBUTORS:

Mancos Conservation District,
Division of Reclamation, Mining & Safety, Watershed Stakeholders,
Mountain Studies Institute

PROJECT COST \$ 102,223

BALANCE \$ 17,996



Nonpoint Source - Watershed planning

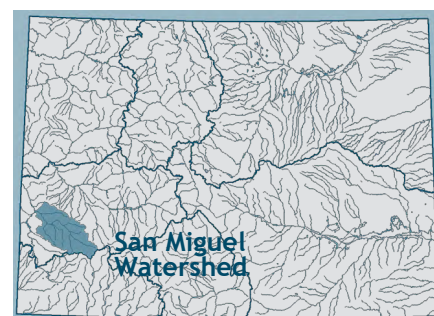
San Miguel Watershed



Background

The watershed, which is the drainage area around Telluride, is in need of data to support a comprehensive plan that will address its current water quality concerns. The upper watershed is impacted by heavy metals pollution because of the area's mining heritage, while the lower watershed has water quality problems related to agriculture uses.

The primary goal of the project is to gather data and create community support for a new watershed plan for the San Miguel River Basin. To accomplish this, the San Miguel Watershed Coalition will engage with stakeholders and expand its water quality testing program to fill in data gaps. The data will be analyzed, presented in a final water quality report, and made publicly available through an EPA portal.



Accomplishments

During the second year (2019) of this two-year project, the coalition completed three of four field water quality sample collection events and completed laboratory analysis of samples. They also created the water quality data and live flow information database and drafted story maps for outreach. The coalition recruited two new members for the mining and fishing stakeholder committee and hosted two stakeholder meetings. They participated in three local watershed events with informational booths. The coalition also facilitated the second of two San Miguel Watershed Forum meetings to share preliminary data and get feedback for the final water quality report. Forum attendees included local government representatives, business owners, citizens, and federal land managers. The project will provide information about the most significant water pollution in the San Miguel River as well as community-endorsed strategies for reducing pollution and improving water quality.



PROGRAM LINE:

Nonpoint source watershed planning

CONTRACTING PERIOD:

May 2018 to March 2020

CONTRIBUTORS:

San Miguel Watershed Coalition, Watershed Stakeholders

PROJECT COST \$ 33,827

BALANCE \$ 5,000

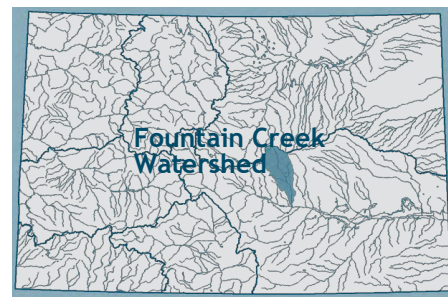
Nonpoint Source - Watershed planning

Fountain Creek Watershed



Background

The Fountain Creek Watershed is located along Colorado's Front Range in the western portion of El Paso County and the northwestern portion of Pueblo County. A watershed plan was completed for this watershed in 2003 but did not specifically address the water quality impairment for *E. coli*. Since then, parts of this watershed have been listed on the 303(d) list of impaired waters for *E. coli*, and stakeholders would like to develop a watershed plan to determine pollutant sources and gather information before the TMDL process begins.



Accomplishments

In 2019, *E. coli* sources and reduction strategies were finalized and prioritized. The draft watershed-based plan was provided and revised in response to the division's comments. The watershed-based plan for the Fountain Creek Watershed focuses heavily on *E. coli* impairments in the watershed and prioritizes them for future implementation projects. In addition, this plan also briefly discusses other sources of pollution – such as arsenic, copper, nutrients, other metals, temperature – that are being explored through other watershed initiatives.

PROGRAM LINE:

Nonpoint source watershed planning

CONTRACTING PERIOD:

October 2017 to March 2019

CONTRIBUTORS:

Pikes Peak Regional Water Authority,
Arkansas Fountain Coalition for Urban
River Evaluation, City of Pueblo,
Colorado Springs Utilities

PROJECT COST \$ 32,400

BALANCE \$ 0



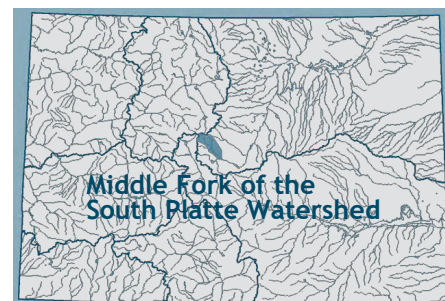
Nonpoint Source - Watershed planning

Middle Fork of the South Platte Watershed



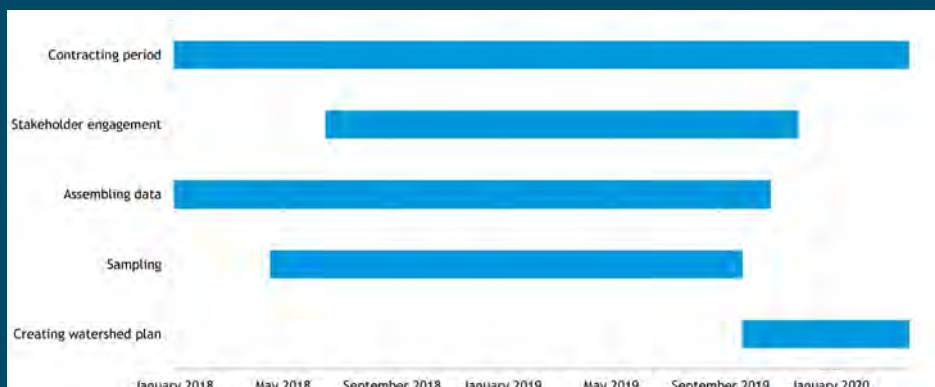
Background

The creation of a watershed-based plan will present solutions for reducing nonpoint source pollutant loading for the Middle Fork of the South Platte watershed. This area contains a large number of mining operations (including abandoned and active sites,) and local water quality issues are tied to nonpoint source pollution from abandoned mines. The plan will outline how pollutants from different nonpoint sources contribute to impairments and what solutions can be implemented to reduce water quality impacts from these sources.



Accomplishments

This project is in progress but will result in the development of a watershed-based plan for the Middle Fork of the South Platte watershed. In 2019, water quality sampling was completed and data was uploaded to the Colorado Data Sharing Network. Monitoring showed that residual acid mine drainage from inactive sites is likely the culprit of mercury issues. A small amount of methylmercury was found in the water samples above the town of Alma, and efforts expanded upstream to determine the origin. Two stakeholder meetings were held to gather feedback for the draft plan. The draft identifies potential implementation projects in priority for future action.



PROGRAM LINE:

Nonpoint source watershed planning

CONTRACTING PERIOD:

January 2018 to March 2020

CONTRIBUTORS:

Middle Fork of the South Platte Watershed Planning to Address Mining Impacts

PROJECT COST \$ 98,550

BALANCE \$ 23,831

Nonpoint Source - Watershed planning

Willow Creek – Trout Unlimited



Background

This project served to implement nonpoint source BMPs to address maintenance needs in Willow Creek near the town of Creede, Colorado. Due to high snowpack and high spring flows in 2019, existing BMPs funded by the division to address impacts from historical mines were damaged. Newly installed BMPs stabilized the creek banks and will prevent erosion of nearby mine waste piles. This work will minimize future nonpoint source pollution and ultimately improve water quality in Willow Creek.

Accomplishments

Trout Unlimited installed appropriately sized boulders, logs, root-wads, willows, and other vegetation at several sites along Willow Creek in the fall of 2019. These BMPs should result in immediate floodplain and stream channel stability in degraded areas. These improvements will reduce the likelihood of nearby mine tailing erosion during runoff events and protect Creede's sewer system and water supply diversion functions in the area. In addition, these improvements will also protect the aquatic life community from additional sediment and heavy metal pollution in Willow Creek.

PROGRAM LINE:

Nonpoint source watershed planning

CONTRACTING PERIOD:

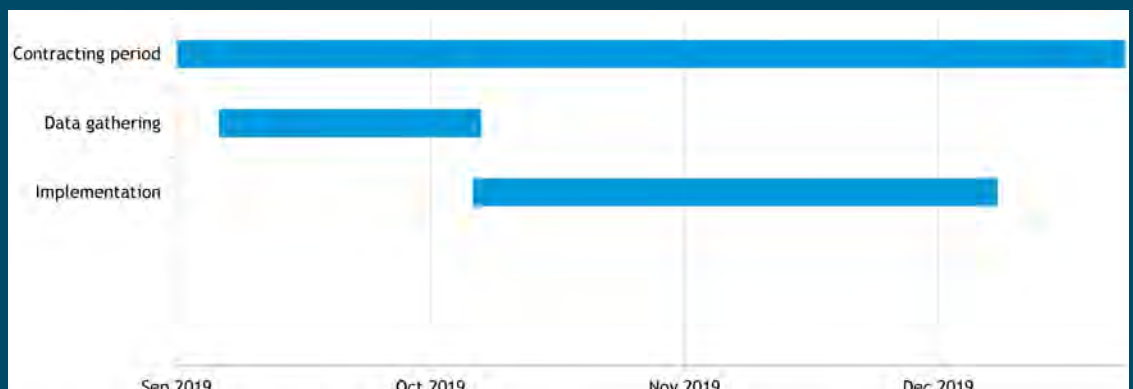
September 2019 to December 2019

CONTRIBUTORS:

Trout Unlimited, Lower Willow Creek Reclamation Committee, Headwaters Alliance

PROJECT COST \$ 25,000

BALANCE \$ 0



Nonpoint Source - Lower Arkansas River Basin

Uranium source investigation



Background

The Lower Arkansas River Basin has high levels of naturally occurring uranium in the soil, which has resulted in parts of this watershed being added to the 303(d) list of impaired waters for uranium. Researchers also believe it is possible that this uranium can transfer from the soil into crops. This project identified sources of uranium in the soil profile and the potential uranium contribution to the return flow system, which carries agricultural tail/return water to ditches and state waters. Colorado School of Mines conducted deep drilling to gather detailed geologic information from beneath the irrigated area of the Lower Arkansas River basin.

Accomplishments

This project evaluated sources of uranium in the soil profile and its effects on uranium contribution to the return flow system. By monitoring wells and deep drilling sites, this project identified that most BMPs used for controlling selenium will also be effective in controlling uranium. This information has and will continue to inform the implementation of BMPs in the Lower Arkansas Valley to bring the water quality to the acceptable levels.



PROGRAM LINE:

Lower Arkansas River Basin watershed-based planning & project implementations

CONTRACTING PERIOD:

June 2016 to June 2019

CONTRIBUTORS:

Colorado School of Mines, Colorado State University, Colorado Geological Survey

PROJECT COST	\$ 468,000
319 604B	\$ 35,000
WPCRF	\$ 8,030
BALANCE	\$ 0

Nonpoint Source - Lower Arkansas River Basin

Selenium reduction



Best Management Practices

The BMPs suggested for selenium reduction:

- Increasing irrigation efficiency- replacing flood irrigation with sprinkler systems.
- Lining/piping waterways to reduce contribution to groundwater.
- Filter strips- creating a strip of vegetated land that will capture and filter runoff and reduce contamination of surface water.
- Reduced nitrogen applications.
- Reduced tillage.

Background

Several waterbodies in the Lower Arkansas River Valley are not able to meet the water quality standards for selenium set by the Water Quality Control Commission and are identified in the 303(d) listing of impaired waters of the state in accordance with EPA requirements. This project has two goals: to update the watershed-based management plan for the Lower Arkansas Valley to comply with EPA requirements and to implement best BMPs to control nonpoint source selenium loading. Specifically, this project has identified and implemented one suggested BMP to address the deep percolation of irrigation water that mobilized selenium in the shallow shale.

Accomplishments

This project is still in progress, and measureable results will be more apparent once the implementation is complete and the monitoring has taken place. So far, this project has resulted in a completed watershed-based management plan, pre-BMP data collection at implementation sites, and the installation of two sprinkler systems. The final sprinkler system is scheduled for installation in spring 2020.

While the water quality impact may not be apparent in the short-term, it is expected that the selenium concentrations will decline over time, as it has in other areas of the state with similar projects. In addition, visual observations indicate that drainage carrying return water to the Arkansas River has relatively less water, which is a positive indication that this project will likely reduce nonpoint source selenium loading.

PROGRAM LINE:

Lower Arkansas River Basin watershed-based planning & project implementations

CONTRACTING PERIOD:

September 2016 to June 2022

CONTRIBUTORS:

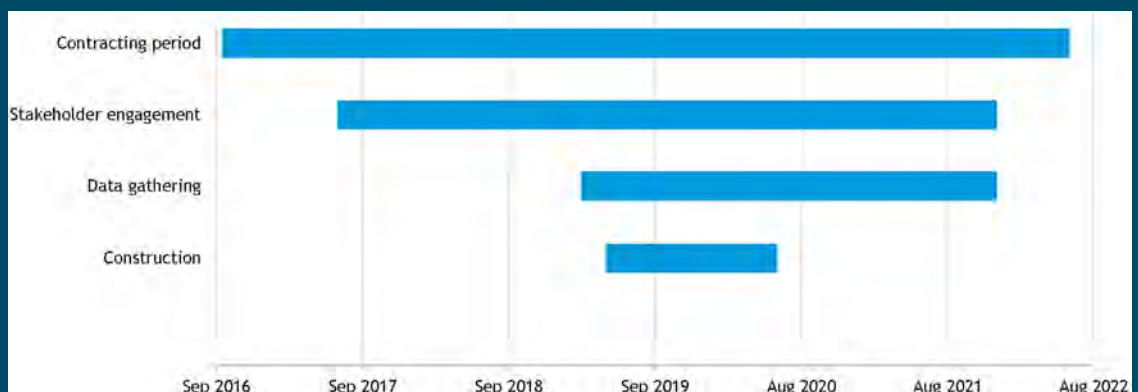
Department of Agriculture, Lower Arkansas Valley Water Conservancy District, Colorado State University, local farmers

PROJECT COST \$ 1,026,442

NONPOINT SOURCE \$ 275,090

106 PPG \$ 25,000

BALANCE \$ 231,855



Nonpoint Source - Lower Arkansas River Basin

Nonpoint source water quality and soil health initiatives

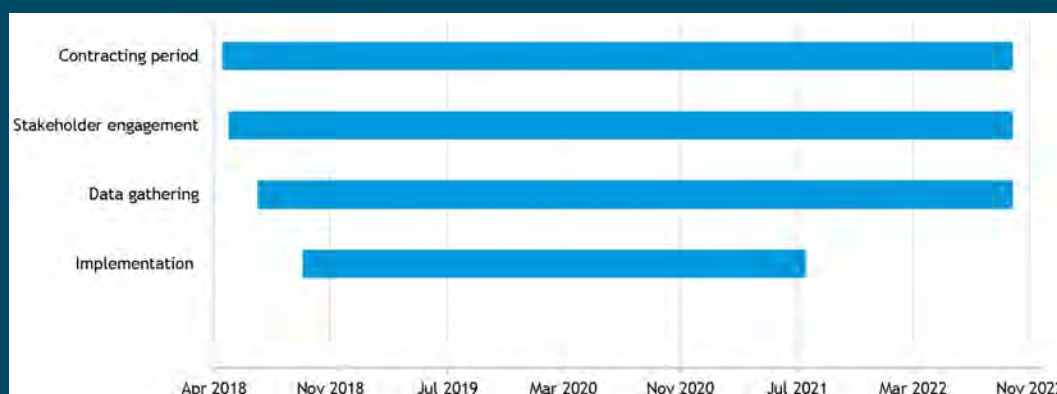


Background

This project aims to investigate the effectiveness of BMPs implemented to address water quality issues in the Lower Arkansas Valley, Colorado. Potential BMPs include lining irrigation head ponds, drying up selected irrigated lands and moving the irrigation water to areas higher in organic matter, piping laterals carrying irrigation water, installing buffer strips, and engaging various soil health initiatives, such as planting cover crops and installing drip irrigation systems.

Accomplishments

This project is still mostly at the early stages of pre-BMP data collection and implementation of BMPs. Two BMPs, the installation of a drip irrigation system and pipelining, have been completed. So far, wells located near the implemented BMPs have demonstrated lower selenium and nitrate results, which is promising for long-term results that will likely be further confirmed with the post-implementation data collection. Ten BMPs will ultimately be implemented in the region.



PROGRAM LINE:

Lower Arkansas River Basin watershed-based planning & project implementations

CONTRACTING PERIOD:

April 2018 to September 2022

CONTRIBUTORS:

Lower Arkansas Valley Water Conservancy District & local farmers

PROJECT COST \$ 1,095,863

NONPOINT SOURCE \$ 651,834

WQIF \$ 144,029

BALANCE \$ 417,421

Nonpoint Source - Emergency/Disaster Support

Spring Fire Ash—Out Project



Background

This project helped communities in the Huerfano River watershed by removing debris (e.g. ash and partially burned materials) from structures in the floodplain in the Spring Creek burn area. The removal of materials will keep nonpoint source pollution from entering waterbodies from the Huerfano River watershed and impacting local communities.

Accomplishments

Ash material was removed from four sites and hauled to the San Luis Valley Regional Solid Waste disposal area, where it was treated. Metal was removed and taken to a salvage area for recycling. Over 124 tons of ash was removed from all sites, with most sites in close proximity to drainages in the Huerfano watershed.

PROGRAM LINE:

Nonpoint Source Disaster Support

CONTRACTING PERIOD:

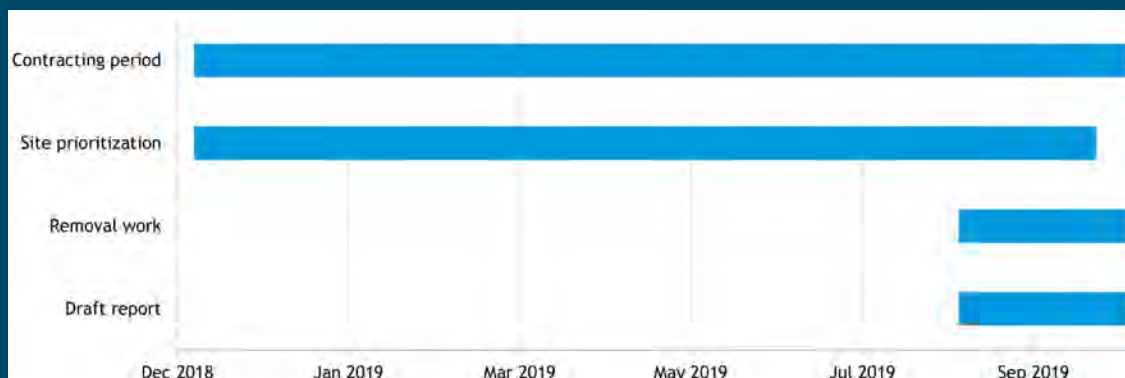
December 2018 to October 2019

CONTRIBUTORS:

Las Animas Huerfano Counties District HD, Walton Contracting LLC

PROJECT COST \$ 60,000

BALANCE \$ 0



Nonpoint Source - Emergency/Disaster Support

Spring Fire Response Action



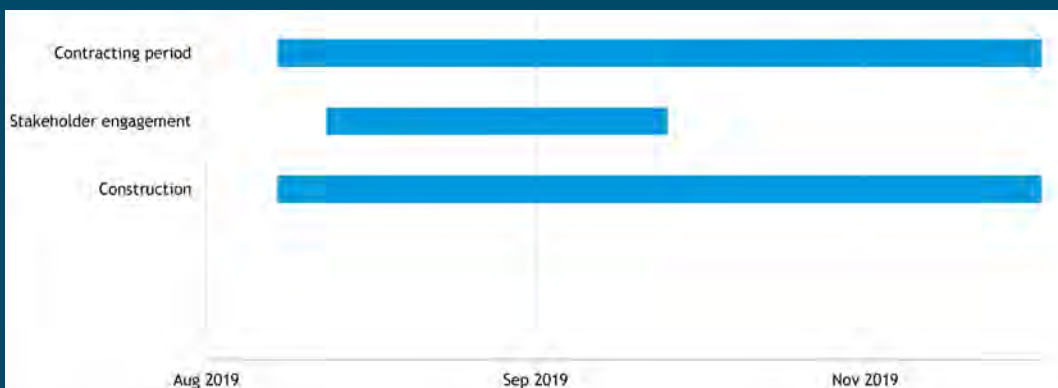
Background

The flooding that occurred in Huerfano County after the Spring Creek Fire in July 2019 threatened the safety and property of local communities. The overall goal of this project was to protect the critical escape route from washout by flood waters and to protect downstream assets.

Accomplishments

The Arkansas River Watershed Collaboration completed various tasks to stabilize the watershed. The collaboration reconnected the floodplain to the alluvial fan, installed a hardened low water crossing, stabilized the Middle Creek stream channel, and built a total of 18 structures, including cross vein weirs, log sills, and root wad embankments to direct flows into the alluvial fan.

The collaboration plans to continue post-fire work in the area if funding is available.



PROGRAM LINE:

Nonpoint Source Disaster Support

CONTRACTING PERIOD:

August 2019 to December 2019

CONTRIBUTORS:

Huerfano County Water Conservancy District, Arkansas River Watershed Collaborative

PROJECT COST \$ 85,000

BALANCE \$ 0

Nonpoint Source - Emergency/Disaster Support

416 Fire Response—Mountain Studies Institute



Background

The 416 Fire burned 54,000 acres in the Hermosa Creek drainage within the Animas River watershed in 2018, impacting communities during the fire and subsequent runoff events. This project will help local communities by improving water quality by monitoring the nonpoint source water impacts to the Hermosa Creek and the Animas River. Water quality monitoring will identify priorities and help develop an immediate action plan for reducing nonpoint source pollution

Accomplishments

Mountain Studies Institute accomplished several key things during 2019. They identified five stakeholders for BMP implementation and hosted workshops for key stakeholders to develop an action plan for this project. The institute also hosted a field tour of pre-existing BMPs and created a draft watershed report that was distributed. In addition to the stakeholder workshops, they also presented to local classrooms, held 416 recovery meetings, and developed curriculum material regarding the watershed report.

PROGRAM LINE:

Nonpoint Source Disaster Support

CONTRACTING PERIOD:

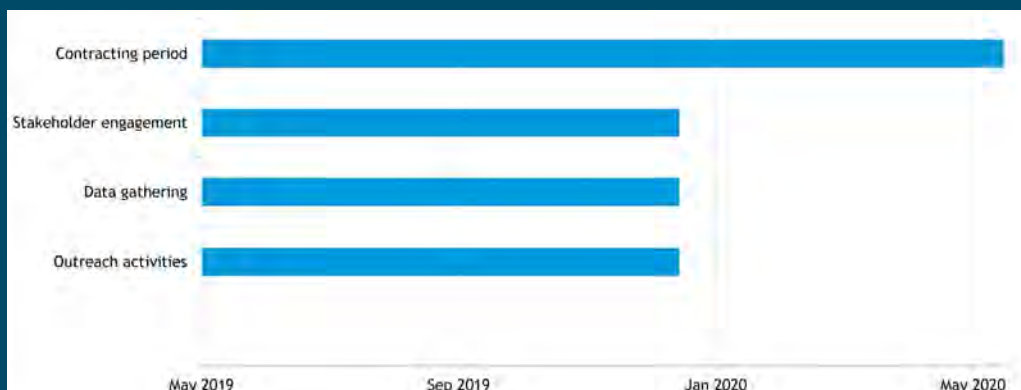
May 2019 to May 2020

CONTRIBUTORS:

Mountain Studies Institute

PROJECT COST \$ 25,000

BALANCE \$ 8,269



Standards support

Selenium feasibility – construction dewatering case studies

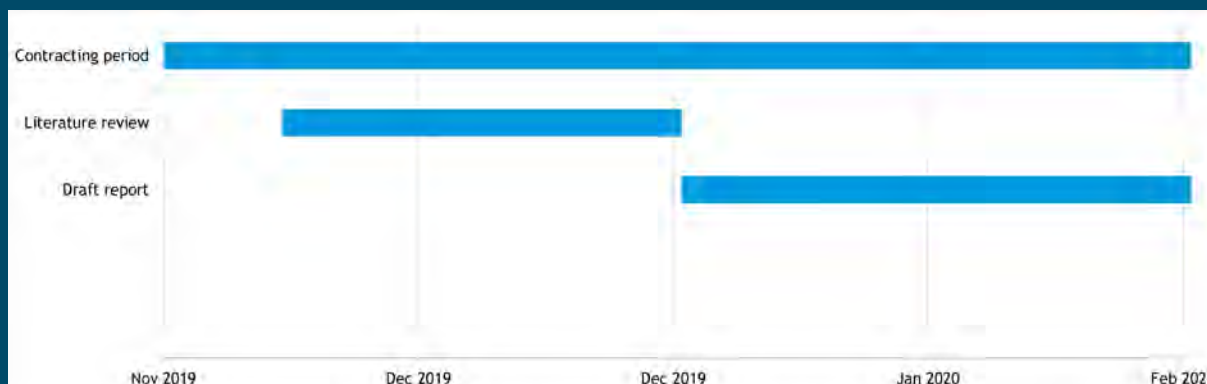


Background

Colorado has a high prevalence of naturally occurring selenium in the environment. As a result, many dischargers experience high selenium in wastewater and struggle to meet the selenium discharge permit limits. While this can be challenging for all dischargers, this project focuses on specific challenges related to short-term construction dewatering discharges, groundwater remediation discharges, and long-term permanent groundwater dewatering discharges such as basement or foundation dewatering. The 2017 CWRPDA-funded report “Evaluation of Selenium Treatment Feasibility for Groundwater Dewatering Discharges” identified the high variability in treatment effectiveness and treatment cost based on site-specific conditions. It further documented the need to develop a report with actual treatment results and costs from case studies implemented to control selenium. Ultimately, this project will build on this report and will result in a second report that contains information on case studies where selenium removal treatment technologies and alternate solutions for groundwater dewatering discharges have been implemented.

Accomplishments

The final report, expected in February 2020, will provide guidance on dewatering and groundwater remediation efforts and potentially support a selenium discharger specific variance proposals to be considered by the Water Quality Control Commission.



PROGRAM LINE:

Standards Support

CONTRACTING PERIOD:

November 2019 to February 2020

CONTRIBUTORS:

TerraCon Consultants

PROJECT COST \$ 25,000

BALANCE

\$ 500

Standards support

Statewide selenium study



SELENIUM is an essential element that occurs naturally in terrestrial and aquatic ecosystems. Elevated levels of selenium can be highly toxic to aquatic life and aquatic-dependent wildlife. Selenium is transferred through food chains and accumulates in the wildlife bodies. It can then be transferred through egg-laying vertebrates (i.e., fish and birds).

Background

The EPA released updated criteria for selenium in June 2016. The criteria consist of water column and tissue-based thresholds derived using laboratory data and field data collected nationwide. The goal of this project is to collect information to support updates to Colorado's selenium criteria for the protection of aquatic life.

Colorado's current water quality criteria for selenium were developed by EPA in 1987 and are based on aqueous exposure. However, food chain transfer is also a pathway of selenium exposure, possibly the most likely. In June 2016, EPA released updated recommended 304(a) criteria for selenium that incorporate dietary exposure by using a much more complex and stringent approach than Colorado's current standards. Colorado's selenium criteria need to be updated to ensure aquatic life uses are protected. Further study is needed to determine whether Colorado can adopt EPA's recommended criteria directly or if state-specific modifications are needed.

Accomplishments

A substantial database of food web, selenium concentration, and selenium toxicity effects data was created with the results of this study. These data, along with information included in EPA's 2016 selenium criteria document and data from other studies conducted in Colorado, will be used to support development of updated selenium criteria in 2027.

PROGRAM LINE:

Standards Support

CONTRACTING PERIOD:

September 2016 to December 2019

CONTRIBUTORS:

Colorado State University &
Colorado Parks and Wildlife

PROJECT COST: \$ 275,000

106 MONITORING \$ 15,000

TOTAL BALANCE \$ 42,421



Standards support

Groundwater atlas

GROUNDWATER is water that exists underground in the soil or in pores and crevices in the rock. Rocky areas holding groundwater are called aquifers. Groundwater is a major source of agricultural and drinking water. 30% of Colorado's counties rely on groundwater for drinking water.



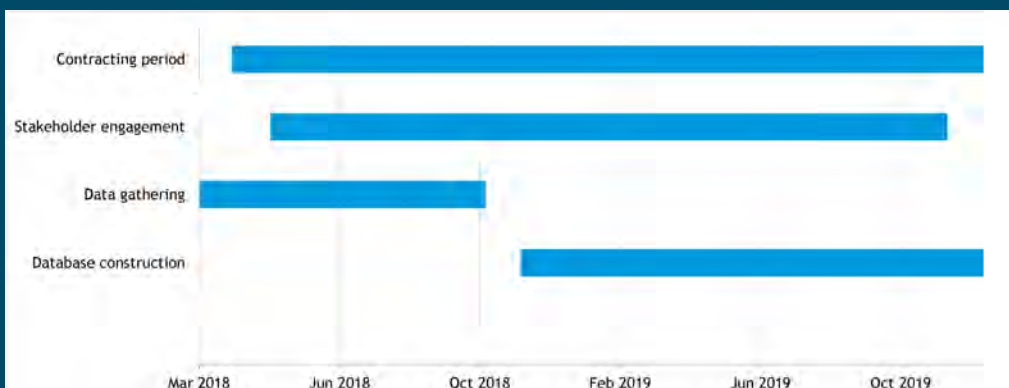
Background

This project updated the 2003 Colorado Ground Water Atlas, which will provide the division with information needed to adequately characterize groundwater quality in Colorado. The information is designed to be accessible on a web-based platform for two primary audiences. The first audience is the public, where the goal is to educate those who use private wells in the state so that they can be made aware of risks and concerns they may encounter. The second audience consists of other agencies that have a role in groundwater use and protection. For this audience, the information was made available in a geo-spatial format.

This project also created a clearing house for all of the groundwater protection agencies to be able to post their knowledge of groundwater quality in order to facilitate communication between agencies. The project included participation from the Colorado Water Conservation Board, Division of Water Resources, the Colorado Geological Survey, Colorado Department of Public Health and Environment, Colorado Department of Agriculture, the Division of Oil and Public Safety, Colorado Oil and Gas Conservation Commission, US Department of Agriculture, and the Natural Resource Conservation Service.

Accomplishments

This project created an interactive GIS database to educate the public about groundwater locations and quality. Ideally, private well owners will use the website to make informed decisions about the water quality they can expect from their well. Also, this project should facilitate communication between groundwater agencies and will help inform future work in Regulations 41 and 42 by delineating important aquifers in the state.



PROGRAM LINE:

Standards Support

CONTRACTING PERIOD:

March 2018 to December 2019

CONTRIBUTORS:

Multiple - listed above

PROJECT COST \$ 149,926

BALANCE \$ 18,184

Standards support

Warm water fish

Background

This project will evaluate wastewater influences on the johnny darter fish, in particular over-winter temperature changes and the effects on reproduction. Water temperature is a critical ecological variable for aquatic life and dictates seasonal spawning and migratory cues as well as growth, reproduction, and survival. Colorado's water quality standards include temperature criteria to protect aquatic life against the acute and chronic effects of elevated temperatures.

The effluent discharge from wastewater treatment facilities is typically warmer than the surface receiving water, especially during winter. The temperature difference presents the potential for reduced johnny darter reproduction and population stability, both of which are critical elements of aquatic life protection.



Accomplishments

Wild johnny darter fish were collected in the fall and winter of 2018, and then again in the fall of 2019. Once collected, the fish were placed in different water temperatures for different periods of time, and the effects on growth and reproduction were monitored and analyzed. The findings are currently preliminary but will conclude with a scientific report by July 2021.

So far, the project has found that individual tanks with larger larval production occurred at 90 and 120 days but not at 60 days. These preliminary results may suggest that at four degrees Celsius, winter durations under 90 days may be damaging to johnny darter reproduction; however these results will need to be interpreted within the context of the second winter's results.



PROGRAM LINE:

Standards Support

CONTRACTING PERIOD:

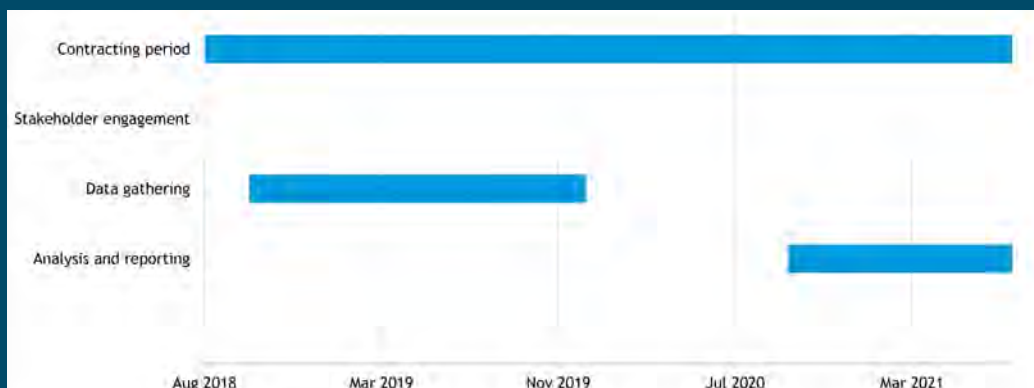
August 2018 to June 2021

CONTRIBUTORS:

Colorado Parks and Wildlife,
Englewood Wastewater, Denver
Metro, Colorado State University

PROJECT COST \$ 100,967

BALANCE \$ 51,375



Standards support

Discharger specific variance package



Background

There are a number of small and/or disadvantaged communities in Colorado with lagoon wastewater treatment plants (WWTP) that discharge to zero or near zero low-flow streams with permit limits for ammonia that cannot feasibly achieve the effluent limits with lagoon technology. One option for WWTPs is to request relief from more stringent effluent limits by evaluating available options and proposing an alternative standard or variance, called a Discharger Specific Variance (DSV). The goal of the DSV Package project is to complete an in-depth evaluation of the WWTP inventory in order to identify small-community, lagoon-based treatment systems that need and would qualify for regulatory relief using a DSV as a compliance solution. Using the WWTP inventory, the division will identify small communities with lagoon-based treatment that could be a candidate for an ammonia-based DSV. This will likely include facilities that would otherwise be required to completely overhaul the treatment process by replacing a lagoon with a mechanical plant (approximately a \$4 million upgrade). On behalf of the set of identified communities, the division will develop a proposal to submit to the Water Quality Control Commission that will meet the qualifications for a DSV.

Accomplishments

This project is in progress. The division has begun reviewing information on existing facilities and has identified approximately 10 candidates that may qualify for an ammonia-based DSV. After identifying the facilities, the division will use the inventory to assimilate the information into a draft DSV proposal. The division plans to request two rulemaking hearings in late 2020 and late 2021 for the proposed DSVs. This project will ultimately benefit small and disadvantaged communities that would otherwise be unable to comply with regulatory requirements.



PROGRAM LINE:

Standards Support

CONTRACTING PERIOD:

January 2018 to December 2021

CONTRIBUTORS:

N/A or none

PROJECT COST \$ 383,000

BALANCE \$ 242,729

Standards support

Arsenic Feasibility Study

Background

Arsenic is a naturally occurring substance that is widely distributed in the earth's crust and is known to cause cancer in humans. Relatively high background levels of arsenic in the Colorado surface and groundwater paired with the difficulty of arsenic removal down to the low levels necessary for the protection of human health make the management of arsenic particularly challenging. The goal of this project was to update the 2012 Water Quality Control Division "Basis for Development of Technologically Feasible Arsenic Treatment Levels" report.

Accomplishments

The completed "Evaluation of Technologically Feasible Arsenic Treatment Levels" report assesses factors that influence the effectiveness of arsenic treatment and provides information on reliably achievable, technology-based arsenic removal from available treatment technologies for different sectors of dischargers.

The sectors included in this study are publicly owned treatment works (POTWs), oil-and-gas extraction, construction dewatering, mining, power utilities, storm water, sand-and-gravel mining, and treatment for drinking water supply.



Data will be used to:

- Evaluate regulatory options for reducing arsenic concentrations from facilities with permitted discharges
- Focus monitoring efforts to help identify conditions that will affect the ability of a facility's treatment to remove arsenic
- Inform potential regulatory flexibilities for arsenic in discharges

PROGRAM LINE:

Standards Support

CONTRACTING PERIOD:

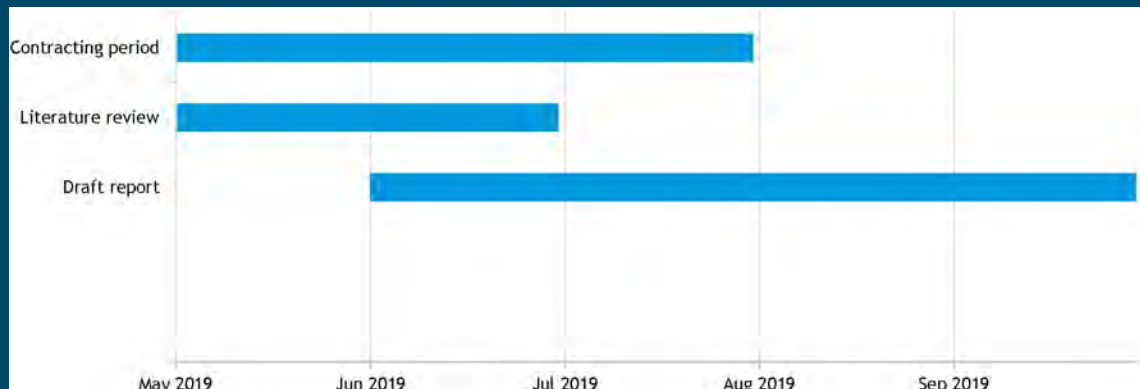
May 2019 to July 2019

CONTRIBUTORS:

Tetra Tech

PROJECT COST \$ 25,000

TOTAL BALANCE \$ 0



Source water program

Extended source water protection plan implementation

Background

Source water protection plans have been substantially implemented since 2008. The division prioritizes local community drinking water protection efforts and has technically and financially supported these efforts since 2008.

One significant statewide risk to public water systems is wildfire and the post-fire implications to water quality and drinking water operations. This project enables the division to enhance the extensive community based programs, identify and prioritize critical public water system infrastructure at risk, assist in protecting and restoring watersheds, and integrate these local community planning efforts with wildland fire emergency operations (as practical).

This project aims to continue source water protection and watershed planning efforts with Colorado Rural Water Association (CRWA). These enhanced source water protection planning collaborative efforts have a direct connection to watershed protection efforts. The project leverages existing statewide protection planning partnerships to facilitate watershed restoration and protection, protect watershed health and drinking water sources, and to further implement local and rural protection plans.

Accomplishments

The number of substantially implemented protection plans on a statewide basis has increased by 3% in 2019. We reported 222 substantially implemented protection plans in 2018 and 229 substantially implemented protection plans in 2019. This reporting is completed via the Performance Accountability Report to Region 8 EPA.

Four Main Concepts

1. Developing and implementing source water protection plans.
2. Public server access to enable broad public and interagency access to developed plans.
3. Collecting and entering critical water system infrastructure data into the US Forest Service Wildland Fire Decision Support System (WFDSS) for wildfire risk analysis and watershed protection.
4. Facilitation of local protection plans that may lead to memorandums of understanding (MOU's) between counties, local governments, and public water systems.

Completed Analyses

65 critical water system infrastructure components were evaluated.

• Keeton Ranch Water	02/19/19
• Town of Alma	02/26/19
• City of Fort Collins	03/12/19
• Paint Brush Hills MD	04/09/19
• Red Rock Valley Estates	04/25/19
• Turkey Canyon Ranch	04/25/19
• Security MHP	04/25/19
• Camelot	04/25/19
• Peak's Shadow	04/25/19
• Silver Bonnett Park	04/25/19
• Mountaindale	04/25/19
• Buffalo Mountain MD	05/28/19
• City of Louisville	06/10/19

The following protection plans were completed and reported:

- Pueblo West MD
- Pueblo Board of Water Works
- Cragmont Water Company
- Homestead Water Company
- Town of Yuma
- Paint Brush Metro District
- Granada Water Authority

147,511
CUSTOMERS
Served by these substantially implemented protection plans

PROGRAM LINE:

Source Water Protection

CONTRACTING PERIOD:

January 2019 to December 2019

CONTRIBUTORS:

Colorado Rural Water Association

PROJECT COST \$ 150,000

UNUSED FUNDS \$ 22,188

Mining Activities

Electro-Biochemical Reactor (EBR)

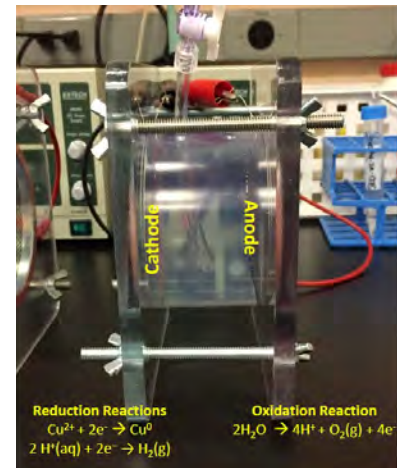


Background

It is common for abandoned mines to be saturated with water and to leach pollution into Colorado rivers and streams. High levels of pollution released to streams from mine drainage can harm fish, aquatic ecosystems, drinking water, and agricultural water sources. These problems are ongoing in Colorado, and there are over 1,800 miles of streams impaired due to mine related pollution. Electro-Biochemical Reactor (EBR) Technology is a promising new technology to remove pollutants from flooded mine workings and ultimately reduce the pollution in Colorado rivers and streams. The division contracted with the Colorado School of Mines to determine the possibility of using this technology at abandoned mine sites in Colorado.

Accomplishments

Colorado School of Mines personnel completed a research review and bench-scale testing from the beginning of 2018 through the summer of 2019. Results of this study show that electrochemical treatment may be an option for treating mine waters, especially those with high concentrations of manganese and low concentrations of zinc. Unfortunately, there are typically high concentrations of zinc found in abandoned mine discharges in Colorado, so a feasible site for implementation within Colorado has not been identified. Because a feasible implementation site could not be identified, this project will be closed out early (likely February 2020).



PROGRAM LINE:

Mining Activities

CONTRACTING PERIOD:

November 2017 to June 2021

CONTRIBUTORS:

Colorado School of Mines, EPA, Trout Unlimited, Division of Reclamation Mining & Safety, & USGS

PROJECT COST \$ 164,010

BALANCE \$ 17,441



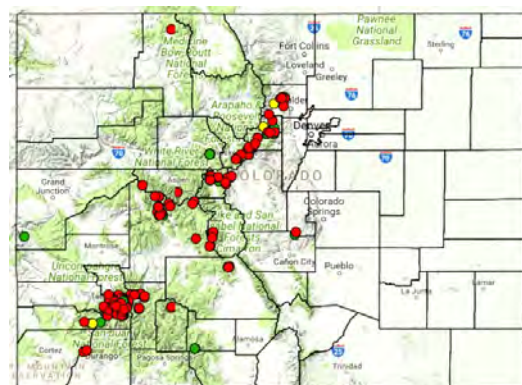
Mining related TMDL implementation

Abandoned mine legacy database



MINING FEATURES DATABASE:

There have been several abandoned mine inventories conducted by state and federal agencies since the 1970s within the boundaries of the state of Colorado. These inventories existed as separate data sources that were not easily accessible. This project gathered basic mine information from these various inventories into a data hub with 50,000 records, a publicly available online map and internally available mine prioritization tools.



Background

Colorado and mining have a long history together. The gold rush in the late 1850s brought an unprecedented number of people and mining operations into the region. Most of Colorado's mineral mining activity predates the passing of current environmental regulations in the 1970s and 1980s. Before this time, many mining companies did not sufficiently restore mined areas, leaving physical hazards and environmental impacts.

Accomplishments

This project is still in process. By compiling information on these abandoned mine sites and making it publicly available, the public will be more informed regarding potential impacts to their watersheds, and agencies and environmental groups that clean up these sites will have a common set of data to work from. This database will also help agencies better understand the scope of the abandoned mine issue within Colorado, which will ultimately help improve water quality in Colorado.



PROGRAM LINE:

Nonpoint source watershed planning

CONTRACTING PERIOD:

February 2018 to March 2020

CONTRIBUTORS:

Division of Reclamation, Mining & Safety, Watershed Stakeholders

PROJECT COST \$ 102,223

BALANCE \$ 17,996

Statewide lakes and reservoir TMDLs

Bear Creek TMDL



Background

The goal of this project was to develop in-lake and watershed models in support of TMDL development for Bear Creek Reservoir and Control Regulation revisions. These models will be used for TMDL development by evaluating nutrient (nitrogen and phosphorus) loading to the watershed and the reservoir to determine necessary reductions to attain the reservoir standards for chlorophyll and total phosphorus. The models will also support development of implementation plans by evaluating potential management scenarios to prioritize best approaches for improving the water quality in Bear Creek Reservoir.

Accomplishments

Models were developed and different management scenarios were tested to determine nutrient reductions that would be needed to attain the reservoir standards for phosphorus and chlorophyll. A report was provided that described model development and the results of the management scenarios that were tested.

PROGRAM LINE:

Statewide lakes/reservoir TMDL development & implementation support

CONTRACTING PERIOD:

August 2017 to November 2019

CONTRIBUTORS:

Black & Veatch Corp. & Bear Creek Watershed Association

PROJECT COST \$ 250,000

BALANCE \$ 0



Statewide lakes and reservoir TMDLs

E. coli TMDL

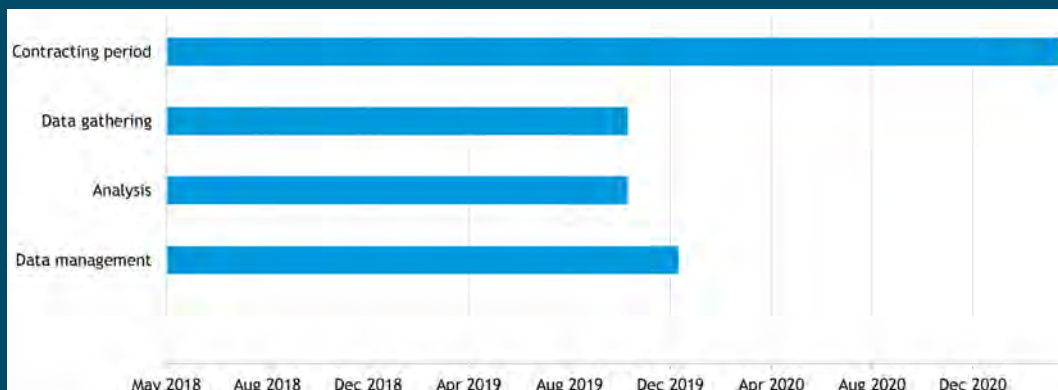


Background

This project supports the development of *E. coli* TMDLs for 303(d) listed impairments in the South Platte basin on segments of the Cache La Poudre River, Sand Creek, and Clear Creek through the collection of two seasons of *E. coli* and stream discharge data for each segment. The water quality standard for *E. coli* protects recreational uses. Data are critical for the development of TMDLs that when implemented will protect local communities that use these urban corridor streams for recreation. Because *E. coli* data are highly variable, assessment methods require data to be collected often. Data needs for *E. coli* TMDLs require data to be collected on a fine spatial and temporal scale. The Watershed Analysis Implementation Support Workgroup partners with Colorado State University to conduct monitoring for *E. coli* and stream discharge.

Accomplishments

Colorado State University monitored the Cache La Poudre River in 2018 and 2019 and collected data that will be used to develop TMDLs for this river system. Following the monitoring project on the Cache La Poudre River, monitoring will begin on Sand Creek and Clear Creek in 2020-2022.



PROGRAM LINE:

Statewide lakes/reservoir TMDL development & implementation support

CONTRACTING PERIOD:

May 2018 to March 2021

CONTRIBUTORS:

Colorado State University, City of Fort Collins, & Northern Colorado

PROJECT COST \$ 317,236

BALANCE \$ 122,615

Safe drinking water projects

Pursuing Excellence Program – Assistance Grants

Background

The assistance grant program originated out of the previously named system improvement pilot with the goal of providing financial aid for systems that needed help reaching or exceeding compliance requirements or addressing a water quality challenge. This program is intended to help systems address infrastructure needs while also requiring systems to address operational and administrative improvements such as emergency response plans, main break response procedures, and storage tank inspection plans.

Accomplishments

Eighteen systems completed work under this program, spending a total of \$248,680.



PROGRAM LINE:

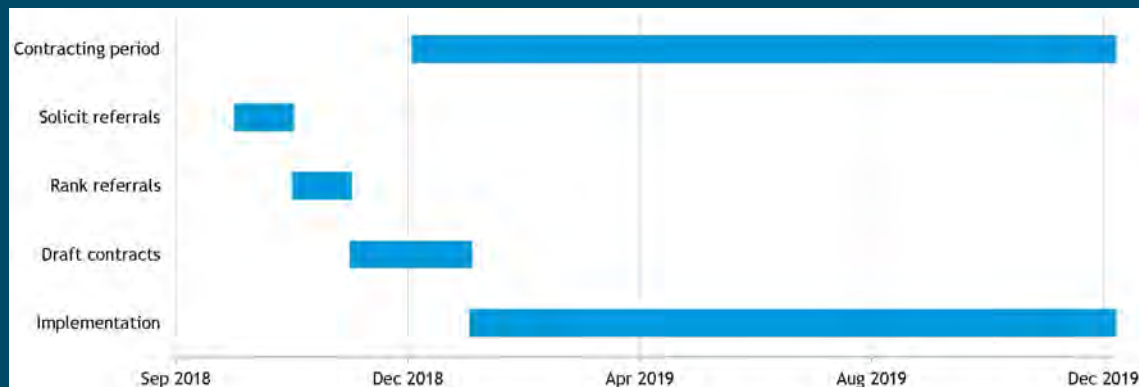
Drinking Water Excellence

CONTRACTING PERIOD:

January 2019 to
December 2019

PROJECT COST \$ 261,150

UNUSED FUNDS \$ 12,470



Safe drinking water projects

Pursuing Excellence Program – Assistance Grants

ASSISTANCE GRANTS - COMPLETED WORK

System	Project	Total	Pop.
Splashland, LLC	New disinfection system.	\$ 5,000	150
Stucker Mesa	Telemetry system for remote monitoring of the treatment facility.	\$ 4,010	36
Crowley Ranch Reserve	Optimal corrosion control treatment and an aeration system to resolve copper and disinfection byproduct exceedances.	\$ 14,778	43
Naturita	Engineering report to address water security issues.	\$ 6,959	585
Jellystone Park of Estes Park	Replaced aging and failing tank.	\$ 11,885	423
Divide South Water Users' Association	New filtration system.	\$ 17,107	60
Roggen Motel	Ion exchange system to address high nitrates.	\$ 25,000	27
Meeker Golf Course Restaurant	Filtration and upgraded disinfection system.	\$ 4,394	100
Buffalo Creek Water District	Upgraded monitoring equipment and replaced aging distribution pipeline.	\$ 23,393	125
Karval Water Users Inc.	Replaced nitrate removal media.	\$ 4,477	102
Town of Campo	Optimal corrosion control treatment study.	\$ 20,030	150
Bone Mesa	Upgraded aging monitoring equipment.	\$ 15,999	400
TV Hills Water	Repaired damaged tank.	\$ 24,640	38
Hot Sulphur Springs	Comprehensive tank inspection.	\$ 2,500	748
Town of Rockvale	Comprehensive tank inspection.	\$ 2,020	485
Sunshine Mesa	Remote power source at the treatment facility to improve reliability.	\$ 21,000	76
Bear Trap Ranch	Filtration system.	\$ 20,500	103
Moraine Park	Optimal corrosion control treatment.	\$ 24,988	100
18 systems		\$ 248,680	3,751





COLORADO

Department of Public Health & Environment

4300 CHERRY CREEK DRIVE SOUTH, DENVER, CO 80246 | 303-692-3500

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