2018 ANNUAL PROJECT REPORT

Water Quality Control Division

CDPHE CO

Foreward

Inaugural annual report

The Water Quality Control Division of the Colorado Department of Public Health and Environment is pleased to submit the first Colorado Water Resources and Power Development Authority annual project report for the period of Jan. 1, 2018 through Dec. 31, 2018. This report covers all projects funded through the Water Quality Control Division's 2018 CWRPDA 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, 2019

Executive Summary

2018 CWRPDA projects

The State of Colorado receives federal funding for water and wastewater infrastructure projects within two State Revolving Loan Funds, the Water Pollution Control Revolving Fund and the Drinking Water Revolving Fund. The agencies that have responsibility for administering the SRFs are the Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division, the Colorado Water Resources and Power Development Authority (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 to 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 319 funding, Colorado Parks and Wildlife, Department of Natural Resources, etc.

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 and 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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2018 annual project report

Clean water projects

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 use of Colorado's waterways.

USEFUL CONCEPTS AND TERMS

Statutory Authority

Colorado's state-level governing act is the Colorado Water Quality Control Act, which is focused on Colorado's needs under The Clean Water Act. The Clean Water Act is the primary federal law that governs water pollution nationwide. The objective 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

Nonpoint source pollution is the result of land runoff, precipitation, etc. Unlike pollution from industrial and sewage treatment plants, it comes from many sources that cannot be regulated. The top five pollutants found in our waterways are metals, selenium, E. coli, nutrients (nitrogen and phosphorus) and uranium. The nonpoint source program helps fund projects that address nonpoint source pollution in impaired watersheds.

Nutrient pollution

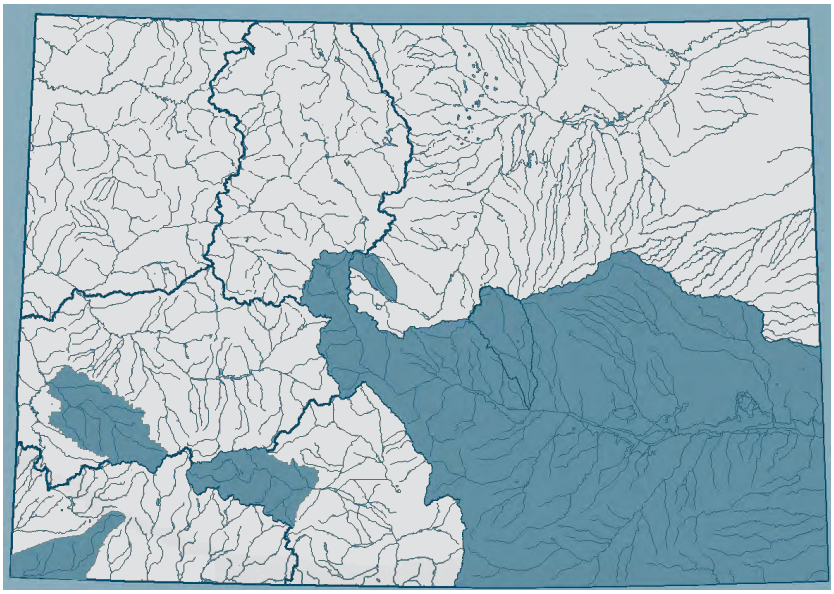
Nutrients (primarily nitrogen and phosphorus) create a significant source of pollution in our rivers, lakes and streams. Too many nutrients can impact the quality of drinking water, impair recreational boating and fishing experiences, and harm native fish. Colorado has been directed by the EPA to adopt nutrient goals to protect our streams and lakes.

Total maximum daily loads

The Clean Water Act (CWA) 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 approved by the Water Quality Control Commission and 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). Nonpoint sources of pollution are usually addressed using a combination of best management practices such as fencing and re-vegetation along a stream bank, education materials or outreach programs. Because the division has no regulatory authority over nonpoint source pollution, work is focused on providing best management practice (BMP) education to reduce pollution in state waters. These voluntary, practice based approaches to addressing the TMDL load allocation are often funded by grants and other cost sharing agreements.

Clean water project impacts by river basin:

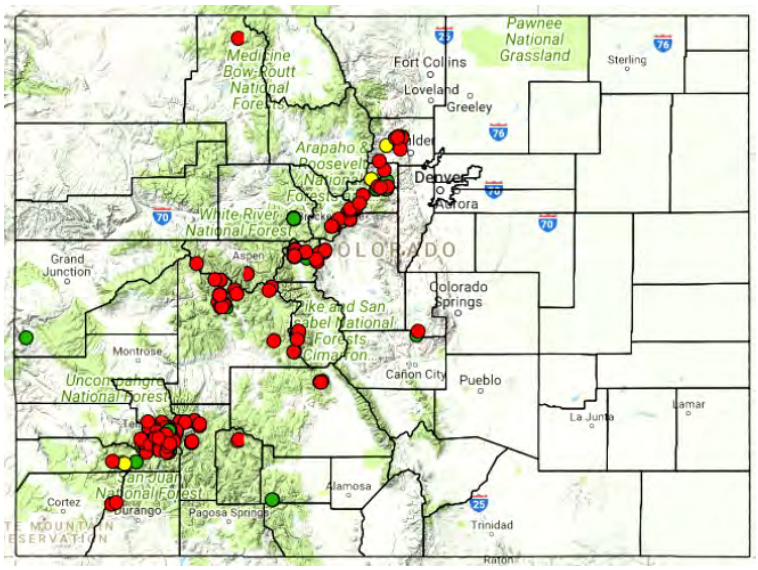


CLEAN WATER PROJECTS BREAKDOWN

PROGRAM LINE	TOTAL APPROPRIATION	REMAINING 2/18/19	PERCENT EXPENDED
DRMS contract/remediation projects	$ 655,529	$ 91,724	86%
Mining activities	$ 215,000	$ 119,786	44%
Regulation 85 support	$ 204,440	$ 0	100%
Statewide lakes/reservoir TMDL development & implementation	$ 700,000	$ 556,425	20%
eRAMS	$ 535,000	$ 45,220	92%
Lower Ark River Basin WSP & project implementation	$ 1,459,352	$ 873,603	40%
Water quality standards support	$ 1,252,310	$ 756,650	40%
Nonpoint source watershed planning	$ 300,000	$ 152,058	50%
Statewide water quality management planning	$ 450,000	$ 450,000	0%
Operation & maintenance for NPS BMP	$ 200,000	$ 200,000	0%
Disaster support	$ 573,274	$ 192,170	67%
Source water assessment & protection	$ 300,000	$ 226,762	60%
TOTALS	**$ 6,844,905**	**$ 3,664,398**	**46%**

DRMS contract/remediation projects

Abandoned mine legacy database



PROGRAM LINE:	DRMS contract/remediation projects
PROJECT TITLE:	AML Database
CONTRACTING PERIOD:	December 2015 to October 2019
TOTAL MONEY ALLOCATED:	$275,000
FUNDING PARTNERS:	Colorado School of Mines
PROJECT STATUS:	In progress

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.

MINING FEATURES DATABSE: 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 exist as separate data sources that are not easily accessible by the public, researchers, emergency planners and environmental regulators. This project serves to gather basic mine information within these inventories and present it through a publically available online map.

Accomplishments

Completion of the database will be the measurement. 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. Further, agencies will better understand the scope of the abandoned mine issue within Colorado. This will help the division reach its goals of improving water quality in Colorado.

DRMS contract/remediation projects

Division of Reclamation and Mining Safety phase II

PROGRAM LINE:	DRMS contract/remediation projects
PROJECT TITLE:	DRMS- Phase II
CONTRACTING PERIOD:	April 2013 to July 2018
TOTAL MONEY ALLOCATED:	$761,700
FUNDING PARTNERS:	Department of Natural Resources, Freeport MacMoran & EPA
PROJECT STATUS:	Complete

PRIORITY MINE SITES:

- **The London Mine** near Fairplay (Park County).
- **Rattler Mine** near Idaho Springs (Clear Creek County).
- **Saints John Mine** near Keystone (Summit County).
- **Pennsylvania Mine** near Keystone (Summit County).
- **Daisy Mine** near Crested Butte (Gunnison County).

Background

This project aims to address water quality impacts from abandoned mines. These are considered nonpoint sources because they are related to runoff and drainage from Abandoned Mine Lands (AML) sites for which there are no remaining financially viable "responsible parties," and they are particularly challenging to manage from a water quality perspective. These AML sites are sources of heavy metals (zinc, cadmium, copper and lead) and are scattered throughout the mineral belt of Colorado running from the southwest to the northeastern high country.

The project funding was intended to reduce heavy metals pollution and improve water quality in Colorado through the implementation of structural best management practices (BMPs). The project included development and implementation of structural best management practices tailored to each particular mine site.

Accomplishments

There are already pH improvements and metals concentration reductions being measured at the Pennsylvania and Daisy Mines. These sites had hydraulic seal bulkheads which have fast-acting pollution control results. Monitoring will continue in the future on these sites as well as the remaining sites since mine waste and stormwater BMPs can take several years for measurable changes in water quality.

Reclamation Techniques

The reclamation techniques employed at the various project sites included:

- Mine waste and tailings consolidation and capping.
- Storm water flow diversions.
- Hydraulic seal bulkheads.
- Other appropriate BMPs.

Mining activities

Electro-Biochemical Reactor (EBR)

PROGRAM LINE:	Mining activities
PROJECT TITLE:	Electro-Biochemical Reactor
CONTRACTING PERIOD:	Nov. 9, 2017 to June 30, 2021
TOTAL MONEY ALLOCATED:	$164,000
FUNDING PARTNERS:	Colorado School of Mines
PROJECT STATUS:	In progress

Background

It is common for abandoned mines to be saturated with water and leach pollution into Colorado rivers and streams. High levels of pollution released to streams from mine drainage can harm fish, aquatic ecosystems, and drinking water and agricultural water sources. These problems are ongoing in Colorado. 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. This project has multiple phases; Phase 1 will be to conduct literature research into the viability of EBR in Colorado and to conduct laboratory tests of the efficacy of EBR treatment on waters with similar characteristics to mine waters in Colorado. Phase 2 will be to conduct an EBR experiment at a flooded mine in Colorado. Phase 2 costs will be evaluated as part of Phase 1.

Accomplishments

This project is still in process and is working towards the goals of reducing the pollution from abandoned mines that enter Colorado rivers, streams and lakes. This will help the division reach its goals of improving water quality in Colorado. Results will be measured by comparing the test results from before the EBR treatment with results after the treatment to see how much the EBR treatment reduces the pollution in the water.

Regulation 85

Nutrients outreach

PROGRAM LINE:	Regulation 85
PROJECT TITLE:	Outreach
CONTRACTING PERIOD:	Sept. 29, 2015 to June 30, 2018
TOTAL MONEY ALLOCATED:	$200,000
FUNDING PARTNERS:	Colorado State University
PROJECT STATUS:	Complete

Background

In 2012, the Water Quality Control Commission approved Regulation 85- Nutrients Management Control Regulation. This regulation aims to control the nutrient loading to state waters, and is aligned with the EPA's priorities regarding nutrient control across the United States.

Effective nutrient management that aims to address water quality impacts relies on a strong public outreach with the backing of local partners. Local partners are important for effective long term implementation of best management practices.

Because of this, the commission encouraged that a public information and education program be developed and implemented by the division and entities responsible for nonpoint source nutrient pollutants.
An outreach program was developed to address the commission's request.

Accomplishments

Colorado State University used this funding to create the Colorado Ag Water Quality website, which contains eight outreach videos for Regulation 85 awareness and best management practices to control nutrients, and a variety of additional information. Each of the videos uses members of the agricultural community to raise awareness about Regulation 85 and best management practices to control nutrients.

Statewide lakes and reservoir TMDLs

Bear Creek TMDL

PROGRAM LINE:	Statewide lakes/reservoir TMDL development and implementation support
PROJECT TITLE:	Bear Creek Watershed and Reservoir nutrient water quality modeling and management practice scenarios
CONTRACTING PERIOD:	Aug. 21, 2017 to Aug. 15, 2019
TOTAL MONEY ALLOCATED:	$250,000
FUNDING PARTNERS:	Black & Veatch Corp.
PROJECT STATUS:	In progress

Background

The goal of this project is to develop an in-lake and watershed model 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 reductions necessary to attain the reservoir standards for chlorophyll and total phosphorus. The models also will be used to 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 are being developed and will be used to evaluate effectiveness of different management scenarios. This project will help develop reservoir standards.

E. coli TMDL

PROGRAM LINE:	Statewide lakes/reservoir TMDL development and implementation support
PROJECT TITLE:	E. coli TMDL
CONTRACTING PERIOD:	May 1, 2018 to March 31, 2021
TOTAL MONEY ALLOCATED:	$205,000
MONEY SPENT IN 2018:	$66,826
FUNDING PARTNERS:	Colorado State University
PROJECT STATUS:	In progress

Background

This project supports the development of E. coli TMDLs for 303(d) listed impairments in the South Platte basin on segments of Sand Creek, Clear Creek, and the Cache La Poudre River through the collection of two seasons of E. coli and stream discharge data.

E. coli is the water quality standard that was adopted to protect 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 at a high frequency which results in the need to develop TMDLs based on fine spatial and temporal scale data. The TMDL workgroup partners with Colorado State University to conduct monitoring for E. coli and stream discharge.

Accomplishments

Colorado State University began the first year of monitoring on the Cache La Poudre River in 2018 and will continue to collect data from the Cache La Poudre River during 2019. Following the monitoring project on the Cache La Poudre River, monitoring will begin on Sand Creek and Clear Creek.

eRAMS

Watershed toolkit

PROGRAM LINE:	eRAMS watershed toolkit
PROJECT TITLE:	eRAMS tool kit
CONTRACTING PERIOD:	Dec. 7, 2016 to Dec. 31, 2020
TOTAL MONEY ALLOCATED:	$679,000
FUNDING PARTNERS:	Colorado State University
PROJECT STATUS:	In progress

Background

This project aims to continue the development of the Environmental Risk Assessment and Management System (eRAMS) based watershed assessment tool that will promote the use of current water quality and related information for water quality management planning. This tool includes modules to support planning, prioritization of resources, assessment and implementation decisions.

This project will develop and pilot-test internet based tools and modules within Colorado State University's (CSU) Environmental Risk Assessment and Management System (eRAMS), namely the Watershed Restoration Assessment and Planning (WRAP) toolkit. This toolkit allows users to extract, organize and analyze water quantity and quality data and information about readily available geospatial characteristics, for varying watershed scales. The toolkit also helps the CDPHE Water Quality Control Division and its stakeholders further its goals of protecting and restoring water quality in the state by facilitating data and process transparency.

Water quality tools & modules

These tools include the following modules:

- CLEAN dashboard- provides estimates of nutrient loading into a watershed.
- 303(d) assessment - will provide the ability for water quality assessments over the internet.
- Nonpoint source prioritization/ healthy watersheds module.
- Low flow calculation module.
- Regulation 85 data display module.

Accomplishments

This project has created one location to house water quality data resources for both stakeholders and division staff. Further, this project has developed water quality tools and modules that can be used by the division and stakeholders for better planning and implementation of water quality measures.

These modules will help stakeholders and division staff process information in the same way and better coordinate on water quality issues. Another benefit of this project is that this is an internet-based system, and all the data and tools can be accessed remotely.

Lower Arkansas River Basin

Selenium reduction

PROGRAM LINE:	Lower Arkansas River Basin watershed-based planning and project implementations
PROJECT TITLE:	Lower Arkansas River Basin selenium reduction and total maximum daily load (TMDL) program support
CONTRACTING PERIOD:	Sept. 15, 2016 to June 30, 2022
TOTAL MONEY ALLOCATED:	$726,352
FUNDING PARTNERS:	Department of Agriculture
PROJECT STATUS:	In progress

Background

Several waterbodies in the Lower Arkansas River Valley are not able to meet the water quality standards set by the Water Quality Control Division, and are listed 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 management practices to control nonpoint source selenium loading.

Specifically, this project has identified and implemented BMPs that address deep percolation of irrigation water which mobilizes selenium in the shallow shale. BMPs will be implemented in two different watersheds. These BMPs will be monitored after implementation to measure effectiveness.

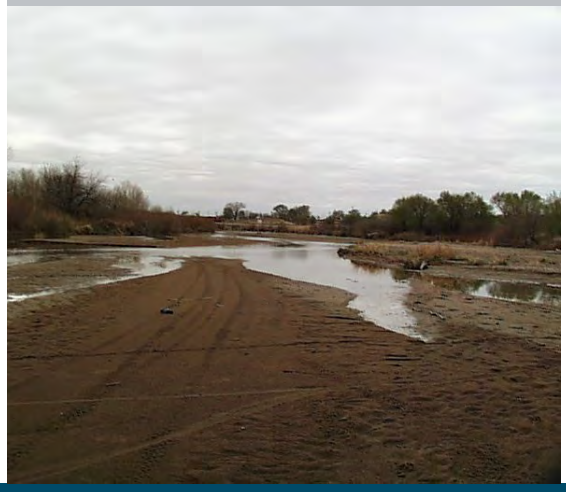
Accomplishments

This project has completed the pre-BMP data collection stage for one of the implementation sites and the other project (sprinkler systems) is in the implementation stage. Accomplishments will be more apparent once the implementation is complete and monitoring has taken place. The impact may not be seen in the short-term, but in the long-term it is expected that the selenium concentrations decline as it has in other areas of the state. It is expected that the selenium loading from the shale will decline and the waterbodies can meet water quality standards for this parameter.

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 is used to capture and filter runoff and reduce contamination of surface water.
- Reduced nitrogen applications.
- Reduced tillage.



Lower Arkansas River Basin

NPS water quality and soil health initiatives

PROGRAM LINE:	Lower Arkansas River Basin watershed-based planning and project implementations
PROJECT TITLE:	Lower Arkansas River Basin nonpoint source water quality and soil health initiatives
CONTRACTING PERIOD:	April 19, 2018 to Sept. 30, 2022
TOTAL MONEY ALLOCATED:	$300,000
FUNDING PARTNERS:	Lower Arkansas Valley Water Conservancy District
PROJECT STATUS:	In progress

BMPs being investigated

- Lining of augmentation ponds.
- Drying up selected irrigated lands and moving the irrigation water to areas higher in organic matter.
- Piping of laterals carrying irrigation water.
- Installing buffer strips.
- Combination of various soil health such as planting cover crops and alternative irrigation systems (e.g. drip irrigation).

Background

This project aims to investigate the effectiveness of BMPs implemented to address water quality issues in the Lower Arkansas Valley, Colorado.

Accomplishments

This project is in the early stages of pre-BMP data collection stage, but one BMP (the installation of piping) is being implemented. Once this is complete, the post-BMP data collection will be conducted.

Uranium source investigation

PROGRAM LINE:	Lower Arkansas River Basin watershed-based planning and project implementations
PROJECT TITLE:	Lower Arkansas Valley uranium source investigation and recommendations
CONTRACTING PERIOD:	June 17, 2016 to June 30, 2019
TOTAL MONEY ALLOCATED:	$433,000
FUNDING PARTNERS:	Colorado School of Mines & Colorado Geological Survey
PROJECT STATUS:	In progress

Background

This project will identify 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. The Colorado School of Mines conducted deep drilling to obtain geologic information of surface deposits and location of bedrock beneath the irrigated area of the river basin.

Accomplishments

This project is evaluating sources of uranium in the soil profile and how it might be impacting uranium contribution to the return flow system. So far, the project has been monitoring wells and deep drilling sites. Findings should be available in June 2019. From there, BMPs will be developed to mitigate human activities that may be contributing to the naturally occurring uranium in the soil. This will lead to the use of BMPs in the valley to bring water quality to acceptable levels.

Standards support

Statewide selenium study

PROGRAM LINE:	Standards Support
PROJECT TITLE:	Statewide selenium study
CONTRACTING PERIOD:	Sept. 1, 2016 to Dec. 31, 2019
TOTAL MONEY ALLOCATED:	$255,000
FUNDING PARTNERS:	Colorado State University
PROJECT STATUS:	In progress

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. If adopted in Colorado, the updated criteria are expected to be exceeded in many waterbodies. The goal of this project is to collect information to support updates to Colorado's selenium criteria.

Colorado's current water quality criteria for selenium were developed by EPA in 1987 and are based on aqueous exposure. Because food chain transfer is the most likely pathway of selenium exposure, selenium criteria should consider dietary exposure rather than only aqueous exposure. In June 2016, EPA released updated recommended 304(a) criteria for selenium that incorporates dietary exposure by using a multi-parameter, water column and tissue-based approach. This approach is much more complex and more stringent than Colorado's current water column-based 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. In addition, this study is needed to expand our knowledge of selenium toxicity in fish and determine a threshold(s) that is protective of Colorado's aquatic life.

Accomplishments

In 2018, CSU's efforts were focused on rearing the brown trout eggs that were collected in fall 2017, collecting and rearing white sucker eggs in the spring, conducting larval evaluations, and completing field sampling of food chain components. Statistical evaluations of data collected to-date commenced in late 2018, and results are expected in spring 2019. All data should be complete in spring 2019.

Standards support

Groundwater atlas

PROGRAM LINE:	Standards support
PROJECT TITLE:	Ground water atlas
CONTRACTING PERIOD:	Mar. 29, 2019 to Dec. 31, 2019
TOTAL MONEY ALLOCATED:	$149,969
FUNDING PARTNERS:	Colorado Water Conservation Board
PROJECT STATUS:	In progress

Background

This project serves to update the 2003 Colorado Ground Water Atlas, which will provide the Water Quality Control Division needed information to adequately characterize ground water quality in Colorado.

This information will be accessible for two audiences on a web-based platform. The first audience is the public where there is a special concern to educate those who use private wells in the state so that they can be made aware of what risks or concerns they may encounter.

The second audience are other agencies that have a role in ground water use and protection. For this audience, the information generated should be available in geo-spatial format, or as GIS data. The goal of this project to create 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 these agencies. The project will include participation from other state agencies and potentially academia, including the Colorado Water Conservation Board, Division of Water Resources, the Colorado Geological Survey and others.

Accomplishments

This project is still in progress and is expected to be completed sometime in 2019.

GROUNDWATER is water that exists underground in the soil or in pores and crevices in the rock. These 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.

Standards support

Warm water fish

PROGRAM LINE:	Standards support
PROJECT TITLE:	Warm water fish
CONTRACTING PERIOD:	Aug. 7, 2018 to June 30, 2021
TOTAL MONEY ALLOCATED:	$100,967
OTHER FUNDING PARTNERS:	Colorado Parks and Wildlife, Englewood Wastewater, Denver Metro, Colorado State University
PROJECT STATUS:	In progress

Background

This project is being proposed by the division and is aimed at evaluating wastewater influences on the Johnny Darter fish, in particular temperature changes and the effects on reproduction. This project is supported by Colorado Parks and Wildlife, as this work is important to the protection of a number of native eastern plains fish species and the division plans on committing funding to the project.

Water temperature is a critical ecological variable for aquatic life and dictates seasonal spawning, migratory cues as well as facilitates and constrains growth, reproduction and survival. Colorado's water quality standards include temperature criteria to protect aquatic life against the acute and chronic effects of elevated and unnatural seasonal patterns of temperatures.

In 2018, Colorado's temperature technical advisory committee (TAC) (a collection of temperature experts and technical stakeholders) produced a research white paper documenting the available literature on the thermal effects of warm water fish and produced a number of recommendations, such as a study on the effects of various winter temperatures on a thermally sensitive warm water native fish, the Johnny Darter. This species was selected because of its relationship to other species (specifically walleye and perch).

The effluent discharge from wastewater treatment facilities is typically warmer than the surface receiving waters, especially during winter. The temperature difference presents the potential for reduced Johnny Darter reproduction and recruitment. This can have negative implications for population growth and stability, both of which are critical elements of the aquatic life use.

Accomplishments

This project is in process and the initial challenge of collecting sufficient numbers of wild Johnny Darter was successful in fall of 2018. Additionally, the fish transition to aquaria at Fort Collins was successful. Fish are currently being exposed to different winter temperatures with spawning expected to commence in spring 2019. At that time, further data will be collected.

Standards support

Utah

PROGRAM LINE:	Standards support
PROJECT TITLE:	Utah
CONTRACTING PERIOD:	June 9, 2016 to March 28, 2018
TOTAL MONEY ALLOCATED:	$25,000
FUNDING PARTNERS:	State of Utah
PROJECT STATUS:	Complete

Background

EPA's compilation of national recommended water quality criteria is presented as a summary table containing recommended water quality criteria for the protection of aquatic life and human health in surface water for approximately 150 pollutants. These criteria are published pursuant to Section 304(a) of the Clean Water Act (CWA). The criteria for ammonia was revised in 2013. The updated criteria reflect recent information regarding the toxicity of ammonia on new and more sensitive species, including unionid mussels and non-pulmonate snails. The updated criteria are significantly more stringent than the 1999 criteria, and adoption of these criteria would likely require substantial upgrades in treatment for numerous facilities throughout the state.

The sensitive species upon which EPA's updated ammonia criteria are based may not be present in all the waterbodies in Colorado. A better understanding of the historical and current distribution of ammonia sensitive species must be developed to inform where the updated criteria would be appropriate and necessary to protect the aquatic life use. This information could allow Colorado to utilize flexibilities of the standards framework such as the recalculation procedure for site-specific criteria derivation or revisions to designated uses.

Accomplishments

The division partnered with researchers at the Utah Department of Environmental Quality and Utah State University to conduct a study which evaluated the historical and current distribution of ammonia sensitive mussels and snails. The dataset and spatial tools provided as a result of this study will enable Colorado to identify specific bodies of water that may be subject to the new ammonia criteria. This represents the first step in identifying the types of waterbodies that are likely to contain ammonia sensitive mollusks, and where adoption of the new criteria may be appropriate. Additional phase two studies based on other approaches will be needed and may include physical surveys, environmental DNA surveys and toxicological testing.

Standards support

Small community lagoon treatment plant inventory

PROGRAM LINE:	Water quality standards support
PROJECT TITLE:	Small community lagoon treatment plant statewide inventory
CONTRACTING PERIOD:	2018
TOTAL MONEY ALLOCATED:	$140,000
FUNDING PARTNERS:	NA or none
PROJECT STATUS:	In progress (Anticipated completion April/May 2019)

Background

The division does not presently have a centralized resource where key information can be stored about wastewater treatment facilities in Colorado to help assist with, and better understand the magnitude of compliance challenges associated with regulatory changes, especially in smaller rural facilities. This project will support the development of an inventory of communities with lagoon treatment plants to identify long-term compliance challenges with consideration to the implementation of nitrate standards, EPA's new ammonia criteria, temperature, selenium and the implication of nutrient standards required by Regulation 85.

The project includes building an inventory of small communities (treatment plants processing less than one million gallons per day) that identifies the specific treatment configurations and technologies employed at each of the facilities. The driver of the inventory is to provide information that will help communities and the division better identify water quality challenges, with a focus on understanding if a discharger specific variance (DSV) may be an appropriate or effective regulatory path to compliance.

Accomplishments

The division is in the process of finalizing the project and is completing the necessary quality assurance and error checking. The project is anticipated to be complete in April 2019. When complete, the inventory will integrate information for 588 wastewater facilities, with 160+ classified as lagoons. The inventory will be a division-wide resource, with contributions from the division's engineering section, grants and loans unit, standards staff, permit writers, and field services staff, as well as information from the Colorado Water and Wastewater Facility Operators Certification Board and the Department of Local Affairs.

Standards support

Discharger specific variance package

PROGRAM LINE:	Water quality standards support
PROJECT TITLE:	Discharger specific variance package
CONTRACTING PERIOD:	2018 to 2019 (3 years)
TOTAL MONEY ALLOCATED:	$383,000
FUNDING PARTNERS:	NA or none
PROJECT STATUS:	In progress

Background

There are a number of small and/or disadvantaged communities in Colorado with lagoon wastewater treatment plants that discharge to zero or near zero low-flow streams, have permit limits for ammonia and cannot feasibly achieve the effluent limits with lagoon technology. The goal of the discharger specific variance (DSV) package project is to complete an in-depth evaluation of the wastewater treatment plant inventory in order to identify small-community, lagoon-based treatment systems, that both need and would qualify for regulatory relief using a variance as a compliance solution.

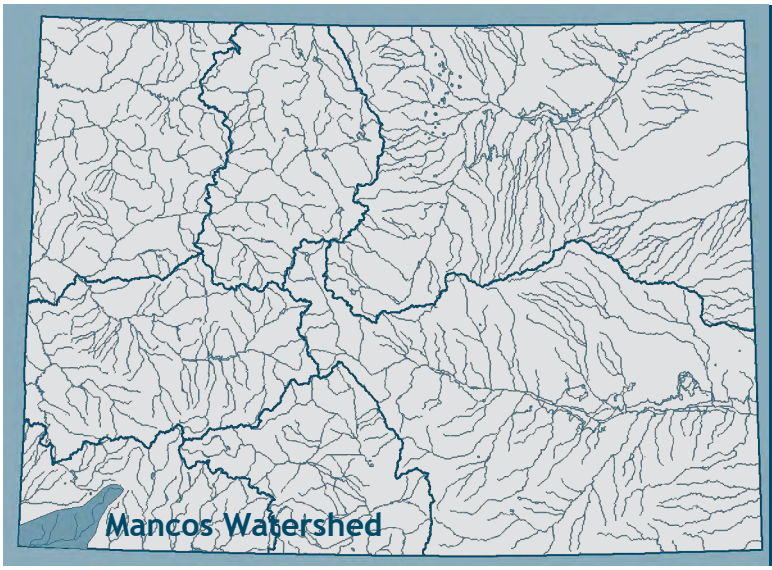
The division will use the inventory to identify small communities with lagoon-based treatment that could be a candidate for an ammonia-based DSV. This will include facilities that would otherwise be required to completely overhaul the treatment process by replacing a lagoon with a mechanical plant (an upgrade costing millions), communities with a limited number of ratepayers and/or low median household income and stressed local economy. On behalf of the set of identified small and/or disadvantaged communities, the division will develop a proposal on behalf of the identified small/disadvantaged communities that meet the qualifications for DSVs. The division will submit the proposal to the Water Quality Control Commission.

Accomplishments

This project is in progress. The division has begun reviewing information on existing facilities. So far, approximately 10 candidates have been identified that may qualify for an ammonia-based variance. After identifying the facilities, the division will use the inventory to assimilate the information into a draft DSV proposal. The division plans to request a rulemaking hearing in late-2019 regarding the proposed DSVs.

Nonpoint source watershed planning

Mancos Watershed



PROGRAM LINE:	NPS watershed planning
PROJECT TITLE:	Mancos WSP
CONTRACTING PERIOD:	Feb. 2018 to March 2020
TOTAL MONEY ALLOCATED:	$102,223
FUNDING PARTNERS:	Mancos Conservation District, Division of Reclamation, Mining & Safety, Watershed Stakeholders
PROJECT STATUS:	In progress

Background

The Mancos Watershed is a drainage area in the southwest corner of Colorado. It is impacted by metals pollution (copper and manganese) related to legacy mining and low flows due to agricultural uses. The existing version of the watershed plan from 2011 was successful in leading to 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 is needed to begin reduction of mine pollution and improve the water quality.

The data collection and planning process will identify which mines are causing the most pollution and potential structural BMPs. The project involves a multi-year process to collect, analyze and share watershed data on copper and manganese and macroinvertebrates. Data will be entered into an EPA database (STORET).

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 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

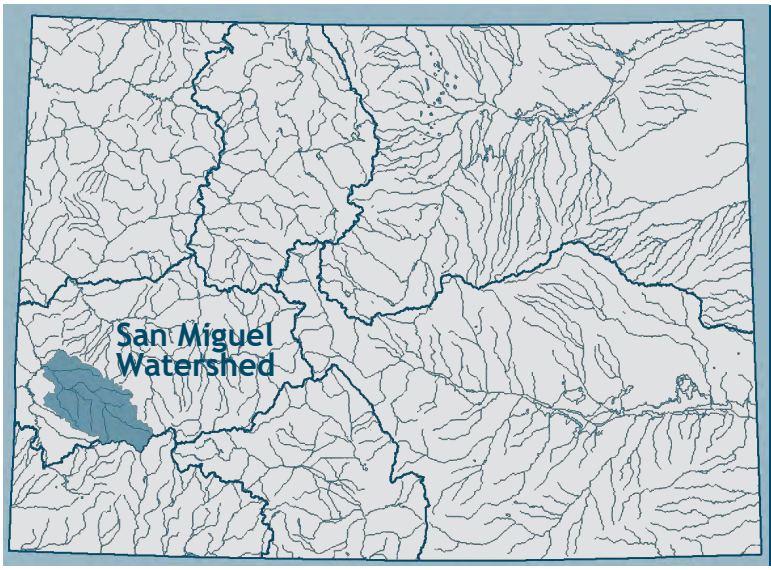
This project is in progress, but will provide information about the location of the highest priority abandoned mines and community-endorsed strategies for reducing mine related pollution and improving water quality.

Completed tasks - 2018

- A water sampling and analysis plan which directs the procedures for collecting and analyzing water quality data.
- The first of three field water quality sample collection events and laboratory analysis of samples.
- The first stakeholder meeting with stakeholders to educate them on the data collection process and get their feedback.

Nonpoint source watershed planning

San Miguel Watershed



PROGRAM LINE:	NPS watershed planning
PROJECT TITLE:	San Miguel WSP
CONTRACTING PERIOD:	May 2018 to March 2020
TOTAL MONEY ALLOCATED:	$33,827
FUNDING PARTNERS:	San Miguel Watershed Coalition, Watershed Stakeholders
PROJECT STATUS:	In progress

Background

The San Miguel Watershed, which is the drainage area around Telluride, is in need of data to support an updated comprehensive watershed 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 current watershed plan is 19 years old and out of date.

The primary goal of the project is to create data and community support for a new watershed plan for the San Miguel River Basin. Data will be entered into a widely available EPA database called STORET as well as analyzed and presented in two annual water quality reports.

As part of the watershed planning process, the coalition will also conduct stakeholder outreach and community education on the water quality report through open forum meetings. The Coalition will also take part in creating a San Miguel River Contingency Plan for addressing response actions to a mine adit spill like Gold King. Overall, the data, reports and stakeholder input will support decisions about where to implement voluntary pollution controls at priority areas such as abandoned mines and degraded stream sections.

Accomplishments

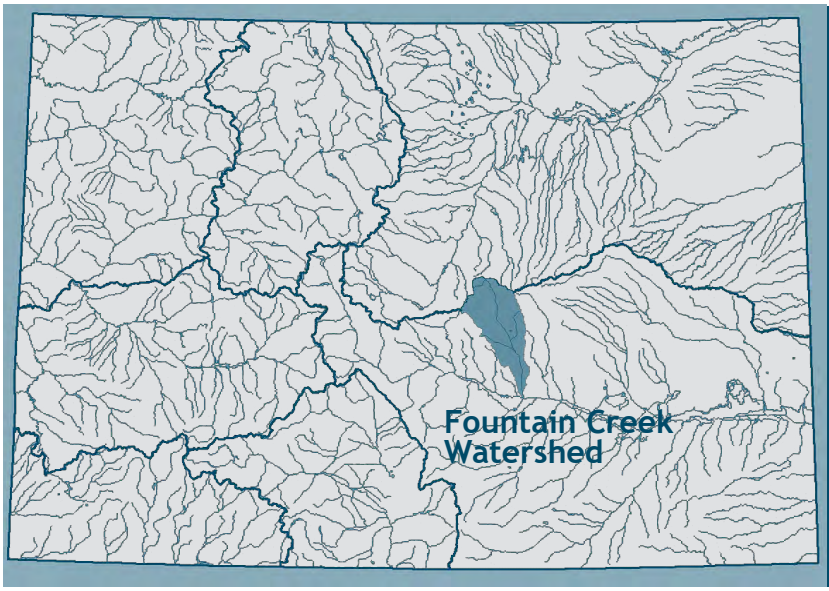
This project is in progress, but will provide information about the location of the most significant water pollution in the San Miguel River, as well as community-endorsed strategies for reducing pollution and improving water quality.

Completed tasks - 2018

- A water sampling and analysis plan which directs the procedures for collecting and analyzing water quality data.
- The first of four field water quality sample collection events and laboratory analysis of samples.
- Partial preparation of the first water quality report which will identify pollution problem areas.
- The first San Miguel Watershed Forum meeting with stakeholders including local government representatives, business owners, citizens and federal land managers to educate them on the data collection process and get their feedback.

Nonpoint source watershed planning

Fountain Creek Watershed



PROGRAM LINE:	NPS watershed planning
PROJECT TITLE:	Fountain Creek Watershed plan for E. coli
CONTRACTING PERIOD:	Oct. 1, 2017 to March 31, 2019
TOTAL MONEY ALLOCATED:	$32,400
FUNDING PARTNERS:	Pikes Peak Regional Water Authority, Arkansas Fountain Coalition for Urban River Evaluation, City of Pueblo, Colorado Springs Utilities
PROJECT STATUS:	In progress

Background

The Fountain Creek Watershed is located in the western portion of El Paso County and the northwestern portion of Pueblo County. The 2003 watershed plan did not address the EPA's nine essential elements. Since then, parts of this watershed have been listed on the 303(d) list of impaired waters for E.coli. Stakeholders would like to determine the sources of the pollutant and gather information before the TMDL process begins.

Accomplishments

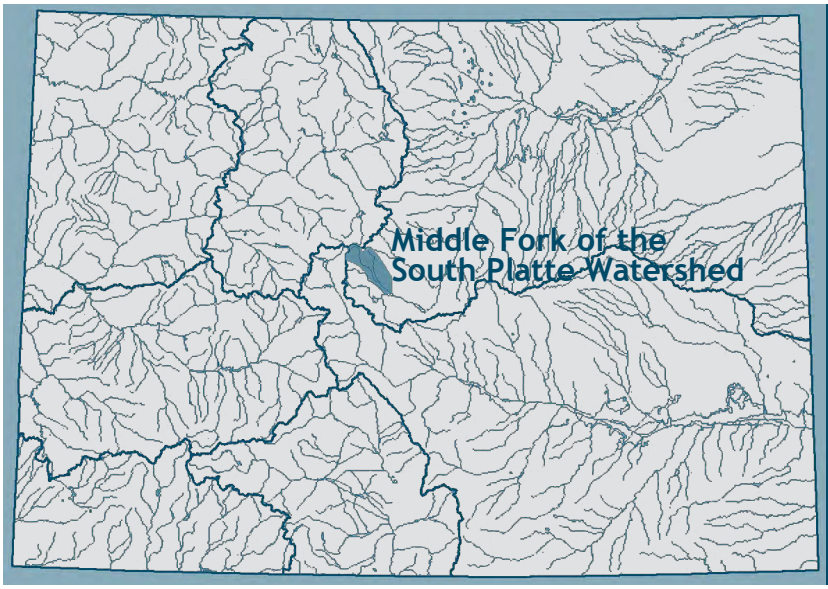
This project is in progress, but will ultimately result in the development of an EPA nine element watershed-based plan for the Fountain Creek Watershed. This plan focuses heavily on E.coli impairments, but briefly examines other sources of pollution, such as arsenic, copper, nutrients, other metals, and temperature that are being explored through other watershed initiatives.

Completed tasks - 2018

- Monthly stakeholder meetings were held.
- Characterization of the watershed and sub-watersheds were completed.
- Potential sources and strategies were considered by stakeholders and a summary of existing E.coli reduction strategies was completed.
- Draft nine element watershed-based plan has been provided.

Nonpoint source watershed planning

Middle Fork of the South Platte Watershed



PROGRAM LINE:	NPS watershed planning
PROJECT TITLE:	Middle Fork of the South Platte Watershed planning to address mining impacts
CONTRACTING PERIOD:	Jan. 15, 2018 to March 31, 2020
TOTAL MONEY ALLOCATED:	$98,550
FUNDING PARTNERS:	Coalition for the Upper South Platte
PROJECT STATUS:	In progress

Completed tasks – 2018

- First stakeholder meeting.
- Sampling analysis and quality assurance project plan completed.
- All three rounds of sampling have been completed, including the addition of soil samples taken below the riverbed to check for mercury accumulation.
- Data gaps and potential additional mining sources are now being identified and will be added for additional sampling events as deemed necessary by the stakeholders.

Background

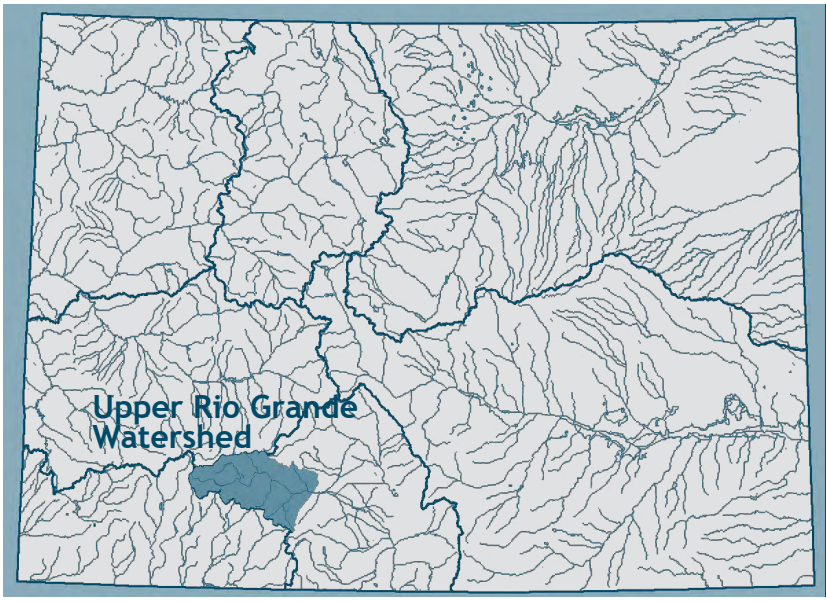
This watershed-based plan will present solutions for reducing nonpoint source (NPS) pollutant loading for the Middle Fork of the South Platte Watershed. This area contains large numbers of mining operations (both abandoned and currently in use), and local water quality impairments are tied to legacy mining drainage and features. This plan will outline how pollutant loading contributes to water quality impairments and how solutions can be implemented.

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. The plan will utilize stakeholder processes, identify problem areas and potential solutions, and prioritize those solutions for future implementation projects.

Nonpoint source watershed planning

Upper Rio Grande Watershed



PROGRAM LINE:	NPS watershed planning
PROJECT TITLE:	Upper Rio Grande Watershed assessment
CONTRACTING PERIOD:	July 1, 2017 to March 31, 2019
TOTAL MONEY ALLOCATED:	$33,000
FUNDING PARTNERS:	The Colorado Rio Grande Restoration Foundation
PROJECT STATUS:	In progress

Background

The Upper Rio Grande Watershed assessment aims to characterize the watershed and compile data into a comprehensive watershed assessment that will identify causes of degradation and develop a prioritized list of projects that will improve water quality in the region. This project is the first step towards a watershed-based plan which would ultimately support long-term restoration actions to improve water quality.

Accomplishments

This project provided baseline water quality information for nonpoint source issues and impairments in the watershed. Data revealed areas of significant water quality concerns that will be the focus of a future watershed plan. This assessment informs future planning and help prioritize impairments in the watershed for implementation projects.

The water quality assessment incorporated on site measurements of physical water conditions (pH, temperature and specific conductivity) as well as laboratory analysis of chemical constituents in samples to evaluate the concentration of dissolved heavy metals and total nitrogen and phosphorus.

The results from the water quality assessment show that overall, the water quality of the Upper Rio Grande appears healthy. However, data collected from this assessment and prior data collection efforts reveal high concentrations of heavy metals: aluminum, arsenic, cadmium and zinc.

The water quality assessment provided a baseline of water quality information for the watershed. That baseline information will be used to monitor changes in the watershed and guide the development of reclamation and restoration objectives in the future through watershed planning.

Emergency/disaster support

Custer County

PROGRAM LINE:	Disaster support
PROJECT TITLE:	2017 Custer County fire cleanup - nonpoint source initiative
CONTRACTING PERIOD:	Sept. 15, 2017 to Oct. 31, 2018
TOTAL MONEY ALLOCATED:	$373,274
FUNDING PARTNERS:	Custer County
PROJECT STATUS:	Completed

Photos courtesy Custer County Emergency Management

Background

Disaster support funding has been invaluable for helping local communities respond to wildfire and flood impacts.

The Wetmore fire resulted in damaged vegetation in these prioritized areas in the Hardscrabble Creek Watershed, Upper Arkansas River, Colorado. It was imperative to remove burned debris from prioritized areas within the 100-year floodplain, making this project necessary.

Accomplishments

In the project area there were numerous instances where owners walked away from burned out buildings and turned them over to the financial institutions. Burned cleaning supplies, paint cans, gas cans, sheds, vehicles, etc. remained on site. Due to the Wetmore and Junkins fire's burn scar instability, high debris flows during periods of flooding would likely move these materials into downstream water supplies. The project significantly protected water quality in the Arkansas River headwaters by removing debris from burned areas in the Upper Arkansas Watershed.

Source water assessment & protection

Extended 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 for many years.

One significant risk to public water systems is wildland fire and the post-fire implications to water quality. This project enables us to enhance the extensive community based programs, protect and restore watersheds, and integrate these local community planning efforts with wildland fire emergency operations.

This project aims to continue source water protection and watershed planning efforts with Colorado Rural Water Association (CRWA).

The partners collaborate on four main concepts:

- Developing and implementing local and rural public water system source water protection plans.
- Public server access to enable broad public and interagency access to developed plans.
- A collaborative effort to collect, distribute, and enter critical water system infrastructure data into the US Forest Service Wildfire Decision Support System (WFDSS) for wildfire and watershed protection.
- Facilitating local protection plans that may lead to memorandums of understanding (MOU's) between counties, local governments, and public water systems.

These enhanced source water protection planning collaborative efforts have a direct connection with watershed health function, planning, and protection efforts. The project will use existing statewide protection plan partnerships to facilitate watershed restoration and protection, protect watershed health and drinking water sources, and to further implement local and rural protection plans.

PROGRAM LINE:	Source water protection
PROJECT TITLE:	Source water protection-extended plan implementation
CONTRACTING PERIOD:	July 5, 2018 to Dec. 31, 2019
TOTAL MONEY ALLOCATED:	$250,224
PROJECT STATUS:	In progress

WILDLAND FIRE DECISION SUPPORT SYSTEM PROJECTS

Actively participating	Beginning the process	Interested and inquiring
• The City of Louisville • Bristol Water and Sanitation District • Granada Water Authority	• Keeton Ranch • City of Fort Collins • Town of Alma	• Town of Salida • City of Louisville • City of Boulder • Red Rock Valley

Accomplishments

To date, the division has invested approximately $5 million specifically focused on statewide source water protection planning efforts. Over 200 source water protection plans have been implemented in Colorado covering approximately 24 percent of community public water systems, 49 percent of the state's population (2.5 million people), and thousands of acres of watershed protection areas in Colorado.

Safe drinking water projects

System improvement pilot

The safe drinking water program works to ensure 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 risks from drinking water sources. Safe drinking water projects funded by SRF dollars are reflected through the system improvement pilot.

PROGRAM LINE	TOTAL APPROPRIATION	REMAINING AS OF 2/18/19	EXPENDED
System improvement pilot	$ 300,000	$ 119,550	60%

PROGRAM LINE:	Drinking water excellence
PROJECT TITLE:	System improvement pilot
CONTRACTING PERIOD:	Jan. 1, 2017 to Dec. 31, 2018
TOTAL MONEY ALLOCATED:	$300,000
PROJECT STATUS:	In progress

Background

The system improvement pilot began in 2017 with the goal of providing financial aid for systems who were interested in pursuing excellence, but did not have the financial resources to do so. This pilot program was intended to help systems address infrastructure needs while also requiring systems to address operational and administrative function, such as emergency response plans, operations and maintenance trainings, and customer complaint tracking.

Accomplishments

Eight systems completed work under this pilot, spending a total of $155,750.

SYSTEM IMPROVEMENT PILOT - COMPLETED WORK

System	Project	Total	Pop.
Beulah Water Works District	Beulah and neighboring Pine Drive installed an interconnect that can be used to transfer water between systems and improve the resiliency of both systems.	$ 25,000	355
Camp Timberline	After a GWUDI evaluation determined that the system was under the influence of surface water, Camp Timberline drilled a new well and was designated as a groundwater system.	$ 25,000	259
Gardner Water and Sanitation District	The system installed a GIS mapping and asset management software to better help with preventative maintenance.	$ 5,000	400
Pine Drive	Beulah and neighboring Pine Drive installed an interconnect that can be used to transfer water between systems and improve the resiliency of both systems.	$ 19,000	416
Rock Creek Mesa	Rock Creek Mesa studied the most effective way to remove colloid material from their water and then implemented the determined solution.	$ 25,000	225
Telluride Pines HOA	Telluride Pines installed a new filtration system to ensure compliance with turbidity limits during spring runoff.	$ 25,000	25
Town of La Veta	The Town of La Veta installed a PLC monitor to observe and operate the plant remotely.	$ 6,750	850
Town of Olney Springs	Olney Springs installed security measures at their source and updated telemetry and electrical systems at their treatment facility.	$ 25,000	399
	8 systems	**$ 155,750**	**2,929**

COLORADO
Department of Public Health & Environment

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