COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan

Water Project Summary

Name of Applicant	Upper Gunnison River Water Conservancy District
Name of Water Project	Integrated physical and geochemical estimation of agricultural return flows in the East River Basin
Grant Request Amount	**$345,347.00**
Primary Category	$345,347.00
Agricultural Projects	
Total Applicant Match	**$798,175.00**
Applicant Cash Match	$739,163.00
Applicant In-Kind Match	$59,012.00
Total Other Sources of Funding	**$600,000.00**
USGS	$600,000.00
Total Project Cost	**$1,743,522.00**

Applicant & Grantee Information

Name of Grantee: Upper Gunnison River Water Conservancy District
Mailing Address: 210 West Spencer, Suite B Gunnison CO 81230

Organization Contact: Sonja Chavez
Position/Title: General Manager
Email: schavez@ugrwcd.org
Phone: 970-641-6065

Description of Grantee/Applicant

MISSION: To be an active leader in issues affecting the water resources of the Upper Gunnison River Basin.

Type of Eligible Entity

- ☐ Public (Government)
- ■ Public (District)
- ☐ Public (Municipality)
- ☐ Ditch Company
- ☐ Private Incorporated
- ☐ Private Individual, Partnership, or Sole Proprietor
- ☐ Non-governmental Organization
- ☐ Covered Entity
- ☐ Other

Category of Water Project

- ■ Agricultural Projects

Developing communications materials that specifically work with and educate the agricultural community on headwater restoration, identifying the state of the science of this type of work to assist agricultural users among others.

☐ Conservation & Land Use Planning
Activities and projects that implement long-term strategies for conservation, land use, and drought planning.

☐ Engagement & Innovation Activities
Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application on the website.

☐ Watershed Restoration & Recreation
Projects that promote watershed health, environmental health, and recreation.

☐ Water Storage & Supply
Projects that facilitate the development of additional storage, artificial aquifer recharge, and dredging existing reservoirs to restore the reservoirs' full decreed capacity and Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap.

Location of Water Project

Latitude	38.556305
Longitude	-106.928720
Lat Long Flag	Water district centroid: Coordinates based on centroid of water district boundary
Water Source	East River
Basins	Gunnison
Counties	Gunnison
Districts	59-East River Basin

Water Project Overview

Major Water Use Type	Agricultural
Type of Water Project	Study
Scheduled Start Date - Design	6/1/2024
Scheduled Start Date - Construction	12/31/2028

Description

In the Upper Gunnison River Basin, agricultural irrigation using water diverted from creeks and rivers locally recharges groundwater where irrigation water percolates below the root zone. In some areas, the local groundwater system supplies water to streams when groundwater flows back to the creek or river through the subsurface. This dynamic can affect water supply by providing temporary storage of water and extending streamflow outside the snowmelt runoff season. Characterization of groundwater/surface-water exchange in the headwaters of the Upper Gunnison River Basin will improve the understanding of potential effects from future changes in water administration or climate. Currently, the amount of return flow from agricultural irrigation to streamflow is not well quantified in the upper Gunnison River Basin. Changes in climate and water administration have the potential to affect water availability and application for irrigation. Monitoring in the upper Gunnison River Basin could improve understanding of surface-water and groundwater interactions and the contribution of agricultural return flows to streamflow. Understanding these interactions and how they are affected by water-use practices is important for resources managers potentially facing changes to operating guidelines in the Colorado River Basin after 2026.

Measurable Results

New Storage Created (acre-feet)
New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive

Existing Storage Preserved or Enhanced (acre-feet)
New Storage Created (acre-feet)
Length of Stream Restored or Protected (linear feet)
Length of Pipe, Canal Built or Improved (linear feet)
Efficiency Savings (dollars/year)
Efficiency Savings (acre-feet/year)
Area of Restored or Preserved Habitat (acres)
Quantity of Water Shared through Alternative Transfer Mechanisms or water sharing agreement (acre-feet)
Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning
Number of Coloradans Impacted by Engagement Activity

Other

This project will inform not only Coloradan's (6M) about the characteristics of flood irrigation practices in a high elevation snowmelt dominated systems but also all those who depend on the Colorado River system. Our hope is that it will also help guide the development of sound water policy that minimizes impacts to rural agricultural headwater communities.

Water Project Justification

This research and model development project proposal is based on UGRWCD's and the State of Colorado's critical need to develop climate adaptation related decision support tools (Agency Action 4.8) and to understand the interactions between surface water and groundwater, particularly the dynamics of agricultural return flows in high elevation snowmelt dominated systems. A recent study by Carroll, et. al., 2024, emphasized the importance of groundwater as a stable and important source to historical streamflow in mountainous watersheds of the Colorado River Basin, specifically the Upper Gunnison River Basin. While groundwater has the potential to buffer streams from short-term climate extremes, there is a lack of understanding regarding the importance or contribution of flood irrigation practices to groundwater recharge and sustained streamflow outside of the snowmelt dominated period in high elevation mountain systems.

By characterizing groundwater and surface water interactions, the project aims to enhance water management strategies, especially in consideration of potential climate changes and evolving water administration policies (Agency Action 5.9). Agriculture is the largest consumer of water in the Upper Gunnison Basin, and irrigation practices significantly influence both local water supply and ecological health (Section 4: Basin Context, Gunnison Basin PDF Pg. 93). This research will address the lack of understanding regarding the quantification of return flows, which are essential for sustaining streamflow beyond the snowmelt period in the Upper Gunnison Basin (Section 4: Basin Context, Gunnison Basin PDF Pg. 93). Utilizing integrated monitoring and modeling approaches, the project will provide actionable insights that can inform resource managers as they navigate upcoming challenges around water use in the Colorado River Basin.

Colorado Water Plan Justification (Section 4: Basin Context, Gunnison Basin PDF Pg. 96): UGRWCD's proposal addresses basin challenges identified in the CO Water Plan related to "Protecting existing water uses is the unwavering goal and main challenge in the Gunnison Basin. Water users and managers must address how to use the limited water resources to maintain agriculture while providing water for growing municipalities and meeting non consumptive needs like environmental, recreation, and hydropower. Stretching water supplies to meet multiple needs will be made more difficult by climate change. "

Compatible goals of the Gunnison Basin Roundtable related to this project Proposal:
(PDF Pg. 97) Protect existing water uses in the Gunnison Basin: Understanding how agricultural irrigation contributes to groundwater recharge and streamflow extends the ability to protect existing water uses. By

documenting these interactions, the study provides critical data that supports the continued viability of senior and junior water rights, especially during periods of low runoff.
(PDF Pg. 97) Improve agricultural water supplies to reduce shortages: Analyzing the recharge process facilitated by irrigation return flows is essential for optimizing water supplies. By modeling how flood irrigation impacts groundwater levels and streamflow, the project can identify opportunities for for improving efficiency and reliability of water for agricultural use, ultimately enhancing water availability during drier seasons.
(PDF Pg. 97) Identify and address municipal and industrial water shortages: The study's insights into groundwater contributions to streamflow can help manage water allocations among various users, including municipal sectors. By better understanding these interactions, the Upper Gunnison District can develop strategies that ensure sufficient supply for all users. even under changing climate conditions.
(PDF Pg. 97) Quantify and protect environmental and recreational uses: The groundwater-surface water exchange dynamics is believed to play a critical role in maintaining streamflow during non-runoff periods. By quantifying agricultural return flows and their influence on local streams, the study supports the quantification of historical flood irrigation practices and their potential benefits to environmental and recreational water uses and aquatic ecosystems .
(PDF Pg. 97) Maintain or, where necessary, improve water quality throughout the Gunnison Basin: Analyzing these interactions also aids in understanding how climate change or different water administration practices may impact water quality in the Upper Gunnison Basin.
(PDF Pg. 97) Describe and encourage relationships among agricultural and environmental recreational water uses: Engaging local agricultural producers in data collection and modeling activities fosters a collaborative effort. By demonstrating the direct benefits of historical irrigation practices on groundwater and streamflow, water users can better appreciate their role in water management and the interconnection our practices with our ecological systems.
(PDF Pg. 97) Restore, maintain, and modernize critical water infrastructure: The modeling outcomes from the study can inform improvements to flood irrigation practices and infrastructure, promoting the sustainable use of water resources. Understanding the recharge dynamics may lead to the adoption of more effective flood irrigation techniques that maximize water retention.
(PDF Pg. 97) Create and maintain active, relevant, and comprehensive public education, outreach, and stewardship processes involving water resources in the six sectors of the Gunnison Basin: The findings regarding groundwater and surface water interactions will serve as educational tools, helping the community understand the importance of flood irrigation and their impacts on local water resources. This knowledge can encourage stewardship and proactive participation in water management initiatives.

Related Studies

1) USGS Next Generation Water Observing Systems (NGWOS) - NGWOS provides high-fidelity, real-time data on water quantity, quality, and use to support modern prediction and decision-support systems that are necessary for informing water operations on a daily basis and decision-making during water emergencies. The headwaters of the Colorado and Gunnison River Basins provide an opportunity to implement NGWOS in a snowmelt-dominated system in the mountain west.

2) Upper Gunnison Basin Drought Contingency Plan (In Progress - Anticipated Completion Date December 2025)

3) Nature Water: Declining Groundwater Storage Expected to Amplify Mountain Streamflow Reduction in a Warmer World (Carroll 2024)

Taxpayer Bill of Rights

The UGRWCD is not subject to TABOR restrictions.