COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan

Water Project Summary

Name of Applicant	Colorado State University
Name of Water Project	CRB Discovery Farms: Establishing Long-Term Case Study Sites for Water Conservation and Soil Health in the Colorado River Basin
Grant Request Amount	**$387,378.00**
Primary Category	$387,378.00
Agricultural Projects	
Total Applicant Match	**$13,564.00**
Applicant Cash Match	
Applicant In-Kind Match	$13,564.00
Total Other Sources of Funding	**$143,185.00**
Ground Up Consulting	$23,185.00
Colorado Department of Agriculture	$45,000.00
Colorado Department of Agriculture	$10,000.00
Conscience Bay Research	$65,000.00
Total Project Cost	**$544,127.00**

Applicant & Grantee Information

Name of Grantee: Colorado State University
Mailing Address: 2002 Campus Delivery Fort Collins CO 80523

Organization Contact: Alexandra Firth
Position/Title:
Email: lexi.firth@colostate.edu
Phone: (623) 203-4714

Organization Contact - Alternate: Megan Machmuller
Position/Title:
Email: megan.machmuller@colostate.edu
Phone: 4025789503

Grant Management Contact: Alexandra Firth
Position/Title:
Email: lexi.firth@colostate.edu
Phone: (623) 203-4714

Grant Management Contact - Alternate: Catherine Douras
Position/Title: Senior Research Administrator
Email: catherine.douras@colostate.edu
Phone: 9704912375

Description of Grantee/Applicant

No description provided

Type of Eligible Entity

- [x] 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

- [x] 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	39.042231
Longitude	-108.466594
Lat Long Flag	Default/Proponent headquarters: If the location cannot be defined with flags above, use location of project proponent headquarters
Water Source	Colorado River
Basins	Colorado; Southwest; Gunnison
Counties	
Districts	

Water Project Overview

Major Water Use Type	Agricultural
Type of Water Project	Study
Scheduled Start Date - Design	11/29/2024
Scheduled Start Date - Construction	

Description

Irrigated agriculture consumes 52% of water in the Colorado River Basin (CRB) (Richter et al., 2024). Remote sensing shows that CRB cropland has the highest evapotranspiration (ET) values among land cover classes,

indicating significant water loss (Singh et al., 2013). Soil health practices alter the biological, chemical, and physical properties of soil that can affect water provisioning and soil moisture usage (Bruemann et al. 2018). While anecdotal evidence abounds, little data exists regarding the direct link between soil health and water conservation and thus its potential to contribute to water security in the CRB (Smith et al., n.d.). This proposal seeks funding to establish three "Discovery Farms" in the CRB to study the impact of soil health practices on soil/water dynamics, including ET and irrigation. These on-farm case studies will collect rigorous data on soil/water dynamics while engaging producers to co-create educational demonstration sites providing region-specific insights. The Discovery Farms will complement three (3) existing CRB research sites founded in collaboration with the Colorado Department of Agriculture (CDA) Colorado Soil Health Program (CoSHp) and the Colorado Open Soil Moisture Monitoring and Infrastructure Project (OSMMIP; IN-RICHES, 2024) to enhance scientific rigor and scale of impact.

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

No additional measurable results provided

Water Project Justification

Colorado Water Plan (CWP) Goals: The CWP recognizes that improving soil health is a critical element to fulfilling its vision of “Robust Agriculture” and “Sustainable Profitable Production” (CWP, p. 1092). Specifically, the CWP acknowledges that healthy soil can increase agricultural resilience in a variety of ways, including through water use efficiency (WUE) and increasing on-farm income (CWP, pp. 192- 194).

By quantifying the impacts of soil health practices on land health, agronomic outcomes, and WUE, this proposal will support the adoption of conservation practices. Currently, anecdotal evidence as to the role of soil health in WUE and water conservation abounds, but robust data is lacking, particularly in the Upper Colorado River Basin (Smith et al., n.d.). This project will fill those gaps.

The CWP also calls for encouraging wise water use through new technologies and increasing land health (CWP, p. 176). This proposal directly supports those goals by: 1) incorporating and educating participating producers on cutting edge technology to improve WUE, including soil moisture sensors, unmanned aerial vehicles, and remote sensing and 2) quantifying and demonstrating the impacts that soil health practice have on a variety of land health metrics, including carbon levels, yields, vulnerability to wind and water erosion, soil biodiversity, and nutrient cycling.

Further, our proposal directly aligns with Agency Action 2.10: 1) Assessing water use and economic opportunities

that accompany emerging soil and water conservation strategies and 2) The Colorado Soil Health Program (CoSHp) (aka, the Colorado Star Plus Program) (CWP, P. 138). IN-RICHES is a key partner in the Colorado STAR Plus program, providing scientific expertise to producers, coordinating research fields, and coalescing all emerging data from the program into a soil health inventory. All data collection and analytical efforts in this proposal will be consistent with the CoSHp and will advance those efforts by incorporating more detailed analytical techniques to assess the hydrological impacts of soil health practices.

Finally, our proposal supports the goals of Thriving Watersheds (CWP, p. 204) and Resilient Planning (CWP, p. 216). Our project will integrate these findings into the IN-RICHES State of Colorado Soils Inventory and the Open Soil Moisture Infrastructure and Monitoring Project (IN-RICHES, 2024), which will expand the data on soil moisture and water flow relevant to agricultural regions . Region-specific challenges will be addressed through our community field days and creating peer-to-peer learning opportunities, fostering a deeper understanding of the soil-water nexus, and promoting practices that benefit watershed health.

Basin Implementation Plans and Education Plans. Our proposal has the potential to touch 3 different water basins: 1) the Colorado Basin; 2) the Gunnison Basin; and 3) the Southwestern Basin. Each of the Basin Implementation Plans (IP(s)) has a goal of supporting agricultural resiliency and maintaining agricultural production through water use efficiency and other conservation measures:

Colorado Basin Implementation Plan (CBIP, p. 13): “Sustain agriculture” and “Encourage a high level of basin wide conservation”
Southwestern Basin Implementation Plan (SWBIP, p. 21): “Support the needs of agriculture” and “Promote health watersheds”
Gunnison Basin Implementation Plan (GBIP, p. 15): “Improve agricultural water supplies to reduce shortages”

Our proposal supports these goals by:
(1) Reducing the potential for agricultural water shortages by understanding the link between irrigation demand, WUE, and soil health practices (CBIP, p. 17; GBIP, p. 15);
(2) Examining the soil and land health impacts of conservation practices (CBIP, p. 17); and
(3) Holding community field days and distributing outreach materials to raise awareness about the impacts of conservation practices on WUE, irrigation demand, and land health (CBIP, p. 20; GBIP, 15)

References

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Related Studies

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Taxpayer Bill of Rights

n/a