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	Colorado Open Soil Moisture Project	
Grant Request Amount		**$511,237.00**
Primary Category		$511,237.00
Agricultural Projects		
Total Applicant Match		**$142,334.00**
Applicant Cash Match		$16,727.00
Applicant In-Kind Match		$125,607.00
Total Other Sources of Funding		**$79,720.00**
Colorado River District		$49,999.00
Conscience Bay Research LLC		$17,303.00
Community Collaborative Rain, Hail, and Snow Network		$12,418.00
Total Project Cost		**$733,291.00**

Applicant & Grantee Information

Name of Grantee: Colorado State University
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Description of Grantee/Applicant

No description provided

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

- [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	40.572900
Longitude	105.084800
Lat Long Flag	Default/Proponent headquarters: If the location cannot be defined with flags above, use location of project proponent headquarters
Water Source	
Basins	Yampa/White/Green; Arkansas; South Platte; North Platte; Colorado; Gunnison; Rio Grande; Metro; S...
Counties	
Districts	

Water Project Overview

Major Water Use Type	Agricultural
Type of Water Project	Study
Scheduled Start Date - Design	11/1/2025
Scheduled Start Date - Construction	

Description

This project will strengthen Colorado’s ability to understand and respond to drought by building on the foundation of a previous Congressional Directed Spending (CDS) investment, while introducing distinct new capabilities in data visualization, monitoring infrastructure, citizen science, and evaluation. Led by IN-RICHES in collaboration with the Colorado Climate Center and the Colorado State University (CSU) Computer Science Department, the

project engages over 70 collaborators.

Despite being critical to environmental risk and monitoring, major gaps remain in soil moisture infrastructure—particularly across agricultural and rangeland regions. This project addresses those gaps and integrates all data into a single, user-friendly platform to improve decision-making for producers, land managers, and policymakers.

The project includes four main tasks:
Quench Platform Enhancements – Add satellite data, analytics, and drought overlays.

Infrastructure Expansion – Install 15 new soil moisture stations in critical areas.

Citizen Science Engagement – Strengthen contributions to the U.S. Drought Monitor through the Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS).

Process Evaluation – Assess impact and relevance using social science methods.

A fifth task consists of overall project management and continued stakeholder engagement, including a virtual meeting in Fall of 2027 to provide updates under this proposal.

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

Task 1
1. A fully functional web-based Quench application requiring no specialized software
2. Cross-device compatibility, enabling access via laptops, desktops, tablets, and larger phone-tablet hybrids
3. Browser-based interface to ensure ease of access and reduce user friction
4. Flexible, location-independent engagement with soil moisture data and tools across user types and settings

Task 2
1. Installation of a weather station and soil moisture sensors at 15 sites.
2. Incorporation of these sites into the Quench Platform.
3. A short document with easy to follow instructions to access soil moisture data.
4. Individualized reports for each station that helps landowners and interested parties interpret the soil moisture data.

Task 3
1. Four US Drought Monitor information listening sessions across Colorado: two on the eastern plains, and two in the Colorado River District 15 County area.
2. CoCoRaHS trainings with CSU extension field offices in every major river basin across Colorado (North Platte, South Platte, Arkansas, Rio Grande, San Juan Combined, Gunnison, Colorado, Yampa).
3. Upgraded Condition Monitor mapping system
4. CoCoRaHS precipitation mapping options that consider precipitation accumulation with respect to NOAA or PRISM normals (potential products: departure from normal precipitation, percent of normal precipitation, precipitation percentile)

Task 4
1. Comprehensive evaluation report summarizing major findings from all qualitative and quantitative analyses
2. Synthesis of interview, survey, and observation data into actionable insights
3. Report distribution to project team members and relevant stakeholders to inform ongoing and future efforts

Task 5
1. Regular internal coordination meetings (quarterly or more frequently as needed)
2. Biannual progress reports to CWCB
3. A final project report summarizing all activities and deliverables across tasks
4. One virtual stakeholder meeting in Fall 2027
5. Quarterly stakeholder update emails over the project period
6. Ongoing expansion and refinement of the stakeholder contact list
7. Stakeholder participation summary included in the final project report

Water Project Justification

The Colorado Water Plan identifies aridification and declining soil moisture as foundational threats to Colorado's water resilience. This project addresses those risks directly by expanding sensor infrastructure in under-monitored regions (Task 2) and deploying Quench (Task 1), a browser-based platform that integrates remote sensing (e.g., NASA SMAP), in-situ data, and user input to support local, regional, and statewide water decision-making (Agency Actions 1.6 [CWP, p. 187] and 1.8 [CWP, p. 189]). These tools are especially critical in the context of increasing drought severity and seasonal water stress across working lands (see CWP, pp. 37–39).

Open SMM contributes to the Water Plan's Robust Agriculture goals by helping producers understand real-time soil water availability and compare it to site-specific thresholds like field capacity and wilting point. This is made possible through paired soil sampling and moisture sensor data (Task 2.a.4), accompanied by customized reports for each site (Task 2.a.5). These insights directly support irrigation decision-making, drought planning, and evaluation of soil health practices.

This project supports and expands upon a key Partner Action under the Robust Agriculture vision of the Colorado Water Plan: the Colorado Department of Agriculture's Soil Health Program (CoSHP). Through IN-RICHES at CSU, this team has served as the scientific backbone of CoSHP, developing the statewide soil health inventory, co-leading STAR Plus technical support, and working directly with producers to quantify the impacts of soil health on water conservation. The Open SMM project deepens this work by building out the physical infrastructure for soil moisture monitoring and providing a real-time data platform that complements long-term conservation tracking (Task 1: Quench Platform Enhancements and Task 2: Infrastructure Expansion).

In addition, the installation of sensors in forested and rangeland ecosystems advances the Water Plan's vision for

Thriving Watersheds (CWP, p. 204 et seq.), offering key data on forest soil moisture that informs snowpack modeling, streamflow forecasting, and wildfire readiness. Through Quench, users will be able to visualize and compare conditions across watersheds and time scales (Task 1.b and 1.c), fostering a better understanding of hydrologic changes and enabling proactive management.

The project also reinforces the Water Plan's emphasis on Resilient Planning by enhancing community-driven contributions to drought monitoring through citizen science and CoCoRaHS (Task 3). This directly supports Agency Action 1.8 [CWP, p. 189], which calls for improving the state's drought preparedness by expanding data collection, integrating local knowledge, and increasing stakeholder participation in monitoring systems. CoCoRaHS's condition monitoring reports—combined with new sensor data—will help ground-truth drought designations and improve the accuracy of U.S. Drought Monitor inputs across Colorado. This approach reflects the Plan's commitment to inclusive, place-based engagement (CWP, pp. 6–7, 216), and strengthens the connection between public observation and institutional decision-making.

A built-in process evaluation (Task 4) will gather feedback and track uptake among stakeholders to refine tools in ways that reflect local knowledge and needs, ensuring that Quench and the broader Open SMM system are usable, relevant, and accessible.

As water managers look to integrated approaches in the face of growing scarcity, these tools provide the foundational data needed to align soil health, water conservation, and long-term aquifer sustainability. Collectively, these components are well aligned with the goals, agency actions, and partner strategies outlined in the Colorado Water Plan, and they represent an integrated, cross-sector approach to building a more water-resilient future for Colorado.

Related Studies

No Related Studies provided

Taxpayer Bill of Rights

No Tax Bill of Rights provided