



Colorado Water Conservation Board

Water Plan

Water Project Summary

Name of Applicant	Pacific Institute for Studies in Development, Environment & Security
Name of Water Project	Diversifying Colorado's Water Portfolio: The Potential for Stormwater Capture and Use to Contribute to a Water Resilient Future
Grant Request Amount	\$209,744.75
Primary Category	\$209,744.75
<i>Conservation & Land Use Planning</i>	
Total Applicant Match	\$89,890.60
<i>Applicant Cash Match</i>	
	\$44,945.30
<i>Applicant In-Kind Match</i>	
	\$44,945.30
Total Other Sources of Funding	\$35,000.00
<i>Gates Family Foundation</i>	
	\$15,000.00
<i>The Water Research Foundation</i>	
	\$10,000.00
<i>Adolph Coors Foundation</i>	
	\$10,000.00
Total Project Cost	\$334,635.35

Applicant & Grantee Information

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Description of Grantee/Applicant

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	39.765381
Longitude	-105.029221
Lat Long Flag	Default/Proponent headquarters: If the location cannot be defined with flags above, use location of project proponent headquarters
Water Source	This project aims to quantify and monetize the potential for urban stormwater capture and use (SCU) as a means of understanding if urban SCU can significantly diversify Colorado's water portfolio and minimize the supply demand gap.
Basins	Arkansas; Colorado; Gunnison; Metro; Yampa/White/Green; Rio Grande; South Platte; Southwest; Nort...
Counties	
Districts	

Water Project Overview

Major Water Use Type	Municipal
Type of Water Project	Planning (e.g. watershed)

Scheduled Start Date - Design

12/1/2022

Scheduled Start Date - Construction

Description

Urban stormwater capture and use (SCU) in Colorado is an opportunity to develop and scale untapped water supplies, for the purpose of diversifying its water portfolio. It is a key strategy to help communities adapt to more variable precipitation patterns, as is expected to occur with climate change. This innovative project will provide a volumetric and economic assessment of the potential of urban SCU in Colorado, as defined within existing water law.

Key objectives include:

1. Quantifying the volumetric potential of urban SCU in Colorado.
2. Highlighting examples where urban SCU has been employed in Colorado and delineate the associated multi-benefits.
3. Identifying and monetizing the multiple benefits associated with urban SCU.
4. Engaging with and learning from an Expert Review Panel comprised of practitioners representing these fields: academia, agriculture, Colorado water law, utilities, research and water quality scientists, and water supply planners.
5. Presenting project findings and collaborating with the panel to socialize the idea of urban SCU within Colorado.

This analysis will reflect the potential in each of Colorado's eight river basins and the Denver metropolitan area.

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)

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)

4,900,000 Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning

Number of Coloradans Impacted by Engagement Activity

Other

Diversifying Colorado's Water Portfolio: The Potential for Stormwater Capture and Use to Contribute to a Water Resilient Future is an innovate project whose aim is to provide outcomes for the following areas: Coloradans Impacted by Water Saving, New Supply developed, Efficiency Savings (%/Year), and Efficiency Saving (AF/Year). These metrics are key deliverables and embedded within the project's objectives. The project team looks forward to providing measured and monetized outcomes so that water and land use planners in Colorado will be informed about the untapped potential of urban stormwater capture and use.

Water Project Justification

In March 2022, the US EPA published the report, Pure Potential: The Case for Stormwater Capture and Use (SCU), which contained a clear call to advance the strategy of stormwater capture and use (SCU). They stated, "SCU, whether at an onsite, community, or watershed scale, offers an adaptive, multi-benefit approach to stormwater management that can create long-term, positive outcomes and contribute to the development of sustainable and climate-resilient communities (US EPA, 2022)."

Subsequently, in April 2022, at a SCU convening hosted by ReNUWIt (Re-Inventing the Nation's Urban Water Infrastructure, a program of the National Science Foundation), the Water Research Foundation, and the Colorado School of Mines in Denver, Colorado, attendees identified a lack of information on the following aspects of SCU as a key barrier to scaled adoption in Colorado:

1. Baseline knowledge of the average volume of stormwater available to capture and use and the extent to which this strategy could be scaled across river basins.
2. Water rights and other conditions that affect the viability of SCU as a strategy for augmenting municipal water supplies.
3. The economic benefits of SCU, when employed as a scaled strategy.

Following the EPA's publication and the findings of the SCU Colorado convening, the proposed project, *Diversifying Colorado's Water Portfolio: The Potential for Urban Stormwater Capture and Use to Contribute to a Water Resilient Future*, was born. The five main objectives of this project include:

1. Quantify the untapped potential of urban SCU in Colorado, as allowed, and defined within existing water law. This analysis will be refined to reflect the potential in each of Colorado's eight river basins and the Denver metropolitan area.
2. Highlight existing examples where urban SCU have been employed successfully in the state and underscore the multiple benefits gained through this strategy.
3. Identify and monetize the overarching, multiple benefits associated with SCU.
4. Engage with and learn from an Expert Review Panel comprised of practitioners representing the following fields: academia, agriculture, Colorado water law, economics, public office, utilities, research and water quality scientists, and water supply planners.
5. With guidance from the Expert Review Panel, ensure we are reaching target audiences, to present the findings of this project and collaborate with the panel to socialize the idea of urban SCU within Colorado.

This innovative project will clarify and provide a baseline understanding of the untapped potential of urban SCU in Colorado. Measuring and monetizing the potential for urban SCU in Colorado meets four overarching measurable objectives of the Colorado Water Plan (CWP) (Colorado Water Conservation Board, Department of Natural Resources, 2015):

By 2025, 75% of Coloradans will live in communities that have incorporated water-saving actions into land-use planning (Land Use measurable objective)

By 2050, achieving 400,000 acre-feet of municipal and industrial water conservation. (Conservation measurable objective)

By 2030, reducing the projected 2050 municipal and industrial gap from as much as 560,000 acre-feet to zero acre-feet (Supply-Demand Gap measurable objective)

Improving the level of public awareness and engagement regarding water issues statewide (Education, Outreach, and Innovation measurable objective)

Additionally, this project is likely to positively promote the following strategies outlined by the Statewide Education Action Plan (SWEAP) (Water Education Colorado, 2020):

Outcome 1: The proportion of Coloradans in each basin who can identify how water supports their quality of life, as well as the threats to and potential solutions for a sustainable water supply, increases.

Outcome 3: The proportion of Coloradans in each river basin who report confidence in having the knowledge necessary to take an active role in water stewardship in their community increases.

Outcome 5: Increased participation in community discourse and decision processes about water at the state, regional, and local levels.

Outcome 6: Voters have access to factual information that addresses potential impacts to sustainable water resources in relevant issue areas.

Outcome 7: Increased proportion of Coloradans in each river basin that are demonstrating sustainable water

behaviors.

Outcome 8: Where relevant, local and state policies and practices are supportive of advancing statewide water literacy.

Outcome 9: Where relevant, local and state policies, regulations, and practices demonstrate a consideration of impacts on sustainable water resources.

Should this project determine that urban SCU is a strategy that offers compelling benefits and can be scaled under existing law, a framework for water professionals will be provided that outlines the volumetric potential by basin and for the Denver metro area, the legal context and constraints, identification of potential co-benefits from existing SCU projects in the state, and monetary benefits of employing urban SCU at scale in one or two basins. Notably, these outcomes will impact each of the Basin Roundtables and inform how they are able to meet their identified needs and gaps. Specifically, the selected roundtable priorities and goals below directly align with the aims and objectives of the project, Diversifying Colorado's Water Portfolio: The Potential for Urban Stormwater Capture and Use to Contribute to a Water Resilient Future. It is important to note that there is variation in the certainty in the degree to which urban SCU will impact these goals, however, the project itself will directly quantify and articulate the degree to which many of these priorities and goals could be impacted by urban SCU.

Arkansas Basin Roundtable

The proposed project complements goals across several priority areas:

Municipal & Industrial Goals:

Meet the Projected Municipal Supply Gap in each subregion within the Basin.

Support regional efforts for cost-effective solutions to local water supply gaps.

Reduce groundwater dependence on unsustainable aquifers for municipal users.

Develop collaborative solutions between municipal, agricultural, and E&R users of water, particularly in drought conditions.

Agricultural Goals:

Support projects within and outside the Basin that will help meet the Arkansas Basin Agriculture water supply gap, maintain existing supplies, better manage vulnerable supplies, and maximize utilization of water users' entitlements.

Sustain recreation and environmental activities that depend on habitat and open space associated with farm and ranch land.

Environment & Recreation Goals:

Support projects and programs within and outside the Basin that protect Arkansas Basin E&R water supply needs and collaborate with municipal and ag users to enhance E&R values.

Maintain or improve native fish populations, restore habitat for fish species, and maintain or improve recreational fishing opportunities.

Maintain or improve aquatic, riparian, and avian habitat (including wetlands) that would support environmental features and recreational opportunities

Watershed Health Goals:

Maintain, improve, or restore critical water supply watersheds that could affect Arkansas Basin water uses and environmental and recreational values.

Improve water quality as it relates to the environment and/or recreation.

(Arkansas Basin Roundtable, 2021)

Colorado River Basin Roundtable

Overarching Goals: Address shortages in the headwaters area & Ensure adequate water supply for future needs (municipal and Industrial, including energy development)

Municipal & Industrial Goals: Encourage a high level of basinwide conservation & Develop local water conscious land use strategies

Environment & Recreation Goals: Protect and restore streams, rivers, lakes and riparian areas & A thriving basin economy

Watershed Health Goals: Improving water quality
(Colorado Basin Implementation Plan, 2022)

North Platte Basin Roundtable

Of the eight stated basin goals, this project complements the following five:

Maintain and maximize the consumptive use of water permitted in the Equitable Apportionment Decree and the baseline depletion allowance in Colorado's Plan for Future Depletions

Increase economic development and diversification through strategic water use and development

Continue to restore, maintain, and modernize critical water infrastructure to preserve current uses and increase efficiencies

Maintain healthy rivers and wetlands through the strategic implementation of projects that meet prioritized environmental and recreational needs

Support the continued development of local municipal infrastructure and water supplies

(North Platte Basin Roundtable, 2022)

Rio Grande Basin Roundtable

This project complements four of the five stated goals:

Healthy watersheds that provide critical ecosystem services, resiliency, improve water quality, and enhance local wildlife habitats

Aquifers with sustainable supplies of groundwater

Vibrant and resilient agriculture, recreation, municipal, and industrial economies

Adaptive, flexible, and creative water administration

(Rio Grande Basin Roundtable, 2022)

South Platte Basin & Metro Roundtables

This project complements seven of the 12 stated goals:

Maximize development of native South Platte supplies

Maintain and promote municipal and industrial conservation and efficiency

Maintain and promote reuse

Protect and enhance watershed function

Protect and enhance environmental attributes

Protect and enhance recreational attributes

Support collaborative development and management of supply options outside of the South Platte Basin

(South Platte Basin Implementation Plans, 2022)

Southwest Basin Roundtable

This project complements five of the seven stated goals:

Balance all needs and reduce conflict

Meet municipal and industrial water needs

Meet recreational water needs

Meet environmental water needs

Promote healthy watersheds

(Southwest Basin Roundtable, 2022)

Yampa/White Basin Roundtable

This project complements three of the eight stated goals:

Identify and address M&I water shortages

Quantify and protect environmental and recreational water uses

Maintain and consider the existing natural range of water quality that is necessary for current and anticipated water uses

(Yampa/White Basin Implementation Plan, 2022)

Finally, the CWP Conservation & Land Use Project Grants put forth the criteria and considerations outlined below. Diversifying Colorado's Water Portfolio: The Potential for Urban Stormwater Capture and Use to Contribute to a Water Resilient Future provides the means with which to address each of these considerations. Through measuring the volumetric potential of urban SCU, it is possible to understand if this strategy is significant enough to scale; by understanding the monetary benefits and identifying co-benefits, water professionals and planners can better understand if this strategy may be beneficial for their community. Finally, by couching this research and analysis within existing Colorado water law, a framework will be provided that may support the scaling of urban SCU, which will contribute to the diminishing of the M&I supply-demand gap as well as promoting inherent co-benefits such as improved water quality, environmental restoration, and flood mitigation.

This project meets and/or exceeds the intent behind the vast majority of these prompting questions. Through this project, there is the opportunity to:

Reduce overall future water needs through cost-effective water efficiency measures;

Implement actions identified in locally adopted water conservation, efficiency or drought management plans;

Integrate water efficiency planning and projects into overall water resource management;

Promote a water efficiency ethic throughout Colorado;

Explore additional water reuse options;

Integrate land use and water planning;

Advance drought mitigation planning efforts; and

Reduce impacts and prepare for the impacts of climate change.

Works Cited

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Related Studies

Diversifying Colorado's Water Portfolio: The Potential for Urban Stormwater Capture and Use to Contribute to a Water Resilient Future builds on projects approved by the Colorado Water Conservation Board. Examples include Colorado Growing Water Smart, the Denver One Water Plan, and Colorado WaterWise's Guidebook update.

Specific to Colorado Growing Water Smart, this project will assess the scalability of urban SCU, a water conservation and efficiency strategy. This study will provide a framework to understand the volumetric potential of SCU and opportunities for scaling within the existing Colorado water law. This assessment will provide insight and clarity around the scenarios in which urban SCU is a promising strategy for the community in which it will be located. Thus, this study has the potential to put another tool in the toolbox for local jurisdictions to plan and implement long-term strategies for the integration of land use and water planning.

Specific to the Denver One Water Plan, this project offers insight into the decision about whether to develop and incorporate urban SCU into their existing water resource portfolio. This assessment has the unique opportunity to directly inform the One Water Plan which serves as a unique and innovative approach to establishing policies around how the City manages its watersheds in a holistic manner.

Additionally, this project will directly inform Colorado WaterWise's recently funded project, Update to the 2010

Guidebook of Best Practices for Municipal Water Conservation in Colorado. Outcomes from this project directly apply to this update, and if approved, our team will engage Colorado WaterWise and share progress and results with them so that their final product reflects current studies and practices in urban SCU in Colorado.

This proposed project is built upon a foundation that reflects credibility, expertise, and practical experience with urban SCU. Below is a list of titles of those related studies. Due to a character constraint, we are only able to provide a sampling of the study titles here; a complementary document listing a complete bibliography is included in the Additional Attachments.

Benefit Accounting of Nature-Based Solutions for Watersheds: Guide.

International Stormwater BMP Database: 2020 Summary Statistics.

Economic Framework and Tools for Quantifying and Monetizing the Triple Bottom Line Benefits of Green Stormwater Infrastructure.

The Untapped Potential of California's Urban Water Supply: Water Efficiency, Water Reuse, and Stormwater Capture.

Incorporating Multiple Benefits into Water Projects: A Guide for Water Managers.

Economic Evaluation of Stormwater Capture and Its Multiple Benefits in California.

National Western Complex Rainwater Harvesting Demonstration & Stormwater Management Innovation.

Stormwater Capture in California: Innovative Policies and Funding Opportunities.

Pure Potential: The Case for Stormwater Capture and Use.

Taxpayer Bill of Rights

N/A