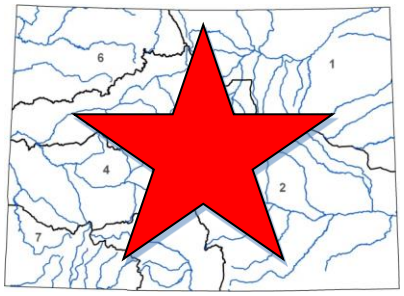
COLORADO
Colorado Water Conservation Board

Tackling Wicked Problems in Water + Climate
10.10.10/Colorado Nonprofit Development Center
July 2020 Board Meeting

Water Plan Grant Application



LOCATION	
County/Counties:	All
Drainage Basin:	Statewide

DETAILS	
Total Project Cost:	$600,892
Water Plan Grant Request:	$82,790
Recommended Amount:	$0
Other CWCB Funding:	$72,000 Secured $44,952 Pending
Other Funding Amount:	$0
Applicant Match:	$401,150
Project Type(s): Study & Other	
Project Category(Categories): Engagement & Innovation	
Measurable Result: 300-2,000 Coloradoans Impacted by Engagement Activity	

**The applicant received partial Water Plan funding for this project at the November 2019 Board meeting and has submitted this amended application per the direction of the Board.*

10.10.10 is a project of the Colorado Nonprofit Development Center (CNDC), a non-profit organization, which "*develops and delivers unique programs presenting wicked problems to the public, volunteers, and successful serial entrepreneurs*". 10 recruited, diverse, experienced entrepreneurs spend 10 days learning about 10 wicked problems in a specific sector. The wicked problems 10.10.10 targets are "*systemic problems requiring attention and solution, though not adequately addressed by government, large organizations or institutions*". The recruited entrepreneurs, "validators" (subject matter experts) and "ninjas" (temporary team members) focus on wicked problems through a developed and enhanced collaborative innovation ecosystem tackling wicked problems without the barriers of organizational silos.

The applicant is seeking to "tackle" wicked problems with Water and Climate over the next three years and will utilize the XGenesis/10.10.10 process (explained below) to the problems selected with CWCB, Basin Roundtable, Water Foundry (international water advisors), corporate and foundation sponsors and subject matter experts, know to the process as *validators*. Recruited prospective CEOs will focus on wicked problems in water, climate; expanding the scale of Colorado stewardship activity including water efficiency, water quality, support for long-term, sustainable balance between future urban, agricultural, recreational and environmental needs in rivers and water supply.

The applicant received $72,000 Water Plan grant in November 2019 and will apply for additional grant funding through the Metro Basin Roundtable Basin Account to fund the first four steps in the xGenesis/10.10.10 process. The applicant seeks to fund the steps below through their amended application:

- Step 5 - convening the "Big Reveal" and Finale programs with 300-500 attendees hearing problem advocates pitch wicked problems in water, climate and the integration of the two.
- Step 6 - enhancing the "*Colorado innovation ecosystem*" by entrepreneurs selecting targeting problems to help solve and potentially create new businesses and job opportunities in the process.

Funding Recommendation: Staff is not recommending approval of a grant in the amount of $82,790 from the Engagement and Innovation category of funding because the projects measurable results compared to other proposals this round were difficult to quantify, therefore the project did not score well.

PARTNERSHIP PROPOSAL FOR 10.10.10 WATER + CLIMATE SERIES
2020 Supplemental Proposal

Colorado Water Conservation Board

Water Plan Grant Application

Instructions

To receive funding for a Water Plan Grant, applicant must demonstrate how the project, activity, or process (collectively referred to as "project") funded by the CWCB will help meet the measurable objectives and critical actions in the Water Plan. Grant guidelines are available on the CWCB website.

If you have questions, please contact CWCB at (303) 866-3441 or email the following staff to assist you with applications in the following areas:

Water Storage Projects	Anna.Mauss@state.co.us
Conservation, Land Use Planning	Kevin.Reidy@state.co.us
Engagement & Innovation Activities	Ben.Wade@state.co.us
Agricultural Projects	Alexander.Funk@state.co.us
Environmental & Recreation Projects	Chris.Sturm@state.co.us

FINAL SUBMISSION: Submit all application materials in one email to *waterplan.grants@state.co.us* in the original file formats [Application (word); Statement of Work (word); Budget/Schedule (excel)]. Please do not combine documents. In the subject line, please include the funding category and name of the project.

Water Project Summary	
Name of Applicant	10.10.10, a project of Colorado Nonprofit Development Center
Name of Water Project	Tackling Wicked Problems in Water + Climate
CWP Grant Request Amount	$72,000 Approved $82,790 Supplemental Request $154, 790 Total CWCB Request
Other Funding Sources	$401,150 Matching funds from X Genesis Holdings LLC (X Genesis) & Corporate sponsors
Other Funding Sources	$44,952 Metro Roundtable Water Supply Reserve Funds WSRF (Approved)
Other Funding Sources	$ In-Kind matching: **10 entrepreneurs** X10 days X $800 ($100X 8 hrs./day) =$80,000 40 **Temporary team members** X 12days X$800=$384,000 **20 SMEs** X5 days X $400= $40,000=$504,000 in-kind volunteer matching
Applicant Funding Contribution	$401,150
Total Project Cost	$ 600,892

Applicant & Grantee Information
Name of Grantee(s) 10.10.10, a project of the Colorado Nonprofit Development Center
Mailing Address 789 N. Sherman St. Suite 250, Denver, CO 80203
FEIN 84-1493585
Organization Contact Melinda Higgs
Position/Title President and CEO

Email mhiggs@cndc.org
Phone 720-855-0501 ext. 224
Grant Management Contact: Jeffrey Nathanson 303.870.4975
Position/Title President, 10.10.10
Email jeffrey@101010.net
Phone 303.870.4975
Name of Applicant (if different than grantee)
Mailing Address
Position/Title
Email
Phone

Description of Grantee/Applicant
Provide a brief description of the grantee's organization (100 words or less).
10.10.10 tackles wicked problems by inspiring entrepreneurs. Our public education and engagement processes focus talent and resources on these vexing problems, which are systemic, require attention, and are not adequately addressed by government or large institutions. Systems maps, problem briefs (Appendix A&B) and proprietary design thinking processes facilitate this effort. 10 diverse, experienced entrepreneurs are recruited from around the country to spend 10 days learning about 10 wicked problems in specific sectors such as water and climate. Experienced entrepreneurs, subject matter experts, and temporary team members attack wicked problems through a collaborative innovation ecosystem without the barriers of organizational silos.

Type of Eligible Entity (check one)	
	Public (Government): Municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.

	Public (Districts): Authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises.
	Private Incorporated: Mutual ditch companies, homeowners associations, corporations.
	Private Individuals, Partnerships, and Sole Proprietors: Private parties may be eligible for funding.
X	**Non-governmental organizations (NGO):** Organization that is not part of the government and is non-profit in nature.
	Covered Entity: As defined in Section 37-60-126 Colorado Revised Statutes.

Type of Water Project (check all that apply)	
X	Study
	Construction
	Identified Projects and Processes (IPP)
X	Other

Category of Water Project (check the primary category that applies and include relevant tasks)	
	Water Storage - 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.. *Applicable Exhibit A Task(s):*
	Conservation and Land Use Planning - Activities and projects that implement long-term strategies for conservation, land use, and drought planning. *Applicable Exhibit A Task(s):*
X	Engagement & Innovation - Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application on the website. *Applicable Exhibit A Task(s):*

	Agricultural - Projects that provide technical assistance and improve agricultural efficiency. *Applicable Exhibit A Task(s):*	
	Environmental & Recreation - Projects that promote watershed health, environmental health, and recreation. *Applicable Exhibit A Task(s):*	
	Other	Explain:

Location of Water Project

Please provide the general county and coordinates of the proposed project below in **decimal degrees**.
The Applicant shall also provide, in Exhibit C, a site map if applicable.

County/Counties	Denver Metro/Colorado statewide
Latitude	39.7392 N
Longitude	104.9903 W

Water Project Overview

Please provide a summary of the proposed water project (200 words or less). Include a description of the project and what the CWP Grant funding will be used for specifically (e.g., studies, permitting process, construction). Provide a description of the water supply source to be utilized or the water body affected by the project, where applicable. Include details such as acres under irrigation, types of crops irrigated, number of residential and commercial taps, length of ditch improvements, length of pipe installed, and area of habitat improvements, where applicable. If this project addresses multiple purposes or spans multiple basins, please explain.
The Applicant shall also provide, in Exhibit A, a detailed Statement of Work, Budget, Other Funding Sources/Amounts and Schedule.

Funding will be used to develop specific educational materials on wicked problems in water and climate, and to conduct an innovation catalyst program for experienced entrepreneurs.

Educational materials include two tools; (1) wicked problem briefs (Appendix A) and (2) systems maps (Appendix B). Funding will facilitate the work of subject matter experts through our proprietary processes to extract content for these tools. Through multiple years of testing, we have found these to be most valuable in catalyzing innovation because they (a) relate to the exact learning needs of entrepreneurs, and (b) take extremely complex ideas and break them down into simple visuals which are useful in a variety of situations.

With CWCB and Basin Roundtable input, we will select 10 wicked problems on water + climate, including those addressing efficiency, quality, reuse, and support for sustainable balance between future urban, agricultural, recreational, and environmental needs in rivers and water supply. Over a 10-day program, we will then challenge 10 experienced entrepreneurs to begin developing market-based solutions for these vexing problems. Using 10.10.10's proprietary "opportunity generation," systems thinking, and mapping methodologies, program participants will identify potential points of influence and opportunity that facilitate the launch of new ventures targeting wicked problems.

Measurable Results

To catalog measurable results achieved with the CWP Grant funds, please provide any of the following values as applicable:

	New Storage Created (acre-feet)	
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Non-consumptive	
	Existing Storage Preserved or Enhanced (acre-feet)	
	Length of Stream Restored or Protected (linear feet)	
	Efficiency Savings (indicate acre-feet/year OR dollars/year)	
	Area of Restored or Preserved Habitat (acres)	
	Quantity of Water Shared through Alternative Transfer Mechanisms	
	Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning	
300-2000	Number of Coloradans Impacted by Engagement Activity To be modified	
	Other	Explain:

Water Project Justification

Provide a description of how this water project supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the applicable Roundtable Basin Implementation Plan and Education Action Plan. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers).

The proposed water project shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan Framework for State of Colorado Support for a Water Project (CWP, Section 9.4, pp. 9-43 to 9-44;)

The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers).

From the Colorado Water Plan:

Colorado's Water Plan Section 9.5 *Outreach Education and Public Engagement Actions section (pg. 9-61)*

3. ***Improve the use of existing state resources:*** *CWCB:*

Will work with stakeholders to identify water challenges that Colorado's innovation community could help solve, develop an award program, and engage Coloradans in the challenge:

Will work with Colorado's innovation community, education and outreach experts, research institutions...to address Colorado's water challenges with innovation and "outside the box" creativity.

Volume 1 Analysis and Technical Update to the Colorado Water Plan (Preliminary Release) July 2019

2.2.1 Incorporating Climate Change into Scenario Planning (page 11)

Through an iterative effort with the CWCB, basin roundtables, and the IBCC, three composite climate scenarios were incorporated into the planning scenarios. Of the five planning scenarios, three include some level of stressed future climate change (Cooperative Growth, Adaptive Innovation, and Hot Growth).

Climate. Factors reflecting increases in IWR due to a potentially warmer and drier future climate were applied in the Cooperative Growth, Adaptive Innovation, and Hot Growth scenarios. Background on climate adjustments are provided in Sec on 2.2.1.

Emerging Technologies. Emerging agricultural technologies will play a significant role in future water use. Instrumentation, automation, and telemetry have improved irrigation efficiency and scheduling in many areas of Colorado and will likely continue to improve into the future. Efficiency improvements in delivery and application of water through drip irrigation, more efficient sprinklers, ditch lining, or enclosing open ditches (or additional adoption of these technologies) may reduce water supply shortages and/or reduce the amount of water diverted or pumped. Innovations in crop hybrids have resulted in more drought-tolerance while preserving or increasing yields. Two adjustments were made to provide perspective on the potential effect of these emerging technologies in the five planning scenarios:

o Sprinkler Development. The South Platte and Arkansas Basins have experienced significant conversion of food irrigation (less water efficient) practices to center-pivot sprinklers and drip irrigation systems (more water efficient) for the past several decades. Discussions with stakeholders in the basin indicated a continued likelihood of this development to varying degrees in the five planning scenarios.

o Technological Innovations. The Adaptive Innovation planning scenario narrative contemplates future technological innovations that mitigate potential climate change related increases in irrigation demand and decreases in supply. To implement this narrative in the agricultural diversion demand methodology, the impact of contemplated technological innovations was translated as reductions to IWR and improved water delivery efficiencies.

Colorado's Water Plan Analysis and Technical Update, Volume 2 Section 13_Reuse, July 2019, Pages 1-2 notes that various forms of water reuse will be an important component of closing future supply-demand gaps for municipalities, and the plan encourages water providers to build on the successes of the many types of reuse projects already implemented in Colorado. The following sections presents an overview of key types of municipal water reuse that may be encountered in Colorado, and further expands on descriptions of reuse provided in Section 6.3.2 of Colorado's Water Plan. Reuse mechanisms summarized in the following sections of this TM include:

- Reuse via exchange: Reuse via exchange can be described as when water right decrees stipulate if a water right holder can reuse water after the initial first use or if they are required to return unconsumed water (assumed to be treated wastewater from municipal users) to the watershed. Under the reuse via water exchange method, return flow water that can be legally reused is returned to the river or watershed and a like amount of water can be diverted from the river at a different point upstream (resulting in no water particles physically being reused) as long as the exchange does not adversely impact other water right holders. Reuse via exchange may fall outside the typical definition of "reuse" for water treatment professionals; however, it is appropriate and relevant when considered in the context of meeting a municipal supply and demand imbalance, or "gap".

- Non-potable reuse: Under the non-potable reuse method (also termed "reclaimed water"), water that can be legally reused receives additional treatment at the wastewater treatment plant and is then conveyed through a non-potable water distribution system (sometimes referred to as a "purple pipe system") to approved non-potable demands (e.g. commercial landscape areas, parks, golf courses, commercial cooling towers).

- Indirect potable reuse: Under the indirect potable reuse method, water leaving a wastewater treatment plant is further treated to potable water standards by an advanced treatment plant before or after being introduced into an environmental buffer water source and prior to delivery for potable consumption. This buffer can be a reservoir, natural stream, or aquifer storage facility to allow blending of the advanced treated water with water in the buffer. The water is either further treated via advanced water treatment, or blended with the other raw water sources and treated at the existing Water Treatment Plant before entering the potable drinking water distribution system.

Direct potable reuse: Under the direct potable reuse method, water leaving a wastewater treatment plant is further treated to potable water standards by an advanced water treatment plant before being

introduced directly into a potable water distribution system, where it is blended with other treated drinking water supplies.

Provide a description of how this water project supports the goals of Colorado's Water Plan,

Colorado's Water Plan enables a balanced strategy of conservation and reuse; alternative agricultural transfers; and environmental, recreational, municipal, industrial, and agricultural projects. The major trends in water management are digital (data acquisition, analytics and artificial intelligence, AI) and "one water" (water reuse and recycling). 10.10.10 and Water Foundry an international water strategy advisory firm, will recruit subject matter experts and corporate sponsors who will aid participating prospective CEOs in the development of market-based solutions that focus on these themes. Together we will explore new technologies like air moisture capture, reuse, desalination, and aquifer recharge.

Chapter 9.5: Goal- Outreach, Education, and Public Engagement

Unlike water, innovation doesn't just flow with gravity. Innovation requires leading innovators who are aware of and engaged in the problems and are inspired to tackle them. The nature of wicked problems is that they are not easily resolved with science or technology alone; they require education in order to understand them. Our programs educate, engage, and activate innovators, in part by facilitating needed connections between the public and the problems.

Water and Climate issues are part of complex adaptive systems that hold these wicked problems in place and obscure easily accessible market-based opportunities. Without a focused effort to reveal opportunities and establish an innovation ecosystem targeting water and climate related wicked problems, entrepreneurs will not be drawn to this area of opportunity. The more apparent the opportunity the better. Without a systematic process to explore wicked problems and find the points of influence and opportunity, entrepreneurs are often more inclined to develop ventures in less complex areas where they are more familiar with the problem (example: a dating app) instead of in highly complex systems such as water (example: consumer accessible water quality monitoring process).

10.10.10 delivers impact ventures: We don't need the greatest innovators and company founders to continue to solve problems in dating and dog walking, but we do need them to focus on tackling wicked problems. Right now, such problems are too often left to governments, nonprofits, industrial giants, and research institutions. These institutions will not solve these problems on their own, and the market is hungry for new businesses that deliver return on investment and benefit to the community, society, and the world. We need new perspectives from experts in the commercialization of solutions. We need outsiders from industries with different points of view. We need successful serial entrepreneurs.

Our efforts to inspire Colorado's innovation community to tackle wicked problems through education and engagement are enhanced through the support of validators–thought leaders and leading edge technological development institutions–participating with entrepreneurs to unlock opportunities. To create frictionless access to research institutions in water innovations 10.10.10 has been invited to join the new National Alliance for Water Innovations (NAWI) and others.

Headquartered at Lawrence Berkeley Laboratory (LBL) in California with the co-founding National Renewable Energy Laboratory (NREL) in Colorado, the U.S. Department of Energy (DOE) selected them to support the DOE Water Desalination Hub in 2019. NAWI brings together a world-class team of industry and academic partners to examine the critical technical barriers and research needed to radically lower the cost and energy of desalination and water reuse.

NAWI is composed of the founding Research Consortium (four DOE national labs, 10 industry partners, 19 leading U.S. research universities), a Research Advisory Council, an Industry Advisory Council, and the NAWI Alliance, an open-membership organization.

The leadership of NREL's Desalination Hub team invited 10.10.10 to join and participate as part of the commercialization effort for NAWI. Representatives from NAWI will be recruited as validators for the 10.10.10 Water + Climate program. New business models developed by 10.10.10 prospective CEOs using NAWI technologies might enhance and aid tackling the reuse, efficiency and water quality problems identified by CWCB or the Basin Roundtables in response to the Colorado Water Plan.

We are developing a similar relationship with the Water Research Foundation (WRF) to aid us in the recruitment of additional validators, systems mapping resources and the production of the Wicked Problem Briefs. The WRF is the leading not-for-profit research cooperative that advances the science of water to protect public health and the environment. Governed by utilities, WRF delivers scientifically sound research solutions and knowledge to serve our subscribers and stakeholders in all areas of drinking water, wastewater, storm water, and reuse.

10.10.10 employs a tested process that educates the public and inspires entrepreneurs to action. For each program, we convene talent and expertise from numerous groups to map and unpack wicked problems and to identify potential market-based solutions. Our subject matter experts are representatives of government, academic institutions, large enterprises, and non-profits. They might be water experts with domain insight or water law expertise who can help focus the attention of entrepreneurs on significant and implementable opportunities within existing regulatory frameworks. They can also be potential partners in bringing novel technologies to market such as water-oriented investors interested in potential return on investment (ROI), and NGOs seeking a sustainable process to foster their missions.

Related Studies

Please provide a list of any related studies, including if the water project is complementary to or assists in the implementation of other CWCB programs.

Tool: System map: Sample: Wicked Problems in Health

The Colorado Lieutenant Governor's Office on behalf of the Office of eHealth Innovations ("OeHI") and Zoma Foundation contracted with X Genesis (10.10.10's tandem for profit LLC) in a similarly defined process that convened representatives of key stakeholder groups throughout the healthcare continuum to develop initial system and network maps of care coordination and its relationship to the complex system of health.
https://costateoehi.kumu.io/colorado-care-coordination-project-overview

We propose a similar systems mapping process for this project, focused on the components and points of leverage or influence of targeted wicked problems in water + climate which will identify the issues, opportunities, and obstacles to successfully exploring and attempting to tackle major priority areas. The focus will be on mapping the components of the selected wicked problems in water + climate. These

components will, in turn, present key opportunities and points of leverage and influence for participating experienced entrepreneurs, all of which will help to impact the wicked problems and the systems in which they live.

Another study on systems thinking is https://wtf.tw/ref/meadows.pdf

In addition, Will Sarni of Water Foundry (who we will work with throughout this project) has previously published "Digital Water Transformation: The Promise of Artificial Intelligence" (February 26, 2019, Medium). Mr. Sarni is a Board Member of FloWater and Project WET, a Project Board Member of 10.10.10, and the Founder and Chairman of WetDATA.org. He has written numerous books and articles and continues to present on subjects such as the value of water, innovations in digital water technology, the circular economy, and the energy-water-food nexus. He is the author of:

CORPORATE WATER STRATEGIES
THE WATER TECH BOOK
BEYOND THE ENERGY-WATER-FOOD NEXUS
WATER STEWARDSHIP AND BUSINESS VALUE
CREATING 21ST CENTURY ABUNDANCE THROUGH PUBLIC POLICY INNOVATION

Mr. Sarni is currently working on: "DIGITAL WATER: New Technologies for a More Resilient, Secure and Equitable Water Future.".

Previous CWCB Grants, Loans or Other Funding

List all previous or current CWCB grants (including WSRF) awarded to both the Applicant and Grantee. Include: 1) Applicant name; 2) Water activity name; 3) Approving RT(s); 4) CWCB board meeting date; 5) Contract number or purchase order; 6) Percentage of other CWCB funding for your overall project.

Systems Mapping to Tackle Wicked Problems, 10.10.10 Water + Climate $45,000 Metro Roundtable, approved January 2020.

Additional River Basin Roundtables like the South Platte River Basin Roundtable will be approached to participate in funding from WSRF funds.

Taxpayer Bill of Rights

The Taxpayer Bill of Rights (TABOR) may limit the amount of grant money an entity can receive. Please describe any relevant TABOR issues that may affect your application.

Submittal Checklist	
X	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.
Exhibit A	
	Statement of Work [1] **1. Recruit and convene subject matter experts to map the complex system of the identified targeted Wicked Problems for the program and beyond in a facilitated process. Deliverable:** Educational materials: **Systems Maps (See Appendix B) and Wicked Problem Briefs (See Appendix A) outlined (see Task 3 below)** 2. **Identify implementation priorities, policy needs, enterprise implementation steps.** Identify and develop prioritized lists of implementation steps, policy needs, components requiring enterprise intervention and key points of influence impacting the targeted wicked problem components and points of influence. These systems maps and wicked problem briefs will be provided to CWCB and eventually the program participants during the large, public events associated with our program–the "Big Reveal" and "Finale"-as well as our 10.10.10 website. 3. **Isolate and highlight the components of each targeted wicked problem that require entrepreneurs to develop new solutions.** Provide an annotated list of wicked problems that require entrepreneurs to develop new solutions. **Wicked Problem Briefs (See Appendix A):** With subject matter expert feedback create Wicked Problem research brief outlines identifying key components of the systems that impact each of the 10 targeted wicked problems in water + climate. Who experiences these problems? Who are the stakeholders and other actors who benefit or are harmed by the system? How are wicked problems generated and held in place? How do these systems operate and what are their dynamics and causal loops? Where can an entrepreneur expect to find opportunities to intervene, to change the status quo, in ways that address issues of inequity and systemic neglect? 4**. Recruit and train 30-50 volunteer temporary team members (Ninjas).** Recruit and train 30-50 volunteer temporary team members focused on working with the recruited prospective CEOs to map the selected wicked problems and determining (in conjunction with the entrepreneurs) which opportunities and market-based approaches will best tackle these wicked problems. **5. Recruit and gain commitment with 20-30 subject matter experts (SME), organizations and individuals, domain experts with deeply rooted passion to help tackle these problems (Validators). These SME validate the problems and help with systems mapping and informing entrepreneurs throughout the 10-day program (and beyond) by sharing informed perspective of the problem areas, markets, and more.** 6. **Recruit 10 prospective CEOs.** Recruit 10 prospective CEOs from around the country, diverse, proven serial entrepreneurs able to articulate a vision, recruit and retain top talent and raise capital to attend and participate in the 10.10.10 Water + Climate program in Denver.

	Supplemental funds request 7. **Conduct a 10-day innovation catalyst program for experienced entrepreneurs.** Convene two public events: the "Big Reveal" and "Finale", each with 300-500 attendees, to hear problem advocates pitch wicked problems in water, climate, and the integration of the two. The Finale provides insight into the entrepreneur's intention to tackle selected wicked problems. With NREL, the DOE Water Desalination Hub, NAWI, Water Research Foundation, WECO, Project Wet and other water education organizations develop educational programming for our two public events highlighting the targeted wicked problems, systems maps and the implementation of the Colorado Water Plan. 8.**Develop an "award fund"** to incentivize participating entrepreneurs to select targeted wicked problems identified by the Metro Roundtable and the CWCB.
X	Budget & Schedule(1)
	Engineer's statement of probable cost (projects over $100,000)
X	Letters of Matching and/or Pending 3rd Party Commitments(1)
Exhibit C	
	Map (if applicable)(1)
	Photos/Drawings/Reports
	Letters of Support (Optional)
	Certificate of Insurance (General, Auto, & Workers' Comp.) (2)
X	Certificate of Good Standing with Colorado Secretary of State(2)
X	W-9(2)
	Independent Contractor Form(2) (If applicant is individual, not company/organization)
Engagement & Innovation Grant Applicants ONLY	

X	Engagement & Innovation Supplemental Application(1)

(1) Required with application.
(2) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

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ENGAGEMENT & INNOVATION GRANT FUND SUPPLEMENTAL APPLICATION

Introduction & Purpose

Colorado's Water Plan calls for an outreach, education, public engagement, and innovation grant fund in Chapter 9.5.

The overall goal of the Engagement & Innovation Grant Fund is to enhance Colorado's water communication, outreach, education, and public engagement efforts; advance Colorado's water supply planning process; and support a statewide water innovation ecosystem.

The grant fund aims to engage the public to promote well-informed community discourse regarding balanced water solutions statewide. The grant fund aims to support water innovation in Colorado. The grant fund prioritizes measuring and evaluating the success of programs, projects, and initiatives. The grant fund prioritizes efforts designed using research, data, and best practices. The grant fund prioritizes a commitment to collaboration and community engagement. The grant fund will support local and statewide efforts.

The grant fund is divided into two tracks: engagement and innovation. The Engagement Track supports education, outreach, communication, and public participation efforts related to water. The Innovation Track supports efforts that advance the water innovation ecosystem in Colorado.

*The grant fund request is referred to as "project" in this application.

Overview (answer for both tracks)
In a few sentences, what is the overall goal of this project? How does it achieve the stated purpose of this grant fund (above)?
10.10.10's goal is to generate market-based companies that target wicked problems, which are systemic concerns that require attention and are not adequately addressed by government or large institutions. We convene educational innovation catalyst programs for experienced entrepreneurs, thought leaders, subject matter experts, and the public, and transform paradigms by developing and using educational tools such as systems maps (see Appendix B), wicked problem briefs (Appendix A) and engaging, proprietary processes. By breaking organizational and industry silos and bringing the right talent to the table, we energize innovation. Our program is unequalled in its ability to merge wicked problems with world changing innovation, which directly meets the purpose of this grant.

Who is/are the target audience(s)? How will you reach them? How will you involve the community?

Who are the target audiences?

Subject Matter Experts (Validators): a community of about 20 experts per program, including practitioners, and individuals with a deeply rooted passion to tackle these problems. These "Validators" help entrepreneurs over the 10-day program (and beyond) by sharing informed perspective of problem areas, markets, and more. In a prior Water and Infrastructure program, for example, representatives from the Colorado Water Conservation Board, Denver Water, Imagine H2O, the Nature Conservancy, Hydro Venture Partners, AECOM, AWWA, Gates Family Foundation, the Walton Family Foundation, and many important local and national organizations served as Validators. For this program, we will again be recruiting these groups to participate, and we expect that our expanding relationship with NREL and the National Alliance for Water Innovations (NAWI), along with the Water Research Foundation, will provide introductions to recruit additional subject matter experts.

Successful Entrepreneurs: We leverage the speed, focus, and capability of experienced entrepreneurs (prospective CEOs) to address wicked problems by recruiting 10 successful, serial entrepreneurs with proven track records. We prize and prioritize diversity– geographic, gender, race, experience, background, and perspective -and our recruits must be able to articulate a vision, recruit and retain top talent, and raise capital. They must already know how to create successful businesses. At the time of our invitation, they must also be in the position and have the desire to start another venture but have not yet decided what that venture will be. We provide a "founder due diligence" process that helps them identify opportunities, mitigate risk, and improve outcomes. Moreover, we engage them in starting a venture that matters.

Volunteer Temporary Team Members: During the program, we surround our prospective CEOs with 30-50 volunteer professionals that we call "Ninjas." They have diverse skill sets and backgrounds in marketing, law, finance, software engineering, UX/UI design, and more, and function as an ad-hoc, temporary "founding team." Some of these volunteers (Sprinters) are further trained to facilitate our proprietary opportunity generation process that is designed to answer critical business questions, including designing, prototyping, and testing ideas with final users and customers.

The Public and Innovation Communities: We utilize our website and social media channels–Twitter, Facebook and LinkedIn-to communicate about our programs and the targeted wicked problems. We also invite the public to two major events held during each program, the "Big Reveal" and "Finale," with 300-500 attendees each, where they hear and are educated by problem advocates pitch wicked problems in water, climate, and the integration of the two. During the "Finale" we hear about the entrepreneurs' journey and their plans to tackle the wicked problems. We are in conversations with WECO (Water Education Colorado) and Project Wet to develop an educational program in the run-up to the program and in coordination with these events, and we are currently in discussions with the National Western Center (NWC, the future home of the Colorado State University (CSU) and Denver Water building that will host DW's water quality laboratory and programs on education, innovation, and research as well as the Western Water Policy Institute) to hold both events at their facilities. This public-facing facility will also support conferences, events, and K-12 field trips, in addition to programs such as 10.10.10 that area focused on addressing water challenges through research and innovation.

How do we engage them?

In some cases, like those of our successful entrepreneurs, we can engage them because we are them. Tom Higley, our founder, had a $280 million dollar exit from his first company, which puts him in a unique network

to which very few have access. Along with our temporary team members and successful entrepreneurs, we have also developed a recruitment and training system designed to convene talent and expertise from various important and relevant groups and networks.

With the public, we use our knowledge of marketing that our team has gained from starting over 20 companies to engage the public through Instagram, Facebook, Twitter, MailChimp, and many non-digitial channels, as well.

How will we involve the community?

See response for target audiences. Our focus is on building a frictionless collaborative innovation ecosystems. We strategically work with our community members to ensure that each member is receiving the connections they need and the ecosystem can offer.

We have also recently received a verbal commitment from McDonald's Corporation to become a financial sponsor for our upcoming 10.10.10 Water + Climate program. McDonald's is committed to reducing its water use footprint across its supply chain, and have shared with us an interest in using their network of franchisees as a marketing channel for water efficiency education in coordination with our program.

Describe how the project is collaborative or engages a diverse group of stakeholders. Who are the partners in the project? Do you have other funding partners or sources?

Entrepreneurs, private investors, and markets give philanthropic and governmental agencies a lever with the ability to move the world. 10.10.10 brings these players together and generates new ventures that address the world's wicked problems. We focus on the development of a repeatable, scalable model for new venture creation that identifies market-based efforts to tackle wicked problems. To our knowledge, there are no other organizations or models similar to 10.10.10. Our problem-first approach and focus on the pre-venture due diligence process are unique and have resulted in powerful results.

Each 10.10.10 program, although funded and developed independently, has delivered collective insight on the value of focused ecosystems targeting wicked problems generated by the complex adaptive systems (CAS) of health, water, and infrastructure. The combination of our mapping of the targeted CAS, wicked problems, and validator recruitment have developed a targeted collaborative network of resources inside and outside of the system. Our program iterations and processes have provided significant value to innovation ecosystems and the impact these networks deliver to the entrepreneurial ecosystem at large.

10.10.10 has focused Colorado's digital health innovation ecosystem with our problems-first processes. Our recruitment of key validators willing to support entrepreneurs and ninjas trained in our opportunity generation and design thinking processes, along with our recruitment of serial entrepreneurs, have all been key factors in Colorado becoming one of the leading digital health innovation hubs in the country. 10.10.10 and X Genesis are intent on utilizing this same process to continue to orient the innovation community towards tackling the wicked problems of water and climate in Colorado.

Throughout our six iterations, 10.10.10 has organized these innovation community components into coherent and focused support resources for our launched companies and has enhanced the interactions of the individual parts into a cohesive resource for the broader innovation ecosystem. These aggregated components magnify 10.10.10's efforts and alliance partners as part of a virtuous cycle.

For the past few years, 10.10.10 has worked with Denver-based Rockies Venture Club (RVC), one of the nation's longest operating and largest angel seed investor groups, to introduce prospective CEOs to new opportunities and prepare the ventures they create for seed investment. For the proposed 10.10.10 Water + Climate and subsequent programs focused on water and climate, 10.10.10 and RVC are exploring the development of a Special Purpose Vehicle (SPV) to create an incentive-based, matching investment fund. This SPV will increase the likelihood that entrepreneurs select wicked problems identified by the Colorado Water Plan and the participating Basin Roundtables to create new ventures that tackle these problems (this SPV structure will be developed prior to the May CWCB meeting). Such relationship aggregations help to decrease friction for prospective CEOs that access and utilize these resources.

We focus on working with entrepreneurs before they start ventures. Most activities in the start-up world, including lean start-up methodology, business model generation, incubators, and accelerators like TAP-IN and angel investment, focus on ventures after they are formed. We instead emphasize starting with wicked problems, exploring complex adaptive systems, and the roles of founder due diligence, founder opportunity fit, and impactful opportunity generation.

Our growing 10.10.10 network has been inculcated in our problem dissection and mapping of Complex Adaptive Systems, explorations of wicked problems, and our blended process of design thinking and opportunity generation. These networks, though initially ephemeral, have become evergreen and long lasting with each new iteration of our programs. We continue to introduce our ecosystem to a select group of vetted successful veteran entrepreneurs and ninjas. Our validators, ninjas, and community resources have become significant and powerful resources for 10.10.10 as well as our prospective CEOs, funding sources, host local communities, and a national network of experts interested in solving wicked problems. In some instances, we have even connected elements of the ecosystem that have never been in communication.

We add a significant level of coherence and organization to an otherwise diffuse grouping of startup resources in our host communities. By targeting wicked problems, we add a focusing lens to aid impact ventures in launching market-based solutions to these vexing problems. Our initial focus on problems instead of solutions allows us to recruit a significant network of validators and resources and breakdown the silos of separate agendas to foster a collaborative effort that solves common problems.

10.10.10 has solicited support from several corporate and philanthropic sponsors like McDonald's, Gates Family Foundation, and the Water Funders Initiative (final commitments will be in place by the CWCB Board meeting in May). 10.10.10 has also received a commitment from X Genesis to match funds received from CWCB, and we have significant validator, problem advocate, and ninja volunteer in-kind contributions already in-pocket (see X Genesis commitment letter).

Describe how you plan to measure and evaluate the success and impact of the project?

Key performance indicators we plan to measure:

The innovation community engagement will be measured by:

- The number of volunteers for our program
- The number of attendees at our public facing program
- The number of views on our Facebook live streams of various events
- The number of opens and the level of interaction and engagement with emails related to the educational information concerning wicked problems

The impact can be measured by:

- The number of ventures created by prospective CEOs
- The number of people these ventures employ
- The level to which wicked problems are tackled in each such venture
- The digital marketing presence of each such venture
- The amount of funding these ventures receive

What research, evidence, and data support your project?

-11 companies have been started
-More than 3000 people have attended our public events
-Over $18 million has been raised by associated ventures
-More than 100 people have been employed by 10.10.10-launched companies

The sixth 10.10.10 health program was held in April of 2019, again sponsored by the Colorado Health Foundation, Rose Community Foundation, and the Robert Wood Johnson Foundation, with two new businesses already inspired by this program – Cheeri and Asha AI. 10.10.10 also successfully convened 10.10.10 Cities: Water and Infrastructure in October of 2017, supported in part by the Gates Family Foundation and the Walton Family Foundation. Two businesses were inspired by this program – Spout and UpSuite.

Since 10.10.10's start in 2015 to the present, we have been fortunate to have received funding for six programs focused on Wicked Problems in Health, water and infrastructure, with a total budget of $1,700,000. With this funding, we have been successful in inspiring the launch of 11 companies. Nine are health related, Spout is water related, and UpSuite, focuses on economic infrastructure. Together, they have attracted over $18,350,000 in new investment with an ROI of 9.79:1

These eleven companies tackle wicked problems of interoperability and cyber security of patient health information (PHI), improved access, navigation and outcomes through healthcare, improved behavioral health for children, adults and seniors, monitoring and reducing toxic stress in children, monitoring clean water, and a marketplace for innovation co-working spaces. Along with matching sponsor funds with private investment, 70 of the new jobs have been created in Colorado and more are projected. With a low average of $75,000/yr. in salary and a low economic multiplier of 2.5, the recurring impact of these salaries is an

additional $13,125,000 annual contribution to Colorado's economic health while also tackling the wicked problems targeted by these companies.

We continue to improve our programs. As listed above, launched ventures, investment raised, and employment are key metrics for our programs. We have recruited hundreds of validators, ninjas and volunteers, and thousands of public participants have attended our Big Reveal and Finale programs.

Our original goal was to generate one venture per program. Now, we expect to see a bump in numbers beyond the ~2 ventures we've seen come out of previous programs. Other success indicators include a boost in our prospective CEO net promoter score (to 100, the maximum score), a high number of prospective CEOs indicating an intention to start a new venture, a record number of ninjas, and positive improvements in a number of other program areas as indicated by participant feedback.

As indicated by our most recent satisfaction score assessments for our 2018 program, 81% of our participants reported in our post program evaluation that they would recommend the program to others. We are committed to continued enhancement of our participant satisfaction scores across our various cohorts. Our key audience is our prospective CEOs and we ask them to respond post program regardless of whether they start a company. Was their investment of 10 days of time in our program worthwhile? Would they do it again in a heartbeat? So far, we are 60 for 60. We want to bring these same results to this CWCB Water Plan proposal.

Describe potential short- and long-term challenges with this project.

1. Not attracting the right caliber of experienced entrepreneurs
2. Not attracting a strong bench of subject matter experts who are willing to provide substantial information to help these prospective CEOs identify solutions
3. Not attracting strong temporary team members
4. Not attracting sufficient sponsorship
5. Lack of interest in at least one of the 10 wicked problems
6. Failure to identify a clear path to a market-based solution for any of the wicked problems

Please fill out the applicable questions for either the Engagement Track or Innovation Track, unless your project contains elements in both tracks. If a question does not relate to your project, just leave it blank. Please answer each question that relates to your project. Please reference the relevant documents and use chapters and page numbers (Colorado's Water Plan, Basin Implementation Plan, PEPO Education Action Plan, etc.).

Engagement Track

Describe how the project achieves the education, outreach, and public engagement measurable objective set forth in Colorado's Water Plan to "significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys."

Education, Engagement and Outreach

We use our website, targeted emails with marketing channel partners and social media channels–Twitter, Facebook and LinkedIn-to market our programs and the targeted wicked problems. We invite the public to our two major events, the "Big Reveal" and "Finale" events with 300-500 attendees each, which are always educational, engaging, and inspirational.

For the first time, the 10 wicked problems are revealed to the public along with the systems maps that are on display at the events.

We are in conversations with WECO (Water Education Colorado) and Project Wet, a national water education resource, to develop educational programs in the run-up to our programs and in coordination with the two public events. Discussions are underway with the National Western Center (NWC) to hold both public programs at their facilities. The NWC will be the future home of the Colorado State University (CSU) and Denver Water building (which itself will host programs on water education, innovation and research and Western Water Policy Institute). Denver Water is also planning to house its water quality laboratory in this building in order to create natural collaboration opportunities. The public facing facility will support conferences, events, K-12 field trips, in addition to programs focused on addressing water challenges through research and innovation such as 10.10.10.

We have also recently received a verbal commitment from McDonald's Corporation to become a financial sponsor for our upcoming 10.10.10 Water + Climate program. McDonald's is committed to reducing its water use footprint and has also shared an interest in using its network of franchisees as a marketing channel for water efficiency education in coordination with 10.10.10.

With the Basin E&O committees, we will identify and partner with other groups and/or entities to conduct water related public education and outreach activities. Several of these groups have previously participated as validators in our 10.10.10 Water and Infrastructure program that was held in 2017.

Several of the identified organizations already active in education and outreach will also be recruited to serve as marketing channel partners, potential validators and system mappers.

Describe how the project achieves the other measurable objectives and critical goals and actions laid out in Colorado's Water Plan around the supply and demand gap; conservation; land use; agriculture; storage; watershed health, environment, and recreation; funding; and additional.

Although it is clear there is an opportunity to extend our work to other Colorado water basins to address common key elements that can be tackled by serial entrepreneurs through market based ventures, 10.10.10's initial focus will be on the problems identified in the Colorado Water Plan and by the Metro Roundtable.

Common opportunities to utilize systems mapping will eventually be extended to the priorities of the Arkansas and Colorado Basins. Our efforts will be iterative; we anticipate learning fast and improving as we develop our subsequent programs. Our efforts to date have demonstrated that the system mapping process develops significant participant engagement. If successful, this could become a way to enhance public outreach and engagement and enhance the development of the innovation ecosystem that is available to other basin roundtables.

As described above, Colorado's Water Plan enables a balanced strategy of conservation and reuse; alternative agricultural transfers; and environmental, recreational, municipal, industrial, and agricultural projects. The major trends in water management are digital (data acquisition, analytics and artificial intelligence, AI) and "one water" (water reuse and recycling). 10.10.10 and Water Foundry will recruit validators and corporate sponsors that will aid participating prospective CEOs in the development of market based solutions that focus on these themes to explore new technologies like air moisture capture, reuse, desalination, and aquifer recharge.

We intend to work with our recruited validators to educate the public on the wicked problems identified by the Colorado Water Plan. In particular, we will work closely with NREL, the DOE Water Desalination Hub, NAWI, the Water Research Foundation, WECO, Project Wet, and other water education organizations to aid in the educational programming of our two public events.

We intend to bring together a world-class team of industry and academic partners to aid us in the presentation of educational materials and exhibits on the critical technical barriers and research needed to radically lower the cost and energy of desalination and water innovations that might enhance and aid tackling the reuse, efficiency and water quality problems identified by CWCB or the Basin Roundtable. We will also be working closely with CSU and Denver Water on the programming to be developed for their water building.

Several of the basins have identified that the storage of surface and alluvial groundwater may offer opportunities to overcome evaporation losses. We will focus on recruiting validators and resources that will highlight opportunities like water use efficiency, agricultural water use technologies, water quality monitoring, new filtration and desalination technologies, digital integration (data acquisition and analytics, AI), and "one water" (water reuse and recycling).

Based on the Colorado Water Plan Chapter 3 and other relevant sections, our validators will also be key resources in aiding in our educational activities:

"Conjunctive use of surface water and alluvial groundwater, as well as use of alluvial aquifers for storage, offer opportunities to expand sustainable water use. Aquifer storage is generally considered to have fewer environmental effects, and water stored in alluvial aquifers is not subject to evaporation losses. Aquifer storage poses control and administrative issues that state agencies and water managers will need to address to ensure that other water rights are not injured.

Water quality will continue to be a challenge as entities divert more water for use and as point and non-point sources discharge to the basin's waters. The salt content of soil and water in the South Platte River Valley, and sedimentation and erosion in parts of the basin, are likely to continue to increase over time, which will negatively affect the ability to use this water for agricultural and M&I purposes. Technological solutions are expensive and non-sustainable because of high energy demands and environmental issues associated with disposal of concentrated treatment residuals.

The South Platte Basin is leading the state in M&I water-use efficiency. Efficient use of the basin's resources through water reuse and conservation is a critical step toward meeting future water needs. Nevertheless, increased M&I water-use efficiency will reduce the quantity of water available for agricultural and ecological practices and other uses, because M&I return- flows will diminish.

The urban environment is an important component of the quality of life for many South Platte Basin residents. Judgments about the value of the urban environment, including "both the need to provide water

for irrigated landscape and the vital benefits that landscape provides to citizens and the environment, make the discussions about water supply development needs all the more difficult."

"A major emphasis of the Arkansas Basin Roundtable was a public outreach program that aspired to reach all corners of the basin roundtable held a series of public meetings and provided information about Colorado's Water Plan and the BIP process. In addition to these public meetings, the annual Arkansas River Basin Water Forum served as a point for receiving major input into the BIP."

South Platte Basin Implementation Plan Metro Basin Roundtable South Platte Basin Roundtable, April 17, 2015:

S.5.10 Research new technologies and strategies

Water quality is an ongoing issue for the South Platte Basin. A major concern is the ability to manage and treat lower quality water effectively, and then dispose of the waste products (brine) in a cost effective and environmentally sound way. One important component of the South Platte Basin Implementation Plan will be for the state to take a proactive role in investigating technologies capable of treating low quality water sources and disposing of waste products.

Recommendations: Continue research and development of new strategies to address both the technical and regulatory constraints associated with treating low quality water and disposing of waste including direct potable reuse (DPR) and indirect potable reuse (IPR), developing an appropriate regulatory framework for these technologies, and promoting and monitoring research on relevant technologies to advance these objectives.

S.5.8 Manage the risk of increased demands and reduced supplies due to climate change

The effects of climate change on water resource availability are very difficult to assess and the exact ways it will impact Colorado are unknown. Many South Platte water providers consider it irresponsible not to consider the potential for climate change in making water supply and demand projections.

Recommendations: The South Platte and Metro Roundtables recommend continued analysis of the potential for back-up supply, such as for east slope interruptible supply agreements. They also encourage additional research to disaggregate the basin's M&I supply gap to gather more specific data on the quantity, time, and geography of the gaps within each county.

S.5.9 Facilitate effective South Platte communications and outreach programs that complement the state's overall program

A critical component in advancing the South Platte Basin Implementation Plan and Colorado's Water Plan will be a strategic focus on communication and education with stakeholders including water users, political leaders, and leaders of major businesses and industries throughout the state. Improving public understanding about the goals, needs, and plans of the state and the South Platte Basin will help to improve public acceptance of the need for innovative water rate structures, energetic conservation measures, and more integrated land use and water supply planning.

Recommendations: Design and implement an intensive education, participation and outreach program designed to generate a lasting baseline of public awareness and support.

Executive Summary, Analysis & Technical Update to the Colorado Water Plan, Page xix

D. Adaptive Innovation: A much warmer climate causes major environmental problems globally and locally. Social attitudes shift to a shared responsibility to address problems. Technological innovation becomes the dominant solution. Strong investments in research lead to breakthrough efficiencies in the use of natural resources, including water. Renewable and clean energy become dominant. Colorado is a research hub and has a strong economy.

Describe how the project achieves the education, outreach, and public engagement goals set forth in the applicable Basin Implementation Plan(s).

We are aware that a draft education and engagement plan for the Metro Roundtable has been developed by WECO in consultation with CWCB. The draft plan was to be circulated for input in July. The contractor has pushed back the timeline for the project, now to be completed by October. We will be pleased to coordinate our efforts with this finalized plan.

There are also updates underway from the Education Action Plan & Strategic Communications Plan. Critical issues currently in the basin that need to be addressed over the EAP planning period are the Statewide Education Action Plan (SWEAP), South Platte Regional Water Development Concept (SPRWDC), and Technical Update (SWSI). The audiences the EAP will be targeting are academic, agriculture, environment & recreation and roundtables. The 2019 WSRF grant scope of work includes coordination and facilitation of SWEAP and SPRWDC, communication through website, press releases, fact sheets and flyers, outreach through orientation for new roundtable members and volunteers, maintain a list of organizations and media outlets and research video feasibility & budget.

Education, Engagement and Outreach

We will implement communications, and engagement programs on water projects and issues in the Metro area and South Platte Basin according to our remit from CWCB. We will also invite the public to our two major 10.10.10 in-program events, the "Big Reveal" and "Finale," which each have between 300-500 attendees. These events will educate and engage the public about targeted wicked problems and our systems maps will be on display (see our response above about public events).

With the Metro Basin E&O Committee, we will identify and partner with other groups and/or entities, conducting water related public education and outreach activities. Several of these groups have previously participated as validators in 10.10.10 Water and Infrastructure program in 2017.

The Metro Roundtable E & O Committee has identified several organizations already active in education and outreach that may serve as marketing channel partners, potential validators and system mappers: the Colorado Watershed Assembly, Colorado Foundation for Water Education, Colorado WaterWise Council, Metro State College of Denver – OWOW, Cherry Creek Stewardship Partners, Denver Water, Aurora Water, City of Thornton-Utilities, South Metro Water Authority, Other water providers, Colorado Division of Water Resources, Special District Association, EPA, South Platte Greenway Foundation, American Public Works Association, America Water Works Association, Urban Waters Partnership, CSU Water Center, Colorado Water Quality Control Division, Colorado Stormwater Council, Ditch and Reservoir Company Alliance, CSU Extension Offices, and Colorado Counties, Inc.

Describe how the project achieves the basin roundtable's PEPO Education Action Plans.

See above

Innovation Track
Describe how the project enhances water innovation efforts and supports a water innovation ecosystem in Colorado.
Building an innovation ecosystem focused on water + climate is not an easy task. Boulder based, national venture capital investor, and Startup thought leader Brad Feld, the Managing Director at Foundry Group and author of Startup Communities: Building an Entrepreneurial Ecosystem in Your City, has stated in interviews that the "last effort in building a startup community is the continuum of activities and events that engage the entire entrepreneurial stack: things that get first-time entrepreneurs together with experienced entrepreneurs, and investors and aspiring entrepreneurs, and people in big companies who want to work with startups." 10.10.10, with its focus on wicked problems and public events does just that. We have shown that competitiveness is reduced and long term cooperation is increased among participating local and national validators and ninjas supporting serial entrepreneurs to tackle wicked problems. Through their experience with 10.10.10's systems mapping and design thinking process, these participants go on to provide support for the broader innovation ecosystem. 10.10.10 programs bring these components together to tackle wicked problems. Armed with this information, innovation efforts can better determine the kinds of policies and incentives required to create a vibrant, prosperous, and sustainable water and climate cluster in Colorado.
Describe how the project engages/leverages Colorado's innovation community to help solve our state's water challenges.
10.10.10 Mission Statement: To tackle the world's Wicked Problems through public education and engagement that inspires entrepreneurs to action. 10.10.10 programs are jointly produced by X Genesis (10.10.10's tandem LLC) and 10.10.10 (a project of the Colorado Nonprofit Development Center (CNDC)). This 10.10.10 program is supported by Water Foundry, an international advisory and consulting organization focused on Water and Climate. Over a 6-month cycle, we will: ● Listen to and learn from experts (nonprofits, businesses and individuals) to identify, define and understand wicked problems needing solutions ● Identify and recruit validators who provide sector-specific, business, and/or technology expertise ● Identify and recruit ninjas (temporary team members) who will assist selected successful entrepreneurs throughout 10.10.10's processes and programs ● Identify and recruit successful, serial entrepreneurs

- Implement a 10-day program and process that allows entrepreneurs, with validator and ninja help, to understand and dissect the problems and generate ideas for solutions

Each 10.10.10 program targets market based solutions to tackle wicked problems. Our mapping of the targeted CAS, wicked problems, and validator/ninja recruitment together develop a collaborative network of resources inside and outside of the system. Each iteration adds value to these ecosystems through the enhanced systems maps that become part of the public commons, and increases dialogue and awareness about these wicked problems and our 10.10.10 opportunity generation process.

Each program enhances the network of validators willing to interact with the innovation community. Systems maps built with stakeholder engagement aid in identifying points of leverage, influence and impact to tackle wicked problems. Our process aids in uncovering new opportunities that deliver value to the entrepreneurial ecosystem at large. 10.10.10's recruitment of key validators focused on supporting entrepreneurs, training of ninjas in our opportunity generation and design thinking process, and our recruitment of serial entrepreneurs have been key components in aiding Colorado's status as one of the leading technology innovation hubs in the country. 10.10.10 and X Genesis are intent on utilizing these same processes to enhance the water and climate innovation community in Colorado.

Through our six iterations, 10.10.10 has organized these innovation community components into coherent and focused support resources for our launched companies and enhanced the interactions of the individual parts into a cohesive resource for the broader innovation ecosystem. These relationship aggregations have decreased friction for prospective CEOs in accessing and utilizing these resources.

We focus on working with entrepreneurs before they start ventures. Most activities in the start-up world, including lean start-up methodology, business model generation, incubators, and accelerators like TAP-IN and angel investment, focus on ventures after they are formed. We instead emphasize starting with wicked problems, exploring complex adaptive systems, and the roles of founder due diligence, founder opportunity fit, and impactful opportunity generation.

Our programs are distinctively focused on serial entrepreneurs before they start a venture. We emphasize exploration of complex adaptive systems, wicked problems, founder due diligence, founder opportunity fit, and impact opportunity generation. Our growing 10.10.10 network has been inculcated in our dissection and mapping of Complex Adaptive Systems (CAS), explorations of wicked problems, and our blended process of design thinking and opportunity generation. These networks, though initially ephemeral, have become evergreen and long lasting with each new iteration of our programs. Our validators, ninjas, and community have become significant and powerful resources for 10.10.10, our prospective CEOs, our funding sources, our host local communities, and the national network of experts interested in solving wicked problems. In some cases, we have connected elements of the ecosystem that have never before been connected.

We add a significant level of coherence and organization to a diffuse group of resources for startups in our host community. By targeting Wicked Problems, we add a focusing lens to aid impact ventures launching market based solutions to wicked problems.

Describe how the project helps advance or develop a solution to a water need identified through TAP-IN and other water innovation challenges. What is the problem/need/challenge?

10.10.10 and Water Foundry have been active participants with TAP-IN since its inception. In fact, 10.10.10 is listed as a resource on the TAP-IN website. We recognize, due to limited CWCB staff bandwidth, TAP-IN has been somewhat dormant of late. 10.10.10 has demonstrated its unique capacity to develop innovation ecosystems through the recruitment and engagement of validators, ninjas and prospective CEOs. The work product of the system and network mapping process will present evergreen resources for the innovation ecosystem to explore wicked problems and identify points of leverage uncovered in the process that are opportunities for market based solutions (see Engagement and Innovation section above).

The State Water plan sets an objective to identify five water challenges that Colorado's innovation community could help solve by 2030, and to engage Coloradans along the way. In 2017, TAP-IN shared a total of 18 challenges with Coloradans. These might serve as the initial list of wicked problems that the 2020 program might map with the CWCB, Roundtable participants and validators. Once completed, these problems will be presented to the recruited 10.10.10 prospective CEOs for the proposed programs.

Describe how this project impacts current or emerging trends; technologies; clusters, sectors, or groups in water innovation.

Colorado's Water Plan enables a balanced strategy of conservation and reuse; alternative agricultural transfers; environmental, recreational, municipal, industrial, and agricultural projects. The major trends in water management are digital (data acquisition, analytics and artificial intelligence, AI) and "one water" (water reuse and recycling). 10.10.10 will focus on these themes by exploring new technologies such as air moisture capture, reuse, desalination, and aquifer recharge.

Each 10.10.10 program targets market based solutions to tackle wicked problems. Our mapping of the targeted CAS, wicked problems, and validator recruitment, all help to develop a targeted collaborative network of resources inside and outside of the system. Each iteration adds value to these ecosystems through the enhanced systems maps that become part of the public commons while increasing dialogue and awareness about these wicked problems and our 10.10.10 opportunity generation process.

Each program enhances the network of validators willing to interact with the innovation community. Systems maps built with stakeholder engagement aid in identifying points of leverage to tackle wicked problems. Our process aids in uncovering new opportunities that deliver value to the entrepreneurial ecosystem at large. 10.10.10's recruitment of key validators focused on supporting entrepreneurs, training ninjas in our opportunity generation and design thinking process, and our recruitment of serial entrepreneurs have been key components in aiding Colorado to become one of the leading technology innovation hubs in the country. 10.10.10 and X Genesis are intent on utilizing these same processes to enhance the water and climate innovation community in Colorado.

Through our six iterations, 10.10.10 has organized these innovation community components into coherent and focused support resources for our launched companies and enhanced the interactions of the individual parts into a cohesive resource for the broader innovation ecosystem. These relationship aggregations have decreased friction for prospective CEOs in accessing and utilizing those resources.

Colorado Water Conservation Board

Water Plan Grant - Exhibit A

Colorado Water Conservation Board

Statement Of Work

Date:	May 21, 2020
Name of Grantee:	10.10.10, a project of the Colorado Nonprofit Development Center
Name of Water Project:	Tackling the wicked problems of Water + Climate
Funding Source:	CWCB Water Fund, Metro Roundtable (proposed)/Water Plan Funds/X Genesis Matching Funds/Volunteer In-Kind.

Water Project Overview: 10.10.10 engages experienced entrepreneurs who are outside the systems within which wicked problems have become established like water + climate. These entrepreneurs are the "outside agents" making breakthrough innovation possible. 10 wicked problems that matter are identified in a specific market segment like urban and rural water demand, supply, quality and efficiency in coordination with water + climate thought leaders, sponsors and stakeholders who understand the domain. Together we map the components of the 10 wicked problems and complex systems that keeps the them in place. Once identified and filtered for appropriateness, 10 Wicked Problem Briefs, research specially designed for entrepreneurs to provide insight on the targeted wicked problems. 10 problem advocates (passionate stakeholders interested in tackling the wicked problems) are identified and recruited to present each of the wicked problems during our Big Reveal opening public event. 10 experienced entrepreneurs are recruited from around the country to our 10+day program. Two public events are held with between 300-500 or more public participants each. During the Big Reveal, the wicked problems are pitched by problem advocates, systems maps are revealed and the entrepreneurs are introduced. During the Finale, the entrepreneurs share their explorations and their plans for the future. We encourage and inspire these entrepreneurs who understand how to build successful ventures to develop solutions that have societal impact and are attractive to investors. We develop incentive investment funds to ensure selection of the wicked problems targeted by the CWCB and Basin Roundtables. In short, we create the necessary conditions for effective entrepreneurial alchemy.

The following steps are to be implemented during the project.
Approved Funding

1. Recruit and convene subject matter experts to map the complex system of the identified targeted Wicked Problems for the program and beyond in a facilitated process. Deliverable: Educational materials: **Systems**

Maps (Appendix B) and outline Wicked Problem Briefs (Appendix A): These systems maps and wicked problem briefs will be provided to CWCB and eventually the program participants during the large, public events associated with our program–the "Big Reveal" and "Finale"-as well as our 10.10.10 website.

2. **Identify implementation priorities, policy needs, enterprise implementation steps.** Identify and develop prioritized lists of implementation steps, policy needs, components requiring enterprise intervention and key points of influence impacting the targeted wicked problem components and points of influence.

3. **Isolate and highlight the components of each targeted wicked problem that require entrepreneurs to develop new solutions.** Provide an annotated list of wicked problems that require entrepreneurs to develop new solutions. **Wicked Problem Briefs (Appendix A):** With subject matter feedback create Wicked Problem research briefs identifying key components of the systems that impact each of the 10 targeted wicked problems in water + climate. Who experiences these problems? Who are the stakeholders and other actors who benefit or are harmed by the system? How are wicked problems generated and held in place? How do these systems operate and what are their dynamics and causal loops? Where can an entrepreneur expect to find opportunities to intervene, to change the status quo, in ways that address issues of inequity and systemic neglect?

4**. Recruit and train 30-50 volunteer temporary team members.** Recruit and train 30-50 volunteer temporary team members focused on working with the recruited prospective CEOs to map the selected wicked problems and determining (in conjunction with the entrepreneurs) which opportunities and market-based approaches will best tackle these wicked problems.

5. Recruit and gain commitment with 20-30 subject matter experts (SME, Validators) organizations and individuals, domain experts with deeply rooted passion to help tackle these problems. These SME validate the problems and help with systems mapping and informing entrepreneurs throughout the 10-day program (and beyond) by sharing informed perspective of the problem areas, markets, and more.

6. **Recruit 10-15 prospective CEOs.** Recruit 10 prospective CEOs from around the country, diverse, proven serial entrepreneurs able to articulate a vision, recruit and retain top talent and raise capital to attend and participate in the 10.10.10 Water + Climate program in Denver. Include 10 invited prospective CEOs and 5 alternates.

Supplemental funds request

7. **Conduct a 10-day innovation catalyst program for experienced entrepreneurs.** Convene two public events: the "Big Reveal" and "Finale", each with 300-500 attendees, to hear problem advocates pitch wicked problems in water, climate, and the integration of the two. The Finale provides insight into the entrepreneur's intention to tackle selected wicked problems. With NREL, the DOE Water Desalination Hub, NAWI, Water Research Foundation, WECO, Project Wet and other water education organizations develop educational programming for our two public events highlighting the targeted wicked problems, systems maps and the implementation of the Colorado Water Plan.

8.**Develop an "award fund"** to incentivize participating entrepreneurs to select targeted wicked problems identified by the Metro Roundtable and the CWCB.

Project Objectives:

10.10.10's 2020 program will focus exclusively on the challenges in water + climate and the nexus of the two. Working with a network of local and national validators (subject matter experts), 10.10.10 will identify 10 wicked problems in these sectors. We invite 10 serial entrepreneurs from throughout the United States to join us in Denver. Over the course of 10 days the entrepreneurs learn about these wicked problems and work to develop market-based solutions that may form the basis for their next new ventures. 10.10.10's mission is to tackle the world's wicked problems through public education and engagement that inspires entrepreneurs to action. Our goal is to generate market-based companies that target these wicked problems. We aim to inspire entrepreneurs to create new ventures based on new products and services that can change the world.

Tasks

Task 1 –Subject Matter Expert recruitment and convening. Recruit and convene subject matter experts to map the complex system of the identified targeted Wicked Problems for the program and beyond in a facilitated process. Deliverable: Educational materials: **Systems Maps (Appendix B) and outline Wicked Problem Briefs (Appendix A):** Highlight two to three wicked problems prioritized by the Metro Roundtable and the CWCB. These systems maps and completed wicked problem briefs will be provided to CWCB and eventually the program participants during the large, public events associated with our program–the "Big Reveal" and "Finale"-as well as our 10.10.10 website.

Description of Task: **Validator/Stakeholder (subject matter experts) Systems mapping** Describe the process, Identify participants. Convene Water and Climate subject matter experts to map the 10 targeted wicked problem components.

We seek subject matter experts (validators) for each wicked problem. The validators identified with the assistance of thought leaders from CWCB, and the Metro Roundtable will aid us with specific wicked problems as well as connect prospective CEOs to other experts who can help him/her understand the problem and then validate or invalidate approaches to potential solutions. These participants will also be asked to aid in the wicked problem mapping process and participate in the 10.10.10 program.

Method/Procedure:
With representatives from the Metro Roundtable and CWCB stakeholders and other thought leaders, we will identify and recruit additional key stakeholders to participate in both video calls and in person workshops to be held in the Metro Denver area. Through a facilitated process, stakeholders will convene to map the targeted 10 water and climate wicked problem components. Our goal is to better understand the dynamic relationship with the wicked problems and public policy, infrastructure, pricing, access to data and information and extreme weather events. These factors result in inadequate resilience, security and sustainability of water and urban and rural communities. The process will identify issues, opportunities and obstacles to successfully explore targeted wicked problems. The systems maps will Identify potential high value/impact priority components with a diverse sub group of actors and stakeholders who experience these wicked problems from different vantage points and are able to share their varied perspectives.

The 10 completed wicked problem systems maps will be used by the 10 prospective CEOs and their temporary teams to navigate the X Genesis program process to identify points of influence to foster the creation of new ventures to tackle the targeted wicked problems.

Once revealed during our opening public Big Reveal event, the systems maps will be available for distribution to the public and innovation ecosystem to enhance the ecosystem and support additional entrepreneurial ventures. The 10 completed targeted wicked problem maps for 10.10.10 Water + Climate will become key evergreen artifact outputs available to CWCB and the participating Basin Roundtables. The maps might reveal additional key opportunities to modify regulatory issues or inspire additional enterprise engagement on the wicked problems.

The initial 10 targeted wicked problems systems maps will also be enhanced over the course of the subsequent programs with the addition of additional wicked problem targets. There will also be an enhanced list of key stakeholders and their resources identified to be called on to support for future efforts to tackle the wicked problems in water + climate.

Deliverable: 10 validated systems maps (See Appendix B) for the 10.10.10 Water + Climate targeted wicked problems. For each map, key wicked problem components will be identified including those that maintain the status quo, those that promote growth, decline and impact. The two to three wicked problems prioritized by the Metro Roundtable and the CWCB will be highlighted.

Tasks

Task 2 Identify implementation priorities, policy needs, enterprise implementation steps. Identify and develop prioritized lists of implementation steps, policy needs, components requiring enterprise intervention and key points of influence impacting the targeted wicked problem components and points of influence.

Description of Task:

With the completed 10 Wicked Problem Systems Maps and the 10 Wicked Problem Briefs conduct an assessment and detailed analysis to identify prioritized wicked problem components, the key opportunities and barriers facing implementation, funding, and scaling tech-enabled solutions within water and climate.

Identify opportunities for value-generating systems interventions. The process will provide a set of prioritized policy, regulatory enterprise and innovation action steps, to provide challenge goals for participating water system components.

Method/Procedure: With the Metro Roundtable and CWCB representatives review the systems maps to identify points of influence and key components to be addressed by key stakeholder groups.

Deliverable: For each of the 10 targeted wicked problems, identify a prioritized list of key points of leverage to focus points of influence requiring regulatory, enterprise and innovation influential action steps.

Tasks
Task 3 –Isolate and highlight the components of each targeted wicked problem that require entrepreneurs to develop new solutions. Provide an annotated list of wicked problems that require entrepreneurs to develop new solutions.
Description of Task: Isolate 10-15 wicked problems that require entrepreneurs and innovation ecosystem components to develop new solutions.
Method/Procedure: Once the list of 10-15 Wicked Problems (Tasks 1 & 2) for innovator efforts are identified based by the appropriateness for innovators, a research process is conducted to report on key elements of the Wicked Problems for the participating entrepreneurs. These educational materials on wicked problems in water and climate are developed to conduct an innovation catalyst program for experienced entrepreneurs. Once drafted these will be validated by the recruited subject matter experts.
Deliverable: 10 Researched Wicked Problem Briefs (See Appendix A) to be provided to the participating Prospective CEOs, Ninjas and Validators. The Wicked Problem Briefs will provide comprehensive research presentations of the most significant insights for entrepreneurs to develop market based solutions for wicked problems. Who experiences these problems? Who are the stakeholders, the actors who benefit or are harmed by the system? How are wicked problems generated and held in place? How does the system operate? What are the system dynamics and causal loops? Where can an entrepreneur expect to find opportunities to intervene, to change the status quo, in ways that address issues of equity and systemic neglect?

Tasks
Task 4 – Recruit and train 30-50 volunteer temporary team members. Recruit and train 30-50 volunteer temporary team members focused on working with the recruited prospective CEOs to map the selected wicked problems and determining (in conjunction with the entrepreneurs) which opportunities and market-based approaches will best tackle these wicked problems.
Description of Task: Recruit and train 30-50 temporary team member volunteers focused on touring the mapped 10 targeted wicked problem components and aiding participating entrepreneurs in developing market based approaches to tackle the prioritized wicked problem components.
***Ninjas and Sprinters**:* We surround our Prospective CEOs with volunteer professionals. "Ninjas" have diverse skill sets and backgrounds in marketing, law, finance, software engineering, UX/UI design and more. They are an ad hoc, temporary "founding team." Sprinters facilitate an opportunity generation process designed to answer critical business questions – including design, prototyping and testing ideas with final users, customers. We recruit 30-50 Ninjas and Sprinters through our website, meetups and social media marketing.
Method/Procedure: After selection, participating volunteers are trained through both an on-line pre-program course on our process and key design thinking processes and two all day weekend training workshops for Ninjas and sprinters. The training is focused on our system mapping, design thinking and opportunity generation process.

Deliverable: A list of 30-50 recruited, committed and trained Ninjas and Sprinters

Tasks

Task 5 –Recruit and gain commitment with 20-30 subject matter experts (SME), organizations and individuals, domain experts with deeply rooted passion to help tackle these problems. These SME validate the problems and help with systems mapping and informing entrepreneurs throughout the 10-day program (and beyond) by sharing informed perspective of the problem areas, markets, and more.

Description of Task: Recruit and gain commitment from 20-30 validators, organizations and individuals, domain experts with deeply rooted passion to solve these selected wicked problems. Validators help entrepreneurs over the 10-day program (and beyond) by sharing informed perspective of the problem area, market, and more.

Validators (subject matter experts)*:* a community of about 20 experts, stakeholders and individuals with deeply rooted passion to solve these targeted problems in water and climate. Validators help entrepreneurs over the 10-day program (and beyond) by sharing informed perspective of the problem area, market, and more. Representatives from the Colorado Water Conservation Board, Denver Water, Imagine H2O, the Nature Conservancy, Hydro Venture Partners, AECOM, AWWA, Gates Family Foundation, and the Walton Family Foundation and many important local and national organizations have served as Validators previously.

Method/Procedure: Through a series of workshops recruited validators review the system maps and participate in enhancing the mapped wicked problems prior to the program. The Validators attend the Big Reveal and a Wicked Problem unpacking day long workshop on day two of the program.

Deliverable: List of 20-30 recruited and engaged Validators (subject matter experts) in water and climate.

Tasks

Task 6 – Recruit 10-15 prospective CEOs. Recruit 10 prospective CEOs from around the country, diverse, proven serial entrepreneurs able to articulate a vision, recruit and retain top talent and raise capital to attend and participate in the 10.10.10 Water + Climate program in Denver.

Description of Task: Recruit 10 prospective CEOs (and five alternates based on experience and diversity) diverse, proven serial entrepreneurs able to articulate a vision, recruit and retain top talent and raise capital.

Serial Entrepreneurs: We leverage the speed, focus and capability of proven entrepreneurs (**Prospective CEOs**) to address wicked problems. Therefore, we recruit 10 successful, serial entrepreneurs and alternates, with a proven track record. They are able to articulate a vision, recruit and retain top talent and raise capital. They know how to create successful businesses. We prize diversity– geographic, gender, race, experience, background and perspective. At the time of our invitation to participate, they want to start another venture but have not decided what that venture will be. We provide a "founder due diligence" process, helping them identify opportunities, mitigate risk and improve outcomes. Moreover, we engage them in starting a venture that matters.

Method/Procedure: We have developed a recruitment process to identify and engage these individuals. With their success, these are not individuals that would apply. They have too many opportunities coming their way for that. We identify entrepreneurs through our network, referrals, research on social networks like LinkedIn and Crunch Base. We are seeking individuals who have had success and are between opportunities.

Deliverable: A ranked list of 10-20 recruited candidates ranked in two segments of invited and alternate candidates.

SUPPLEMENTAL REQUEST

Tasks

Task 7 – Conduct a 10-day innovation catalyst program for experienced entrepreneurs. Convene two public events: the "Big Reveal" and "Finale", each with 300-500 attendees, to hear problem advocates pitch wicked problems in water, climate, and the integration of the two. The Finale provides insight into the entrepreneur's intention to tackle selected wicked problems. With NREL, the DOE Water Desalination Hub, NAWI, Water Research Foundation, WECO, Project Wet and other water education organizations develop educational programming for our two public events highlighting the targeted wicked problems, systems maps and the implementation of the Colorado Water Plan.

Description of Task: The 10.10.10 innovation catalyst program including the opening and closing events of a 12-day (arrival day, 10-day program, departure day) aiding serial entrepreneurs find new opportunities to tackle 10 targeted wicked problems with market based opportunities. Prior to the program the entrepreneurs arrive to start the program the morning of the Big Reveal and leave the morning after the Finale. In between, the 10 Prospective CEOs are housed and work at a common co-working space to work and meet with Ninjas and Validators. These two events will also include significant educational activities highlighting the targeted wicked problems and the Colorado Water Plan.

Our approach is unique. We are not an accelerator. We support successful entrepreneurs earlier, before they've even created a venture or settled on a particular idea. We are not an incubator: we do not supply the ideas that will become new ventures. Instead we engage entrepreneurs who plan to start new ventures and give them a context to discover the wicked problems that could form the basis of their next new opportunity.

If things go well, the entrepreneurs and the investors achieve an exit, a liquidity event and great ROI. We operate before a new venture is formed. We aid the participating It brings to new venture generation the power of due diligence to identify an opportunity, mitigate risk, make better decisions and improve outcomes.

During the Big Reveal, for the first time, the 10 wicked problems are revealed to the public along with the systems maps that are on display at the events. We are in conversations with WECO (Water Education Colorado), the National Alliance for Water Innovations (NAWI) and the Water Research Foundation to develop educational programs before the program and in coordination with the two public events. Discussions are underway with the National Western Center (NWC) to hold both public programs at their facilities. The NWC will be the future home of the Colorado State University (CSU) and Denver Water building. The water building will host programs on water education, innovation and research and Western Water Policy Institute. Denver Water is planning to house its water quality laboratory in this building to create natural collaboration opportunities. The public facing facility will support conferences, events, K-12 field trips, in addition to programs focused on addressing water challenges through research and innovation like 10.10.10.

We have also recently received verbal commitment from McDonald's Corporation that they will become a financial sponsor for our upcoming 10.10.10 Water + Climate program. They are committed to reducing their water use footprint. They have also shared an interest in using their network of franchisees as a marketing channel for water efficiency education in coordination with our program.

Method/Procedure: We start with the problem, providing early due diligence. Investors have demonstrated over many decades the value of a rigorous due diligence process. We provide for entrepreneurs a kind of "founder due diligence" approach that can help them achieve what we call "founder-opportunity-fit" – even before they start their new venture.

Deliverable: A significant innovation catalyst program. The Metro Roundtable and CWCB stakeholders serving throughout the process and during the program as validators. A significant educational program highlighting targeted wicked problems and the Colorado Water Plan. Highlighted emphasis on prioritized wicked problems from CWCB and Metro Roundtable with incentive award funds available. (See below)

Tasks

Task 8 – Enhance the selection of targeted wicked problems by entrepreneurs

Description of Task: Enhance the focus of participating entrepreneurs the targeted wicked problems prioritized by CWCB and Metro Roundtable.

Method/Procedure: During and after the program we work with the participating entrepreneurs to aid them in the development of their business venture opportunity. We will announce and intend to emphasize the incentive that is in store for them if they target the priorities of CWCB and the Metro Roundtable.

For the last few years, 10.10.10 has worked with Denver based Rockies Venture Club (RVC) one of the nation's longest operating and largest angel seed investor groups, introducing prospective CEOs to new opportunities and preparing the ventures they create for seed investment.

For the proposed 10.10.10 Water + Climate and subsequent programs focused on water and climate, 10.10.10 and RVC are exploring the development of a Special Purpose Vehicle (SPV) to create an incentive matching investment fund. The SPV will increase the likelihood that entrepreneurs select a wicked problem

identified by the Colorado Water Plan and the participating Basin Roundtables and create new ventures to tackle these problems. This SPV structure will be developed prior to the May CWCB meeting.

Deliverable: Participating prospective CEOs focused on prioritized wicked problems of CWCB and Metro Roundtable on Water + Climate.

Budget and Schedule

This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format.

Reporting Requirements

Progress Reports: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues.

Final Report: At completion of the project, the applicant shall provide the CWCB a Final Report on the applicant's letterhead that:

- Summarizes the project and how the project was completed.
- Describes any obstacles encountered, and how these obstacles were overcome.
- Confirms that all matching commitments have been fulfilled.
- Includes photographs, summaries of meetings and engineering reports/designs.

The CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Payment

Payment will be made based on actual expenditures and must include invoices for all work completed. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions.

Costs incurred prior to the effective date of this contract are not reimbursable. The last 10% of the entire grant will be paid out when the final deliverable has been received. All products, data and information developed as a result of this contract must be provided to CWCB in hard copy and electronic format as part of the project documentation.

Performance Measures

Performance measures for this contract shall include the following:
(a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in Exhibit B. Per Water Plan Grant Guidelines, the CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.
(b) Accountability: Per Water Plan Grant Guidelines full documentation of project progress must be submitted with each invoice for reimbursement. Grantee must confirm that all grant conditions have been complied with on each invoice. In addition, per Water Plan Grant Guidelines, Progress Reports must be submitted at least once every 6 months. A Final Report must be submitted and approved before final project payment.
(c) Monitoring Requirements: Grantee is responsible for ongoing monitoring of project progress per Exhibit A. Progress shall be detailed in each invoice and in each Progress Report, as detailed above. Additional inspections or field consultations will be arranged as may be necessary.
(d) Noncompliance Resolution: Payment will be withheld if grantee is not current on all grant conditions. Flagrant disregard for grant conditions will result in a stop work order and cancellation of the Grant Agreement.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan Grant - Exhibit B
Budget and Schedule

Prepared Date:February 1, 2020

Name of Applicant:10.10.10, A project of the Colorado Nonprofit Development Center

Name of Water Project:Tackling Wicked Problems in Water + Climate

Project Start Date: 6/1/20

Project End Date: 12/31/20

Task No.	Task Description	Task Start Date	Task End Date	Grant Funding Request	Match Funding	Total
1	SME recruitment-Systems Maps/Problem Briefs outlined	6/1/2020	10/31/2020	$ 14,000	$ 49,500	$63,500
2	Identify implementation priorities, policy needs, individual enterprise implementation steps.	9/1/20	10/31/20	$ 5,000	$ 15,000	$20,000
3	Isolate wicked problem components that require entrepreneurs to develop new solutions. Problem Briefs research completed	9/1/20	10/31/2020	$ 8,000	$ 12,000	$20,000
4	Recruit and train 30-50 volunteer temporary team members	7/1/20	10/31/20	$ 15,000	$ 15,000	$30,000
5	Recruit and gain commitment with 20-30 subject matter experts (SME	6/15/20	10/31/19	$ 10,000	$ 20,000	$30,000
6	Recruit 10-15 prospective CEOs	6/1/20	10/31/20	$ 20,000	$ 20,000	$40,000
	CWCB Water Funds Previously Approved Funding			**$ 72,000**	**$ 131,500**	**$ 203,500**
	CWCB Water Funds Supplemental Request					
7	Conduct 10-day innovation catalyst program for experienced entrepreneurs, convene two public educational events	11/1/20	11/20/20	$ 56,500	$ 76,300	$132,800
8	Enhance the selection of targeted wicked problems by entrepreneurs–create incentive award fund	11/1/2020	12/31/2020	$0	$0	$0
	Direct Expenses Fiscal Sponsorship			$ 17,990	$ 5,152	$23,142
	Direct Expenses			$ 8,300	$ 194,350	$202,650
	Total					
	CWCB WP APPROVED FUNDING			$72,000		
	METRO ROUNDTABLE APPROVED FUNDING				$44,952	
	TOTAL SUPPLEMENTAL CWCB WATER FUND REQUEST			$82,790		
	TOTAL CWCB REQUEST			$154,790		
			Total	**$154,790**	**$407,302**	**$562,092**

Xenesis

Mr. Ben Wade
Colorado Water Conservation Board
Water Supply Planning Section
1313 Sherman St. Room 718
Denver, CO 80203

Dear Mr. Wade,

I hope this letter finds you well. X Genesis is a for-profit organization that operates in tandem with 10.10.10 – a project of the Colorado Nonprofit Development Center, a 501(c)3 organization. With the proposed events, we aim to tackle Wicked Problems, educate the public, and inspire and enhance the Colorado Innovation ecosystem. We are pleased CWCB is considering 10.10.10's Supplemental proposal to map the complex system of water and focus serial entrepreneurs on Wicked Problems in water + climate. These are some of the most pressing issues for Colorado and our planet.

X Genesis is pleased to commit matching funds up to 50% of the requested funds to support 10.10.10 's "Tackling Wicked Problems in Water + Climate" proposals to the Colorado Water Conservation Board. I mentioned previously that X Genesis is raising capital. We are now on track to close $1.5 million of funding by the end of Q1. (We have investor commitments for $600,000 and another $500K of strong interest.) We plan to raise an additional $4-6 million by the end of this year. With funds in place, we will provide up to 50% matching funds for the Water Plan proposal and/or the 25% match for the Water Plan Grant proposal and this supplemental request.

As Jeffrey Nathanson has shared with you, 10.10.10 has concurrently approached several additional corporate and individual partners that are considering providing matching funds for the 10.10.10 Water + Climate programs. Funds raised from these partners will also be provided as matching funds for these proposals. Irrespective of the status of these funds, X Genesis will, with our successful fundraising, provide the necessary additional matching funds to support the series of programs in 2020, 2021 and 2022.

Please let me know if you have any questions. I look forward to meeting with you both soon.

Sincerely,

Thomas K. Higley
Thomas K. Higley (Jan 30, 2020)

Thomas K. Higley
Founder & CEO

CWCB Supplemental Matching Fund Letter

Final Audit Report 2020-01-30

Created:	2020-01-30
By:	Jeffrey Nathanson (jeffrey@101010.net)
Status:	Signed
Transaction ID:	CBJCHBCAABAAUz1NG75Hp96snlzBZsMP6JcMxdnKpeM_

"CWCB Supplemental Matching Fund Letter" History

Document created by Jeffrey Nathanson (jeffrey@101010.net)
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Signature Date: 2020-01-30 - 6:59:45 PM GMT - Time Source: server- IP address: 71.33.143.70

Signed document emailed to Jeffrey Nathanson (jeffrey@101010.net) and Thomas K. Higley (tom@xgenesis.io)
2020-01-30 - 6:59:45 PM GMT

PROBLEM STATEMENT: IMBALANCE IN ALLOCATION OF WATER

The goal of balancing water allocations is to optimize water use. Many pricing, irrigation and water use systems were put into place during a period of relative water abundance when efficiency was not a high priority. These same systems are compounding the difficulty of balancing water allocations in a time when demand is growing and supply is shrinking.Inefficient and imbalanced water allocation systems can lead to a number of issues, including using higher quality water than is required for an application, water leakage in long transport systems, using more water than required for agricultural applications, and loss of water due to evaporation in reservoirs.

CONTRIBUTING FACTORS

- **Water withdrawals are predicted to increase** by approx. 50% in developing countries and 18 percent in developed countries by 2025, leading to increased competition for water.
- **Agriculture is a crucial and increasing use of water**, accounting for more than 70 percent of all water withdrawals.
- **Extreme water scarcity is projected to be widespread across all continents by 2025**, including much of the western United States, Australia, Africa and Asia.
- **Infrastructure investments** often lag the market need due to capital financing issues and politics.
- **Market rates** for water are not well-defined and long-term costs are typically not reflected in prices. Prices range from $5/1000m3 from gov't to >$100/1000m3 from private sources in the western US.
- **Water regulations** in many areas were implemented decades ago and have not kept up with the changing landscape (e.g. use it or lose it clauses).
- **Lack of real-time data** on water has led to the water-efficiency problem being ill defined, making balanced allocation of water especially challenging.

KEY PLAYERS

- **Agriculture** shows interest in irrigation innovation, but in some places, especially the Western US, they fear losing water rights due to use-it-or-lose-it regulations (National Farmers Union, Farm Bureau, State agriculture departments)
- **Consumers:** many recognize the problem and want to be part of a solution, but they are not likely to welcome an increase in water rates.
- **Energy Producers** and other Corporations are increasingly publicly expressing a desire to be good corporate citizens, and are seeking solutions.
- **Water utilities** are struggling with increasing demand and aging infrastructure.
- **Big food** (e.g., Monsanto) is seeking greater efficiency for potential to increase profits and corporate social responsibility.
- **Multi-state water compacts, .e.g. Colorado River Compact**, are charged with apportioning water resources and monitoring source protection.

TRENDS

- **The cost and value of water are rising** as scarcity worsens.
- **Advances in Technology** point to future cost-effective monitoring of use, and identification of waste across agriculture, industry, residential, and commercial applications.
- **Awareness:** there is a growing realization of long-term costs and social implications of inefficient water use, and the impact of climate change on water supply.
- **Growing corporate awareness:** corporations are starting to treat sustainable water use as a business imperative.
- **Growth in Sustainable Agriculture Practices:** the soil moisture sensor market expected to grow at a CAGR of 16.2% through 2020; increasing attention toward optimization of soil/rain/crop combinations.

CURRENT APPROACHES

- **Cities such as San Francisco are successfully implementing requirements** for developers to use on-site water reuse systems for anything that does not require potable water.
- **Sustainable Agriculture Initiative:** created by Nestlé, Unilever, and Danone as a nonprofit organization to facilitate knowledge-sharing and implementation of sustainable ag practices.
- Many useful **water efficiency technologies** exist today, and can be enacted with the right incentives.
- **Resource Recovery:** Increasing reuse of wastewater, energy and other resources.
- **ICT Applications:** Smart water grids to monitor water flow, manage pressure or detect leaks; smart meters; smart sensors to optimize irrigation.

VALIDATORS

Walton Family Foundation (Jill Ozarski)
Gates Family Foundation (Russ Schnitzer)
Summit Capital Water Advisors, (Rob Steiner)
Imagine H2O (Scott Bryan)
Colorado Department of Natural Resources/Colorado Water Conservation Board (Mara MacKillop)
Jim Ginley
American Water Works Association (Barb Martin)
Denver Water (Greg Fisher)
Xcel (Rob Osborn)
Conservation Colorado (Kristin Green)
Environmental Defense Fund (Brian Jackson)
Business for Water Stewardship (Craig Mackey)
Israel Colorado Innovation Fund (Gili Elkin)
The Nature Conservancy (Season Martin)
Colorado Foundation for Water Education (Jayla Poppleton)
AECOM (Tim Volz)
Sue Brown
Water Foundry (Will Sarni)

MORE INFORMATION

http://nca2014.globalchange.gov/report/sectors/water
https://www.usnews.com/news/best-states/california/articles/2017-05-31/santa-barbara-reactivates-seawater-desalination-plant
https://www.scientificamerican.com/article/water-use-rises-as-fracking-expands/
https://water.usgs.gov/watuse/
http://www.usga.org/course-care/water-resource-center/how-can-courses-minimize-water.html
http://www.sciencedirect.com/science/article/pii/S037837741400211X
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/az/soils/?cid=nrcs144p2_065174

10.10.10

PROBLEM STATEMENT: LACK OF ACCESS TO WATER DATA AND ACTIONABLE INFORMATION

Climate change, periodic droughts, inefficient use of water, and growing populations continue to threaten many municipal water supplies (especially in arid western cities), putting their future growth and prosperity in jeopardy. Commercial and individual consumers, many of whom are aware of the problem, often do not have the information necessary to be part of the solution. While useful data exists, it is often fragmented and/or severely outdated. Most residential, industrial, commercial, and agricultural water users still use automatic meter-reading infrastructure, or AMR systems. AMR systems are used by utilities to read the user's water data from month-to-month, but do not provide real-time water use data. Additionally, data is currently expensive to capture, digitize, and provide to consumers. Antiquated data collection and provisioning methods have proven to be major barriers to digitization and wider dissemination of actionable information for water consumers and providers.

CONTRIBUTING FACTORS

- **Old paper-based research** does not allow real-time information streaming
- **There is a lack of quantifiable water data** from municipalities, especially smaller towns
- **There are few public education campaigns in smaller cities/towns:** Due to the cost of generating and sharing data, historically only larger cities have provided data to consumers.
- **Cost of data:** New metering/infrastructure installation is timely and expensive as is the educational outreach that is necessary
- **Outdated technology** AMR systems only provide data to providers, not consumers.
- **Converting to real-time monitoring is expensive:** a study by Siemens determined average cost per meter was about $221.

KEY PLAYERS

- **Water utilities** are beginning to use real-time data and are generally working to make more information available to individual and commercial consumers.
- **States and cities,** especially those that have water plans, are interested in engaging the larger community in efforts to conserve and protect water.
- **Technology companies** are developing smart-meter solutions for both utilities and consumers.
- **Industries** recognize the importance of water conservation and want real-time data in order to find ways to use water more efficiently
- **Environmental nonprofit and advocacy groups** are committed to environmental stewardship and water conservation. These organizations play an important role in consumer education.

TRENDS

- **Technology and New Data Tools:** Real-time data technologies are becoming more readily-available to water users; IoT presents many new opportunities.
- **Growing Use of Real Time Metering:** From 2007-2017, residential systems have increased from 2.2 million to 57 million and Advanced Metering Infrastructure (AMI) in residential, commercial, industrial, and transportation has increased from 28 million in 2007, to 64 million in 2017.
- **Growing Awareness of Water Scarcity as a problem:** entities across all levels of government and industry are taking a closer look at how reliable water data can be used to increase efficiency and promote conservation.
- **State water plans** provide a roadmap for future water planning and set clear benchmarks and goals using data. For example, the , Colorado Plan and Texas Plan, which both use quantitative water data.

CURRENT APPROACHES

- **Consumer apps** such as DropCountr, Drip Detective, H2O Tracker and Other apps are making it easier to conserve water.
- **Technology to update meters:** Tendril, a Boulder-based startup, has developed a device that converts existing electrical meters into smart meters that track customers' energy use
- **Tools to quantify big water data** Alliance for Water Efficiency has created a complex conservation tool– tool is complex, but could be simplified for wateit could be simplified for water providers to use alongside smart metering to send data to consumers in real-time.
- **Digitization of water:** new digital technologies are enabling water utilities and industries to extract greater information and efficiency from legacy water infrastructure.

VALIDATORS

Walton Family Foundation (Jill Ozarski)
Gates Family Foundation (Russ Schnitzer)
Imagine H2O (Scott Bryan)
Colorado Department of Natural Resources/Colorado Water Conservation Board (Mara MacKillop)
Hydro Venture Partners (John Chahbandour)
Colorado Cleantech Industry Association (Shelly Curtiss)
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GOCode Colorado (Andrew Cole)
Environmental Defense Fund (Brian Jackson)
Israel Colorado Innovation Fund (Gili Elkin)
Colorado Foundation for Water Education (Jayla Poppleton)
The Nature Conservancy (Season Martin)
Jorg Heinemann
Sue Brown
Water Foundry (Will Sarni)

MORE INFORMATION

https://issuu.com/texasnetwork/docs/2013_primer_document
AMR System https://www.denverwater.org/residential/services-andinformation/troubleshooting-and-repairs/water-meters/automatic-meter-reading
Denver Water AMI RFP https://www.denverwater.org/contractors/bid-and-contractopportunities/purchasing-current/advanced-metering-infrastructure
Mapping http://www.watersage.com
Aurora Water https://www.auroragov.org/residents/water/water_system/aurora_water_facts
Goldwater Project https://issuu.com/texasnetwork/docs/2013_primer_document
http://www.pecanstreet.org/what-is-pecan-street-inc/
https://www.tvsg.co.uk/products/smart-home-addon-kit-smart-metering-plug-smart-rgb-bulb

Energy Information Administration data
(1) https://www.eia.gov/todayinenergy/detail.php?id=8590
(2) https://www.eia.gov/analysis/studies/electricity/pdf/sg_case_studies.pdf
(3) https://www.eia.gov/analysis/studies/electricity/pdf/sg_case_studies.pdf
(4) https://www.eia.gov/electricity/annual/html/epa_10_10.html
(5) https://www.eia.gov/tools/faqs/faq.php?id=108&t=3

https://ac.els-cdn.com/S1877705815026077/1-s2.0-S1877705815026077-main.pdf?_tid=8da360e4-b02c-11e7-958f-00000aab0f26&acdnat=1507909286_3ecef98f729a7ce82bb829a2b1c98ed7
http://www.waterworld.com/articles/print/volume-29/issue-12/water-utility-management/smart-water-a-key-building-block-of-the-smart-city-of-the-future.html
https://www.accenture.com/us-en/~/media/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Industries_9/Accenture-Utilities-Engaging-Consumers-Acn-Perspective.pdf
https://books.google.com/books?hl=en&lr=&id=ApJcKO0Jw3oC&oi=fnd&pg=PA409&dq=growth+in+consumers+demanding+actionable+information+toward+conservation&ots=GgntdVDPeC&sig=o5xM4aFqgvQ7DH5wJo9bT6VOR2k#v=onepage&q&f=false

10.10.10

PROBLEM STATEMENT: WATER MANAGEMENT SYSTEM LACKS TRANSPARENCY AND FLEXIBILITY

Century old laws and regulations govern water rights and determine how we manage and allocate water. Our current systems are slow and lack complete transparency. How can we create a more frictionless system to encourage and facilitate water trading? How do we ensure a long-term sufficient water supply to meet agricultural, municipal and environmental needs when in many instances water is a property right?

CONTRIBUTING FACTORS

- **Increasing demand for water:** The world's billions of people and their need for water for domestic uses, agriculture and livestock production, industry, aquaculture, mining, recreation, power generation, etc., put demands on water that are exponentially higher than ever and are now competing, creating conflicts over obtaining enough water - and the right kind of water - for all those users/uses.
- **Lack of uniformity in water law:** Eastern states follow riparian system (water rights granted to land adjacent to waterway) while western states use prior appropriation doctrine (first in time, first in right, means first there has rights to water).
- **Not all water is regulated the same way:** Policies and prices for surface water often differ from those for groundwater, e.g., many western states regulate surface water supplies very carefully, while groundwater withdrawals are not subject to close regulation.
- **Conflicting oversight:** In U.S. 9 federal agencies oversee various aspects of water, often compete on uses for water – domestic, agricultural, industrial, etc.
- **Conflicting view of water:** Water as a common pool resource vs a property right v a commodity.
- **High transaction costs:** Right now determining who owns water rights, how much they own and connecting buyers with sellers is difficult (sum of cost of obtaining info, finding willing traders, negotiation costs, affecting and registering trades and any contract enforcement).
- **High infrastructure costs:** It is actually difficult to move water (done through canal or ditch built/maintained by government).

KEY PLAYERS

- **Lawyers** who know water law and what is currently possible.
- **Governments** (national, state and local) who have enacted many of the regulations and may want to either maintain them or change them depending on how well they are meeting their needs.
- **Agriculture** is estimated to use 70% of world's freshwater supply and their need for water will continue in order to meet growing demand for food.
- **Business/industry** use water in manufacturing, energy production and will want to keep costs low in order to maintain profitability.
- **Recreation/environment** will look to protect water sources
- **Tech companies** who can help digitize records, map water, etc.
- **Citizens** who need water for residential purposes.
- **Water utilities, water districts** that require water rights in order to access water and fulfill their mandates.

TRENDS

- **Technological advancement** in automation of data scraping.
- **Growing awareness** of water scarcity is a problem: governments, the public and businesses understand this is a growing issue and are looking for ways to solve the problem. In order to do so, they'll need to know more about how the water management system works and will want tools to make it better.
- **Increase in the number of State Water Plans** that look at how best to plan for water use.
- **Climate change** and increase in weather disasters, including periodic droughts have decreased the water available, especially to downstream users in western states that use the prior appropriation doctrine.

CURRENT APPROACHES

- **Success of markets for water entitlements** in Australia and Mammoth Trading which facilitate the allocation of water and trading among users.
- **New companies** like Water Sage, which 'show' where the water is, who owns it and how it is used making the understanding of water rights easier.
- **Apply to water court or State Water Board for water rights.**
- **Sustainable Groundwater Management Act** (SGMA), the first statewide mandate for managing groundwater resources.
- **California passed the State Groundwater Management Act,** which opens the door for groundwater markets by giving local groundwater agencies responsibility for managing priority groundwater basins and an array of tools to work with, including the ability to authorize transfers of groundwater pumping allocations within their jurisdictions.

VALIDATORS

City of Denver (Emily Silverman)
National Renewable Energy Lab, NREL (Josh Sperling)
Xcel Energy (Rob Osborn)
Hydro Venture Partners (John Chahbandour)

Denver Water (Greg Fisher)
GoCode Colorado (Andrew Cole)
Confluence Group (Peter Kraft)
Denver Regional Council of Governments, DRCOG (Ashley Summers)

MORE INFORMATION

http://waterinthewest.stanford.edu/publications/colorado-river-basin-environmental-water-transfers-scorecard
http://www.ampinsights.com/rock-report
https://www.ecova.com/blog/2016/06/h20-matters-sustainable-water-management-101/
http://www.npr.org/2013/06/15/192034094/rivers-run-through-controversies-over-who-owns-the-water
https://en.wikipedia.org/wiki/Water_trading
https://www.oecd.org/unitedstates/45016437.pdf
http://waterinthewest.stanford.edu/sites/default/files/WITW-WaterRightsLawReview-2015-FINAL.pdf
http://waterinthewest.stanford.edu/publications/colorado-river-basin-environmental-water-transfers-scorecard
https://www.newsdeeply.com/water/community/2017/04/11/the-chore-of-understanding-water-rights-just-got-a-little-easier
http://www.un.org/waterforlifedecade/iwrm.shtml

10.10.10

PROBLEM STATEMENT: WATER CONTAMINATION AND DECLINING QUALITY

The safe and reliable provision of clean water is a critical public health issue. A multi-faceted approach to ensuring water quality includes appropriate infrastructure, treatment and water source protection. Aging water and waste-water infrastructure pose an environmental and public health threat. Moreover, the release of contaminants into our water supply can cause injury that is extremely costly to remedy. Water source protection can alleviate the need for costly treatment and ensure environmental stewardship. How can communities reduce and eliminate surface and groundwater pollution in a cost effective manner that is also responsive to business and agricultural needs?

CONTRIBUTING FACTORS

- **Worldwide demand will outpace the availability of clean water by 40% in 2030** and closing the gap will cost $50–60 billion a year, exacerbating challenges of **W**ater scarcity, **A**ccess to clean water, **S**anitation, and **H**ygiene (WASH).
- **Health Impacts:**
  - 88% of diarrheal disease deaths linked to water quality.
  - 1,400 deaths/day in children under 5 are caused by poor water quality worldwide.
  - Exposure to lead from leakage in pipes (e.g., Flint, MI).
  - Several diseases are linked to contaminated water including Hepatitis A, norovirus, salmonella, etc.
  - Growing concern about long-term effects of hormones, microplastics and other contaminants.
- **Economic Impact of WASH:**
  - providing basic, low cost water and sanitation facilities to countries in need would save US$263 billion a year (savings in diarrheal-related diseases alone would be US$11.6 billion and generate $5.6 billion in labour spending).
- **Eutrophication:** is the most prevalent water quality problem globally, caused by high-nutrient loads (phosphorus and nitrogen) from agricultural runoff, domestic sewage, industrial effluents and atmospheric inputs from fossil fuels and bushfires.
- **Water is a Nexus Problem:** production is dependent on energy, workers are dependent on food supply, both of which are dependent on water. Water remedies need to be considered in light of all three.

KEY PLAYERS

- **Industry** has a vested interest in clean water, and is increasingly expected to play a stewardship role.
- **Consumers** want clean, safe drinking water in both developed and developing countries.
- **Municipal Water Utilities** are charged with providing safe drinking water and are looking for cost-effective ways to do so.
- **Agriculture** needs dependable and predictable clean water supply for crop production. Agricultural runoff is a leading cause of water contamination.
- **Investors** recognize the growing populations in developing nations and the need for clean water and better sanitation.
- **NGOs** like the World Health Organization, UNICEF, United Nations, and the World Bank are committed to global development and alleviating the health and economic burden of poor water quality.
- **Environmental groups** are committed to safe, clean water sources.
- **Regulators** set and enforce clean water standards.

TRENDS

- **Growth & industrialization of emerging markets:** low and medium income economies will account for over 90 percent of global population growth by 2030; their rapid industrialization, urbanization, and motorization mean that these economies will contribute 70 percent of global GDP growth by 2030. These markets often face the most serious WASH challenges.
- **Recognition of water as a market:** many companies recognize the opportunity to provide solutions to water related challenges, and the market is growing in areas lacking access to safe drinking water and sanitation. This is also true for areas affected by climate change where water efficiency, recycling, and reuse are becoming increasingly important.
- **Growing awareness of the importance of water in the private sector:** businesses increasingly recognize the negative impact that poor quality water can have on production.
- **Increased community awareness:** communities are increasingly questioning industry practices (i.e., fracking or mining) that may threaten their local water supply.
- **Aging infrastructure:** older pipes leach contaminants in water and the estimated 240,000 water main breaks per year provide entry for contaminants.
- **Technology advances** in water quality detection and treatment include the use of predictive analytics and sophisticated data analysis.
- **Scientific advances** are improving the recognition and identification of new and potential contaminants.

CURRENT APPROACHES

- **Nanotechnology in filtration:** Researchers in India have come up with a low-cost, commercially scalable water purification system using nanotechnology to remove microbes, bacteria and other matter from water using composite nanoparticles.
- **Advanced membrane science**, especially ceramic membranes, are making desalination cheaper.
- **Water Source Protection:** recognised as a cost-effective method to keep contaminants out of drinking water and to make costly water purification measures and the construction of new wells unnecessary.
- **Atmospheric water generation:** Systems can be installed wherever there is a power source and at least 40% humidity, pulling hundreds of gallons daily right out of the air.
- **Using sensors for precise delivery of fertilizer** reduces the chance that excess nitrogen will get into groundwater.

VALIDATORS

Gates Family Foundation (Russ Schnitzer)
Denver Water (Greg Fisher)
Water for People (Eleanor Allen)
American Water Works Association (Barb Martin)

Jim Ginley
Israel Colorado Innovation Fund (Gili Elkin)
The Nature Conservancy (Chris Hawkins)
City of Denver (Sarah Anderson)

Colorado Foundation for Water Education (Jayla Poppleton)
Jorg Heinemann
Water Foundry (Will Sarni)

MORE INFORMATION

http://www.waterrf.org/resources/NewsletterStories/Microplastics.html
http://www.septicsafe.com/washing-machine-filter/
https://www.5gyres.org/plastic-fashion/
http://pacinst.org/wp-content/uploads/2013/02/water_quality_facts_and_stats3.pdf
http://www.mydaytondailynews.com/business/aging-water-infrastructure-could-cost-rate-payers-billions-dollars/yXnIqkaffiFRnba0yDrg5M/
http://mashable.com/2011/10/26/clean-water-innovations/#lyrFoeO5Gsq8
https://www.epa.gov/innovation/examples-innovation-water-sector#market9
https://www.huffingtonpost.com/2015/03/22/clean-water-innovations_n_6909106.html

10.10.10

PROBLEM STATEMENT: WATER SCARCITY

Simply put, water scarcity is either the lack of enough water (quantity) or lack of access to safe water (quality). By 2025, about 1.8 billion people will be living in regions or countries with absolute water scarcity. Water security is a major – and often growing –challenge for many countries today due to:

- **Demographic pressure:** Estimates show that with current practices, the world will face a 40% shortfall between forecasted demand and available supply of water by 2030.
- **Declining freshwater supplies:** Depletion of underground aquifers, utilization of shared river basins; global warming resulting in reductions in melt water as glaciers recede; water pollution; droughts.
- **Changing dietary preferences:** Today, 70% of global water withdrawals are for agriculture. This is likely to increase as we see growing demand for water-intensive agriculture for livestock and feed grain.
- **Poor water management:** Urban pipeline leakage (averages 30-50%); inadequate knowledge of ground and surface water budgets; lack of understanding of water rights; pollution; impact of floods; distance water must travel to reach populations.

How can we create new sources of water through innovation, reclamation and reuse to address the supply side challenge?

CONTRIBUTING FACTORS

- **Current cost structure:** In most regions of the world, water is cheap. Thus, water users are less motivated to adopt technologies and practices that may conserve water but raise prices.
- **Current infrastructure or poor water management:** In the U.S. water infrastructure is often old, deteriorating and urban "water leakage" (pipeline leakage) averages 30-50% in many cities.
- **Complex water rights agreements:** Water rights are complex, and it is difficult to share or trade rights.
- **Conflicting views of water:** Water is seen as both a common pool resource, a human right and a commodity.
- **Urbanization:** As cities continue to grow, so will our demand for water.
- **Human suffering:** More than one out of six people lack access to safe drinking water.
  - 1.1 billion people live without clean drinking water
  - 2.6 billion people lack adequate sanitation
  - 3,900 children die every day from waterborne diseases

KEY PLAYERS

- **Industry:** Reducing the amount of water needed in production or on-site reuse for clothing manufacturers, bottlers, energy producers, food and beverage makers, petroleum refineries, paper producers, etc.
- **Consumers:** When industry spends more on water, that cost is reflected in prices;
- **Municipal Water Utilities:** Improving processes for water reuse.
- **Agriculture:** Move toward precision agriculture (probability of rainfall, on soil moisture, on water, and on fertilizer requirements), water saving technology as well as productivity enhancing seeds.

TRENDS

- **Businesses are starting to understand and treat water as a business imperative.**
- **Many argue that water is underpriced.** Global Water Security for industry and households, in developed countries $0.60/cubic meter to more than $3/cubic meter. Water for agriculture $0.10/cubic meter.
- **Recent data indicate that desalination processes produce water at much higher costs:** $0.61/cubic meter vs. reverse osmosis, and $0.72/cubic meter to $0.89/cubic meter for thermal processes.
- **New technologies and companies** that are working to address the issue by improving the productivity of:
  - water treatment and distribution
  - water-intensive industrial and power processes
  - water usage in agriculture
- **Better understanding of processes (pros and cons) of the following:**
  - Aquifer recharge
  - Cloud seeding
  - Desalination
  - Brackish water treatment
- **Growing recognition** of the problem.

CURRENT APPROACHES

- **Water conservation efforts** (individual, government and industry)
- **Successful efforts by utilities such as San Francisco,** "One Water" approach, thinking of wastewater, drinking water, grey water as one, reducing use by 12%
- **Israel has successfully found a way to handle its water issues** by addressing water leakage, farming efficiency, recycling waste, desalination, pricing policy, and education.
- **New commercial tools:** Smart sensors for agriculture, veolia, that help companies determine the true cost of water for an entity and the use of data, sensors, etc. to identify where and how to be more efficient and digitization of water for efficiency
- **Improving water management,** trade of products with high water content, and institutional capacities to treat water and encourage efficient water use
- **Development and use of satellite and other remote sensing** data and hydrological modeling tools that allow users to better understand and manage their resources
- **Membrane and other nanotechnology** applications for desalination and water-purification
- **Alternate water sources** (rain harvesting, rain barrels, etc.)

VALIDATORS

Walton Family Foundation (Jill Ozarski)
Will Sarni
Water for People (Eleanor Allen)
Jim Ginley
Hydro Venture Partners (John Chahbandour)
Department of Natural Resources/Colorado Water Conservation Board (Mara MacKillop)
Denver Water (Greg Fisher)
Environmental Defense Fund (Brian Jackson)
Israel Colorado Innovation Fund (Gili Elkin)
Colorado Foundation for Water Education (Jayla Poppleton)
The Nature Conservancy (Season Martin)
Business for Water Stewardship (Craig Mackey)
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MORE INFORMATION

https://www.dni.gov/files/documents/Special%20Report_ICA%20Global%20Water%20Security.pdf
https://water.usgs.gov/edu/qa-home-uphill.html
https://www.epa.gov/dwsixyearreview/drinking-water-distribution-systems
https://en.wikipedia.org/wiki/Water_scarcity
https://www.conserve-energy-future.com/causes-effects-solutions-of-water-scarcity.php

The American Water Works
https://www.awwa.org/conferences-education/distance-learning/customer-service-certificate-program.aspx

How Water Works
https://www.awwa.org/resources-tools/water-knowledge/how-water-works.aspx

Water topics by EPA
https://www.epa.gov/environmental-topics/water-topicshttps://www.epa.gov/urbanwaters
https://www.epa.gov/urbanwaterspartners/19-designated-urban-waters-locations

Build America Investment Initiative 2015
https://portal.hud.gov/hudportal/documents/huddoc?id=BAInfraResGuideMay2015.pdf

Effective Funding Frameworks for Water Infrastructure
https://www.epa.gov/waterfinancecenter/effective-funding-frameworks-water-infrastructure#federal

Innovation in City Water Utilities:

San Francisco
http://sfwater.org/index.aspx?page=836
http://www.huffingtonpost.com/tara-lohan/san-franciscos-innovative-step-to-save-water_b_8236072.html
http://www.waterinnovationproject.com
http://sfwater.org/modules/showdocument.aspx?documentid=6057
https://www.greenbiz.com/blog/2014/08/04/10-companies-innovating-water-making-waves-water-innovation
http://www.waterworld.com/articles/2017/07/building-a-resilient-water-future-in-san-francisco.html

Philadelphia
http://news.nationalgeographic.com/news/2012/06/120606/philadelphia-storm-water-runoff/
http://phillywatersheds.org/philadelphia-water-challenge-seeks-innovative-approach-streamlining-green-infrastructure-projects
https://nextcity.org/daily/entry/philadelphia-green-stormwater-infrastructure-innovation-challenge

Los Angeles
http://www.filtsep.com/view/43216/los-angeles-water-reclamation-plant-selects-innovation/
http://laincubator.org

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