Water Supply Reserve Fund
Water Activity Summary Sheet
March 11-12, 2020
Agenda Item 23(p)

Applicant & Grantee:	Montezuma Land Conservancy
Water Activity Name:	Innovative Agricultural Management and Colorado's Next Generation of Water Leaders
Water Activity Purpose:	Multi-Purpose - Implementation
County:	Montezuma
Drainage Basin:	Southwest
Water Source:	n/a
Amount Requested:	$24,192 Southwest Basin Account
Matching Funds:	Applicant & 3rd Party Match (cash) = $69,251 • 286% of the Basin Account request (meets 25% min)

Staff Recommendation:
Staff recommends approval of up to $24,192 from the Southwest Basin Account to help fund the project: Innovative Agricultural Management and Colorado's Next Generation of Water Leaders .

Water Activity Summary: WSRF Funds, if approved will assist the Montezuma Land Conservancy bring together a diverse collaboration of partners in Montezuma County to engage, educate, and empower youth, agricultural producers, and the general public. Their goal is to help create a more resilient, connected, and collaborative community that is positioned to transition into the future of water in Colorado in the face a changing climate and a growing population. The project is broken into two objectives described below. To accomplish this goal, they will bring together dedicated community partners to collaborate on a project that no single partner would be able to carry out on their own. The project will utilize MLC's education center, called Fozzie's Farm, as a site for research and public education. The research component will look at regenerative agricultural strategies that focus on building soil health as a method for conserving water, and the use of soil moisture technology as a method for more efficient irrigation applications.

Discussion: This effort will assist the Southwest Basin Roundtable meet the Goals A4, B2 and C, as described in their Basin Implementation Plan, and compliments the SWBRT's Education Action Plan as well as assisting Colorado's Water Plan achieve the goals of reducing the Supply Demand Gap, Agriculture, and Education, Outreach , and Innovation.

Issues/Additional Needs: None

Eligibility Requirements: The application meets requirements of all eligibility components.

Evaluation Criteria: Staff has determined this activity satisfies the Evaluation Criteria.

Funding Sources/Match	Cash	In-kind	Total	Status
Gates Family Foundation	$30,720	$0	$30,720	Secured
Great Outdoors Colorado	$38,531	$0	$38,531	Secured
Sub-total	$69,251	$0	$69,251	
WSRF Soputhwest Basin Account	$24,192	$0	$24,192	Secured
Total Project Costs	$93,443	$0	$93,443	

CWCB Project Manager: Craig Godbout072

SOUTHWEST BASINS ROUNDTABLE
Michael Preston, Chair
c/o Dolores Water Conservancy District
P.O. Box 1150
Cortez, Colorado 81321
970-565-7562

January 17, 2020

Craig Godbout
Water Supply Management Section
Colorado Water Conservation Board
1580 Logan Street, Suite 600
Denver, Colorado 80203

SUBJECT: SWBRT Approval Montezuma Land Conservancy Research Center and Colorado's Next Generation of Water Leaders $24,192 from the Basin Account

Dear Craig:

The Southwest Basin Roundtable (SWBRT) approved funding for the Montezuma Land Conservancy Research Center and Colorado's Next Generation of Water Leaders in the amount of $24,192 from the Basin Fund at our January 15, 2015 Roundtable meeting. A quorum of Roundtable members was present.

The Project conforms with the Colorado Water Plan Measurable Objectives and Adaptive Management. A: Supply-Demand Gap via water conservation demonstrations and public education about climate change; D: Agriculture via innovative ways to conserve water and maintain yields in periods of scarcity; H: Outreach and education via youth education and outreach to agricultural landowners to drive their own innovations to adapt; as well as 6.3.4 Agricultural Conservation, Efficiency and Reuse; and 9.5 Outreach, Education and Public Involvement.

The project also conforms with the Southwest BIP Goals A4: Promote dialogue, foster cooperation in every basin and between basins with regard to water conservation; B2: Meet Agricultural Needs by efficiency measures to maximize beneficial use and production; and BIP Section 4.1: Encourage and conservation to reduce demand; and Implement informational events about water conservation (p. 79)

The completed Grant Application will be forwarded directly to you by the applicant. Please contact the applicant directly or me at 970-739-4181, or mpreston@frontier.net, if you have questions or wish to discuss this application in more detail.

Sincerely,

Michael Preston
Southwest Basin Roundtable Chair

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Update: July 31, 2018

Colorado Water Conservation Board

Water Supply Reserve Fund Grant Application

Instructions

All WSRF grant applications shall conform to the current 2016 WSRF Criteria and Guidelines.

To receive funding from the WSRF, a proposed water activity must be approved by a Roundtable(s) **AND** the Colorado Water Conservation Board (CWCB). The process for Roundtable consideration and recommendation is outlined in the 2016 WSRF Criteria and Guidelines. The CWCB meets bimonthly according to the schedule on page 2 of this application.

If you have questions, please contact the current CWCB staff Roundtable liaison:

Arkansas	**Gunnison | North Platte | South Platte | Yampa/White**	**Colorado | Metro | Rio Grande | Southwest**
Ben Wade	Craig Godbout	Megan Holcomb
ben.wade@state.co.us	craig.godbout@state.co.us	megan.holcomb@state.co.us
303-866-3441 x3238	303-866-3441 x3210	303-866-3441 x3222

WSRF Submittal Checklist (Required)

X	I acknowledge this request was recommended for CWCB approval by the sponsoring roundtable.
X	I acknowledge I have read and understand the 2016 WSRF Criteria and Guidelines.
X	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.(1)
Application Documents	
X	Exhibit A: Statement of Work(2) *(Word – see Template)*
X	Exhibit B: Budget & Schedule(2) *(Excel Spreadsheet – see Template)*
X	Letters of Matching and/or Pending 3rd Party Commitments(2)
X	Map(2)
	Photos/Drawings/Reports
X	Letters of Support
Contracting Documents(3)	
	Detailed/Itemized Budget(3) *(Excel Spreadsheet – see Template)*
	Certificate of Insurance(4) *(General, Auto, & Workers' Comp.)*
	Certificate of Good Standing(4)
	W-9 Form(4)
	Independent Contractor Form(4) *(If applicant is individual, not company/organization)*
	Electronic Funds Transfer (ETF) Form(4)

(1) Click "Grant Agreements". For reference only/do not fill out or submit/required for contracting
(2) Required with application if applicable.
(3) Additional documentation providing a Detailed/Itemized Budget maybe required for contracting. Applicants are encouraged to coordinate with the CWCB Project Manager to determine specifics.
(4) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

Last Update: July 31, 2018

Schedule		
CWCB Meeting	**Application Submittal Dates**	**Type of Request**
January	December 1	Basin Account; BIP
March	February 1	Basin/Statewide Account; BIP
May	April 1	Basin Account; BIP
July	June 1	Basin Account; BIP
September	August 1	Basin/Statewide Account; BIP
November	October 1	Basin Account/BIP

Desired Timeline	
Desired CWCB Hearing Month:	March 2020
Desired Notice to Proceed Date:	April 15th, 2020

Water Activity Summary	
Name of Applicant	Montezuma Land Conservancy
Name of Water Activity	Innovative Agricultural Management and Colorado's Next Generation of Water Leaders

Approving Roundtable(s)	Basin Account Request(s)(1)
Southwest Basin Roundtable	$24.192.00
Basin Account Request Subtotal	$24,192.00
Statewide Account Request(1)	$0
Total WSRF Funds Requested (Basin & Statewide)	$24,192.00
Total Project Costs	$93,443.00

(1) Please indicate the amount recommended for approval by the Roundtable(s)

Grantee and Applicant Information	
Name of Grantee(s)	Montezuma Land Conservancy

Last Update: July 31, 2018

Grantee and Applicant Information	
Mailing Address	216 West Montezuma Avenue, Cortez, CO 81321
FEIN	31-1632961
Grantee's Organization Contact(1)	Travis Custer
Position/Title	Executive Director
Email	travis@montezumaland.org
Phone	970-565-1664
Grant Management Contact(2)	Lindsay Yarbrough
Position/Title	Operations Manager
Email	lindsay@montezumaland.org
Phone	(970) 565-1664
Name of Applicant (if different than grantee)	N/A
Mailing Address	
Position/Title	
Email	
Phone	

(1) Person with signatory authority
(2) Person responsible for creating reimbursement invoices (Invoice for Services) and corresponding with CWCB staff.

Description of Grantee
Provide a brief description of the grantee's organization (100 words or less).
The Montezuma Land Conservancy (MLC) is a non-profit land trust located in Southwest Colorado with a big vision. In addition to protecting 45,000 acres of land since 1998, MLC is leading the way around the country in innovative community engagement strategies that redefine what it means to be a land trust. Through the use of our 83-acre education farm, MLC has expanded its mission and programs to include a critical focus on reconnecting our community to the natural world. Through hands-on education programs and youth pathways to careers in conservation these programs have served over 1,200 youth and 120 adults.

Type of Eligible Entity (check one)

Last Update: July 31, 2018

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: are eligible for funding from the Basin Accounts but not for funding from the Statewide Account.
X	**Non-governmental organizations:** broadly, any organization that is not part of the government
	Covered Entity: as defined in Section 37-60-126 Colorado Revised Statutes

Type of Water Activity (check one)	
	Study
X	Implementation

Category of Water Activity (check all that apply)		
	Nonconsumptive (Environmental)	
	Nonconsumptive (Recreational)	
X	Agricultural	
	Municipal/Industrial	
	Needs Assessment	
X	Education & Outreach	
	Other	Explain:

Location of Water Activity	
Please provide the general county and coordinates of the proposed activity below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable.	
County/Counties	Montezuma
Latitude	108 41’ 24.1” W
Longitude	37 29’ 50.8” N

Last Update: July 31, 2018

Water Activity Overview
Please provide a summary of the proposed water activity (200 words or less). Include a description of the activity and what the WSRF funding will be used for specifically (e.g. studies, permitting, construction). Provide a description of the water supply source to be utilized or the water body affected by the activity. 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, area of habitat improvements. 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, and Schedule.
Located in the Dolores River Basin, this project will utilize the Montezuma Land Conservancy's (MLC) 83-acre farm, Fozzie's Farm, as a site for a collaborative Engagement and Innovation project with a diverse set of local partners. The project will focus on two main components fully funded and shovel ready with WSRF funds. **1) Scientific Research** to study the use of sensor-based irrigation management on a 5-acre perennial grass system using regenerative agricultural strategies such as rotational grazing and soil health management; and **2) Youth Engagement** through MLC's nationally recognized high school internship programs that create a critical opportunity to engage youth in hands-on education relating to water conservation, innovative agricultural strategies, and citizen based science. As the next generation of agricultural producers, water consumers, and community leaders, we believe it is key to emphasize and elevate our efforts to prepare youth to take Colorado's water and conservation future head on.

Measurable Results		
To catalog measurable results achieved with WSRF funds please provide any of the following values.		
	New Storage Created (acre-feet)	
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive	
	Existing Storage Preserved or Enhanced (acre-feet)	
	Length of Stream Restored or Protected (linear feet)	
Approx. .5-1 AF per acre/yr	Efficiency Savings (indicate acre-feet/year OR dollars/year)	
	Area of Restored or Preserved Habitat (acres)	
	Length of Pipe/Canal Built or Improved	
2,000 + annually through direct education, community forums, social media/online outreach, and printed materials	Other	Explain: Number of Coloradans Impacted by Engagment Activities

Water Activity Justification
Provide a description of how this water activity supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the respective Roundtable Basin Implementation Plan and Education Action Plan [(1)]. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or

Last Update: July 31, 2018

Water Activity Justification

page numbers).

For applications that include a request for funds from the Statewide Account, the proposed water activity shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan criteria for state support (CWP, Section 9.4, pp. 9-43 to 9-44;) (Also listed pp. 4-5 in 2016 WSRF Criteria and Guidelines).

After reviewing supporting documents (BIP, CWP, and EAP plans) we have identified this project will engage the following actionable steps towards accomplishing regional and statewide goals:

Southwest Basin Roundtable Basin Implementation Plan:

In the executive summary of the Southwest Basin Roundtable (SWBRT) BIP it identifies that, "*The Roundtable supports the idea that on a statewide basis we all need to be more efficient with water use and achieve high conservation. Recognizing that municipal demand is one of the driving forces to agricultural dry up…"* The report goes on to identify that crop irrigation requirements are predicted to increase based on changes in climate and resulting higher temperatures and lower irrigation-season precipitation. Coupled with identified irrigation gaps in Montezuma County, this data paints a stark and urgent picture for the Basin: *develop and transition to agricultural models that use water more efficiently, rely on more resilient crop types and practices, and do it yesterday.*

We believe that through innovative practices and technologies agricultural water usage can be reduced without having significant impacts to the economics of farming and ranching operations. Further, we believe this can be done while also improving the overall resiliency of the land and thus, over time, likely increase yields with less water.

In Section 1, Table 1 of the BIP there are a number of goals and outcomes listed that this project meets including components within Goal A: Balance All Needs and Reduce Conflict, Goal B: Meet Agricultural Needs, and Goal G: Comply with CO River Compact and Manage Risk (SWBRT BIP, pg. 11).

Goal A: Balance All Needs and Reduce Conflict – This project addresses goal *A4: Promote dialogue, foster cooperation and resolve conflict among water interests in every basin and between basins for the purpose of implementing solutions to Southwest Colorado's, and Colorado's water supply.* While this project is not related directly to an IPP we do believe it helps to accomplish a similar outcome to number 3, "…promote dialogue, foster cooperation, and resolve conflict," by bringing together diverse water users and stakeholders within the community to discuss water conservation strategies (SWBRT, pg.12).

Goal B: Meet Agricultural Needs – Under this goal we believe this project impacts goal *B2: Implement efficiency measures to maximize beneficial use and production*, specifically touching on measurable outcomes 1 and 2 (SWBRT BIP, pg. 13). By working towards these goals this project could act as an example of strategies that could assist in bridging the identified irrigation gap for the Dolores Project of nearly 4,000 AF (SWBRT BIP, pg. 32).

Goal G: Comply with CO River Compact and Manage Risk – This project addresses goal *G6: Support strategies to mitigate the impact of a CO River Compact curtailment should it occur.* By looking at opportunities for agricultural producers to conserve water, increase efficiency, and bring innovative management to their operations, we believe this project will help supplement a growing body of

Water Activity Justification

evidence that could inform transitional strategies for southwest Colorado agriculture to adapt to drought and climate change. Should a curtailment ever occur, operations that have transitioned to using less water, and those who are able to create more resilient systems, will be impacted less. Additionally, agricultural water conservation efforts can assist in diverting less water which will also help offset the gaps identified to prevent a curtailment scenario (SWBRT BIP, pg. 18).

The final component of the SWBRT BIP that this project addresses is assisting to support the overall goals identified in the **Roundtable Education Action Plan (EAP)** which identifies the following pertinent short term goals identified in the Outreach Plan of Section 4.1, 1) Encourage education and conservation to reduce demand; and 2) Implement informational events about water conservation and land-use planning and water reuse efforts, tools and strategies (SWBRT BIP, pg. 79).

Colorado Water Plan:

Chapter 10 of the Colorado Water Plan Identifies Colorado's Water Values and actions for implementation. As stated in 10.1:

> *"Colorado will continue to face natural stressors such as deep droughts, destructive wildfires and catastrophic floods. The best science available indicates that these conditions will only get worse with climate change…Coloradans at all levels—individually, locally, regionally, and statewide—must prepare to respond to these inevitable natural pressures so that Colorado can continue to flourish."*

Additionally, 10.1 identifies Colorado's Water Values and states that the water plan will drive towards, *"A productive economy that supports vibrant and sustainable cities; viable and productive agriculture; and robust skiing, recreation, and tourism industry."* This project hits on methods that focus on creating a more sustainable community by supporting agricultural innovation, youth education, and general public discourse around the need for water conservation strategies that are necessary to prepare for a transitional future. Chapter 10 further identifies following action items that have been identified as being addressed through this project:

A. Supply Demand Gap: By addressing alternative conservation efforts in agriculture that may, on a larger scale, result in greater water savings as well as public engagement that creates dialogue around water values and addressing topics like the impact of climate change.

D. Agriculture: This project addresses the needs of the agricultural community by exploring innovative ways to not only conserve water and increase agricultural efficiency, but also potentially do so without fallowing or reduction of yields allowing farmers to continue to produce their current yields and potentially increase yields. This project is a perfect opportunity for the state to encourage innovation and creativity as outlined in the action plan. Additionally, this process puts farmers and ranchers in the driver seat of their own innovations and shows them opportunities to collaborate with other water needs without making significant sacrifices.

H. Education, Outreach, and Innovation: Through youth engagement, outreach to landowners (particularly young farmers and ranchers), and creating opportunities for diverse public discourse this project applies a multitude of strategies to accomplish this goal. Emphasis should be given to programs that encourage the participation of young people and help to prepare the next generation

Last Update: July 31, 2018

Water Activity Justification

of water consumers and leaders.

In addition to these sections within Chapter 10, the following sections of the water plan are also pertinent to this project:

1. Chapter 6.3.4 – Agricultural Conservation, Efficiency, and Reuse: In this section it is identified that a goal of this strategy includes assisting Colorado's agricultural industry to become, "*more efficient and resilient, and to reduce non-beneficial water consumption and diversions without affecting statewide agricultural productivity and the environment.*" This project seeks to explore strategies that can reduce non-beneficial consumption and diversion, but also regenerative agricultural strategies that can improve yield while benefiting the overall ecological environment. The southwest must focus on adaptive management and transitional strategies to address climate change, and this is one of those ways. It also identifies specifically the goal of the Southwest Basin Roundtable to, *"implement efficiency measures to maximize beneficial use and production."*

2. Chapter 9.5 – Outreach, Education, and Public Engagement: This chapter identifies the goal by the state to promote financial assistance of programs that help to inform Colorado water users about issues to promote a sustainable future. To do so, the plan identifies the need for "sophisticated water users," and outreach efforts that, "…promote well-informed community discourse regarding balanced water solutions." As identified above, this project will accomplish this task through engaging a diverse community of users ranging in age, profession, and overall sector of water usage.

We believe that this project directly addresses the needs to not only develop and implement innovative concrete practices to conserve water and use it more efficiently, but to also engage the communities, and in particular the next generation, to become citizens who are prepared to respond.

In similar ways to the SWBRT BIP this project also addresses overarching components and actions identified in the Colorado Water Plan as they relate to agriculture and education and outreach. Agricultural action items identified in Chapter 10 and further explored in Appendix H of the water plan that could be touched on through this particular project include 6.3.4 Agricultural Conservation, Efficiency, and Reuse Actions 1a and 1b: Working with Colorado State University to research agricultural water conservation and outreach to the agricultural community about techniques related to innovative soil health strategies.

(1) Access Basin Implementation Plans or Education Action Plans from Basin drop down menu.

Matching Requirements: Basin Account Requests

Basin (only) Account grant requests require a 25% match (cash and/or in-kind) from the Applicant or 3rd party and shall be accompanied by a **letter of commitment** as described in the 2016 WSRF Criteria and Guidelines (submitted on the contributing entity's letterhead). Attach additional sheet if necessary.

Contributing Entity	Amount and Form of Match (note cash or in-kind)
Gates Family Foundation	$30,720 cash

Last Update: July 31, 2018

Matching Requirements: Basin Account Requests	
Great Outdoors Colorado	$38,531 cash
Total Match	$69,251
If you requested a Waiver to the Basin Account matching requirements, indicate the percentage you wish waived.	

Matching Requirements: Statewide Account Requests	
Statewide Account grant requests require a 50% match as described in the 2016 WSRF Criteria and Guidelines. A minimum of 10% match shall be from Basin Account funds (cash only). A minimum of 10% match shall be provided by the applicant or 3rd party (cash, in-kind, or combination). The remaining 30% of the required match may be provided from any other source (Basin, applicant, or 3rd party) and shall be accompanied by a **letter of commitment.** Attach additional sheet if necessary.	
Contributing Entity	Amount and Form of Match (note cash or in-kind):
Total Match	$
If you requested a Waiver to the Statewide Account matching, indicate % you wish waived. (Max 50% reduction of requirement).	

Related Studies
Please provide a list of any related studies, including if the water activity is complimentary to or assists in the implementation of other CWCB programs.

Last Update: July 31, 2018

Related Studies

1. A recent report released by the climate-risk data firm Four Twenty Seven, an affiliate of one of the world's largest three credit agencies Moody's, identifies the unavoidable risk associated with the expected impact of past carbon emissions. The report largely explores increasing risks to global water supplies and impacts to the global food system. Amongst the areas identified in the report as most vulnerable to "widespread water stress" include southern Europe and the Mediterranean, the southwest United States, and southern Africa. The report states that these areas are, "anticipated to experience 10 to 20% reductions in dry season rainfall, reductions equivalent to the two decades surrounding the American 'dust bowl.'" These expected changes and others identified in the report, including new data produced by Aqueduct Food and the World Resource Institute (funded by Cargill, one of the world's largest food producers by revenue), show that, "…by 2040 as much as 40% of all irrigated crops will face acute water stress." This report and others make a damning case for immediate action in our region to address water conservation efforts and strategies that allow community-wide transformation and transition in the midst of intensifying conditions.

2. Sensor based irrigation has resulted in considerable irrigation water savings, yet most producers in southwest Colorado do not make irrigation decisions based on targeted approaches, while also utilizing irrigation systems with low efficiency. The region is primarily using gated-pipe and overhead sprinkler irrigation systems confirming the regional application for the research proposed. Sensor-based irrigation management was found to be more beneficial for low-frequency surface and sprinkler irrigation due to large irrigation levels where greater soil-moisture depletions occur between irrigations compared to high-frequency, low irrigation levels seen with micro-irrigation systems (Hanson, et al., 2000).

   Rivers et al. (2015) demonstrate significant water savings (+ 50%) using soil moisture sensor networks. Dukes et al. (2003) had a 50% water savings using targeted irrigation in a vegetable trial with no significant reductions in yield. Further, the ability to rebound after periods of reduced irrigation has been seen in perennial alfalfa hay systems in western Colorado. Cabot et al. (2017) indicate partial season irrigation treatments on alfalfa fields can be a reasonable approach to reduce water-use while maintaining forage quality despite modest yield reductions.

   Targeted irrigation combined with partial season irrigations may become a necessary management strategy in times of water scarcity and to promote in-season water savings on a large scale basis. The research proposed here display the potential for significant irrigation water savings using a sensor-based approach rather than volume based approaches across multiple cropping systems. A need for regional data and an opportunity for demonstration drives the relevancy of the proposed research trial beyond on-location water savings.

   Additionally, The American Society of Agricultural and Biological Engineers (ASABE) partnered with the Environmental Protection Agency (EPA) WaterSense program to test the precision accuracy of soil-moisture based irrigation at various depletion levels versus field capacity. Their data recognizes the intra-regional variability of soil-moisture sensing accuracy. The soil type and field conditions of the research proposed in this grant proposal can serve as a regional representation to gain data for demonstration purposes to help convert regional irrigation scheduling away from volume based decision making, thereby providing a scalable water savings through irrigation efficiencies.

Last Update: July 31, 2018

Related Studies

In a climate smart agricultural management context, soil moisture sensor-based irrigation was shown to reduce the leaching potential of several nutrients (i.e. nitrogen and phosphorus) in a commercial nursery setting. The detailed soil nutrient and quality sampling in the enclosed research protocol will provide measurements for nutrient availability in a 3 feet deep soil profile replicated across treatments. An understanding of nutrient availability in conjunction with water use can provide insight into nutrient loads that leach to water resources. Further, through regenerative grazing practices, Shawver (2019) found that the management of livestock in an irrigated intensive-managed grazing system is the largest impact on forage quality and that with proper management there can be improvement in soil quality. These anticipated additional outcomes will also present data-based demonstration opportunities for regional producers.

Sources:

Cabot, P., J. Brummer, S. Gautam, L. Jones and N. Hansen. 2017. Benefits and Impacts of Partial Season Irrigation in Alfalfa Production. Western Alfalfa and Forage Symposium, https://alfalfa.ucdavis.edu/+symposium/2017/PDFfiles/Cabot%20Perry%202.pdf

Dukes, M.D. 2019. Soil Moisture-Based Irrigation Controller Final Test Report. EPA WaterSense Report

Dukes, M., E. Simonne, W. Davis, D. Studstill, and R. Hochmuth. 2003. Effect of Sensor-based high frequency irrigation on bell pepper yield and water use. Proceedings of 2nd International Conference on Irrigation and Drainage, pp. 665-674.

Hanson, B., S. Orloff, and D. Peters. 2000. Monitoring soil moisture helps refine irrigation management. California Agriculture. 38–42 May/June 2000 Vol. 54 No. 3.

Iersel, M., R.M. Seymour, M. Chappell, F. Watson and S. Dove. 2009. Soil Moisture Sensor-Based Irrigation Reduces Water Use and Nutrient Leaching in a Commercial Nursery. SNA Research Conference, Vol. 54.

Rivers,M., N. Coles, H. Zia, N. R. Harris and R. Yates. 2015. "How could sensor networks help with agricultural water management issues? Optimizing irrigation scheduling through networked soil-moisture sensors, *2015 IEEE Sensors Applications Symposium,* pp. 1-6. doi: 10.1109/SAS.2015.7133593

Shawver, C. 2019 Effects of Management-intensive Grazing in relation to soil health and forage production in an irrigated perennial pasture system. Colorado State University Thesis. https://mountainscholar.org/handle/10217/197432

Soil Moisture-Based Irrigation Control Technologies: WaterSense Specification Update. 2017. EPA WaterSense Report

Previous CWCB Grants

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;

Last Update: July 31, 2018

Previous CWCB Grants
5) Contract number or purchase order
None.

Tax Payer Bill of Rights
The Tax Payer Bill of Rights (TABOR) may limit the amount of grant money an entity can receive. Please describe any relevant TABOR issues that may affect the applicant.
None.

Last Update: January 9, 2018

Colorado Water Conservation Board	
Water Supply Reserve Fund	
Exhibit A - Statement of Work	
Date:	**1-6-2020**
Water Activity Name:	Innovative Agricultural Management and Colorado's Next Generation of Water Leaders
Grant Recipient:	**Montezuma Land Conservancy (MLC)**
Funding Source:	**Southwest Basin Roundtable Account**

Water Activity Overview: (Please provide brief description of the proposed water activity (no more than 200 words). Include a description of the overall water activity and specifically what the WSRF funding will be used for.

This project seeks to bring together a diverse collaboration of partners in Montezuma County to engage, educate, and empower youth, agricultural producers, and the general public. Our goal is to help create a more resilient, connected, and collaborative community that is positioned to transition into the future of water in Colorado in the face a changing climate and a growing population. The project is broken into two objectives described below. To accomplish this goal, we will bring together dedicated community partners to collaborate on a project that no single partner would be able to carry out on their own. The project will utilize MLC's education center, called Fozzie's Farm, as a site for research and public education. The research component will look at regenerative agricultural strategies that focus on building soil health as a method for conserving water, and the use of soil moisture technology as a method for more efficient irrigation applications.

Objectives: (List the objectives of the project)

Objective 1: Design and Implement a long-term irrigation and soil health monitoring protocol that includes methods of measurement, monitoring, and analysis which will be carried out by student interns in collaboration with researchers from Colorado State University. Emphasis will be placed on exploring transformative, climate smart agricultural practices combining the use of management informed water savings technology with regenerative agricultural practices;

Objective 2: Empower and engage the next generation of conservation leaders, our youth, through hands-on experiential opportunities to take science into their own hands, explore career opportunities in natural resources and agriculture, and advocate for a more resilient and transformative future;

Tasks

Provide a detailed description of each task using the following format:

Last Update: January 9, 2018

Tasks
Task 1 – Irrigation and Soil Research Monitoring
Description of Task:
With Colorado State University (CSU) research staff at the helm, this task will seek to design and implement a scientific research project on MLC's Fozzie's Farm with youth program participants assisting. This project will focus on soil moisture monitoring for the purpose of enhanced irrigation water application strategies, and monitoring soil health over time as management changes occur on the farm. The goal is to show producers and the public strategies for conserving water through both application management and changes in overall farm management that seek to use improved soil health as a method of water conservation. While this protocol will be developed with Fozzie's Farm needs in mind, the goal is to create something easily replicable on other agricultural operations.
Method/Procedure:
Irrigation will be blocked across a 5-acre field based on replicated time domain reflectrometry (TDR) probes (CR655, Campbell Scientific, Logan, UT) placed within the field at depths of 12 and 24 inches using data loggers (CR 1000x) taking measurements in 15 minute intervals. The control portion of the field will be irrigated based on volume determined on weekly measurements (i.e. 1 inch/week). Sensor-based irrigation will be timed based on soil moisture measurements indicating need based on the electromagnetic soil capacitance as a function of water content. A Giddings probe will be used to take soil samples to 3 feet June 2020 and June 2021. We will take three replications of samples in both the research and control fields. Soil samples will be analyzed for total nitrogen, total organic carbon, total organic nitrogen; H3A extract: nitrate-nitrogen, ammonium-nitrogen, inorganic nitrogen, total phosphorus, inorganic Phosphorus, organic phosphorus, potassium, calcium, magnesium and the Haney test for an indicator of soil health. In the research and control field three GPS points will be selected as representative points in the fields. At this location photo-points and line transects will be done. SWCRC staff will train MLC staff and Fozzie's student interns. MLC staff and Fozzie's student interns will complete the monitoring. Using a 4.8 ft^2 hoop, clippings will be done by randomly throwing the hoop from this GPS point. This will be done to calculate pounds of standing forage before and after grazing. At the same time, photo points will be completed using the GrassSnap App in established points that will be replicated throughout the study each time before and after grazing. Using the protocols established by the Colorado Rangeland Monitoring Guide 100-foot line transects will be conducted at the beginning of this study and at the end of this study in the month of June to evaluate the changes in plant composition. While we do not anticipate many changes in plant composition over the course of this grant, this data will give us baseline data for future pasture monitoring. MLC will work with CSU to find appropriate avenues for youth engagement and public outreach and will work with Southwest Open School staff to connect youth programs to high school credits. MLC will also act in collaboration with CSU staff to develop the white paper and distribute to stakeholders.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)

Tasks
Grantee will receive valuable information about on-farm management practices which will inform future decision making. The installation of the research plot also creates a hands-on opportunity for long-term curriculum for youth and adult programs. Data derived from the research will also be used to provide valuable outreach and education opportunities to the public. Additionally, this research also helps to strengthen local partnerships and helps to add to a local body of critical knowledge about how to address natural resource concerns (soil and water) in our community.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Deliverables from this task include a written scientific procedure and design with clear monitoring protocols that will allow this research to continue long-term. CSU will assist in the installation of the research components. All monitoring will be recorded and evaluated and grantee will deliver a final white paper at the conclusion of the project. MLC in collaboration with CSU will also deliver one field day per year to producers and the public during the course of the grant. In addition, grantee will draw from the experience to document all successes, challenges, and lessons learned to incorporate into grant reporting and future fundraising and program design.

Tasks
Provide a detailed description of each task using the following format:
Task 2 – Citizen Science: Youth Exploration and Engagement
Description of Task:
We believe in the power of youth and the importance of preparing the next generation to meet the challenges of water conservation and climate change head on. For the Water Plan to be successfully implemented, emphasis on youth engagement should be a primary priority. By engaging youth in the direct scientific research of this project, as well as the public outreach, we seek to empower these young people to take agency in conservation and advocacy. To this end, youth will be a key player in this grant at all steps. Research has also shown the power and impact of experiential education in schools and the importance of getting youth outdoors to connect to nature. By engaging youth in the research portion of this grant we offer a unique opportunity to learn about physical sciences, agriculture, scientific method, and critical thinking further developing important lifelong skills. Additionally, youth participants will be eligible to receive credits towards graduation. MLC has worked diligently with Southwest Open School (SWOS) to identify opportunities for students to receive credits towards graduation for participation in our Summer Agricultural Immersion Program and Student Internships. Not only do these programs provide youth the opportunity for academic credits but they also touch on key principles emphasized in the Colorado Department of Education's work based learning and Innovative Learning Opportunities which state: *"Innovative learning opportunities may include work-based learning such as apprenticeships or residency programs, enrollment in postsecondary courses taught on college campuses, competency-based learning or capstone projects, and other learning experiences that are designed to help students*

Last Update: January 9, 2018

Tasks
develop and demonstrate personal, entrepreneurial, civic and interpersonal, and professional skills as described in CDE's Essential Skills Required in the Colorado Academic Standards." SWOS staff have identified the following Work Based Learning opportunities and essential skills created by this grant: 1. Initiative/Self Direction 2. Adaptability/flexibility 3. Perseverance/Resilience Critical thinking/problem solving 4. Inquiry/Analysis 5. Collaboration/teamwork 6. Communication 7. Global/Cultural Awareness 8. Civic engagement 9. Task/time management 10. Career awareness 11. Leadership Students are eligible to receive .25 credits per 30 hours for work based learning that incorporates these essential skills. Work based learning that incorporates on-farm labor allows students .25 credits per 60 hours. Students are also eligible to receive academic credits for English and speech for the public outreach component of this grant as well as science and math credits (including integrated science, life science, earth science, and agricultural science) for the research component. Please feel free to contact applicant for a complete breakdown of Colorado State educational standards used by SWOS administration to cite these credits as it is to extensive for the purposes of this application.
Method/Procedure:
MLC will first work with SWOS staff and administration to identify how the scientific research component and public outreach fits into student's graduation requirements. Applicable credits will be applied to eligible youth participants. MLC and CSU will design the four-week summer program, and internship scopes of work to include direct participation of students in the research and analysis of the irrigation and biological monitoring. MLC will work in collaboration with SWOS teachers to find relevant opportunities for students to present their findings at school and incorporate their experience into other projects.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
MLC's youth programs have received national attention as they represent a changing paradigm for land trusts around the country. For MLC and our partners, the continuation of these programs is paramount and they define the future of conservation. With youth engagement in the outdoors at the lowest point it's ever been, it is more important than ever to create opportunities for these connections. This project provides an important opportunity to continue to develop a deeper relationship with Southwest Open School and for our organization to grow our programs. Additionally, youth will help to collect and analyze important data that drives the management of Fozzie's Farm.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)

Tasks
The deliverable of this portion of the grant will include documentation of students receiving school credit for their participation and connection to state standards that could help to inform future programs and strengthen experiential strategies between SWOS and MLC, as well as a model for other programs statewide. Documentation of youth participation will be included in the white paper and final report. This will include but is not limited to: pictures, recorded interviews, student surveys, and quotes. In addition, grantee will draw from the experience to document all successes, challenges, and lessons learned to incorporate into grant reporting and future fundraising and program design.

Tasks
Provide a detailed description of each task using the following format:
Task 3 – Grant Administration
Description of Task:
All necessary tasks to oversee the budget, track spending, prepare documentation for reimbursements, and communication with CWCB staff will be carried out by MLC's executive director and operations manager.
Method/Procedure:
MLC has a substantial track record of managing and reporting 21 years of successful grant administration. MLC utilizes financial software (quickbooks) and external excel documents for tracking expenses. The executive director and operations manager oversee all budget management and grant tracking as well as all follow-up reporting.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Grantee will administer tasks necessary for timely reimbursement of funds to keep project on track and running smoothly.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Grantee will provide CWCB with all necessary documentation to track expenditures, request reimbursements, and report on grant outcomes. These documents will include, but are not limited to: receipts, invoices, salary narratives, expense worksheets, contractor bids, and any other documents deemed necessary by CWCB. Grantee will provide documentation that is complete, clear, organized and timely. Final reports will be submitted to CWCB outlining the project deliverables, lessons learned, and successes.

Budget and Schedule
Exhibit B - 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. A separate excel formatted Budget is required for engineering costs to include rate and unit costs.

Reporting Requirements

Progress Reports: The grantee 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. The CWCB may withhold reimbursement until satisfactory progress reports have been submitted.

Final Report: At completion of the project, the grantee shall provide the CWCB a Final Report on the grantee'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.

Payments

Payment will be made based on actual expenditures, must include invoices for all work completed and must be on grantee's letterhead. 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.

The CWCB will pay the last 10% of the entire water activity 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 water activity and purchase order or contract will be closed without any further payment. Any entity that fails to complete a satisfactory Final Report and submit to CWCB within 90 days of the expiration of a purchase order or contract may be denied consideration for future funding of any type from CWCB.

Performance Requirements

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 Grant Guidelines, the CWCB will pay out the last 10% of the budget when the final deliverable is completed to the satisfaction of CWCB staff. Once the final deliverable has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.
(b) Accountability: Per the 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 the 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.

Last Update: December 17, 2019

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Supply Reserve Fund

EXHIBIT B - BUDGET AND SCHEDULE - Direct & Indirect (Administrative) Costs

Date: 1-2-2020

Water Activity Name: Innovative Agricultural Management and Colorado's Next Generation of Water Leaders

Grantee Name: Montezuma Land Conservancy

Task No.[1]	Description	Start Date[2]	End Date	Matching Funds (cash & in-kind)[3] Gates Family Foundation and Great Outdoors Colorado (GOCO)	WSRF Funds (Basin & Statewide combined)[3]	Total
1	Irrigation and Soil Research Monitoring	April - June 2020	Summer 2020		$ 9,412.00	$ 9,412.00
2	Citizen Science: Youth Exploration and Engagement	ongoing	ongoing	$ 69,251.00	$ 12,780.00	$82,031
3	Grant Administration	ongoing	ongoing		$ 2,000.00	$ 2,000.00
			Total	$ 69,251.00	$ 24,192.00	$ 93,443.00

(1) The single task that include costs for Grant Administration must provide a labor breakdown (see Indirect Costs tab below) where the total WSRF Grant contribution towards that task does not exceed 15% of the total WSRF Grant amount.

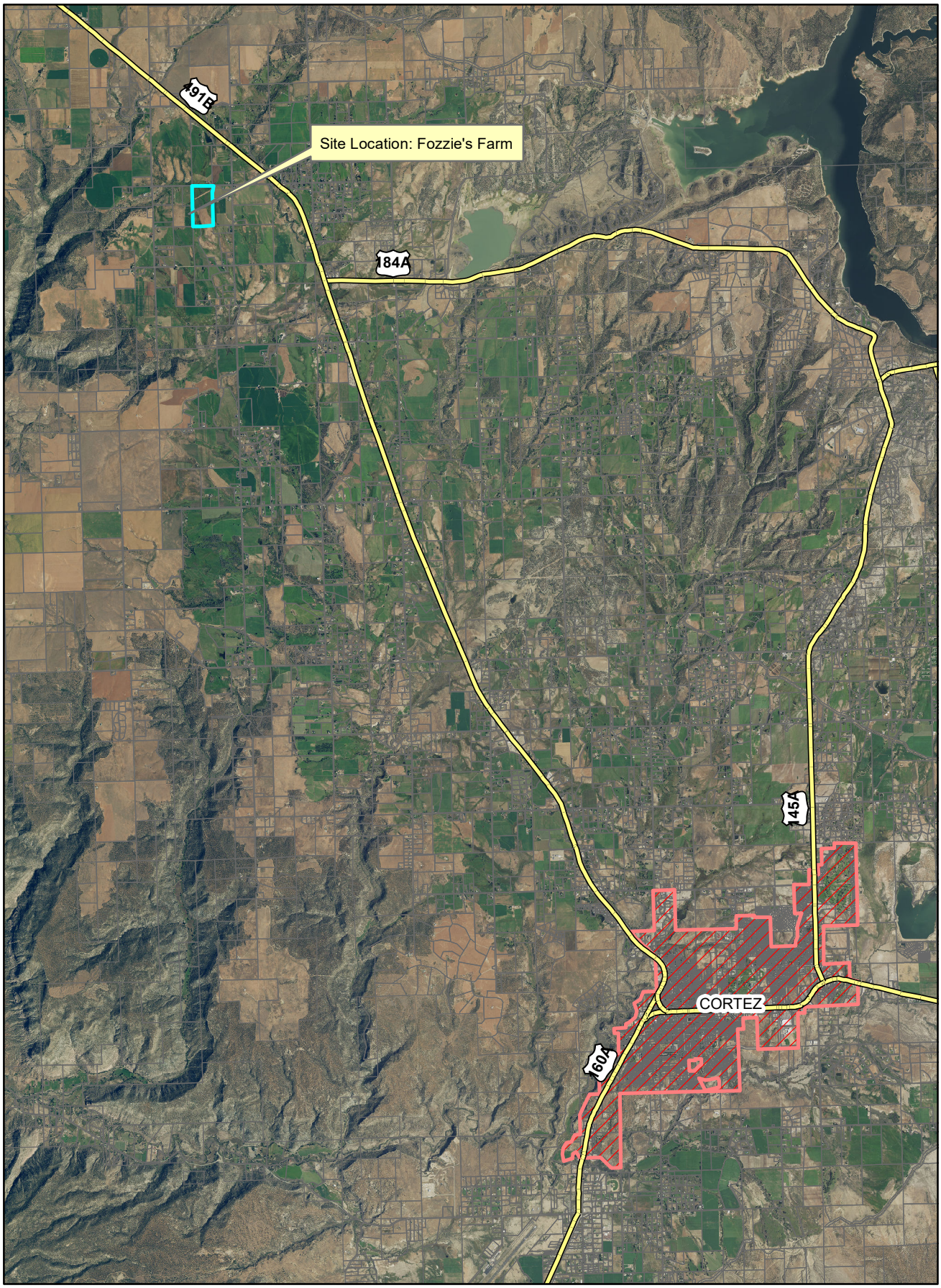
(2) Round values up to the nearest hundred dollars.

• Additional documentation providing a Detailed/Itemized Budget may be required for contracting. Applicants are encouraged to coordinate with the CWCB Project Manager to determine specifics.

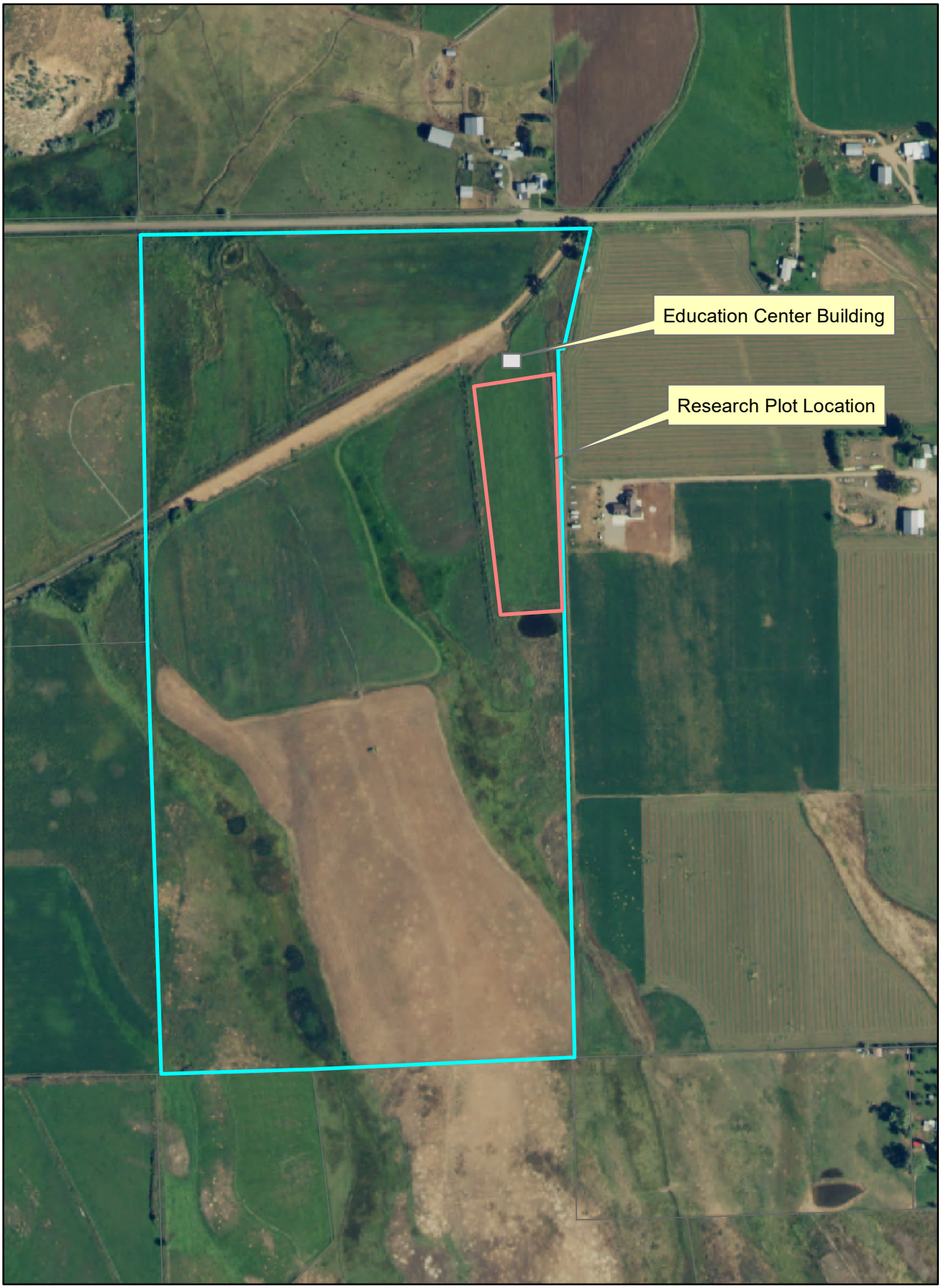
The CWCB will pay the last 10% of the entire water activity budget when the Final Report is completed to the satisfaction of the CWCB staff project manager. Once the Final Report has been accepted, the final payment

• Additonally, the applicant shall provide a progress report every 6 months, beginning from the date of contract execution

Innovative Agricultural Management and Colorado's Next Generation of Water Leaders
Area Map



Innovative Agricultural Management and Colorado's Next Generation of Water Leaders
Fozzie's Farm Site Map



GATES FAMILY FOUNDATION

2 January 2020

Southwest Basin Roundtable
Mr. Mike Preston, Chair
841 East Second Ave.
Durango, CO 81301

Southwest Basin Roundtable Leadership Team,
The Gates Family Foundation proudly supports the Montezuma Land Conservancy (MLC)'s application for funding support from the Southwest Basin Roundtable (SWBR) to further the development and utilization of Fozzie's Farm as a living, working exhibit benefitting area residents and visitors. This collaborative engagement and innovation project will serve as a catalyst for evolving land management practices, applied learning, and directly engaging future land stewards to pave the way for a new generation of agricultural producers and conservationists.

The MLC has been an outstanding conservation and community leader in southwestern Colorado, particularly under the leadership of Travis Custer and MLC's board of directors. The Gates Family Foundation has supported MLC's work with multiple grants over the past five years, including support for the development of Fozzie's Farm. A grant to MLC from the SWBR in 2020 would be matched by current Gates Family Foundation support in the amount of $30,720; $18,220 for the organization's youth programs and $12,500 to support the administration of its community conservation efforts. MLC has effectively demonstrated its ability to leverage Gates Family Foundation grants not only to deliver stated objectives, but to also reinforce the organization's sustainability and long-term relevance to the communities it serves.

A grant from the SWBR will be instrumental in furthering a project that directly supports the objectives of the SWBR and its Basin Implementation Plan. The MLC's stated outcomes related to regenerative agricultural practices, soil health, and efficient water use and management are mutually beneficial. It is our hope that the information and best practices resulting from this work will help inform future SWBR prioritization and investments.

GFF encourages the SWBR to fund MLC's request of support. Please do not hesitate to contact me directly with any questions about GFF's support of MLC and this project.

Sincerely,

Russ Schnitzer
Senior Program Officer, Natural Resources

1390 Lawrence Street, Suite 400 Denver, Colorado 80204-2081
303.722.1881 Fax 303.316.3038 www.gatesfamilyfoundation.org

GREAT OUTDOORS COLORADO

January 2, 2020

Southwest Basin Roundtable
P.O. Box 475
Durango, CO 81302

Dear Roundtable Members:

I am writing to support the Montezuma Land Conservancy's (MLC) proposal to the Southwest Basin Roundtable for Colorado Water Plan Implementation funds. This funding will support MLC and their community partners in setting up an agricultural irrigation study with a heavy emphasis on youth engagement and public outreach. MLC will leverage these funds with $38,531.20 in funding received from Great Outdoors Colorado (GOCO) through our Generation Wild Initiative.

Great Outdoors Colorado (GOCO) is a public trust fund that dedicates a portion of Lottery proceeds to the future of Colorado's outdoors, including projects that preserve, protect, and enhance our state's wildlife, park, river, trail, and open space heritage. In 2015, GOCO launched Generation Wild, a $25million statewide initiative aimed at getting more kids outside more often. Fifteen Generation Wild coalitions are working hard in urban, rural, suburban and mountain communities to break down barriers to outdoor access. MLC is leading the Montezuma Inspire Coalition in their work to provide equitable access to parks and programs across Montezuma County. MLC is the only land trust to receive a Generation Wild grant and has emerged as a leader in the statewide movement to get kids outside.

GOCO strongly supports MLC's vision to further activate its educational site, Fozzie's Farm, for scientific research, landowner and public outreach and youth engagement opportunities. Conservation needs in Colorado are vast, and this grant would accelerate MLC's work to meet the conservation challenges and opportunities unique to southwest Colorado. MLC's continued, innovative work to reconnect its community with the natural world is a model for the land trust community here in Colorado and nationally.

Please consider funding this proposal and reach out if you need additional information. You can contact me at ccastilian@goco.org and 303-226-4533.

Kind regards,

Chris Castilian
Executive Director