Alternative Agricultural Water Transfer Method Grant Program
Water Activity Summary Sheet
July 15, 2020
Agenda Item 7c

Applicant & Grantee:	Colorado Water Trust
Water Activity Name:	McKinley Ditch Deficit Irrigation Study
Water Activity Purpose:	Study the agronomic impacts to forage production and soil health, as well as economic impacts of deficit irrigation on high-elevation cow calf operation.
Drainage Basin:	Gunnison
Water Source:	Little Cimarron River
Amount Requested:	$219,914
Matching Funds:	**$63,050** total match

Staff Recommendation
Staff recommends approval of up to $219,914 from the Alternative Water Transfer Methods Program to help fund the "McKinley Ditch Deficit Irrigation" project.

Water Activity Summary: The purpose of the McKinley Ditch Deficit Irrigation Study is to better understand the agronomic and broader economic impacts of temporary deficit irrigation on high-elevation, irrigated pasture in the Gunnison River Basin and to inform guidance and education regarding the development of best management practices to minimize potential impacts, while maximize the benefits of a split-season irrigation alternative transfer method.

In early 2014, the Colorado Water Trust (CWT) purchased a portion of McKinley Ditch shares to help restore late summer flows to the Little Cimarron River, which is tributary to the Cimarron River and Gunnison River. The McKinley Ditch irrigates the Mighty Zephyr Ranch, which grows high elevation grass pasture and hay for forage. The ranch currently utilizes the pasture for late fall grazing to support a cow/calf operation. In late 2014, CWT and the Colorado Water Conservation Board (CWCB) filed a water court application to change the McKinley Ditch shares to allow the shares to be used in a first of its kind split-season arrangement for both instream flow use and irrigation. In 2015, CWT and CWCB completed a partnership agreement, under which CWT maintains ownership of the shares but conveyed to CWCB a "Grant of Flow Restoration Use" of its shares to allow for instream flow use. In 2018, the CWT and CWCB obtained a final decree (Case No. 14CW3108) allowing for spilt-season irrigation and instream flow use. The McKinley Ditch project is the first decreed agricultural to environmental ATM in Colorado.

The McKinley Ditch ATM project provides a unique opportunity to better understand the effects of long-term split-season irrigation on high-elevation grass/hay pasture lands. CWT, with the support of the Colorado Water Center at Colorado State University and Ranch Advisory Partners, will conduct a study to better understand the short and mid-term impacts of split-season deficit irrigation on forage production and soil health. The results of the study will be used to develop management recommendations to best utilize the property under new irrigation patterns, characterize the

operational and economic barriers and opportunities for realizing split-season irrigation management, and produce a best management practice guide to educate and assist future participants in split-season arrangements.

Discussion: Staff supports the application based on the following considerations: the project will: collect information regarding an identified data gap related to the agronomic impacts of temporary water conservation mechanisms on higher elevation irrigated grass pasture and hay production; develop methods for determining compensation for producers involved in alternative transfer methods; build on research completed through previous CWCB ATM funded projects; promote the use of voluntary, alternative transfer methods on the Western Slope through the development of best management practices for voluntary, temporary, and compensated conservation programs; help meet the Gunnison River Basin Implementation Plan's goal of managing water to sustain an optimal agricultural economy while meeting environmental/instream flow needs; and further the Colorado Water Plan Measurable Objectives and Critical Goals and Actions with regard to ATMs and instream flows.

Issues/Additional Needs: None at this time.

CWCB Project Manager: Alexander Funk

COLORADO WATER CONSERVATION BOARD

ALERNATIVE AGRICULTURAL WATER TRANSFER METHODS COMPETITIVE GRANT PROGRAM

GRANT APPLICATION FORM

McKinley Ditch Deficit Irrigation Study Little Cimarron River, Gunnison Basin

Program/Project Name **River Basin Name**

$219,914

Amount of Funds Requested

$47,300 Cash $15,050 In-Kind $63,050 Total

Amount of Matching Funds

Instructions: This application form must be submitted in electronic format (Microsoft Word or Original PDF). The application can be emailed or a disc can be mailed to the address at the end of the application form. The Alternative Agricultural Water Transfer Methods Competitive Grant Program, Criteria and Guidelines can be found at http://cwcb.state.co.us/LoansGrants/alternative-agricultural-water-transfer-methods-grants/Pages/main.aspx. **The criteria and guidelines must be reviewed and followed when completing this application**. You may attach additional sheets as necessary to fully answer any question, or to provide additional information that you feel would be helpful in evaluating this application. Include with your application a cover letter summarizing your request for a grant. If you have difficulty with any part of the application, contact Craig Godbout of the Water Supply Planning Section (Colorado Water Conservation Board) for assistance, at (303) 866-3441 x3210 or email at craig.godbout@state.co.us.

Generally, the applicant is also the prospective owner and sponsor of the proposed program/project. If this is not the case, contact Craig before completing this application.

Alternative Agricultural Water Transfer Methods – Grant Application Form
October 2010

Part A. - Description of the Applicant(s) (Program/Project Sponsor);

1. Applicant Name(s): The Colorado Water Trust

Mailing address: 3264 Larimer St, Suite D
Denver, CO 8025

Taxpayer ID#: Email address: tlagreca@coloradowatertrust.or

Phone Numbers: Business: 720-570-2897
Home: n/a
Fax: n/a

2. Person to contact regarding this application if different from above:

Name: Tony LaGreca

Position/Title Project Manager

3. If the Contracting Entity is different then the Applicant, please describe the Contracting Entity here.

4. *Provide a brief description of your organization. The applicant may be a public or private entity.*

Founded in 2001, the Colorado Water Trust's mission is to restore flows to Colorado's rivers in need. We work directly with a diverse group of water rights owners to find common ground and collaborative solutions to restore flows in dry rivers using market-based transactions. Past project partners have included irrigation districts, individual agricultural producers, municipalities and utilities. The Water Trust also works closely with the CWCB's Instream Flow Program to help Colorado protect instream flows. With our partners, the Water Trust works within Colorado's water law system to return flows to rivers and keep them flowing strong. Over the past 18 years, we have returned over 11.5 billion gallons of water to over 400 miles of rivers and streams. A comprehensive list of our projects can be found on our website here.

Tony LaGreca will serve as the project manager for this grant and the associated study. A longtime resident of Colorado, Tony earned undergraduate and graduate degrees in geography from the University of Colorado before moving to the Klamath basin in Oregon. At the Klamath Tribes, he directed research and monitoring programs, and worked with stakeholders to develop watershed scale restoration strategies. Later, he went to work for Trout Unlimited and implemented numerous stream restoration projects designed to benefit ESA listed species and native trout. Tony has been with the Colorado Water Trust for just over a year and he is working on multiple facets of the Little Cimarron project, developing new flow projects across the state and leading a monitoring and accounting effort to better document the benefits of the Water Trust's permanent projects.

To ensure that the McKinley Ditch Deficit Irrigation Study will be successful and impactful, the Water Trust will contract with two experts in the field to design, implement and report the results of the study.

The Water Trust will contract with The Colorado Water Center at Colorado State University to study the physical impacts to forage production and soil health and the economic impacts the water sharing agreement has on a cow calf operation. The Colorado Water Center (CoWC) brings together the work of the Colorado Water Institute and the CSU Water Center. The CoWC serves to lead interdisciplinary research, education, and engagement to address today's most pressing water issues in Colorado and beyond, and connect diverse water stakeholders to resources and expertise. Nora Flynn, Agricultural Water Specialist, will be leading the CoWC's efforts for this project. Nora is a soil health expert and has worked on deficit irrigation studies of row crops on Colorado's eastern plains. Other members of CoWC's staff will be assisting on the project as needed, most notably Joe Brummer who is an expert in high altitude grass pastures.

Ranch Advisory Partners (RAP) will provide critical ranch and grazing management expertise to the study, and will develop a grazing management plan designed to maximize benefits under the water sharing operations. RAP is dedicated to cultivating thriving rangelands, pastures, wildlife habitat, and riparian condition. RAP's group of committed resource managers work with clients to design

agricultural operations and wildlife habitat improvement projects that blend the values of ecological wellbeing, financial performance, and community dynamics.

Part B. - Description of the Alternative Water Transfer Program/Project –

1. *Purpose of the Program/Project*

Please provide a summary of the proposed program/project, including a statement of what the program/project is intended to accomplish, the need for the program/project, the problems and opportunities to be addressed, the expectations of the applicant(s), and why the program/project is important to the applicant(s). The summary must include a description of the technical, institutional (i.e., how the program/project will be organized and operated), and legal elements that will and/or have been addressed by the applicant and proposed program/project. The summary should also discuss relevant project history, if applicable, and any other relevant issues.

The McKinley Ditch Project is a groundbreaking, collaborative water sharing agreement between agriculture and the environment and a model for future ATM projects across the state. Under this pioneering project, high value agricultural lands continue early season irrigation through June or July to maintain a viable agricultural operation while preserving local agricultural heritage and the rural/agricultural nature of the beautiful Little Cimarron Valley (Figure 1). Later in the summer, the protected instream flows will greatly improve water quality and aquatic habitat in a section of the Little Cimarron River that historically ran dry. In 2014, the Colorado Water Trust (Water Trust) purchased 1.5 shares of water in the McKinley Ditch and began the process of obtaining a first of its kind split-season decree which allowed for both agricultural and instream flow uses in the same season. The Water Trust then conveyed to CWCB a permanent right to use those water rights for instream flow use under this proposed split-season operation. The CWCB Board voted unanimously to accept the offered water rights. Members commended the Water Trust for taking this novel idea from a "conversation to a concept", and for helping the state realize the consumptive/non-consumptive partnerships envisioned by the Water Plan. The decree was awarded in late 2018 and provides a permanent protected supply of water for both Cagriculture and the environment. In 2019, the Water Trust completed a Grant of Irrigation Use with the landowners which solidifies the water sharing agreement and ensures continued irrigation use of the water. To fully implement the project, the Water Trust will install a splitter in fall of 2020 which will return the decreed instream flows to the Little Cimarron and begin the new water sharing agreement on the Mighty Zephyr Ranch. This permanent ATM project will be the first long-term deficit irrigation project on a high altitude grass pasture operation in the state, and will dovetail well into ongoing efforts elsewhere in the state. The Water Trust feels that this groundbreaking project also provides a unique and important opportunity study the effects of deficit irrigation on high altitude grass pastures and produce guidance documents that can help fill information gaps and lower uncertainty barriers for new ATM projects.

Irrigated grass pastures are an important part of the Colorado agricultural landscape, and are by far

the most dominant agricultural use in high altitude areas of Colorado's western slope. Those who have stewarded these lands for generations have expressed a growing interest in utilizing their water rights for multiple benefits including instream flow for environmental purposes. However, there remains a lack of information on how to best manage irrigated grass pastures under novel water-sharing arrangements to realize multiple benefits. There is especially little information about how reduced irrigation impacts the productivity and soil health of irrigated grass pastures and how those impacts affect the economic viability of ranching operations. The lack of information is a significant hurdle to future ATM projects on the western slope, and additional information about benefits/impacts will support any statewide ATM program. Without proper information about the impacts to productivity, soil health and operations; agricultural producers are extremely hesitant to partner in this type of ATM project. Furthermore, information on benefits and impacts of deficit irrigation at high elevation will support future ATM project proponents' abilities to appropriately value ATM transactions. Future agricultural operations with split-season ATM's may not be viable or successful without proper guidance and education about the best management practices needed to maximize benefit and minimize impacts of a split-season irrigation ATM.

To help fill the data and knowledge gaps surrounding this type of ATM The Water Trust is partnering with the Colorado Water Center and Ranch Advisory Partners to give management recommendations and to complete a study of the effects of the McKinley Ditch ATM project on the productivity, soil health, operations and economics of the Mighty Zephyr Ranch. The primary objectives of this study are to:

1. Understand the short and mid-term impacts of split-season deficit irrigation on forage production and soil health.
2. Develop management recommendations to best utilize the property's irrigated acreage under the new irrigation patterns.
3. Characterize the operational and economic barriers and opportunities for realizing split-season irrigation management in high altitude grass pastures.
4. Write and publish scientific report and produce a Best Management Practice Guide to educate and assist future participants in split-season irrigation arrangements.

This project will utilize the best scientific and industry standard methods to collect soils, forage production and plant species/density data to fully document changes or effects resulting from the split-season operations. The data will inform a comprehensive grazing management plan, annual operational management recommendations and potential infrastructure upgrades designed to maximize beneficial use of and minimize impacts to the grass pasture resource under the split-season irrigation regime. To broaden the body of scientific knowledge surrounding deficit irrigation, the data, analysis and management activities will be synthesized and reported in relevant scientific journals. Ultimately the information will be presented in a Best Management Practices Guide that will fill in the data gaps, provide vital information directly to agricultural producers contemplating an ATM project, and help producers to realize the highest value of their pastures

under an ATM. The body of work resulting from this study will lower the barriers to high elevation grass pasture ATM projects and encourage wider use in the state.

This unique opportunity to study and demonstrate the value, effectiveness and impacts of a split-season deficit irrigation ATM project supports many basin and statewide water goals, follows recommendations from past work, and compliments other work in the state.

The proposed study generally follows up on the recommendations found in the *Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update*, November 2012 and compliments other work which is following the recommendations. The Program Summary recommends future projects:

1. Advance the Colorado River Compact Water Banking study and its focus on rotational fallowing by integration using the results from the Aspinall Water Bank study and Yampa ATM study.
2. Continue the study by CSU and others on the suitability of pasture grass for rotational fallowing.

While the initial Water Bank Feasibility Studies are complete, this work will provide hard data to help ground truth conclusions from the earlier work. The study also compliments other high altitude grass pasture studies being undertaken in the Gunnison Basin by the UGRWCD, Trout Unlimited and the CSU Extension office.

The information, guides and best management practices produced from this study will lower barriers to future ATM projects which are a key component of Colorado's Water Plan. Additionally, work completed under this grant will support the following Water Plan goals:

1. Support the development of multipurpose projects and methods that benefit environmental and recreational water needs as well as water needs for communities or agriculture. (Chapter 6.6)
2. The Chapter on ATM's (6.4) identifies "lack of data" and "irrigators concerns" as impediments to achieving the goal of "Maximizing Alternatives to Permanent Agricultural Dry Up"

The McKinley Ditch ATM and the proposed study will also help further the following goals from the 2015 Gunnison Basin Implementation Plan (BIP)

1. Protect water uses in the Gunnison basin. (Primary Plan Goal)
2. Discourage conversion of productive agricultural land to other uses. (Goal 2)
3. Quantify and protect environmental and recreational water uses. (Goal 5)
4. Describe and encourage the beneficial relationship between agricultural and environmental and recreational water users. (Goal 7)
5. Instream flow on the Little Cimarron was also identified in the "Nonconsumptive Protection and Monitoring Project List" (p. 113)

Figure 1. High elevation grass pastures on the Mighty Zephyr Ranch in the scenic Little Cimarron Valley. Site of the McKinley Ditch split-season irrigation ATM project and the study location.

Previous Studies

This study builds on the results of previous studies and investigations by applying known deficit irrigation concepts to the much lesser studied high elevation grass pastures and cow-calf operations of Colorado. These systems merit research because of their unique environmental, social, and economic challenges and opportunities. In a recent report, Colorado agriculture and water experts reported that there is very little research on deficit irrigation grass pastures in Colorado[1]. Deficit irrigation is a promising strategy for reducing agricultural water use; however, it is not proven as a practical management strategy on high elevation grass pasture[2]. The CoWC lead researcher, Nora Flynn, will combine her own 4.5 years of experience researching deficit irrigation in eastern plains of Colorado with other studies of how deficit irrigation impacts row crops, alfalfa, and soil characteristics[3,4,5]. This project will also rely on the extensive research and extension experiences of Dr. Joe Brummer, Extension Forage Expert, and Associate Professor in Soil and Crop Sciences at Colorado State University. A previous deficit irrigation pilot study by Dr. Brummer found that deficit irrigation leads to a significant decrease in forage yield[6,7]. Our research will build on this work by studying the multi-year impact of deficit irrigation management on grass production, soil health, soil moisture dynamics, and cow-calf operations. This project will also build on existing economic studies related to deficit irrigation to create an enterprise budget that takes into account

the unique operational and economic constraints of high altitude grass pastures and cow-calf operators in Colorado[8,9]. This project also stands to fill critical gaps in our knowledge of ATM utilization in high elevation pasture systems, which are vital to Colorado's agricultural and economic landscape[10,11].

1. Udall, B. and G. Peterson. 2017. Agricultural water conservation in the Colorado River Basin: Alternatives to permanent fallowing. Colorado Water Institute Completion Report.
2. Fereres, E. and M. A. Soriano. 2007. Deficit irrigation for reducing agricultural water use. J. of Exp. Bot. 58: 147-159.
3. Payero, J. O., S. R. Melvin, S. Irmak, D. Tarkalson. 2006. Yield response of corn to deficit irrigation in a semiarid climate. Agric. Water. Manag. 84: 101-112.
4. Cabot, P., J. Brummer, S. Gauam, L. Jones, and N. Hansen. 2017. Benefits and impacts of partial season irrigation on alfalfa production. Proceedings, Western Alfalfa & Forage Symposium, Reno, NV, 28-30.
5. Blanco-Canqui, H., N. L. Klocke, A. J. Schegel, L. R. Stone, and C. W. Rice. 2010. Impacts of deficit irrigation on carbon sequestration and soil physical properties under no-till. Soil Sci Soc. Am. J. 74: 1301-1309.
6. Cook, J., J. Brummer, P. Meiman and T. Gourd. 2018. Colorado Forage Guide. Colorado State University Extension Press.
7. Jones, L., and J. Brummer. 2015. Agronomic responses of grass and alfalfa hayfield to no and partial season irrigation as part of a western slope water bank. Colorado State University Thesis.
8. Peck, D. E., D. M. McLeod, J. P. Hewlett, and J. R. Lovvorn. 2004. Irrigation-dependent wetlands versus instream flow enhancement: Economics of water transfers from agricultural to wildlife uses. Env. Manag. 34:842-855.
9. Manning, D. T., S. Lurbe, L. H. Comas, T. J. Trout, N. Flynn, S. J. Fonte. 2018. Economic Viability of deficit irrigation in the Western US. Agric. Water. Manag. 196:114-123.
10. Varzi, M. M., and N. Grigg. Alternative water transfer methods: Review of Colorado experiences. J. of Irrig. and Drain. E. 145:1-8.
11. Bovee, B., N. Flynn, L. Gingrich, B. Osborne, R. Waskom, P. Cabot. *In prep*. ATM support project final report: Status assessment, framework, and future recommendations for Colorado's ATM program.

2. *Study Area/Service Area Description*

The study area/service area is generally the geographic area that is the subject of the proposed program/project (include both the source of supply and location and type of new use.

The Colorado Water Trust owns 1.5 (out of 8) shares of the McKinley Ditch which diverts water from the Little Cimarron River which is tributary to the Cimarron River and eventually the Gunnison River immediately downstream from Morrow Point Dam. The project area is located primarily in Gunnison County with some acreage in Montrose County; the nearby town of Cimarron is approximately 20 miles east of Montrose, Colorado. The area surrounding the study site is primarily rural, has a limited seasonal population base, and is dominated by ranchland with irrigated grass pastures, and public lands.

The 1.5 shares of the McKinley Ditch historically watered approximately 194 acres on what is now known as the Mighty Zephyr Ranch aka the Shepardson Property or the Western Rivers Conservancy Property (Figure 2). At an elevation of 7,400 ft the ranch has historically used irrigation water to grow high elevation grass pasture for either hay production or cattle grazing. The ranch currently utilizes the pasture primarily for late fall grazing to support a cow/calf operation. Average annual diversions for the 200 acre irrigated parcel are 767 af. The Water Trust does not have any historic crop yield numbers available at this time.

When utilized for instream flow the 1.5 shares (5.8 cfs maximum) owned by Water Trust will provide instream flow benefits to 2 segments of the Little Cimarron River and one segment of the Cimarron River (Figure 3).

- Segment One – Point of diversion of the McKinley Ditch to where return flows from the historical use of the Shares are returned to the Little Cimarron River, estimated to be upstream of the Perrin Ditch.
- Segment Two – The terminus of Segment One to the confluence of the Little Cimarron River and the Cimarron River.
- Segment Three – The terminus of Segment Two to the confluence of the Cimarron River and the Gunnison River.

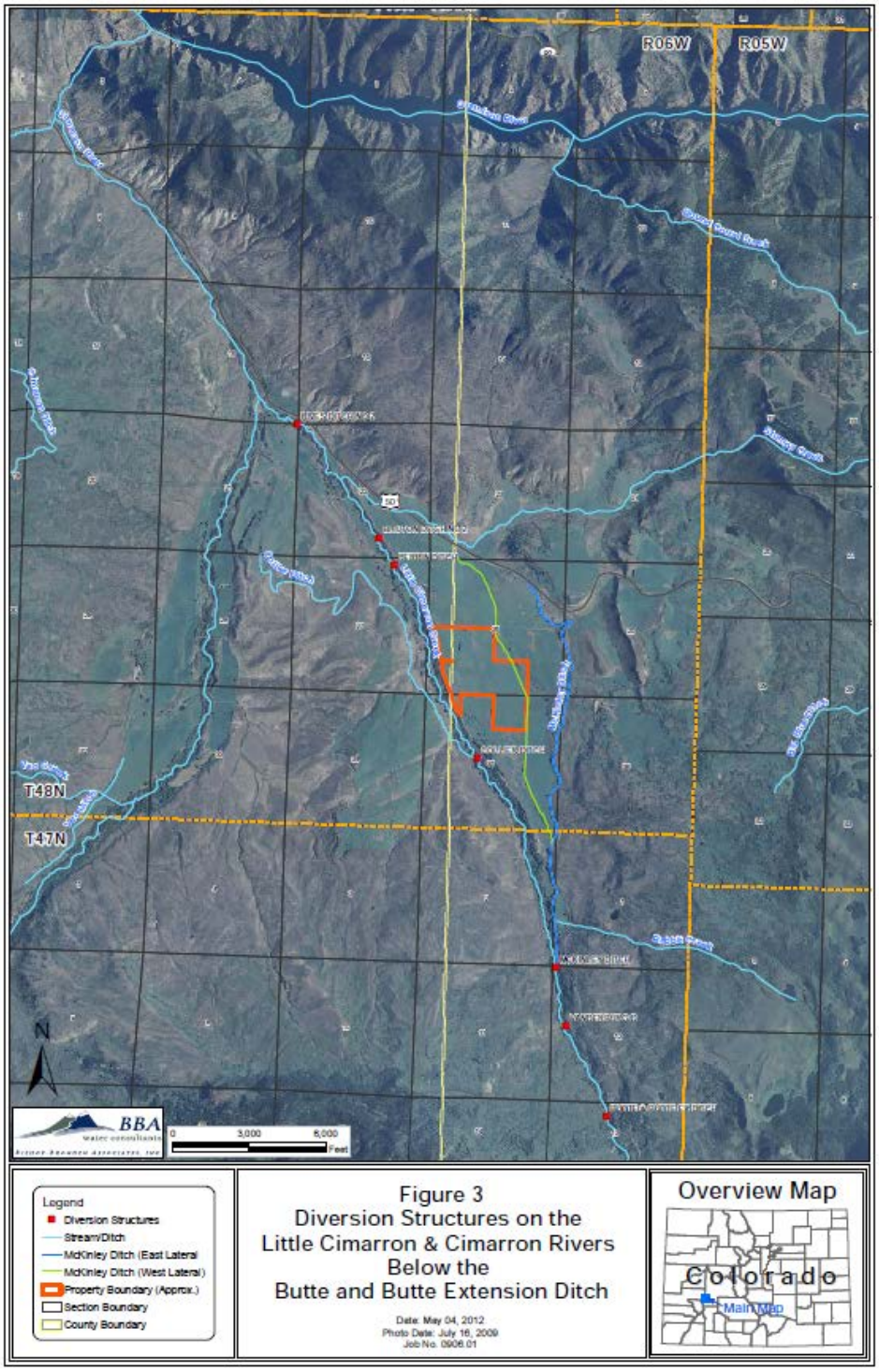

Figure 2. Study Location Map

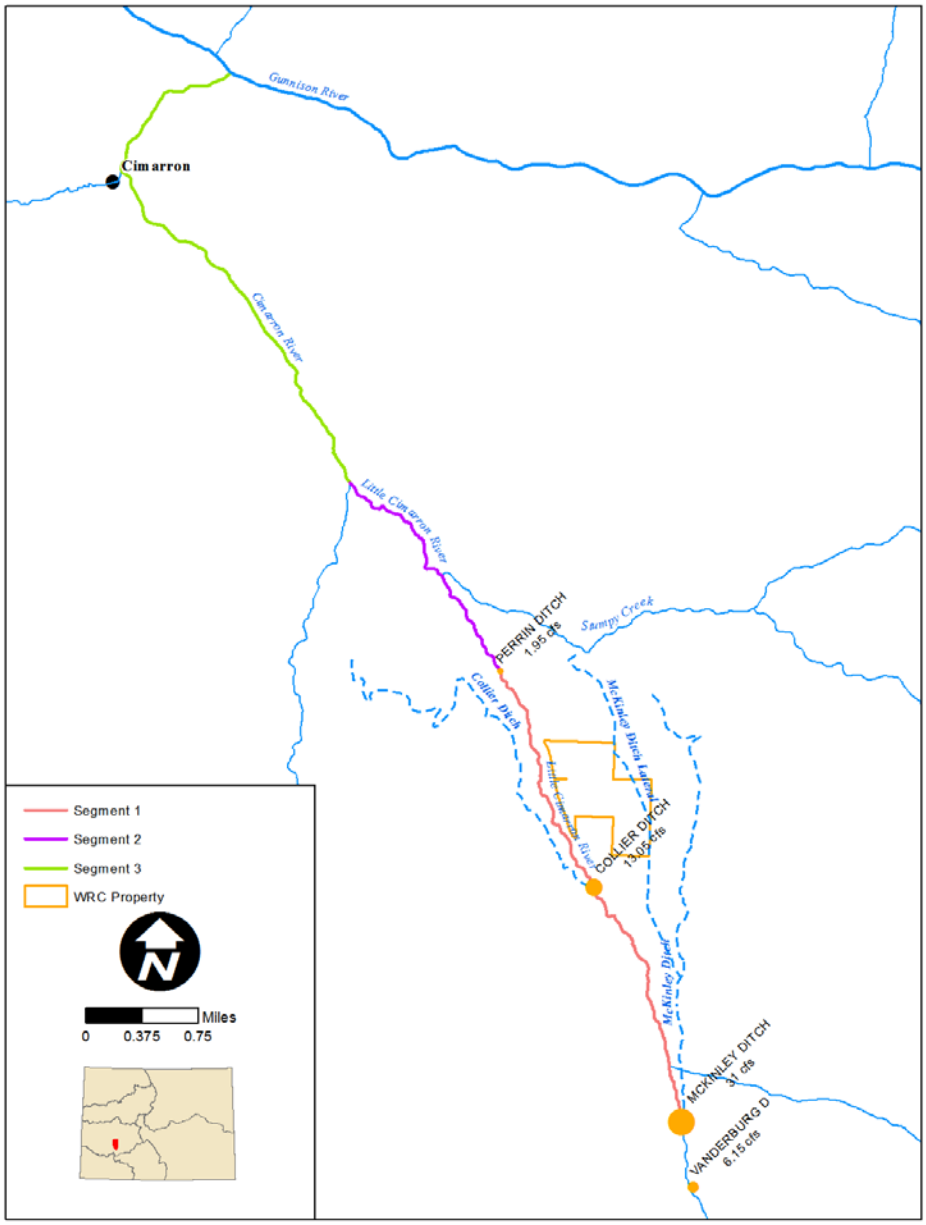

Figure 3. McKinley Ditch Project Instream Flow Segments

3. Description of the Alternative Water Transfer Method

Please describe the type(s) of water transfers that will be examined/utilized (i.e., conceived transfer methods include, but are not limited to: 1) interruptible water supply agreements; 2) long-term agricultural land fallowing; 3) water banks; 4) reduced consumptive use through efficiency or cropping changes while maintaining historic return flows; and 5) purchase by end users with leaseback under defined conditions). In addition, please describe how the transferable consumptive use will be calculated and quantified, and how return flow patterns will be addressed/maintained.

The McKinley Ditch ATM project is a first of its kind permanent agricultural/environmental ATM. Rather than a permanent transfer and a "buy and dry" project to benefit the river, the Water Trust sought a "split-season" decree (signed in 2018) which allows for agricultural water use in the spring/early summer and instream flow use in the late summer/fall. The novel nature of this project is exciting and provides a unique opportunity to study the effects of long-term split-season irrigation on high altitude grass/hay pasture lands.

4. Program/Project Eligibility

Please describe how the proposed program/project meets each of the following eligibility requirements (please see Criteria and Guidelines for additional information regarding the alternative water transfer methods/strategies that qualify for funding). Note: If these requirements are addressed in other parts of the application you may simply reference the applicable section(s).

a) *A description of how, if implemented, the proposed program/project will protect property and water rights.*

The Water Trust is now the owner of the 1.5 McKinley shares, however it does not own the irrigated ranch land. At the beginning of the project in 2012, Western Rivers Conservancy (WRC) purchased what was then called the Shepardson Ranch which included the 1.5 shares of McKinley ditch water. WRC then sold the shares to the Water Trust in 2014. The Water Trust and CWCB then filed a water court application to change the use of the McKinley Ditch shares in late 2014. In 2015, the Water Trust and CWCB completed and recorded a Grant of Flow Restoration Use to allow CWCB to use the shares for instream flow use.The Water Trust and CWCB obtained a final decree in 2018 allowing for both irrigation use and instream flow use of the McKinley Ditch shares per the project design. To protect agricultural uses the Water Trust and WRC completed and recorded a Grant of Irrigation Use (Grant) that ensures that the shares will be utilized for irrigation purposes on the property. The Grant runs with the land and ensures that the 1.5 shares will be utilized for agricultural use per the project design and protects the property owner from losing irrigation water. With the Grant of Irrigation Use recorded, WRC wished to sell the Shepardson Ranch land. WRC and Water Trust worked hard to ensure the land was sold to an agricultural user and in March of 2020, the property was transferred to a new owner who is committed to sustainable agriculture in rural Colorado.

b) Identified group(s) of agricultural users that are or may be willing to transfer a portion of their water and identified entity(s), group(s) or area(s) where the transferred water could or would be put to the new use and a description of the new use.

The ATM transfer is completed and the Water Trust worked hard to ensure the water would stay with the land and that the new owner would continue agricultural operations.

c) The program/project must at a minimum conceptually describe the technical, institutional, and legal elements of the water transfer. Grant monies may be used to address one or more of these elements. If grant monies are not requested for all three elements, the grant applicant must describe how the applicant has or intends to address the elements, which are not included in the grant request, through other efforts.

N/A

d) If grant monies are proposed for use for legal assistance, then the use of those funds shall be oriented toward advancing the knowledge of alternative agricultural water transfer methods and techniques; not for preparation of a specific water court case. The total requested funds for legal assistance shall not exceed 40 percent of the total grant request. In addition, grant monies proposed for use for legal assistance must be used to collaboratively address issues and concerns related to agricultural water transfer. Funds shall not be used to solely advance the cause of the project proponents.

N/A

e) A minimum of a 10 percent cash match of total project cost (past expenditures and "in kind" can not be counted toward the 10 percent match).

As of April 20, 2020, the Water Trust has raised $47,300 dollars of cash match from a private foundation for this project and is also bringing $15,750 dollars of in kind funding to the project through its partners. This equates to a 17% cash match and a total match of 22%. The in kind funds will come from the Colorado State University (CSU) Department of Soil and Crop Sciences in the form of donated salary time from Dr. Joe Brummer whom will be assisting the CoWC lead Nora Flynn. See budget and attached letter from Colorado State University.

5. Program/Project Evaluation Criteria

The following grant evaluation criteria will be used by the CWCB to evaluate and make recommendations to fund, partially fund or not fund a grant application. The criteria are aimed at advancing alternative transfer methods from the literature and studies to actual on the ground projects/programs that provide reliable water supply and sustain key elements of the agricultural area from which the water is transferred. The applicant should fully address and explain in detail in the application how, and the extent to which, the proposed project/program meets each of the criteria. However, it should be noted that the project does not have to meet all of the criteria to be eligible to receive funding and the criteria below are not listed in any order of important or priority.

a. The proposed project/program builds upon the work of former alternative water transfer methods efforts and addresses key areas that have been identified. For more detailed

information on this work, please refer to the draft report: Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update, November 2012.

b. *The proposed project addresses one or more key recommendation(s) in the report: Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update, November 2012.*
c. *The proposed project/program addresses key water needs identified in SWSI 2010 or as identified in a basin's needs assessment.*
d. *The proposed project/program advances the preservation of high value agricultural lands. Value can be viewed as: the value of crops produced, the value the agriculture provides to the local community, and the value the agricultural area provides for open space and wildlife habitat.*
e. *The proposed project/program addresses water quality, or provides other environmental benefits to rivers, streams and wetlands.*
f. *The proposed project/program increases our understanding of and quantifies program/project costs. This could include: institutional, legal, technical costs, and third party impacts.*
g. *The proposed project/program does not adversely affect access to other sources of water (not subject to/participating in the program) where owners of these water rights may wish to pursue traditional transfer of their rights to other users.*
h. *The proposed project/program provides a perpetual water supply for the new and/or alternate use and preserves agricultural production and/or helps sustain the area's economy from which the transfer is occurring.*
i. *The quantity of water produced by the proposed project/program. Preference will be given to programs that can address larger water supply needs.*
j. *Applicants are encouraged to develop projects demonstrating participation and/or support from a diverse set of stakeholders and interests.*

6. Statement of Work

Provide the proposed statement of work. On the following page there is an example format for the statement of work. You can use the example format or your own format, provided that comparable information is included. The statement of work should outline by task how the proposed program/project will be accomplished. It is important that the statement of work detail the specific steps, activities/procedures that will be followed to accomplish each individual task and the overall program/project and the specific products/deliverables that will be accomplished. The statement of work must include but not be limited to: task description, key personnel, budget, schedule and deliverables and the final report/project documentation upon completion of the water activity.

The statement of work will form the basis for the contract between the Applicant and the State of Colorado. In short, the Applicant is agreeing to undertake the work for the compensation outlined

in the statement of work and budget, and in return, the State of Colorado is receiving the deliverables/products specified. Please note that costs incurred prior to execution of a contract or purchase order are not subject to reimbursement.

Please provide a detailed statement of work using the following template. Additional sections or modifications may be included as necessary. Please define all acronyms. If a grant is awarded an independent statement of work document will be required with correct page numbers.

Statement of Work

WATER ACTIVITY NAME -

GRANT RECIPIENT –

FUNDING SOURCE -

INTRODUCTION AND BACKGROUND
Provide a brief description of the project. (Please limit to no more than 200 words; this will be used to inform reviewers and the public about your proposal)

OBJECTIVES
List the objectives of the project

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

TASK 1 – [Name]

Description of Task

Method/Procedure

Deliverable

TASK 2 – [Name]

Description of Task

Method/Procedure

Deliverable

REPEAT FOR TASK 3, TASK 4, TAKE 5, ETC.

REPORTING AND FINAL DELIVERABLE

Reporting: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion 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 Deliverable: At completion of the project, the applicant shall provide the CWCB a final report that summarizes the project and documents how the project was completed. This report may contain photographs, summaries of meetings and engineering reports/designs.

BUDGET

Provide a detailed budget by task including number of hours and rates for labor and unit costs for other direct costs (i.e. mileage, $/unit of material for construction, etc.). A detailed and perfectly balanced budget that shows all costs is required for the State's contracting and purchase order processes. Sample budget tables are provided below. Please note that these budget tables are examples and will need to be adapted to fit each individual application. Tasks should correspond to the tasks described above.

Total Costs				
	Labor	Other Direct Costs	Matching Funds (If Applicable)	Total Project Costs
Task 1 - (Specify name of task)				
Task 2 -				
In-Kind Contributions				
Total Costs:				

Example Titles

Example Project Personnel: Hourly Rate:	Project Manager	Project Engineer	Geologist	Scientist	Graphics/ Designer	Clerical		Total Costs
Task 1 -								
Task 2 -								
Total Hours:								
Cost:								

Other Direct Costs						
Item: Units: Unit Cost:	Copies No.	Materials	Equipment/ Supplies	Mileage Miles		Total
Task 1 -						
Task 2 -						
Total Units:						
Total Cost:						

In-Kind Contributions (If Applicable)				
Project Personnel: Hourly Rate:				Total
Task 1 -				
Task 2 -				
Total Hours:				
Total Cost:				

SCHEDULE

Provide a project schedule including key milestones for each task and the completion dates or time period from the Notice to Proceed (NTP). This dating method allows flexibility in the event of potential delays from the procurement process. Sample schedules are provided below. Please note that these schedules are examples and will need to be adapted to fit each individual application.

Example 1

Task	Start Date	Finish Date
1	Upon NTP	NTP + 90 days
2	Upon NTP	NTP + 180 days
3	Upon NTP	NTP + 180 days
4	Upon NTP	12/31/11
5	NTP + 60 days	12/31/11
6	NTP + 60 days	12/31/11
7	NTP + 60 days	12/31/11

NTP = Notice to Proceed

Example 2

Task	First 6 Months						Second 6 Months					
	1/10 – 3/10			4/10 – 6/10			7/10 – 9/10			10/10 - 12/10		
A – Economic Analysis												
B – Storage Analysis												
C – TA for Ditch Cos												
D – Injury Analysis												
Final Reports												

PAYMENT

Payment will be made based on actual expenditures and invoicing by the applicant. Invoices from any other entity (i.e. subcontractors) cannot be processed by the State. The request for payment must include a description of the work accomplished by major task, and estimate of the percent completion for individual tasks and the entire water activity in relation to the percentage of budget spent, identification of any major issues and proposed or implemented corrective actions. The last 5 percent of the entire water activity budget will be withheld until final project/water activity documentation is completed. All products, data and information developed as a result of this grant must be provided to the CWCB in hard copy and electronic format as part of the project documentation. This information will in turn be made widely available to the public and help promote the development of alternative agricultural transfer methods.

Additional Information – If you would like to add any additional pertinent information please feel free to do so here.

The above statements are true to the best of my knowledge:

Signature of Applicant:

Print Applicant's Name:

Project Title:

Return this application to:

Mr. Craig Godbout
Colorado Water Conservation Board
Water Supply Planning Section
1313 Sherman St., Room 721
Denver, CO 80203
craig.godbout@state.co.us

Last Update: December 17, 2019

Colorado Water Conservation Board	
Alternative Agricultural Water Transfer Methods Grant	
Exhibit A - Statement of Work	
Date:	
Water Activity Name:	McKinley Ditch Deficit Irrigation Study Little Cimarron River, Gunnison Basin
Grant Recipient:	**The Colorado Water Trust**
Funding Source:	**ATM Grant Fund**

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 ATM funding will be used for.

The Colorado Water Trust will implement a first of its kind split season deficit irrigation ATM project on a high altitude grass pasture ranch. To help fill the data and knowledge gaps surrounding this type of ATM, The Water Trust is partnering agricultural experts to complete a study of the effects of the McKinley Ditch ATM project on the productivity, soil health, operations and economics of the study ranch. Study results will be reported in relevant scientific journals. Ultimately the information will be presented in a Best Management Practices Guide that will fill in the data gaps, provide vital information directly to agricultural producers contemplating a split season ATM project, and help producers to realize the highest value of their pastures under an ATM. The body of work resulting from this study will lower the barriers to high elevation grass pasture ATM projects and encourage wider use in the state.

Objectives: (List the objectives of the project)

1. Understand the short and mid-term impacts of split-season deficit irrigation system on forage production and soil health.
2. Develop management recommendations to best utilize the property under the new irrigation patterns.
3. Characterize the operational and economic barriers and opportunities for realizing split-season irrigation management.
4. Write and publish scientific report and produce a Best Management Practice Guide to educate and assist future participants in split-season irrigation arrangements.

Last Update: December 17, 2019

Tasks
Provide a detailed description of each task using the following format:
Task 1 - Study Setup, Initial Assessments
Description of Task:
The Water Trust, Colorado Water Institute (CoWC) and Ranch Advisory Partners (RAP) will collaborate to 1. Finalize the study design, 2. Delegate tasks, 3. Conduct field visits, 4. Interview landowners and grazing lessees, 5. Install monitoring equipment, 6. Set up study plots. Initial assessments of pasture health and information from interviews and field visits will guide development a written grazing management plan and recommendations for use in 2020.
Method/Procedure:
An initial assessment of the study site will be conducted to ascertain all information needed to begin design of a grazing program for 2020. This will include a site visit and tour of the field, and communications with the potential grazing tenant to determine livestock class, weights, desired on/off dates, historic livestock performance, breeding program, shipping abilities, herd health practices, and interactions between livestock grazing operations and irrigation operations. A written record of the visit will be produced that details current field and infrastructure conditions, as well as recommended carrying capacity using NRCS databases and ocular adjustments. Partners will prepare a written grazing plan for the 2020 season. This will also highlight any additional infrastructure needed, including use of temporary electric fencing. We propose to establish 10 monitoring sites on the field. At 180 acres, this sample size represents one monitoring site for every 18 acres. Further, assuming the field is subdivided into five temporary paddocks using temporary fencing, this represents two sites per temporary paddock.

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Tasks
Each monitoring site will consist of a permanently marked point that can be revisited each sampling year. In the peak of the growing season, likely in July, depending on the grazing program and irrigation practices, a one-square meter plot will be used to gather the following: • A digital photo of each plot, looking straight down on the plot. • Plant height, as measured in the middle of the plot. • Vegetative production, as measured by the dry weight after having clipped plants to the soil surface, dried, and weighed the vegetation. • Relative plant species composition. Model A™ atmometers (ETgage Company®, Loveland, CO) and Stratus™ rain gauges (Productive Alternatives®, Fergus Falls, MN) will be installed to measure potential ET and rainfall. Atmometer and rain gauge measurements will be taken regularly throughout the season by collaborating neighbor. Thermometers (Hobo Pro Series, Model H8, Onset Computer Corp., Bourne, MA) and data loggers will be used to collect hourly temperature data. To understand the dynamics of soil content in this irrigated we will use soil moisture probes to measure volumetric water content throughout the season.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Finalized study design documents, Established study plots and instrumentation, Data Collection guidelines and schedules, Task delegation list
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
2020 Grazing Management Plan

Tasks
Provide a detailed description of each task using the following format:
Task 2 - Annual Grazing Plans
Description of Task:

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Tasks
Monitoring data, input from landowner and lessee, and lessons learned from the previous year will inform new annual grazing plans for 2021 and 2022.
Method/Procedure:
A summary of major grazing and livestock variables will be compiled, including the following: • On/off dates in each paddock. • Grazing duration in each paddock. • Recovery period between grazing events. • Timing of grazing events. • Herd size. • Stock density of each paddock. • General herd health. • If feasible, weight gain on specific classes of cattle could be determined if a scale is available. Each of these data and observations will be compiled, along with a summary of management practices and recommendations for upcoming grazing seasons.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Annual Grazing Management Plans
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Annual Grazing Management Plans

Last Update: December 17, 2019

Tasks
Provide a detailed description of each task using the following format:
Task 3 - Ongoing Monitoring and Data Collection
Description of Task:
All partners will work together to gather necessary data as needed throughout the term of the grant.
Method/Procedure:
Each year, forage and soil data will be collected to monitor the impacts of split-season irrigation management on the Mighty Zephyr Ranch and on the neighboring control plot ranch which receives full irrigation each year. Forage analyses will include: Vegetative production, as measured by the dry weight after having clipped plants to the soil surface, dried, and weighed the vegetation. Forage quantity, forage species composition, ground cover, weed emergence and forage quality. Cuttings will be collected once per year during the irrigation season. Soil Analyses will include: Organic matter, available phosphorus, available nitrogen, total carbon and nitrogen, soil pH, wet aggregate stability, available water holding capacity, and soil texture. These edaphic factors are essential to measure because they play a large role in determining plant response to irrigation management. Soil moisture, rainfall and ET will be monitored throughout the study. These measurements will allow us to not only understand impacts of climatic variations from year to year of the study but also estimate crop water use. To understand the dynamics of soil content in the irrigated acreage, we will use soil moisture probes to measure volumetric water content throughout the season. Based on the soil water balance principals, the cumulative water loss can be described as follows: $L = (WC_i - WC_f) \times Z$ where L is the cumulative loss of water (mm), WC_i is the initial volumetric soil water content ($cm^3\ cm^{-3}$), WC_f is the final volumetric soil water content and Z is the measure of depth. Soil moisture probes will placed at 15 and 30 cm deep in the soil.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)

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Tasks
Annual data summaries and data uploaded into an internal project database.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Annual data summaries will be included in the final deliverables.

Tasks
Provide a detailed description of each task using the following format:
Task 4 – Analysis, Reporting, and BMP Guide Generation
Description of Task:
Project partners will utilize standard industry and scientific methods to analyze annual project data. Additionally, partners will also use the analyzed data in conjunction with interviews of experts to identify operational and economic barriers and opportunities to split season ATM projects.
Method/Procedure:
Split-season irrigation with the intention of sharing water between agriculture and the environment presents social, economic and operational barriers that merit further study. 30 interviews with ranchers and other local experts will be conducted to gather perspectives and experiences with reduced irrigation practices. Findings from interviews will used to inform economic analysis and the best management practice guide. Enterprise budgets created by the Colorado State University department of Agricultural Resource Economics will be used to estimate annual revenue from production. This will involve documenting yearly management data with the ranch lessee.

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Tasks
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Annual and final analysis reports interview reports.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Analysis and interview reports will be included in final deliverables.

Tasks
Provide a detailed description of each task using the following format:
Task 5 - Reporting and BMP Guide Generation
Description of Task:
Project partners will use data, analysis, interview feedback, and landowner/lessee feedback to generate peer reviewed scientific reports and a Best Management Practice guide.
Method/Procedure:

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Tasks
Agronomic data, result summaries, and key findings will be prepared for a peer-reviewed journal publication. A best management practice guide will be informed by an extensive literature review and interviews conducted in task d. This guide will be aimed at answering these questions and more: What is the annual or short-term change in yield under a split-season deficit irrigation regime? Do irrigated production levels drop compared to full irrigation? What, if any, are the long-term changes in yield on the property? Do yield losses continue and compound over time? Do they level off or even rebound? Does deficit irrigation affect pasture health in the long or short term? Does species composition change over time to adapt to the new irrigation patterns? Does stem density or vegetation cover change over time? Do weeds increase presence or abundance? Sagebrush and other native range species? To what extent do precipitation and monsoon patterns effect yields after shut off? What does fall regrowth look like under deficit irrigation? Should the property be utilized for hay or grazing or a combination of the two? Does that decision change with the irrigation season type (i.e. July or August cutoff)? Should the user utilize different stock (i.e. cow calf, steer, sheep or other)? What should the grazing use timing look like? How many cuttings are possible or likely? Should they change pasture fencing and grazing rotations? Should they fertilize or augment? Does the operation work best as a standalone or a part of a bigger operation? Should they upgrade irrigation infrastructure or technology? How does or could access to grazing allotments on public land mitigate impacts?
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Peer Reviewed scientific publications. Best Management Practices Guide. Data Compilations.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Peer Reviewed scientific publications. Best Management Practices Guide. Data Compilations.

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

Reporting Requirements

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

Alternative Agricultural Water Transfer Methods Grants

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

Date:

Water Activity Name:

Grantee Name:

Task No.[1]	Description	Start Date[2]	End Date	Matching Funds (cash & in-kind)[3]	ATM Funds	Total
1	Study Setup, Initial Assessments	Jun-20	Aug-20	$ 12,610	$ 43,780	$56,390
2	Annual Grazing Plans	May-20	May-22	$ 12,610	$ 24,000	$36,610
3	Ongoing Monitoring and Data Collection	Jun-20	Oct-22	$ 12,610	$ 39,134	$51,744
4	Analysis	Oct-20	Oct-22	$ 12,610	$ 53,000	$65,610
5	Reporting and BMP Guide Generation	Jun-21	Mar-23	$ 12,610	$ 60,000	$72,610
						$0
						$0
						$0
						$0
						$0
						$0
						$0
						$0
						$0
			Total	$63,050	$219,914	$282,964

(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.

SOIL AND CROP SCIENCES
COLORADO STATE UNIVERSITY

C-127 Plant Sciences • 1170 Campus Delivery
Fort Collins, Colorado 80523-1170
(970) 491-6517 • (970) 491-5676 (FAX)

April 13, 2020

Mr. Alexander Funk
Colorado Water Conservation Board
Alternative Ag Water Transfer Methods Grant Application
Attn: Interstate & Federal Section /ATM
1313 Sherman Street, Room 718
Denver, CO 80203

Subject: McKinley Ditch Pilot Project grant application to the Colorado Water Conservation Board.

This is letter is intended to serve as the commitment letter for matching funding for the McKinley Ditch Pilot Project proposed by Nora Flynn, Agriculture Water Specialist at the Colorado Water Center, and Dr. Joe Brummer, Associate Professor in the Department of Soil and Crop Science. We commit 0.5 months/year of cost share to be provided by Dr. Bummer's salary over the proposed 3-year grant period. This is equivalent to $15,750 (3-year total). Dr. Brummer has extensive knowledge of high elevation pasture management and his previous experience working at the McKinley Ditch Pilot Project site will be a tremendous asset to this project.

Sincerely,

Matthew Wallenstein
Department Head and Professor, Soil and Crop Sciences