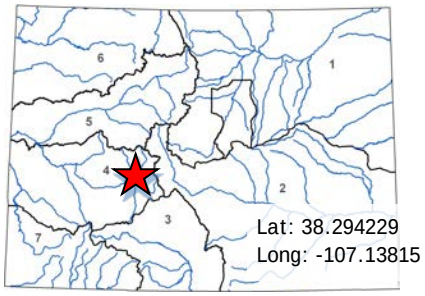
COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Water Plan Grant Application

Applying Tech to Monitor Grass CU
Trout Unlimited
July 2020 Board Meeting



L O C A T I O N	
County/Counties:	Multiple
Drainage Basin:	Gunnison

D E T A I L S	
Total Project Cost:	$62,685
Water Plan Grant Request:	$29,394
Recommended Amount:	$29,394
Other CWCB Funding:	$0
Other Funding Amount:	$6,000
Applicant Match:	$27,291
Project Type(s): Study, Demonstration Project	
Project Category(Categories): Agricultural	
Measurable Result: Agricultural water efficiency/conservation (100 AF)	

This project is a cooperative effort coordinated by Trout Unlimited (TU), the Upper Gunnison River Water Conservancy District (UGRWCD), and the Colorado River Water Conservation District (River District). TU staff will work with agricultural producers in the upper Gunnison, Cimarron, North Fork and lower Gunnison watersheds to demonstrate a practical, cost-effective approach for evaluating consumptive use of irrigated grass and alfalfa, through soil moisture monitoring, on-site evapotranspiration gages, yield assessment, and high-resolution aerial imagery analysis.

Project sites selected are located at approximately 8000, 7000, 6000, and 5000 feet above sea level and range from 35 acres to 200 acres in size. This project will provide a definitive record of consumptive use at these elevation ranges, providing information that may help fill in data gaps concerning the measure of historical consumptive use at higher elevation systems and the impacts of temporary fallowing and deficit irrigation on crop development and soil moisture management. The data collected and the monitoring methodology will be transferable to other irrigated mountain valleys in western Colorado and help make this information more accessible to producers. The study design will complement existing monitoring efforts in the Gunnison Basin developed at sites managed by Colorado State University (CSU) Water Center. Equipment installation and monitoring will be completed by Trout Unlimited staff and a Western Colorado University (WCU) Graduate student with guidance from the WCU graduate advisor and the CSU Water Center. The data collected at the sites in 2020 will provide baseline information and be used to develop water conservation demonstration projects in 2021.

Staff recommends Board approval of the full grant amount requested. This project will evaluate the effectiveness of several methods of verifying and monitoring crop consumptive, particularly the use of aerial imagery, in comparison with existing resources. The project will also develop an accurate baseline of consumptive use and agronomics (e.g., forage quality, crop yield) that will be used to more accurately measure conserved consumptive use and corresponding impacts under a future conservation program. This information will support the development of various efforts in the region to promote voluntary agricultural conservation practices such as split-season irrigation and deficit irrigation to meet region water demands.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: July 2019

Colorado Water Conservation Board

Water Plan Grant Application

Instructions

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

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

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

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

Water Project Summary

Name of Applicant	Trout Unlimited
Name of Water Project	Appling technology to monitor grass consumptive use at scale

CWP Grant Request Amount	$ 29,394
Other Funding Sources pending UGRWCD cash	$6,000
Other Funding Sources _____	$
Other Funding Sources _____	$
Applicant Funding Contribution: TU cash and in-kind	$ 27,291
Total Project Cost	$ 62,685

Last Updated: July 2019

Applicant & Grantee Information
Name of Grantee(s) Trout Unlimited
Mailing Address: 1777 North Kent Street, Suite 100 Arlington VA, 22209
FEIN: 38-161215
Organization Contact: Danielle Typinski
Position/Title: Grant Compliance Coordinator
Email: danielle.typinski@tu.org
Phone: (703)284-9429
Grant Management Contact: Jesse Kruthaupt
Position/Title: Upper Gunnison Project Manager
Email: jesse.kruthaupt@tu.org
Phone: 970-209-0976
Name of Applicant (if different than grantee)
Mailing Address
Position/Title
Email
Phone

Description of Grantee/Applicant
Provide a brief description of the grantee's organization (100 words or less).
Trout Unlimited (TU), the nation's largest coldwater conservation organization, representing more than 150,000 members and volunteers nationwide, including 10,000 in Colorado, has a program in the Gunnison Basin focused on water use solutions that will benefit agricultural operations as well as protect and improve cold water trout habitat. Jesse Kruthaupt works for Trout Unlimited as the upper Gunnison project manager and Cary Denison is based in the lower Gunnison.

Last Updated: July 2019

Type of Eligible Entity (check one)	
	Public (Government): Municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.
	Public (Districts): Authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises.
	Private Incorporated: Mutual ditch companies, homeowners associations, corporations.
	Private Individuals, Partnerships, and Sole Proprietors: Private parties may be eligible for funding.
X	**Non-governmental organizations (NGO):** Organization that is not part of the government and is non-profit in nature.
	Covered Entity: As defined in Section 37-60-126 Colorado Revised Statutes.

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

Category of Water Project (check the primary category that applies and include relevant tasks)		
	Water Storage - Projects that facilitate the development of additional storage, artificial aquifer recharge, and dredging existing reservoirs to restore the reservoirs' full decreed capacity and Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap.. *Applicable Exhibit A Task(s):*	
	Conservation and Land Use Planning - Activities and projects that implement long-term strategies for conservation, land use, and drought planning. *Applicable Exhibit A Task(s):*	
	Engagement & Innovation - Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application on the website. *Applicable Exhibit A Task(s):*	
X	Agricultural - Projects that provide technical assistance and improve agricultural efficiency. *Applicable Exhibit A Task(s):*	
	Environmental & Recreation - Projects that promote watershed health, environmental health, and recreation. *Applicable Exhibit A Task(s):*	
	Other	Explain:

Last Updated: July 2019

Location of Water Project	
Please provide the general county and coordinates of the proposed project below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable.	
County/Counties	Gunnison, Delta, and Montrose counties
Latitude	38°29'42.29"N
Longitude	107° 1'38.15"W

Water Project Overview
Please provide a summary of the proposed water project (200 words or less). Include a description of the project and what the CWP Grant funding will be used for specifically (e.g., studies, permitting process, construction). Provide a description of the water supply source to be utilized or the water body affected by the project, where applicable. Include details such as acres under irrigation, types of crops irrigated, number of residential and commercial taps, length of ditch improvements, length of pipe installed, and area of habitat improvements, where applicable. If this project addresses multiple purposes or spans multiple basins, please explain. The Applicant shall also provide, in Exhibit A, a detailed Statement of Work, Budget, Other Funding Sources/Amounts and Schedule.
Trout Unlimited (TU) staff will work with agricultural producers in the upper Gunnison, Cimarron, North Fork and lower Gunnison watersheds to demonstrate a practical approach for evaluating consumptive use of irrigated grass and alfalfa, through soil moisture monitoring, on-site evapotranspiration gages, yield assessment, and high resolution aerial imagery analysis. Project sites selected are located at approximately 8000, 7000, 6000, and 5000 feet above sea level and range from 35 acres to 200 acres in size. This project will provide definitive record of consumptive use at these elevation ranges. The data collected and the monitoring methodology will be transferable to other irrigated mountain valleys in western Colorado. The study design will complement existing monitoring efforts in the Gunnison Basin developed at sites managed by Colorado State University (CSU) Water Center. Equipment installation and monitoring will be completed by Trout Unlimited staff and a Western Colorado University (WCU) Graduate student with guidance from the WSC graduate advisor and the CSU Water Center. The data collected at the sites in 2020 will provide baseline information and be used to develop water conservation demonstration projects in 2021.

Last Updated: July 2019

Measurable Results		
To catalog measurable results achieved with the CWP Grant funds, please provide any of the following values as applicable:		
	New Storage Created (acre-feet)	
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive	
	Existing Storage Preserved or Enhanced (acre-feet)	
	Length of Stream Restored or Protected (linear feet)	
	Efficiency Savings (indicate acre-feet/year OR dollars/year)	
	Area of Restored or Preserved Habitat (acres)	
100 AF	Quantity of Water Shared through Alternative Transfer Mechanisms	
	Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning	
	Number of Coloradans Impacted by Engagement Activity	
x	Other	Explain: Demonstration of monitoring consumptive use at scale

Water Project Justification
Provide a description of how this water project supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the applicable Roundtable Basin Implementation Plan and Education Action Plan. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers). The proposed water project shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan Framework for State of Colorado Support for a Water Project (CWP, Section 9.4, pp. 9-43 to 9-44;)
The Gunnison BIP mentions on page 71, that ideal solutions to address environmental and recreational needs while preserving existing agricultural uses include temporary and voluntary instream flow leasing arrangements that sustain flows during critical drought periods. This project will help water right owners and those seeking conserved water better understand the relationship between consumptive use and yield at a range of elevations in western Colorado. The Colorado Water Plan Water Plan frequently references collaboration and multiple use projects. In section 6.6, page 6-157, the third goal listed is "Support the development of multipurpose projects and methods that benefit environmental and recreational water needs as well as water needs for communities or agriculture". This project will involve coordination between NGO's, private land owners, and state agencies, and the approach will benefit all user by demonstrating tools to accurately monitor water usage. This project addresses many of the goals listed in Section 6.4, Alternative Transfer Methods, including on page 6-115 "Colorado's Water Plan will respect property rights and the contributions of the agricultural industry by maximizing options for alternatives to permanent agricultural dry-up." Streamlined monitoring is also emphasized as an "Action" in Section 6.4, on pages 6-125-126. For

example, Action Number 2 states, “Encourage funding grants that focus on implementing on-the-ground ATM projects, data collection, agile administration practices, ATM affordability, basin-specific ATM projects, and infrastructure modernization.”

This project will help meet the following goals listed in the Gunnison Basin Roundtable’s BIP:

1. Protect existing uses.
5. Quantify and protect environmental and recreational water uses.
7. Describe and encourage the beneficial relationship between agricultural and environmental recreational water uses.

Related Studies

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

Upper Gunnison irrigated meadow full season fallow and recovery monitoring – This study began in 2019 to understand yield and recovery on irrigated meadows after a season without irrigation. Potential evapotranspiration (ET), soil moisture, soil and root characteristic, and yield will be monitored from 2019-2021. Partners include, the Upper Gunnison River Water Conservancy District, Colorado State University, Trout Unlimited, Western Colorado University.

CSU Water Center remote sensing and water balance approach to understand CU.

CWCB ATM and Demand Management Investigations

USGS, Evaluation of the Relation between Evapotranspiration and Normalized Difference Vegetation Index for Downscaling the Simplified Surface Energy Balance Model. 2012.

Previous CWCB Grants, Loans or Other Funding

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

Last Updated: July 2019

Grant Name	Agreement Number	Amount	Start Date	End Date
Irrigators in Kremmling	CTGG1 2017-0667	$465,400	11/29/2016	9/30/2018
Redburn Ranch Diversion Dam	CTGG1 2015-2791	$148,500	1/27/2015	6/1/2018
San Miguel River Stream Management Plan Pilot	POGG1 2016-0800	$96,413	3/22/2016	6/1/2018
Ware Hinds Fish Bypass	POGG1 2017-0749	$63,500	2/14/2017	12/31/2018
Windy Gap Reservoir Bypass	POGG1 2016-0900	$30,000	5/18/2016	1/31/2017
W-Mountain Ranch Restoration	POGG1 2016-0610	$15,000	1/8/2015	5/31/2017
Kerber Creek Restoration	POGG1 2015-0286	$30,000	6/10/2015	10/31/2016
River Ranch Irrigation Diversion	CTGG1 2015-3313	$113,000	6/9/2015	5/31/2016
South Arkansas River Restoration	POGG1 2015-0175	$10,000	11/14/2014	10/31/2016
Upper Ohio Creek Flow Restoration	POGG1 2015-0161	$6,000	10/10/2014	12/31/2014
Tomichi Water Conservation Program	POGG1 2018-901 &902	$109,500 (50%)	5/4/2018	5/4/2018
Cimarron Canal Diversion Gate Replacement and Water Management Planning Project	POGG1,PDAA,2020 00002130	$30,418	8/15/2019	7/31/2021
Wilbur Ditch Improvement	POGG1,PDAA,20 1900002930	$20,500	6/3/2019	6/30/2020

Taxpayer Bill of Rights

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

None

Last Updated: July 2019

Submittal Checklist	
x	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.
Exhibit A	
x	Statement of Work(1)
x	Budget & Schedule(1)
	Engineer's statement of probable cost (projects over $100,000)
	Letters of Matching and/or Pending 3rd Party Commitments(1)
Exhibit C	
x	Map (if applicable)(1)
x	Photos/Drawings/Reports
x	Letters of Support (Optional)
	Certificate of Insurance (General, Auto, & Workers' Comp.) (2)
	Certificate of Good Standing with Colorado Secretary of State(2)
	W-9(2)
	Independent Contractor Form(2) (If applicant is individual, not company/organization)
Engagement & Innovation Grant Applicants ONLY	
	Engagement & Innovation Supplemental Application(1)

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

Last Updated: July 2019

Colorado Water Conservation Board
Water Plan Grant - Exhibit A

Statement Of Work	
Date:	**1/20/2020**
Name of Grantee:	**Trout Unlimited**
Name of Water Project:	**Appling technology to monitor grass consumptive use at scale**
Funding Source:	**Water Plan Grants – Land Use and Conservation**
Water Project Overview:	
Trout Unlimited (TU) staff will work with agricultural producers in the upper Gunnison, Cimarron, Lake Fork and lower Gunnison watersheds to demonstrate a practical approach to evaluate base line consumptive use of irrigated grass and alfalfa meadows by monitoring soil moisture, yield, and analyzing high resolution aerial imagery. Project sites selected are located at approximately 8000, 7000, 6000, and 5000 feet above sea level and range from 35 acres to 200 acres in size. This project will provide definitive record of consumptive use at these elevation ranges. The data collected and the monitoring methodology will be transferable to other irrigated mountain valleys in western Colorado. Assess to accurate base line data on consumptive use (CU) will be important for verifying CU savings in any future demand management program or water lease agreements. The study design will replicate existing monitoring sites in the Gunnison Basin developed and managed by Colorado State University (CSU) Water Center. Equipment installation and monitoring will be completed by Trout Unlimited staff and a Western Colorado University (WCU) Graduate student with guidance from the CSU Water Center and WSC graduate adviser. The data collected at the sites in 2020 will provide baseline information and be used to develop water conservation demonstration projects in 2021.	
Project Objectives:	

Project objectives include the following:

1. Use soil moisture monitoring, on-site ET gages, and aerial imagery to develop baseline data on crop consumptive use.
2. Document the relationship of consumptive use and yield at a 1,000-foot elevation step from 8,000 to 5000 feet above sea level.
3. Analyze aerial imagery to further define the relationship between Normalized Difference Vegetation Index (NDVI), evapotranspiration (ET), and yield.
4. Share the monitoring methodology and data collected with water right owners and water managers in respective geographies.
5. Use the data collected to accurately account for reduced consumptive use at sites that participate in demand management demonstration projects in 2021.

Tasks

Task 1 – Monitor and record soil volumetric water content

Description of Task:

This task will involve designing the soil moisture sensor network for each of the four properties, purchasing the necessary equipment, installing the equipment at each site, and collecting soil moisture data throughout the 2020 and 2021 irrigation season.

Method/Procedure:

TU will coordinate with agricultural partners to select the appropriate location for soil moisture sensors in each participating field. At least two soil moisture monitoring locations will be selected at each property, one on higher ground that is more difficult to irrigate, and one on lower ground where water generally accumulates.

Each location will have a sensor placed at 18 inches and a sensor placed at 6 inches. Once installed, the sensors will be programed to record volumetric water content every 30 minutes. Each sensor will be calibrated by manually sampling soils and measuring water content at the WCU lab.

We expect it will take 6-8 hours to install sensors at each site. We plan to have this installed and begin collecting data as close to 2020 spring "green up" as possible.

Data loggers will be downloaded twice a month from the time of installation until the end of the irrigation season. This is expected to take 4-6 hours per site including drive time. Sensors will be left in place during the winter of 2020-2021 but loggers and batteries will be removed and stored indoors for the winter months.

Tasks
These will be positioned back at the sites in the spring of 2021 and a similar monitoring approach will take place in 2021. TU has selected a graduate student to work as a field technician during the 2020 irrigation season. This student will have access to the WCU lab to evaluate soil samples collected from the sites. This technician will have oversite provided from TU staff and faculty from WCU and The CSU Water Center. Data collected will be shared with an agricultural water resource consultant who will work with TU staff to analyze the data and summarize the findings.
Deliverable:
• Scope of work and monitoring protocol for technician • Map of each site with locations of sensors • Report summarizing soil characteristics and monitoring data.

Tasks
Task 2 – Monitor and record forage yield
Description of Task:

Last Updated: July 2019

Tasks
This task will involve collecting forage samples at each site and evaluating forage yield, species type, and quality.
Method/Procedure:
Forage samples will be taken twice a month at each site from June to October 2020. These samples will be taken by the hired project technician with oversite from Jesse Kruthaupt, Cary Denison, and/or WCU faculty. Crop samples will be taken on a line transect near the soil moisture sensor locations. Two transects will be taken per field, one on high ground, and one on lower areas where irrigation water accumulates. Five samples will be taken per transect by dropping a ¼ meter (.0001 acre) square onto the meadow and clipping all forage inside that square. Each clipping will be stored, labeled and transported to the lab where it will be dried, weighed, and sorted by species. Transect locations will be marked with GPS. An aggregate sample from each transect will be tested for crude protein, acid detergent fiber (ADF), neutral detergent Fiber (NDF), total digestible nutrients (TDN), and net energy. Data collected will be shared with an agricultural water resource consultant who will work with TU staff to analyze the data and summarize the findings. The relationship between soil moisture, yield, and quality will be evaluated and documented. The forage sampling methodology will be replicated during the 2021 irrigation season, but a separate technician may be used in 2021.
Deliverable:
• Report summarizing yield data on each participating field. This summary will include description of relationship between soil moisture data, forage yield and forage quality.

Last Updated: July 2019

Tasks
Task 3 – Record NDVI and consumptive use
Description of Task:
This task will involve the purchase of a drone with a Normalized Difference Vegetation Index (NDVI) sensor and other necessary hardware which will be used to collect images at selected sites. The NDVI data will be compared to Land Sat NDVI and ET data from local sources. This task will also include the purchase, installation, and monitoring of ET gages at each site.
Method/Procedure:
TU will purchase a DJI drone with a NDVI sensor and a two-year subscription to the Field Agent software. The drone will be shared between these four sites and available for use by CSU Water Center and other entities interested in monitoring NDVI. "ETa (actual ET) shares a well-established, strong relation with the Normalized Difference Vegetation Index" (Haynes and Senay, USGS, 2012). This relationship is being further evaluated though existing research by the CSU Water Center and data collected with this project will support that effort. Drone flights for this project will be completed bi-monthly at each site, likely on the same day as yield measurements and logger downloads. When possible, these fights will coincide with Land-Sat passes allowing the correlation of Land-Sat imagery. This will help analyze the relationship between ET and NDVI at low resolution (30-meter pixels), and NDVI recorded at a much higher resolution by the drone. These images will also be compared to yield and soil moisture data collected in task 1 and 2. An ET gage with a data logger will be installed at each site. ET Gage manufactured in Fort Collins has proven to track very closely with CoAgMet potential ET outputs so that product will be used. Data collected will be shared with an agricultural water resource consultant who will work with TU staff to analyze the data and summarize the findings.
Deliverable:
• NDVI data from bi-monthly drone flights • ET potential data collected at each site • ET data from Land Sat for each site • Report summarizing the relationship between NDVI, ET, soil moisture, and yields.

Tasks
Task 4 – Design 2021 Water Conservation Demonstration Projects

Last Updated: July 2019

Tasks
Description of Task:
This task will involve using the data collected in tasks 1-3 to develop a strategy at each site that will result in reduced consumptive use during the 2021 season. This task will also involve securing funding to compensate participating water users for reduced consumptive use or reduced yield that results from water conservation actions
Method/Procedure:
After the 2020 irrigation season TU will meet with each project participant and consultant to review data collected during the season from each respective site. Based on the data and operation specific nuances, partners will work to develop a water conservation approach that will be implemented in 2021. An estimate of what consumptive use saving should be expected with that approach will be completed. Once the particular action is chosen, TU will work to identify and secure funding to compensate irrigators for reduced consumptive use and reduced yield The monitoring procedure used in 2020 will be replicated in 2021 to demonstrate the resulting difference in yield and consumptive use from the chosen conservation actions. Possible actions include turning on irrigation later in the season, shutting irrigation off for the season early, deficit irrigation, crop switching, or fallowing.
Deliverable:
• Description of conservation action and reasoning that approach was chosen. • Report summarizing 2020 and 2021 NDVI data and correlation with ET, soil moisture, and yield at each elevation. • A minimum of 100-acre feet consumptive use reduction by October 30, 2021. • Summary report of success, challenges, and recommendations in implementing the chosen conservation approach and the monitoring methodology.

Tasks
Task 5 – Grant Administration
Description of Task:

Last Updated: July 2019

Tasks
This task will involve contracting, insurance, payments to contactors, reimbursement invoices to CWCB, and accounting of project expenses.
Method/Procedure:
15% of project equipment and contracted expenses is included in the budget.
Deliverable:
Project oversight, reporting and management of tasks.

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.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: July 2019

Reporting Requirements

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

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

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

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

Payment

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

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

Performance Measures

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

Last Updated: July 2019

Performance Measures

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan Grant - Exhibit B
Budget and Schedule

Prepared Date:

Name of Applicant:

Name of Water Project:

Project Start Date:

Project End Date:

Task No.	Task Description	Task Start Date	Task End Date	Grant Funding Request	Match Funding	Total
1	Task 1 - Monitor and record soil Volumetric Water Content	6/1/2020	6/1/2022	$ 7,905.00	$ 9,612.00	$17,517
2	Monitor and record forage yield	6/1/2020	6/1/2022	$ 5,752.50	$ 7,364.50	$13,117
3	Record NDVI and CU	6/1/2020	6/1/2022	$ 10,602.50	$ 9,814.50	$20,417
4	Design 2021 water conservation Demo Projects	6/1/2020	6/1/2022	$ 3,000.00	$ 4,800.00	$7,800
5	Grant administration	6/1/2020	6/1/2022	$ 4,089.00	$ -	$4,089
						$0
						$0
						$0
						$0
						$0
						$0
						$0
						$0
			Total	$31,349	$31,591	$62,940

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan Grant - Detailed Budget Estimate
Fair and Reasonable Estimate

Prepared Date: 1/29/2020
Name of Applicant: Trout Unlimited
Name of Water Project: Applying Tech to Monitor Grass Consumptive Use

EXAMPLE C: Construction

Sub-task	Unit	Quantity	Unit Cost	Total Cost	CWCB Funds	Matching Funds
Task 1 - Monitor and record soil Volumetric Water Content						
Loggers	EA	8	$ 400	$ 3,200	$ -	$ 3,200
Sensors	EA	16	$ 250	$ 4,000	$ -	$ 4,000
TU labor install and downloading	HRS	50	$ 45	$ 2,250	$ -	$ 2,250
TU Travel to sites	Miles	300	$ 0.54	$ 162	$ -	$ 162
Technician labor on-site and lab	HRS	150	$ 20	$ 3,000	$ 3,000	$ -
Technician Mileage travel to sites	Miles	750	$ 0.54	$ 405	$ 405	$ -
Consultant analysis	HRS	30	150	$ 4,500	$ 4,500	$ -
Task 2 - Monitor and Record Forage Yield						
Sampling materials	EA	20	$ 25.00	$ 500	$ 250	$ 250
Technician sampling labor on-site and lab	HRS	150	$ 20.00	$ 3,000	$ 1,500	$ 1,500
Forage quality lab tests	EA	40	$ 20.00	$ 800	$ 800	$ -
TU sampling labor	HRS	50	$ 45.00	$ 2,250	$ -	$ 2,250
TU travel to sites	Miles	300	$ 0.54	$ 162	$ -	$ 162
Technician travel to sites	Miles	750	$ 0.54	$ 405	$ 203	$ 203
Consultant Analysis	HRS	40	$ 150.00	$ 6,000	$ 3,000	$ 3,000
Task 3 - Record NDVI and Consumptive Use						
Purchase ET gages	EA	4	$ 300.00	$ 1,200	$ 1,200.0	$ -
Purchase Drone and NDVI sensor	EA	1	$ 4,200.00	$ 4,200	$ 4,200.0	$ -

Field agent software subscription	YRS	2	$	500.00	$	1,000	$ 1,000.0	$ -
Technician labor flight and analysis	HRS	100	$	20.00	$	2,000	$ 1,000.0	$ 1,000.0
TU labor flights anylisis	HRS	50	$	45.00	$	2,250	$ -	$ 2,250.0
TU analysis labor (GIS specialist)	HRS	40	$	80.00	$	3,200	$ -	$ 3,200.0
TU travel to sites	Miles	300	$	0.54	$	162	$ -	$ 162.0
Technician Travel	Miles	750	$	0.54	$	405	$ 202.5	$ 202.5
Consultant Analysis	HRS	40	$	150.00	$	6,000	$ 3,000.0	$ 3,000.0
Task 4 - Design 2021 Water Conservation Demonstration Projects								
Coordination labor TU	HRS	40	$	45.00	$	1,800.00	$ -	$ 1,800.00
Consultant Analysis	HRS	40	$	150.00	$	6,000.00	$ 3,000.00	$ 3,000.00
Task 5 - Grant Administration								
TU admin overhead	Percent	0.15	$	27,260	$	4,089.00	$ 4,089.00	
TOTAL					$	62,940.00	$ 31,349	$ 31,591

TU inkind $12,236

Appyling Tech to Monitor grass CU

January 31, 2020

1:577,791

0 5 10 20 mi

0 5 10 20 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Jesse Kruthaupt
Earthstar Geographics | Esri, HERE, Garmin, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA