COLORADO
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

WSRF – 416 Fire Aquatic Monitoring
POGG1 2019-2894

May 22, 2019

Mountain Studies Institute
Attn: Carolyn Moller, Finance Director
P.O. Box 426
Silverton, CO 81433-0426

Dear Grantee:

We are pleased to inform you that the Colorado Department of Natural Resources, Colorado Water Conservation Board (CWCB) has approved your grant request for funding pursuant to the WSRF Grant Program ("Program"). This letter authorizes you to proceed with the 416 Fire Aquatic Monitoring Project ("Project") in accordance with the terms of this Grant Award Letter.

Attached to this letter are the terms and conditions of your Grant. Please review these terms and conditions, as they are requirements of this Grant to which you, Mountain Studies Institute, agree by accepting the Grant Funds.

If you have any questions or concerns regarding the project, please contact Craig Godbout, Project Manager at 303-866-3441 or at Megan Holcomb@state.co.us. Please send all grant correspondence directly to Megan and cc me on your invoice billing requests.

Thank you.

Sincerely,

//s//

Doriann Vigil
Program Assistant II
O 303-866-3441 ext. 3250
1313 Sherman Street, Rm. 719, Denver, CO 80203
Dori.vigil@state.co.us / cwcb.state.co.com

cc: Scott Roberts, Director of Water Programs

STATE OF COLORADO

Department of Natural Resources

ORDER

Number: POGG1,PDAA,201900002894

Date: 5/10/19

Description:

PDAA WSRF 2500 Mtn Studies Institute 416 Fire Aquatic Monito

Effective Date: 05/01/19

Expiration Date: 05/01/22

BUYER

Buyer:

Email:

VENDOR

MOUNTAIN STUDIES INSTITUTE
PO BOX 426
SILVERTON, CO 81433-0426

Contact: .

Phone: .

*****IMPORTANT*****

The order number and line number must appear on all invoices, packing slips, cartons, and correspondence.

BILL TO

COLORADO WATER BOARD CONSERVATION
1313 SHERMAN STREET, ROOM 718
DENVER, CO 80203

SHIP TO

COLORADO WATER BOARD CONSERVATION
1313 SHERMAN STREET, ROOM 718
DENVER, CO 80203

SHIPPING INSTRUCTIONS

Delivery/Install Date: -

FOB: FOB Dest, Freight Allowed

VENDOR INSTRUCTIONS

EXTENDED DESCRIPTION

Line Item	Commodity/Item Code	UOM	QTY	Unit Cost	Total Cost	MSDS Req.
1	G1000		0	0.00	$18,000.00	☐

Description: Mountain Studies Institute 416 Fire Aquatic Monitoring

Service From: 05/01/19 Service To: 05/01/22

TERMS AND CONDITIONS

https://www.colorado.gov/pacific/osc/small-dollar-grant-award-terms-conditions

DOCUMENT TOTAL = $18,000.00

Last Update: January 9, 2018

Colorado Water Conservation Board	
Water Supply Reserve Fund	
Exhibit A - Statement of Work	
Date:	1/1/2019
Water Activity Name:	416-Fire Aquatic Monitoring
Grant Recipient:	Mountain Studies Institute on behalf of 416-Fire Aquatic Monitoring Research Group
Funding Source:	Water Supply Reserve 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 WSRF funding will be used for.

During the summer of 2018, the 416 Fire burned 54,000 acres in the San Juan National Forest, primarily in the Hermosa Creek drainage north of Durango, CO. Subsequent runoff events and debris flows have occurred within the 416-burn area, creating concern in southwest Colorado communities about the resulting impacts to water quality and aquatic life. Ash and sediment delivered from the 416-burn area have been evident in changes in color, discharge, turbidity, and reports of fish kills in Hermosa Creek and the Animas River. Additionally, irrigators and ditch companies were impacted from sediment and debris flows that inhibited their ability to access their water allocations.

To investigate these impacts, we formed a research team made up of scientists from the Mountain Studies Institute, Colorado School of Mines, and USFS Rocky Mountain Research Station. Preliminary results from our research conducted thus far demonstrate that runoff events from the 416-burn scar can result in elevated levels of sediment, nutrients, and metal concentrations. While our preliminary studies captured the immediate impacts of the 416 Fire, it is unknown how these impacts may persist into 2019 and how long it will take before hillsides stabilize and water quality and aquatic life recover.

Objectives: (List the objectives of the project)

We are respectively requesting funding to continue our research efforts with the following objectives:

- Evaluate water quality impacts to Hermosa Creek and the Animas River from the 416-Fire in context of the use of these waters for irrigation, water supply, recreation, and aquatic life.
- Document the recovery of water quality and aquatic life following the 416-Fire to share with concerned public members and more broadly to further our understanding of the recovery of river health after wildfire. For regulatory purposes, the state of Colorado generally considers rivers to recover from wildfire impacts after five years. This study will provide additional evidence as to whether the five-year recovery time period is a reasonable assumption.
- Establish monitoring sites on Hermosa Creek and Junction Creek to serve as watershed comparisons of differing forest health, fire history, and forest health treatments.

Specifically, we propose to:

- Collect regular and opportunistic storm event water quality samples and evaluate for nutrients, dissolved organic carbon, suspended sediment, and metals (*see table 1 and map 1 for sampling locations*).
- Collect and enumerate benthic macroinvertebrate samples (*see table 1 and map 1 for sampling locations*).
- Deploy and maintain instrumentation to continuously collect water quality parameters in Hermosa Creek and Junction Creek including pH, conductivity, temperature, and turbidity.
- Deploy and maintain pressure transducers in Hermosa Creek and Junction Creek so that continuous discharge can be monitored.
- Analyze data and convey findings to the public through reports, public meetings, direct information to ditch users, Animas Valley Grange, and social media.

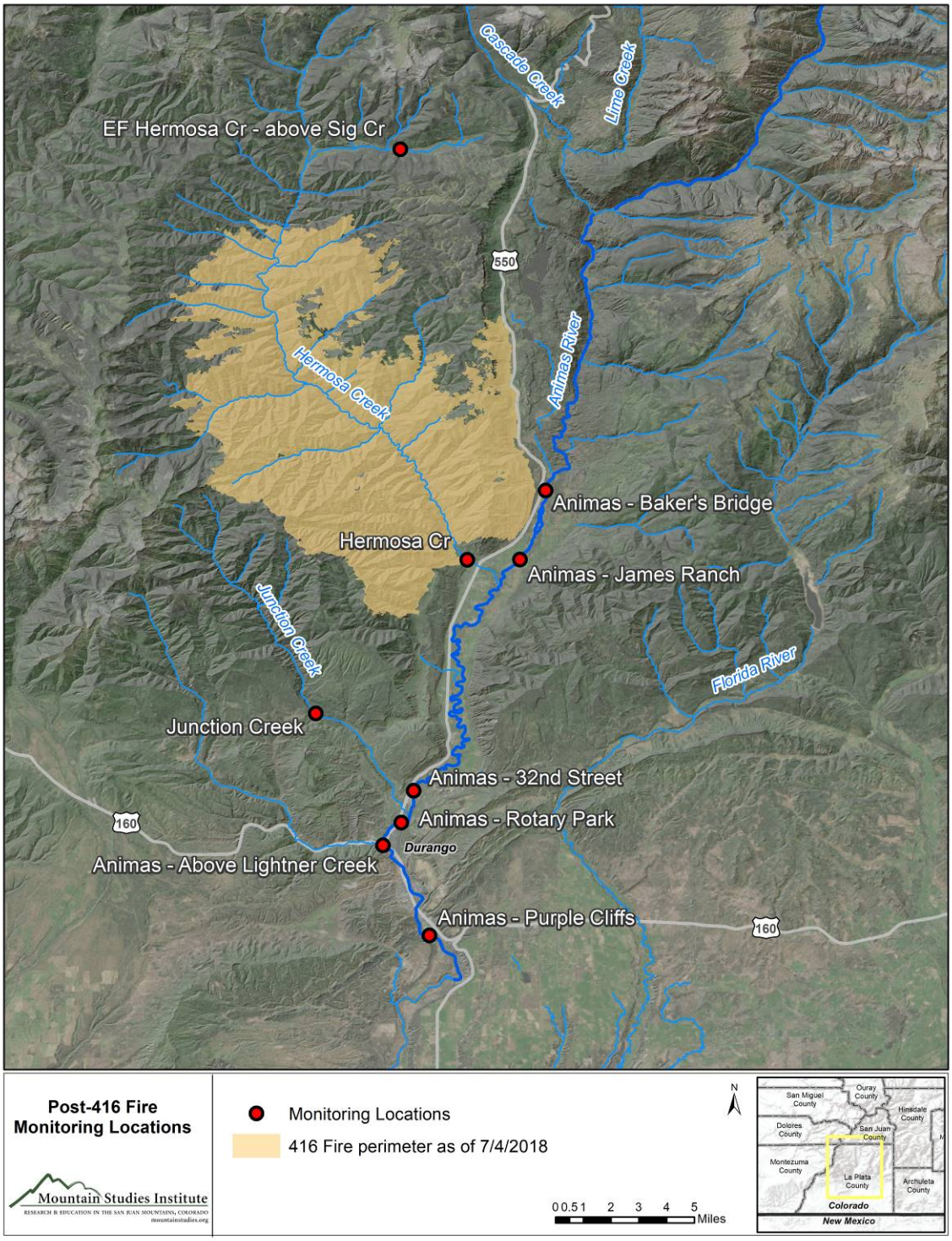
Water quality samples will be collected from five locations, instrumentation will be installed at two locations, and benthic macroinvertebrate samples will be collected from eight locations (Table 1, Map 1).

Table 1: Sampling locations

Site	Description	Instrumentation	Water Quality	Benthic macroinvertebrates
1	Hermosa Creek – above Animas ditch	X	X	X
2	East Fork Hermosa Creek – above Sig Cr			X
3	Junction Creek – Colorado Trail trailhead	X	X	X
4	Animas River – Baker's Bridge		X	X
5	Animas River – James Ranch		X	X
6	Animas River – 32nd Street			X
7	Animas River – Rotary Park		X	
8	Animas River – above Lightner Creek			X
9	Animas River – Purple Cliffs			X

Last Update: January 9, 2018

Map 1: Sampling locations



Last Update: January 9, 2018

Tasks
Provide a detailed description of each task using the following format:
Task 1 - Water Quality Sampling
Description of Task:
Evaluate water quality impacts to Hermosa Creek and the Animas River from the 416-Fire in context of the use of these waters for irrigation, water supply, recreation, and aquatic life.
Method/Procedure:
Collect regular monthly and opportunistic storm water quality samples for eight months from April through November. Samples will be analyzed at Green Analytical Lab, Rocky Mountain Research Station, and Colorado School of Mines. Samples will be analyzed for nutrients, dissolved organic carbon, suspended sediment, and metals.
Grantee Deliverable:
Water quality results in context of historical observations and water quality standards.
CWCB Deliverable:
This information will be coupled with continuous water parameter measurements collected through instrumentation to provide a comprehensive understanding of the water quality conditions during debris flow and flood events. Data will be made available to Colorado state and local agencies.

Tasks
Provide a detailed description of each task using the following format:
Task 2 - Instrumentation
Description of Task:
Deploy and maintain instrumentation to continuously collect water quality parameters in Hermosa Creek and Junction Creek including pH, conductivity, temperature, and turbidity. Deploy and maintain pressure transducers in Hermosa Creek and Junction Creek so that continuous discharge can be monitored.
Method/Procedure:
Deploy *HydroLab MS5* multi-probe instruments in April 2019 to capture peak spring runoff and continue collecting measurements through November 2019. Instruments will be deployed by scientists with the Colorado School of Mines, who have experience deploying these instruments in the Rio Grande watershed to assess wildfire impacts.
Grantee Deliverable:
Continuous measurements of pH, conductivity, temperature, and turbidity will allow us to better characterize the water quality conditions during debris flow and flood events.

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Tasks
CWCB Deliverable:
This information will be coupled with water quality chemistry results to provide a comprehensive understanding of the water quality conditions during debris flow and flood events. Data will be made available to Colorado state and local agencies.

Tasks
Provide a detailed description of each task using the following format:
Task 3 - (Name) Benthic Macroinvertebrates
Description of Task:
Collect and enumerate benthic macroinvertebrate samples to compare to pre-fire observations.
Method/Procedure:
Methodologies for collecting and enumerating benthic macroinvertebrates will closely follow pre-fire methodologies employed by Mountain Studies Institute so that post-fire observations are directly comparable to post-fire observations.
Grantee Deliverable:
Up-to-date information to share with the public regarding the impacts to and recovery of benthic macroinvertebrate communities, as an indication of overall river health, following the 416-Fire.
CWCB Deliverable:
A better understanding of the recovery of river health after wildfire. For regulatory purposes, the state of Colorado generally considers rivers to recover from wildfire impacts after five years. This study will provide additional evidence as to whether the five-year recovery time period is a reasonable assumption. Data will be made available to Colorado state and local agencies.

Tasks
Provide a detailed description of each task using the following format:
Task 4 - (Name) Data Analysis, Presentations, and Reporting
Description of Task:
Analyze data and convey findings to the public through reports, public meetings, direct information to ditch users, Animas Valley Grange, and social media.
Method/Procedure:
Post-fire water quality and aquatic life data will be compared to pre-fire observations visually in graphs as well as with statistical analysis.

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Tasks
Grantee Deliverable:
Reporting will consist of a technical report and an executive summary written in easily digestible language intended for the public. Results will be provided to the public through public meetings, social media, and direct communication to organizations such as ditch operators.
CWCB Deliverable:
Technical report and executive summary, press release of information, and public presentation.

Budget and Schedule
Exhibit B - Budget and Schedule: This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format. A separate excel formatted Budget is required for engineering costs to include rate and unit costs.

Reporting Requirements
Progress Reports: The grantee shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues. The CWCB may withhold reimbursement until satisfactory progress reports have been submitted.
Final Report: At completion of the project, the grantee shall provide the CWCB a Final Report on the grantee's letterhead that: • Summarizes the project and how the project was completed. • Describes any obstacles encountered, and how these obstacles were overcome. • Confirms that all matching commitments have been fulfilled. • Includes photographs, summaries of meetings and engineering reports/designs.

Payments
Payment will be made based on actual expenditures, must include invoices for all work completed and must be on grantee's letterhead. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions. The CWCB will pay the last 10% of the entire water activity budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the water activity and purchase order or contract will be closed without any further payment. Any entity that fails to complete a satisfactory Final Report and submit to CWCB within 90 days of the expiration of a purchase order or contract may be denied consideration for future funding of any type from CWCB.

Performance Requirements
Performance measures for this contract shall include the following: (a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in Exhibit B. Per Grant Guidelines, the CWCB will pay out the last 10% of the budget when the final deliverable is completed to the satisfaction of CWCB staff. Once the final deliverable has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Last Update: January 9, 2018

Reporting Requirements
(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: July 31, 2018

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Supply Reserve Fund

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

Date: 1/1/2019

Water Activity Name: 416-Fire Aquatic Monitoring

Grantee Name: Mountain Studies Institute on behalf of 416-Fire Aquatic Monitoring Research Group

Task No.[1]	Description	Start Date[2]	End Date	Matching Funds (cash & in-kind)[3]	WSRF Funds (Basin & Statewide combined)[3]	Total
1	Water Quality Sampling	4/1/2019	11/30/2019	$30,243	$6,000	$36,243
2	Instrumentation	4/1/2019	11/30/2019	$35,231	$1,500	$36,731
3	Benthic Macroinvertebrates	9/1/2019	1/31/2020	$5,601	$7,000	$12,601
4	Data Analysis, Presentations, and Reporting	1/1/2020	4/30/2020	$25	$3,500	$3,525
			Total	$71,100	$18,000	$89,100

(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) Start Date for funding under $100K - 45 Days from Board Approval; Start Date for funding over $100K - 90 Days from Board Approval.

(3) 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.

• Reimbursement eligibility commences upon the grantee's receipt of a Notice to Proceed (NTP)

• NTP will not be accepted as a start date. Project activities may commence as soon as the grantee enters contract and receives formal signed State Agreement.

The CWCB will pay the last 10% of the entire water activity budget when the Final Report is completed to the satisfaction of the CWCB staff project manager. Once the Final Report has been accepted, the final payment has been issued, the water activity and purchase order (PO) or contract will be closed without any futher payment. Any entity that fails to complete a satisfactory Final Report and submit to the CWCB with 90 days of the expiration of the PO or contract may be denied consideration for future funding of any type from the CWCB.

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

• Standard contracting proceedures dictate that the Expiration Date of the contract shall be 5 years from the Effective Date.