

**Water Supply Reserve Fund
Water Activity Summary Sheet
March 21, 2019
Agenda Item 24(q)**

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

Water Activity Name: 416-Fire Aquatic Monitoring

Water Activity Purpose: Multiuse Study & Outreach

County: La Plata

Drainage Basin: Southwest

Water Source: Hermosa Creek & Animas River

Amount Requested: \$18,000 Southwest Basin Account

Matching Funds: Applicant Match (cash & in-kind) = \$71,100

- 284% of the Basin Account request (meets 25% min)
- 80% of the total project cost of \$89,100

Staff Recommendation:

Staff recommends approval of up to \$18,000 from the Southwest Basin Account to help fund the project titled: 416-Fire Aquatic Monitoring.

Water Activity Summary: Mountain Studies Institute (MSI) is requesting research effort support on behalf of the 416-Fire Aquatic Monitoring Research Group, which formed to investigate impacts to water quality and aquatic life from the 2018 416-Fire in southwest Colorado. The research group consists of scientists from MSI, Colorado School of Mines, and the US Forest Service Rocky Mountain Research Station. WSRF grant funds, if approved will help the research team:

- 1) 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.
- 2) Document the recovery of water quality and aquatic life following the 416-Fire to share with concerned public members and further understanding of river health recovery
- 3) Establish monitoring sites on Hermosa Creek and Junction Creek to serve as watershed comparisons of differing forest health, fire history, and forest health treatments. 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

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.

Discussion: As described in the Southwest Basin Roundtable chair’s recommendation letter, this project was supported and recommended for approval by the roundtable on January 17, 2019. The proposed project Colorado’s Water Plan *Objective H1: Education, Outreach, and Innovation* to significantly improve the level of public awareness and engagement regarding water issues statewide. One goal of the proposed project is to increase the level of public awareness regarding the impacts of wildfire on water quality and the health of aquatic life - providing valuable information to the public about how wildfire in southwest Colorado impacts water quality for users such as irrigators, livestock owners, recreationalists, and domestic water suppliers. Findings will be conveyed to the public through reports, public meetings, direct information to ditch users, Animas Valley Grange, and social media.

Issues/Additional Needs: No additional needs have been identified.

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

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

Funding Summary / Matching Funds:

| <u>Funding Source</u> | <u>Cash</u> | <u>In-Kind</u> | <u>Total</u> |
|---|-----------------|-----------------|-----------------|
| Colorado School of Mines | \$11,525 | \$5,345 | \$16,870 |
| USFS Rocky Mountain Research Station | \$0 | \$11,330 | \$11,330 |
| Rio Grande Watershed Emergency Action Coordination Team | \$1,500 | \$21,000 | \$22,500 |
| Colorado Department of Public Health and Environment | \$0 | \$8,400 | \$8,400 |
| City of Durango | \$5,000 | \$0 | \$5,000 |
| Trout Unlimited | \$1,000 | \$0 | \$1,000 |
| Southwestern Conservation District | \$6,000 | \$0 | \$6,000 |
| Subtotals | \$25,025 | \$46,075 | \$71,000 |
| WSRF Southwest Basin Account | \$18,000 | n/a | \$18,000 |
| Totals | \$43,025 | \$46,075 | \$89,100 |

CWCB Project Manager: Megan Holcomb

SOUTHWEST BASINS ROUNDTABLE

Michael Preston, Chair

c/o Dolores Water Conservancy District

P.O. Box 1150

Cortez, Colorado 81321

970-565-7562

January 17, 2019

Megan Holcomb

Water Supply Management Section

Colorado Water Conservation Board

1580 Logan Street, Suite 600

Denver, Colorado 80203

SUBJECT: 416 Fire Aquatic Monitoring - \$18,000 from the Southwest Basin Fund

Dear Megan:

The Southwest Basin Roundtable has approved funding in the amount of \$18,000 from the Southwest Basin Fund for the 416 Fire Aquatic Monitoring Project, Administered by Mountain Studies Institute on behalf of the 416 Fire Aquatic Monitoring Group. The application was considered in detail at the January 9, 2019 meeting of the Southwest Basin Roundtable. There was a quorum of Roundtable members present.

The Fire Aquatic Monitoring Project addresses BIP Goals A2: Support quality of life by maintaining all water uses, A4: Promote dialogue, foster cooperation and resolve conflict among water users in every basin, A5: Maintain watershed health by protecting and restoring, C2: Provide safe drinking water to Colorado's citizens and visitors, D1: Maintain protect recreational and economic values, E1: Support restoration and recovery of imperiled aquatic, riparian dependent species and plant communities, E2: Monitor and improve natural function of streams, F1: Monitor, protect, improve water quality. The project is also aligned with Colorado Water Plan Goal H: Education, Outreach and Innovation.

Water quality is a crucial 416 Fire impact. While the Gold King Mine Spill resulted in no apparent fish kill, it is estimated that 80% or trout populations were killed in the relevant reaches of the Animas River from sediment loading after the 416 fire.

The completed Grant Application will be forwarded directly to you by the applicant. Please contact the applicant directly or me at 970-565-7562, mpreston@frontier.net, if you have questions or wish to discuss this application in more detail.

Sincerely,



Michael Preston

Southwest Basin Roundtable Chair



Colorado Water Conservation Board
Water Supply Reserve Fund
Grant Application

Instructions

All WSRF grant applications shall conform to the current [2016 WSRF Criteria and Guidelines](#).

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

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

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

WSRF Submittal Checklist (Required)

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

(1) Click "Grant Agreements". For reference only/do not fill out or submit/required for contracting

(2) Required with application if applicable.

(3) Additional documentation providing a Detailed/Itemized Budget maybe required for contracting. Applicants are encouraged to coordinate with the CWCB Project Manager to determine specifics.

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



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

| Desired Timeline | |
|---------------------------------|------------|
| Desired CWCB Hearing Month: | March 2019 |
| Desired Notice to Proceed Date: | April 2019 |

| Water Activity Summary | |
|--|--|
| Name of Applicant | Mountain Studies Institute on behalf of 416-Fire Aquatic Monitoring Research Group |
| Name of Water Activity | 416-Fire Aquatic Monitoring |
| Approving Roundtable(s) | Basin Account Request(s) ⁽¹⁾ |
| Southwest Basin Roundtable | |
| Basin Account Request Subtotal | \$18,000 |
| Statewide Account Request ⁽¹⁾ | \$ |
| Total WSRF Funds Requested (Basin & Statewide) | \$18,000 |
| Total Project Costs | \$89,100 |

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

| Grantee and Applicant Information | |
|---|--|
| Name of Grantee(s) | Mountain Studies Institute |
| Mailing Address | 679 E. 2 nd Ave, Durango, Co |
| FEIN | 73-1644103 |
| Grantee's Organization Contact ⁽¹⁾ | Marcie Bidwell |
| Position/Title | Executive Director |
| Email | marcie@mountainstudies.org |



| Grantee and Applicant Information | |
|---|--|
| Phone | 970-387-5161 |
| Grant Management Contact ⁽²⁾ | <u>Carolyn Moller</u> |
| Position/Title | Finance Director |
| Email | finance@mountainstudies.org |
| Phone | 970-387-5161 |
| Name of Applicant (if different than grantee) | Scott Roberts |
| Mailing Address | 679 E 2 nd Ave, Durango, CO |
| Position/Title | Director of Water Programs |
| Email | scott@mountainstudies.org |
| Phone | 970-387-5161 |

(1) Person with signatory authority

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

| Description of Grantee |
|---|
| Provide a brief description of the grantee's organization (100 words or less). |
| <p>Mountain Studies Institute (MSI) is respectfully submitting this application on behalf of the 416-Fire Aquatic Monitoring Research Group, which formed to investigate impacts to water quality and aquatic life from the 2018 416-Fire in southwest Colorado. The research group consists of scientists from MSI, Colorado School of Mines, and the US Forest Service Rocky Mountain Research Station. MSI is an independent not-for-profit mountain research and education center established in 2002 with offices and lab space in Durango and Silverton, CO. MSI develops "science that people can use" to address local and regional environmental issues.</p> |

| Type of Eligible Entity (check one) | |
|-------------------------------------|---|
| | Public (Government): municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient. |
| | Public (Districts): authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises |
| | Private Incorporated: mutual ditch companies, homeowners associations, corporations |
| | Private Individuals, Partnerships, and Sole Proprietors: are eligible for funding from the Basin Accounts but not for funding from the Statewide Account. |
| x | Non-governmental organizations: broadly, any organization that is not part of the government |
| | Covered Entity: as defined in Section 37-60-126 Colorado Revised Statutes |

| Type of Water Activity (check one) |
|------------------------------------|
| |



| | |
|---|----------------|
| x | Study |
| | Implementation |

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

| Location of Water Activity | |
|--|-----------------|
| Please provide the general county and coordinates of the proposed activity below in decimal degrees . The Applicant shall also provide, in Exhibit C, a site map if applicable. | |
| County/Counties | La Plata County |
| Latitude | 37.4158 |
| Longitude | -107.837 |

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



Water Activity Overview

To investigate impacts on water quality and aquatic life following the 416-Fire, we formed a research team made up of scientists from the Mountain Studies Institute (MSI), Colorado School of Mines, and US Forest Service 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, 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. We are respectfully requesting funding to continue our research efforts to:

- 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.
- Establish monitoring sites on Hermosa Creek and Junction Creek to serve as watershed comparisons of differing forest health, fire history, and forest health treatments.

Measurable Results

To catalog measurable results achieved with WSRF funds please provide any of the following values.

| | | |
|---|---|--|
| | New Storage Created (acre-feet) | |
| | New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive | |
| | Existing Storage Preserved or Enhanced (acre-feet) | |
| | Length of Stream Restored or Protected (linear feet) | |
| | Efficiency Savings (indicate acre-feet/year OR dollars/year) | |
| | Area of Restored or Preserved Habitat (acres) | |
| | Length of Pipe/Canal Built or Improved | |
| x | Other | Explain: provide the communities of southwest Colorado with information regarding the impacts to water quality from the 416-Fire in context of water uses and further our understanding of the recovery of river health after wildfire |

Water Activity Justification

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

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



Water Activity Justification

The alignment with BIP goals & the Colorado Water Plan are identified in Tables 1.1 and 1.2 below, respectively.

Table 1.1: Alignment with SW Basin Implementation Plan

| GOAL | MEASURABLE OUTCOME | PROJECT-RELATED MEASURABLE OUTCOME |
|--|--|--|
| <p>A2: Support specific and unique new IPPs important to maintaining the quality of life in this region, and to address multiple purposes including municipal, industrial, environmental, recreational, agricultural, risk management, and compact compliance needs.</p> | <p>Supports achievement of outcomes 3,5, and 6</p> | <p>The proposed project will provide valuable information on how wildfire in southwest Colorado impacts water quality for users such as irrigators, livestock owners, recreationalists, and domestic water suppliers. This research will further our understanding of the recovery of river health after wildfire and will serve as information to guide future decision makers.</p> |
| <p>A4: Promote dialogue, foster cooperation and resolve conflict among water interests in every basin and between basins for the purpose of implementing solutions to Southwest Colorado's and Colorado's water supply challenge (<i>SWSI 2010</i>).</p> | <p>Supports outcome 3</p> | <p>Cooperation and conflict resolution is greatly bolstered by the availability of up-to-date, relevant information to all water interests. Our work will provide an independent source of information regarding the impacts to, and recovery of, water quality and aquatic life following wildfire.</p> |
| <p>A5: Maintain watershed health by protecting and/or restoring watersheds that could affect critical infrastructure and/or environmental and recreational values.</p> | <p>Supports outcome 5-6</p> | <p>Our research will provide decision-makers with relevant information needed to justify whether treatment or mitigation strategies may be necessary to address water quality concerns following wildfire.</p> |
| <p>C2: Provide safe drinking water to Southwest Colorado's citizens and visitors</p> | | <p>Our research will provide up-to-date, relevant, water quality information that is crucial to water suppliers evaluating changing water quality conditions following wildfire.</p> |



| Water Activity Justification | | |
|---|--|---|
| <p>D1: Maintain, protect and enhance recreational values and economic values to local and statewide economies derived from recreational water uses, such as fishing, boating, hunting, wildlife watching, camping and hiking.</p> | <p>Supports achievement of outcome 3</p> | <p>We will document the recovery of Animas River aquatic life and associated water quality, which will be a valuable message to convey to resident and visiting recreationists that our local economies depend on.</p> |
| <p>E1: Encourage and support restoration, recovery, and sustainability of endangered, threatened, and imperiled aquatic and riparian dependent species and plant communities.</p> | <p>Supports, or assists, in achievement of outcomes 1-5</p> | <p>Our research will provide information about the impacts and recovery of river health following wildfire, which will be relevant for the management of endangered, threatened, and imperiled species.</p> |
| <p>E2: Protect, maintain, monitor and improve the condition and natural function of streams, lakes, wetlands, and riparian areas to promote self-sustaining fisheries, and to support native species and functional habitat in the long term, and adapt to changing conditions.</p> | <p>Supports, or assists, in achievement of outcomes 1-5.</p> | <p>We will directly monitor streams to address how river health is affected by wildfire and how recovery occurs. Our monitoring will document how aquatic life may or may not adapt to changing conditions such as wildfire.</p> |
| <p>F1: Monitor, protect and improve water quality for all classified users</p> | <p>Supports achievement of outcome 1 & 2</p> | <p>Immediately following the 416-Fire, we detected water quality conditions that surpassed water quality standards. It is unknown how long these water quality impacts from the 416-Fire may persist. 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.</p> |



Water Activity Justification

Table 1.2: Project Alignment with Colorado Water Plan

| GOAL | PROJECT-RELATED MEASURABLE OUTCOME |
|---|---|
| <p>H1: Education, Outreach, and Innovation: Colorado’s Water Plan sets a measurable objective to significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys. Colorado’s Water Plan also sets a measurable objective to engage Coloradans statewide on at least five key water challenges (identified by CWCB) that should be addressed by 2030.</p> | <p>One of the goals of the proposed project is to increase the level of public awareness regarding the impacts of wildfire on water quality and the health of aquatic life. Our work will provide valuable information to the public about how wildfire in southwest Colorado impacts water quality for users such as irrigators, livestock owners, recreationalists, and domestic water suppliers. More broadly, this research will further our understanding of the recovery of river health after wildfire. We will convey findings to the public through reports, public meetings, direct information to ditch users, Animas Valley Grange, and social media.</p> |

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



Matching Requirements: Basin Account Requests

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

| Contributing Entity | Amount and Form of Match (note cash or in-kind) |
|--|---|
| Colorado School of Mines (part of applicant research team) | Total of \$16,870 (cash \$11,525 for labor + in-kind \$5,345 lab analysis and materials) |
| USFS Rocky Mountain Research Station (part of applicant research team) | \$11,330 in-kind lab analysis and materials |
| Rio Grande Watershed Emergency Action Coordination Team | \$22,500 (cash \$1,500 for labor + in-kind equipment value of \$21,000) |
| Colorado Department of Public Health and Environment | Total of \$8,400 (in-kind - \$3,600 benthic lab analysis + \$4,800 water quality lab analysis) |
| City of Durango | \$5,000 (cash - benthic monitoring) |
| Trout Unlimited | \$1,000 (cash - benthic monitoring) |
| Southwest Conservation District (pending) | \$6,000 (cash) |
| Total Match | \$71,100 |
| If you requested a Waiver to the Basin Account matching requirements, indicate the percentage you wish waived. | |

Matching Requirements: Statewide Account Requests

Statewide Account grant requests require a 50% match as described in the 2016 WSRF Criteria and Guidelines. A minimum of 10% match shall be from Basin Account funds (cash only). A minimum of 10% match shall be provided by the applicant or 3rd party (cash, in-kind, or combination). The remaining 30% of the required match may be provided from any other source (Basin, applicant, or 3rd party) and shall be accompanied by a **letter of commitment**. Attach additional sheet if necessary.

| Contributing Entity | Amount and Form of Match (note cash or in-kind): |
|--|--|
| N/A | |
| | |
| | |
| Total Match | |
| If you requested a Waiver to the Statewide Account matching, indicate % you wish waived. (Max 50% reduction of requirement). | |



Related Studies

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

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 in Hermosa Creek and the Animas River.

Previous CWCB Grants

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

CWCP IPCP 2016- 1) Applicant: Mountain Studies Institute (MSI), 2) Water Activity Name: Invasive Phreatophyte Control Program: Animas River Invasive Species Removal Program Phase I, 3) Approving RT: Southwest Basin Roundtable, 4) SWBRT date: November 13, 2015; CWCB date: April 2016; , 5) Contract number: CTGG1 PDAA 2016-1860, 6) Percentage of Award: The total award was \$195,000, which was 44% of our total project cost. Completion date: April 2018.

WSRF 2017-Nov) Applicant: Mountain Studies Institute (MSI); 2) Project Name: San Juan Headwaters Stream Management Plan Phase I; 3) Approving RT: Southwest Basin Round Table; 4) CWCB Date: April 2018; 5) Contract number : TBD 6) Completion Date: December 2019

WSRF 2017-1) Applicant: Mountain Studies Institute (MSI); 2) Project Name: Animas River Community Forum in the Southwest Basin, Phase II; 3) Approving RT: Southwest Basin Round Table; 4) CWCB Date: July 2017; 5) Contract number : CTGG1 2018-201, POGG1 PDAA 201800000201, 6) Completion Date: December 2018

WSRF 2017-1) Applicant: Mountain Studies Institute (MSI); 2) Project Name: Animas River Community Forum, Phase II; 3) Approving RT: Southwest Basin Round Table; 4) CWCB Date: April 2016; 5) Contract number: POGG1 2016-794, POGG1 PDAA 20160000000000000794, 6) Completion Date: September 2017

Colorado Water Plan 2018-1) Applicant: Mountain Studies Institute (MSI); 2) Project Name:, Animas River Removal and Replacement of Invasive Phreatophytes, Phase II; 3) Approving RT: Southwest Basin Round Table; 4) CWCB Date: May 2018; 5) Contract number: POGG1, PDAA, 201900002100, 6) Completion Date: August 2023

Colorado Water Plan- Innovation Fund 2018-1) Applicant: Mountain Studies Institute (MSI); 2) Project Name: Silverton Science & Innovation Center (SSINC); 3) Approving RT: Southwest Basin Round Table; 4) CWCB Date: Nov 2018; 5) Contract number: Pending, 6) Completion Date: 2020

Tax Payer Bill of Rights

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

NA



SOUTHWEST BASIN ROUNDTABLE’S EVALUATION QUESTIONNAIRE

To assist the Roundtable in determining whether and to what extent a proposed project and/or process meets the values set forth in the By-Laws and goals of the Basin Implementation Plan, the following questions should be addressed separately as can reasonably be answered by the applicant. *Note: this is not an exhaustive list and additional questions may be asked of the applicant.*

1. What benefit(s) does the project provide? Are there multiple purposes? *Note: this does not mean that a single purpose project would be rejected, but for major funding requests, addressing multiple use needs would be an advantage.*

The proposed project will benefit multiple uses (including both consumptive and non-consumptive) by empowering local decision-making (for example, ditch companies, domestic water suppliers, emergency management, recreationalists, and fishery management) that is informed by the most up-to-date information and research. This project will further our understanding of the recovery of river health after wildfire. Our work will document the recovery of water quality and aquatic life following the 416-Fire, providing valuable insights 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.

Hermosa Creek has long been a valued tributary in the Animas River Basin and years of focus by community partners that lead to the designation of the Hermosa Creek Wilderness and the State of Colorado’s Outstanding Waters recognition. Our research will build on the work of the Hermosa Creek Workgroup, who in 2010 prioritized ensuring “water quality stays at current level” and the “trout fishery stays strong.”

The analytical toolset we develop for this work can be translatable to other watersheds, where an assessment of the impacts to water resources from forest fire or forest treatment would be beneficial. This work will enable us to provide updates on the condition of the Animas River to stakeholders and community members, including information and data that can be incorporated into future editions of the Animas River Community Forum’s *Our Animas* publication.

2. Outline the steps needed for completion of the project. What permit issues must be overcome? How will funds acquired in this process be used to accomplish the final goal?

There are no permits required for this project.

| Steps/Objectives: |
|--|
| a) Conduct water quality sampling from April through November 2019 |
| b) Deploy instrumentation from April through November 2019 to capture continuous water quality and water quantity parameters |
| c) Collect benthic macroinvertebrate sampling in September 2019 |
| d) Process and Identify benthic macroinvertebrate samples in the winter of 2019-2020 |
| e) Analyze data, deliver presentations and report in the winter of 2019-2020 |



There are no permits required for this project.

The funding we respectfully request would be used to cover labor, travel expenses, and field supplies, putting us in a position to most effectively utilize the generous matching contributions from our partners. For example, partners have committed to covering the cost of some laboratory analysis, and the funding we are requesting would allow us to collect and deliver the samples to our partners for analysis.

3. For prioritization of different proposals and assessment of the merits of the plan, can this project be physically built with this funding? Are further studies needed before actual construction is commenced (if the project anticipates construction)? Will these studies or additional steps delay the completion of the project substantially?

n/a

4. Does the proposal envision and anticipate financial or in-kind support from its beneficiaries or from other sources in addition to the funding requested here? Would a loan reasonably address the needs of the applicant or, with a grant, should a recommendation be added to assess the future project status for ability to repay a portion of the grant?

Yes, both cash and in-kind contributions are being offered. This grant would cover ~20% of the total project cost. Applicant derives no direct or exclusive benefit from the project. Rather, the project furthers the water planning goals of the state and the SWBRT and will benefit water users, recreation, and the general community in Southwest Colorado. As such, a loan would not be appropriate.

5. What is the ability of the sponsor to pay for the project? What actions have been taken to secure local funding? Are there supporting factors which overcome the sponsor's inability to pay? Please provide a summary of the sponsor's financial health such as customer fee structure, mill levy rate, or other applicable information that demonstrates the sponsor's ability to pay for the project. (These could be related to basin water needs and compact considerations).

The proposed project is the initiative of the 416-Fire Aquatic Monitoring Research Group and local community members. Collectively, we are working together to seek matching funds and in-kind donations in addition to funds requested.

6. What alternative sources of water or alternative management ideas have you considered? Are there water rights conflicts involving the source of water for the project? If yes, please explain.

n/a

7. Has there been public input solicited and is there local support for the project? Have the beneficiaries solicited funding, letters or other documentation to demonstrate support?



Many stakeholders affected by the health and function of Hermosa Creek and the Animas River have expressed interest in continued monitoring of water quality, water quantity, and aquatic life following the 416-Fire. Stakeholders include Trout Unlimited, Colorado Department of Public Health and the Environment, City of Durango, Colorado Parks and Wildlife, U.S. Forest Service, San Juan Citizens Alliance, Rio Grande Watershed Emergency Action Coordination Team, outdoor recreation industry company and groups, interested members of the public. Letters of support from various stakeholders are in Exhibit C.

8. Is there opposition to the project? If there is opposition, how have those concerns been addressed? Identify any conflicts that may exist and how they will be addressed.

To the best of our knowledge, no opposition exists to the proposed project.

9. Does this project affect the protection and conservation of the natural environment, including the protection of open space? If yes, please explain.

The proposed project will provide information directly applicable to decision makers working to protect and preserve the natural environment, especially in post-fire landscapes.

10. Are there impacts of the proposed action on other non-decreed values of the stream or river? Non-decreed values may include things such as non-decreed water rights or uses, recreational uses and soil/land conservation practices.

No, this project will have no effect on water rights.

11. Does this project relate to local land use plans? If yes, please explain.

The proposed project will provide up-to-date relevant information that could be used by local land use planners and water users.

12. Does the project depend on a conversion of an agricultural water right? If yes, please explain.

No. This project does not depend on the conversion of an agricultural water right.

13. Does the project support agricultural development or protect the existing agricultural economy? If yes, please explain.

The proposed project will provide relevant water quality information to irrigators and other agriculturalists.

14. Does the project optimize existing water rights and/or existing infrastructure? If yes, please explain.

n/a

15. Does the applicant anticipate future funding requests to complete the additional components of this project? Does the applicant have a long term operation, maintenance and replacement plan? When was the last update of the plan?

The proposed work would characterize the aquatic impacts and potential recovery in the year following the 416-Fire. The interpretation of this information will guide whether further monitoring would be beneficial to the community.

16. Does this project have an education component? If yes, please explain how it is consistent with the Roundtable's Education Action Plan.

We plan to convey research findings to the public through reports, public meetings, direct information to ditch users, Animas Valley Grange, and social media.



Last Update: January 9, 2018

| Colorado Water Conservation Board | |
|---|--|
| Water Supply Reserve Fund | |
| <u>Exhibit A - Statement of Work</u> | |
| 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.) | |
| <p>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.</p> <p>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.</p> | |
| Objectives: (List the objectives of the project) | |
| <p>We are respectfully requesting funding to continue our research efforts with the following objectives:</p> <ul style="list-style-type: none"> • 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. | |



Last Update: January 9, 2018

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).

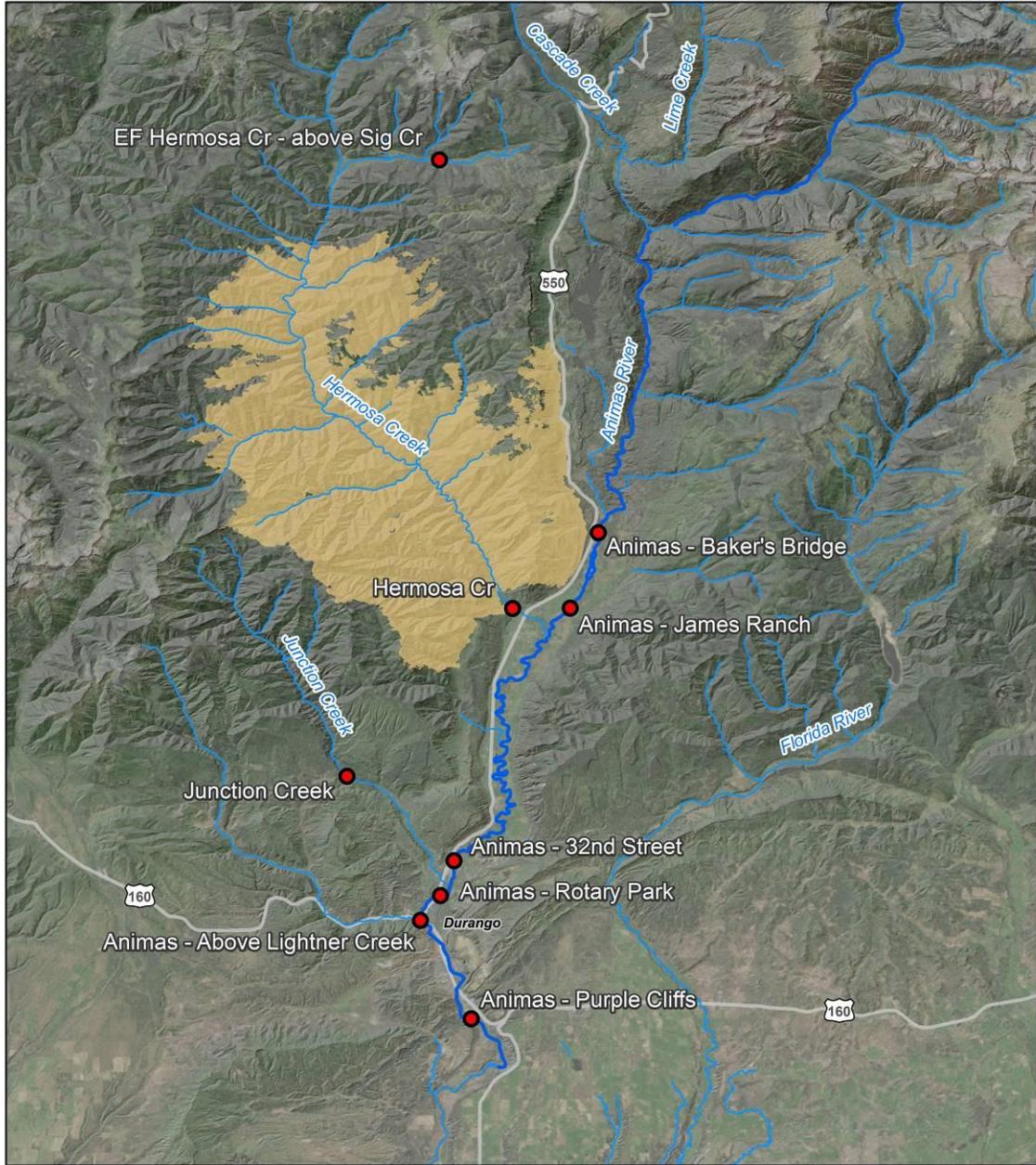
Table 1: Sampling locations

| 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 – 32 nd 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



| | | | |
|--|---|----------|--|
| <p>Post-416 Fire Monitoring Locations</p> | <ul style="list-style-type: none"> ● Monitoring Locations 416 Fire perimeter as of 7/4/2018 | <p>N</p> | |
| <p>Mountain Studies Institute <small>RESEARCH & EDUCATION IN THE SAN JUAN MOUNTAINS, COLORADO</small> <small>mountainstudies.org</small></p> | <p>0 0.5 1 2 3 4 5 Miles</p> | | |



Last Update: January 9, 2018

| Tasks |
|--|
| Provide a detailed description of each task using the following format: |
| <u>Task 1 - Water Quality Sampling</u> |
| 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: |
| <u>Task 2 - Instrumentation</u> |
| 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 <i>HydroLab MS5</i> 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. |



Last Update: January 9, 2018

| 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: |
| <u>Task 3 - (Name) Benthic Macroinvertebrates</u> |
| 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: |
| <u>Task 4 - (Name) Data Analysis, Presentations, and Reporting</u> |
| 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. |



Last Update: January 9, 2018

| 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 <u>excel formatted</u> 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: <ul style="list-style-type: none"> • 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 <u>entire</u> 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.

**EXHIBIT C: LETTERS OF SUPPORT FROM
RIO GRANDE WATERSHED EMERGENCY ACTION COORDINATION TEAM
& TROUT UNLIMITED**

In the development of this proposal, MSI consulted and collaborated with many partners, including: City of Durango, Colorado Parks and Wildlife, Colorado Department of Public Health and the Environment, Animas River Community Forum, Trout Unlimited, Rio Grande Watershed Emergency Action Coordination Team, Colorado School of Mines USFS Rocky Mountain Research Station, and Fort Lewis College.

Additional letters of support may be supplied upon request.



August 12, 2018

To Whom it May Concern:

Re: Support for a Water Quality Monitoring Study during post-disaster 416 fire Conditions

The Rio Grande Watershed Emergency Action Coordination Team (RWEACT) heartily supports funding applications for post-disaster monitoring from the 416 fire within the counties of San Juan and La Plata. We have offered an equipment loan of water quality monitoring probes that monitor nine different characteristics both manually and remotely.

Through partnership with the Rio Grande Headwaters Restoration Foundation and Colorado School of Mines, RWEACT has provided funding for the continued monitoring of conditions following our own event of the West Fork Complex fire during 2014-2018. This data has been valuable during our environmental and economic recovery efforts.

Colorado School of Mines (CSM) has been able to determine trends as the Upper Rio Grande watershed recovers. Findings are in the process of being published. We anticipate there will be similar recovery efforts in the Animas and Hermosa drainages and we support these monitoring efforts. We support the proposed partnership of CSM and the Mountain Studies Institute.

RWEACT was established in July 2013 in response to the West Fork Complex Fire. RWEACT brings together local, state and federal agencies, organizations and individuals in a coordinated approach to address fire-caused hazards, early notification, and future resiliency of our natural and economic communities. Working closely with the Rio Grande National Forest, the Colorado Water Conservation Board, the counties of Hinsdale, Mineral, and Rio Grande, and more than 70 additional partners, RWEACT has implemented 200 projects and endeavors. We have increased the geographical representation of our Board of Directors now to also include Saguache, Alamosa, and Costilla counties. We began working with the Divide Ranger District where the West Fork Complex fire occurred and are now able to expand forest-wide to support appropriate projects.

The West Fork Complex Fire increased collaboration between counties and other local governments. Current work of RWEACT includes an Upper Rio Grande Watershed Assessment, participation in efforts to bring regional Radar to the area, improved Emergency Communications, post-disaster economic recovery, and stewardship activities. Our post-disaster economic recovery efforts identifying "increasing heritage tourism assets" as a regional effort. This project supports that finding and action.

RWEACT's mission to promote partnerships and actions that provide for public safety and resiliency of communities and watersheds of the Rio Grande Basin in Colorado. With an emphasis on Watershed Stewardship and the ability to leverage, RWEACT is expanding our geographical focus within the organization. More information about our organization can be found at www.rweact.org Thank you for your consideration.

Respectfully,

/s/ Kristine M. Borchers

Kristine Borchers
Program Manager, RWEACT
kristineborchers@yahoo.com
970-596-9071



Five Rivers Chapter

December 13, 2018

To: Mountain Studies Institute

From: Five Rivers Trout Unlimited

Subject: Monitoring and evaluation of 416 Fire impact on Aquatic Life.

This letter is to document Five Rivers Trout Unlimited's support of MSI's on-going research into 416 Fire impacts on the Benthic Macro Invertebrates in the Hermosa and Animas watersheds.

To support this work Five Rivers Trout Unlimited has donated \$1000. 5RTU expects these funds to be used for on-going monitoring of the BMI communities as well as water quality.

In the past Five Rivers Trout Unlimited has been instrumental in raising over \$15,000 to further BMI monitoring in the Animas River. We stand ready in the future to provide continuing support.

Sincerely,

Buck Skillen, President – Five Rivers Chapter of Trout Unlimited.



Last Update: January 9, 2018

| Colorado Water Conservation Board | |
|---|--|
| Water Supply Reserve Fund | |
| <u>Exhibit A - Statement of Work</u> | |
| 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.) | |
| <p>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.</p> <p>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.</p> | |
| Objectives: (List the objectives of the project) | |
| <p>We are respectfully requesting funding to continue our research efforts with the following objectives:</p> <ul style="list-style-type: none"> • 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. | |



Last Update: January 9, 2018

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.
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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).

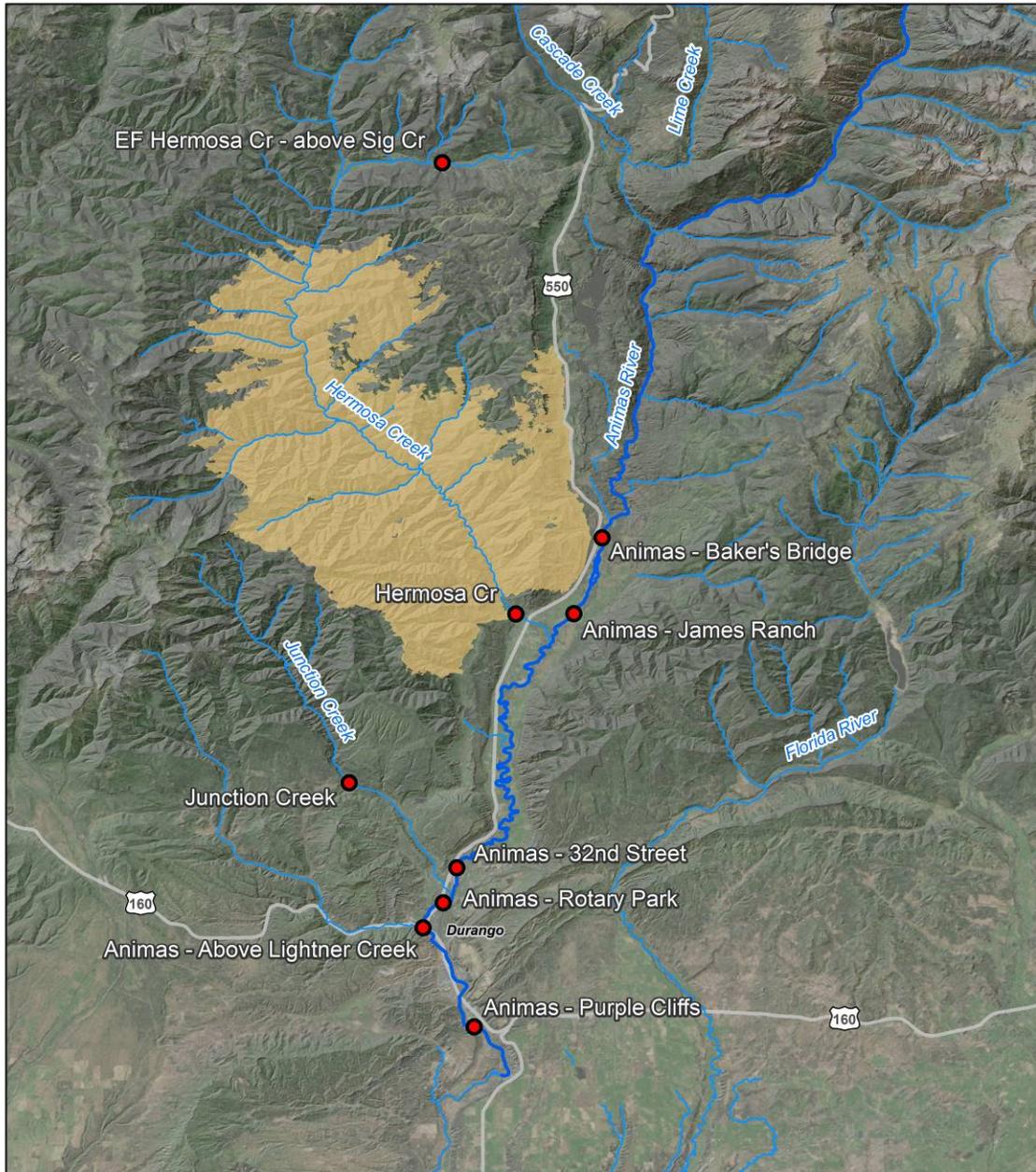
Table 1: Sampling locations

| Site | Description | Instrumentation | Water Quality | Benthic macroinvertebrates |
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| 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 – 32 nd 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



| | | |
|--|---|--|
| <p>Post-416 Fire Monitoring Locations</p>  <p>RESEARCH & EDUCATION IN THE SAN JUAN MOUNTAINS, COLORADO mountainstudies.org</p> | <ul style="list-style-type: none"> ● Monitoring Locations 416 Fire perimeter as of 7/4/2018 <div style="text-align: right;">  </div> | <div style="text-align: center;">  </div>  <p style="text-align: center;">Colorado New Mexico</p> |
|--|---|--|



Last Update: January 9, 2018

| Tasks |
|--|
| Provide a detailed description of each task using the following format: |
| <u>Task 1 - Water Quality Sampling</u> |
| 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: |
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| 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: |
| <u>Task 2 - Instrumentation</u> |
| 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. |
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| Deploy <i>HydroLab MS5</i> 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. |
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Last Update: January 9, 2018

| 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: |
| <u>Task 3 - (Name) Benthic Macroinvertebrates</u> |
| 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: |
| <u>Task 4 - (Name) Data Analysis, Presentations, and Reporting</u> |
| 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. |
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Last Update: January 9, 2018

| Tasks |
|---|
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| CWCB Deliverable: |
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| 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 <u>excel format</u> . A separate <u>excel formatted</u> 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. |
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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.

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**EXHIBIT C: LETTERS OF SUPPORT FROM
RIO GRANDE WATERSHED EMERGENCY ACTION COORDINATION TEAM
& TROUT UNLIMITED**

In the development of this proposal, MSI consulted and collaborated with many partners, including: City of Durango, Colorado Parks and Wildlife, Colorado Department of Public Health and the Environment, Animas River Community Forum, Trout Unlimited, Rio Grande Watershed Emergency Action Coordination Team, Colorado School of Mines USFS Rocky Mountain Research Station, and Fort Lewis College.

Additional letters of support may be supplied upon request.



August 12, 2018

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Re: Support for a Water Quality Monitoring Study during post-disaster 416 fire Conditions

The Rio Grande Watershed Emergency Action Coordination Team (RWEACT) heartily supports funding applications for post-disaster monitoring from the 416 fire within the counties of San Juan and La Plata. We have offered an equipment loan of water quality monitoring probes that monitor nine different characteristics both manually and remotely.

Through partnership with the Rio Grande Headwaters Restoration Foundation and Colorado School of Mines, RWEACT has provided funding for the continued monitoring of conditions following our own event of the West Fork Complex fire during 2014-2018. This data has been valuable during our environmental and economic recovery efforts.

Colorado School of Mines (CSM) has been able to determine trends as the Upper Rio Grande watershed recovers. Findings are in the process of being published. We anticipate there will be similar recovery efforts in the Animas and Hermosa drainages and we support these monitoring efforts. We support the proposed partnership of CSM and the Mountain Studies Institute.

RWEACT was established in July 2013 in response to the West Fork Complex Fire. RWEACT brings together local, state and federal agencies, organizations and individuals in a coordinated approach to address fire-caused hazards, early notification, and future resiliency of our natural and economic communities. Working closely with the Rio Grande National Forest, the Colorado Water Conservation Board, the counties of Hinsdale, Mineral, and Rio Grande, and more than 70 additional partners, RWEACT has implemented 200 projects and endeavors. We have increased the geographical representation of our Board of Directors now to also include Saguache, Alamosa, and Costilla counties. We began working with the Divide Ranger District where the West Fork Complex fire occurred and are now able to expand forest-wide to support appropriate projects.

The West Fork Complex Fire increased collaboration between counties and other local governments. Current work of RWEACT includes an Upper Rio Grande Watershed Assessment, participation in efforts to bring regional Radar to the area, improved Emergency Communications, post-disaster economic recovery, and stewardship activities. Our post-disaster economic recovery efforts identifying "increasing heritage tourism assets" as a regional effort. This project supports that finding and action.

RWEACT's mission to promote partnerships and actions that provide for public safety and resiliency of communities and watersheds of the Rio Grande Basin in Colorado. With an emphasis on Watershed Stewardship and the ability to leverage, RWEACT is expanding our geographical focus within the organization. More information about our organization can be found at www.rweact.org Thank you for your consideration.

Respectfully,

/s/ Kristine M. Borchers

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Five Rivers Chapter

December 13, 2018

To: Mountain Studies Institute

From: Five Rivers Trout Unlimited

Subject: Monitoring and evaluation of 416 Fire impact on Aquatic Life.

This letter is to document Five Rivers Trout Unlimited's support of MSI's on-going research into 416 Fire impacts on the Benthic Macro Invertebrates in the Hermosa and Animas watersheds.

To support this work Five Rivers Trout Unlimited has donated \$1000. 5RTU expects these funds to be used for on-going monitoring of the BMI communities as well as water quality.

In the past Five Rivers Trout Unlimited has been instrumental in raising over \$15,000 to further BMI monitoring in the Animas River. We stand ready in the future to provide continuing support.

Sincerely,

Buck Skillen, President – Five Rivers Chapter of Trout Unlimited.