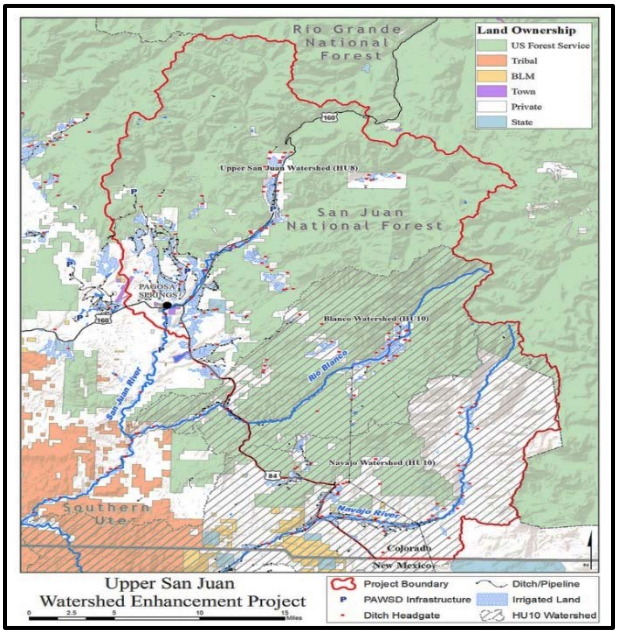
PROJECT SUMMARY AND PROPOSAL

Title: Upper San Juan Basin Integrated Water Management Plan, Phase II

Project location: Upper San Juan River Basin on a subset of rivers and streams in Archuleta and Mineral counties. Primary focus will be on the Upper San Juan from the Continental Divide to the confluence with Mill Creek. (Attachment A)



Grant type: Integrated Water Management Plan/Stream Management Plan
Grant request/amount: $85,913.52
CWCB WSRF match funding: $42,956.76
Cash match funding: $43,000.00
In-kind match funding: $28,056.80

Project sponsor:
Mountain Studies Institute,
501(c)3 nonprofit
Aaron Kimple, Program Director
akimple@mountainstudies.org,
970-387-5161
679 East 2nd Ave, Suite 8,
Durango, CO 81301

PROJECT DESCRIPTION:
Informed by the outputs from the coordinated efforts of Phase I (2018-2019), Phase II of the project (this proposal) will develop an assessment of E&R water supply needs and agricultural irrigation structural needs as well as pave the way for Phase III of the project: identification of opportunities for multiple-use water projects. This proposal seeks funding for Phase II of the Upper San Juan Basin Integrated Water Management Plan.

OBJECTIVES & OUTCOMES: The primary objective of Phase II (this proposal) is to develop technical information necessary to identify E&R water supply needs, agricultural irrigation structural needs, and to begin identifying opportunities for cooperative projects to address the multiple water needs of the project area. The outcomes of Phase II will be:

1. An understanding of the hydrology of the upper San Juan watershed project area and the interactions between stream flows, environmental and recreational attributes, and consumptive uses under existing and potential future conditions – including forest health and climate change;
2. An inventory of agricultural structural needs, such as ditch/diversion improvements and other measures that have the potential to improve irrigation and irrigation efficiency;
3. An understanding of E&R water supply needs and gaps;
4. A well-coordinated process that informs and incorporates input from stakeholders and the community as a whole
5. A work scope for Phase III management plan.

Specific deliverables associated with these outcomes are outlined in Attachments C and E. The timeframe for Phase II is 12 months (Timetable and Budget in Attachment B). The timeframe for the entire proposal is 42 months (Phase I=18 months, Phase II=12 months, Phase III=12 months).

APPLICATION CRITERIA

I. Basic Applicant Qualifications

A. Applicants' Commitment

Mountain Studies Institute (MSI): MSI is a non-advocacy, research and education institute based in the San Juan Mountains of southwest Colorado. Through our ongoing role coordinating the San Juan Headwaters Forest Health Partnership (SJHFHP) in Pagosa Springs, MSI was approached to address a growing need for and interest in furthering efforts to develop a SMP or IWMP for the Upper San Juan Basin. MSI is committed to diverse representation and a community-driven process that incorporates conversations and assessment of consumptive and non-consumptive uses, including E&R values.

Support from our community liaison (Western Wildscapes), advising services from Trout Unlimited, and engaged Steering Committee members will help frame the broader watershed assessment of Phase II, align complimentary efforts, and guide the IWMP process.

B. Project Purpose

Both the Colorado Water Plan and the SWBRT make funds available for multiple-use projects proposed through these efforts, with the intent of developing a Stream Management Plan (SMP) or Integrated Water Management Plans (IWMP). Building on the goals of Stream Management Plans, to better understand and assess E&R water needs, Integrated Water Management Plans include analysis of both non-consumptive and consumptive uses, such as water for irrigation or drinking water supply. IWMPs provide collaborative approaches and mutually beneficial opportunities to provide for current and future water needs, with a comprehensive understanding of needs and gaps for environmental, recreation, agricultural and municipal water uses.

In 2018, Mountain Studies Institute (MSI), Trout Unlimited (TU), and Western Wildscapes (WW) (Project Proponents) proposed a three-phase process to meet the goals of the San Juan BIP in the upper San Juan River watershed. Thanks to the generous support of the CWCB, the Southwestern Water Conservation District and other partners, the Project Proponents undertook Phase I of the Project, gathering a diverse stakeholder group and coordinating a community-led process to develop an understanding of the community's water-related values and E&R water needs and to identify and evaluate opportunities for projects to meet the diversity of water needs present in the San Juan River Basin. This stakeholder group is now known as the Upper San Juan Watershed Enhancement Partnership, with a committed steering committee working to identify priority values, data gaps, and develop unified goals and outcomes of collective interest for the community. The steering committee is composed of representatives from local ranchers/producers, ditch company leaders, outdoor recreation businesses, water districts, local and state government agencies, non-profits, and private citizens

The overarching purpose of the project is to foster community-driven efforts that utilizes the priority values and issues identified by local stakeholders for planning and management of streams within the Upper San Juan Basin, assess existing and future water needs and gaps, and identify opportunities to address those gaps (see scope, Attachment C). This effort will seek to incorporate forest health and climate change considerations in its assessments, expanding on existing community efforts. In so doing, the proposed IWMP is likely to serve as a model for incorporating these two critical components to SMPs/IWMPs elsewhere in Colorado. Guided by the steering committee and stakeholder groups, Lotic

Hydrological and the San Juan Conservation District are expected to assess consumptive and non-consumptive water use needs and values in a cooperative setting that responds specifically to the community and aligns with the Colorado Water Plan's goal to improve our understanding of E&R water needs throughout the state.

C. Broad Based Involvement and Support

Many stakeholders affected by the health and function of streams within the Upper San Juan River Basin have expressed interest in the process and support for this proposal. They include but are not limited to: Pagosa Area Water and Sanitation District, San Juan Headwaters Forest Health Partnership, San Juan Water Conservancy District, Town of Pagosa Springs, U.S. Forest Service, Colorado Parks and Wildlife, Stollsteimer Creek Watershed Steering Committee, Natural Resource Conservation Services, San Juan Conservation District, Chama Peak Land Alliance, science organizations, outdoor industry companies and groups, interested members of the public and more. MSI and TU will closely coordinate the efforts of the San Juan WEP with the Southwest Basin Roundtable and its E&R needs Subcommittee. Letters of support from these and other stakeholders are found in Attachment D.

D. In-kind Support and Cash Match

MSI respectfully requests $85,913.52 from the Colorado Watershed Restoration Program towards a total budget of $171,827.04 (a 50% match). MSI has developed a funding plan to request $42,956.76 from the Southwest Basin Roundtable (proposed, 25% match). Additionally, MSI's team will seek $43,000.00 in cash from local partners The Nature Conservancy, Trout Unlimited, Banded Peak Ranch, Southwestern Water Conservation District, San Juan Water Conservancy District, and others (25% match, unsecured). MSI anticipates in-kind contributions from 15 steering committee members (6 meetings), 25-35 stakeholders (2 public meetings), Trout Unlimited, SJCD/NRCS staff, and local partners as $28,056.80 in-kind funding (16% match).

II. APPLICATION AND EVALUATION CRITERIA

A. Qualification Evaluation

MSI is the lead project sponsor, with support and assistance from Mely Whiting of TU and Al Pfister of Western Wildscapes. MSI will be the fiscal agent for this grant. The steering committee and stakeholder group guide the direction for the development of an IWMP. MSI will work with identified partners, those listed above as well as Lotic Hydrological and the San Juan Conservation District, to support administrative tasks, coordinate inventory and assessment processes, and compile project opportunities (Lotic & SJCD Scope of Work, Attachment E). Biographies and information for key personnel are included in Attachment F.

MSI will enlist the help of Mely Whiting and Al Pfister to engage the consultants, steering committee, and public stakeholders to ensure the successful completion of all tasks. Aaron Kimple will be the Senior Project Manager, overseeing MSI's responsibilities as coordinator, facilitator and fiscal agent, with assistance from Mandy Eskelson. Al Pfister will serve as the community liaison for the project, securing local leadership and developing outreach.

Lotic Hydrological will be the consultant responsible for the data and information review and collection; characterization and modeling of project site systems; and identification of river segments and management issues to address in subsequent phases, informed by stakeholder input. The San Juan

Conservation District will be the entity responsible for conducting an inventory of agricultural infrastructure and needs assessment on the Upper San Juan, Navajo and Blanco rivers to be included in Lotic's modeling and project identification (Attachment E).

B. Organizational Capability

Mountain Studies Institute (applicant, fiscal agent) (MSI): In addition to MSI's long-standing relationships in the community and experience convening a group in the Pagosa Springs Community around forest health, MSI is a respected scientific research institute in the San Juan Mountains. Through efforts that range from youth education and outreach to specific and ongoing science and monitoring efforts, MSI has a varied and intimate knowledge of San Juan Mountain communities and the issues that affect them. MSI has been the coordinator for the San Juan Headwaters Forest Health Partnership for the past five years, during which time the partnership has leveraged over a million dollars in funding and accomplished over 5,000 acres of treatment around priority water resources for Archuleta County communities. This work was made possible by coordinating the interests and values of individual landowners, agencies and local interests. MSI is a non-partisan actor committed to convening stakeholders without a vested interest in a particular outcome. MSI will manage the project, engage and convene stakeholders, oversee Lotic's and SJCD's work, and conduct public outreach to secure broad support for the outcomes.

Mely Whiting, Trout Unlimited (TU): TU will provide organizational and strategic support for the effort and serve as liaison with the SW Basin Roundtable. Mely Whiting has extensive experience in stakeholder group efforts, including the Upper Colorado Wild and Scenic River Stakeholder Group and Learning by Doing (she has co-chaired both), the Water Quality Forum, and the River Protection Workgroup. She is the SW Basin Roundtable's environmental representative and was instrumental in both reaching roundtable consensus on an approach for identifying E&R water supply needs, as reflected in the roundtable's BIP, and developing the San Miguel SMP pilot project, the roundtable's first effort to address the identified needs. Mely is a resident of Pagosa Springs.

Al Pfister, Western Wildscapes: Al has over 36 years of experience dealing with stream and watershed management issues in seven western states. He has worked for and with Federal Agencies (USFWS, BLM, USFS, BOR, EPA, ACOE, Defense Department, WAPA, BIA), State, County and local government officials, Native American Tribes, and private landowners in their respective involvement and implementation of land use plans in their management of streams. Relying on this extensive experience, Al will act as a community liaison to support development and coordination of both the steering committee and stakeholder group, and will assist Lotic in technical, regulatory, and policy aspects of the Project. Al provides additional technical expertise from a faunal, floral and ecological perspective. Al is a resident of Pagosa Springs.

Lotic Hydrologic LLC (Lotic): MSI's team proposes to contract Lotic to carry out technical aspects of the environmental, recreation, and municipal uses of the Project. Lotic provides technical expertise, water resource engineering services, and a firm commitment to scientific problem solving when engaged in both field data collection and complex quantitative analysis. They generate the high-quality data tools and interpretations necessary to inform science-based decision-making in public policy development and natural resource management. Lotic helps clients implement strategies that protect diverse water user while maintaining high levels of environmental quality and contributing to the long-term stewardship of water resources. Seth Mason, founder of Lotic Hydrologic, is originally from Pagosa Springs and remains tied to the community.

San Juan Conservation District (SJCD): MSI's team proposes to contract SJCD to carry out technical aspects for an agricultural inventory and assessment of the Project. SJCD offers 72 years of technical expertise, water resource planning, and commitment to improve efficiency and conservation of water resources in the district. SJCD's team has a strong rapport with local irrigators and ditch companies, with a resume of assisting water users in identifying infrastructure issues and implementing solutions. SJCD is located in Pagosa Springs and represents landowners in Archuleta County and parts of Hinsdale & Mineral Counties.

C. Proposal Effectiveness:

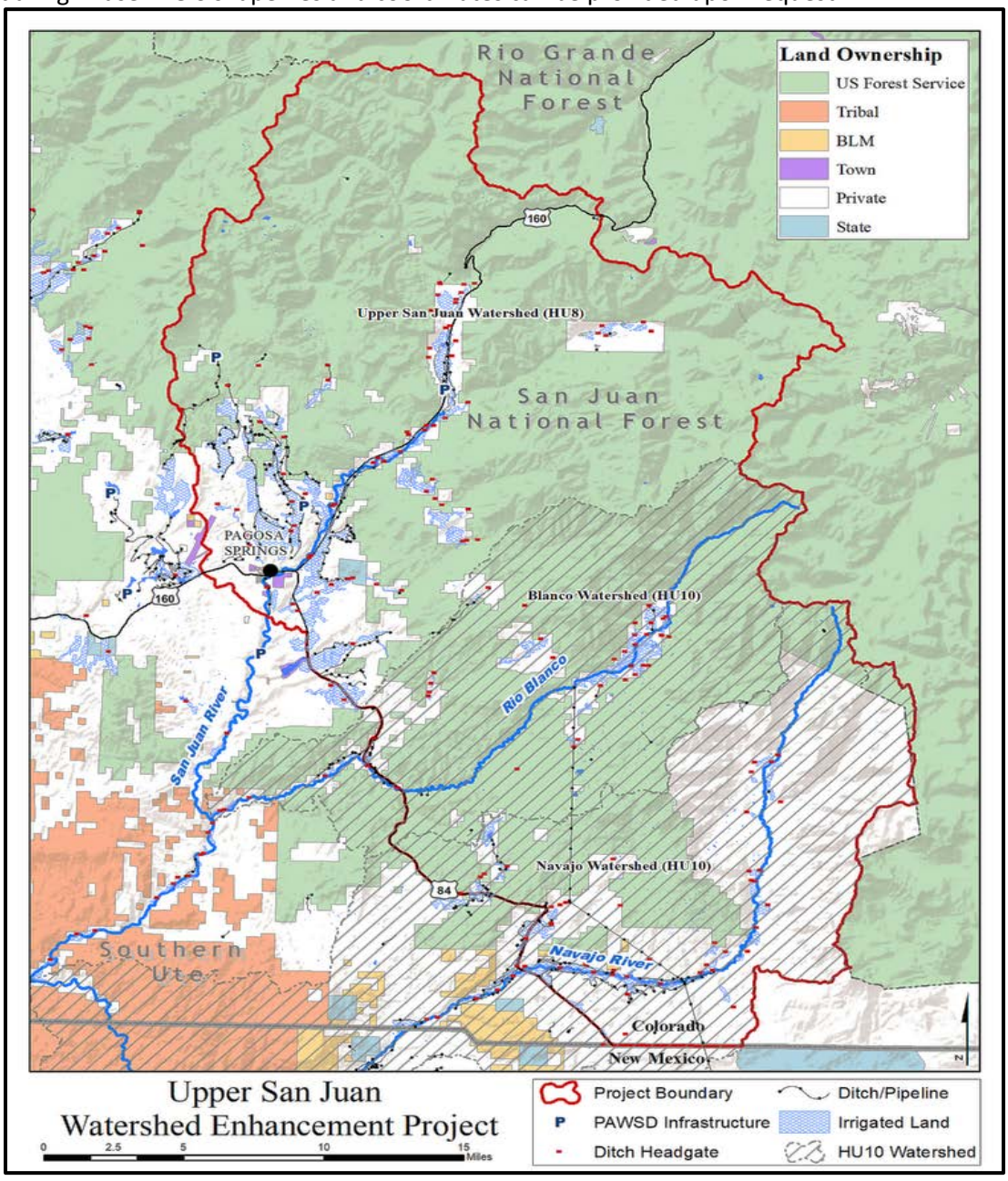
The success and relevance of stream or integrated water management planning efforts are highly dependent on a combination of stakeholder engagement and scientific analysis to evaluate water needs and prioritize actions. With the establishment of an engaged steering committee and stakeholder group in the Upper San Juan Basin, this proposal provides the next critical steps toward the success of any SMP/IWMP effort. In developing this proposal, MSI and partners conducted a review of historic efforts, available data and reports to build off of local efforts and findings when conducting a watershed-wide assessment. Some of these efforts include but are not limited to: the Stollsteimer Creek Watershed Master Plan, Rio Blanco restoration efforts, San Juan National Forest Plan (Pagosa and Columbine Ranger Districts), River Protection Workgroup, the Town of Pagosa's efforts for river restoration, Town of Pagosa's Comprehensive Plan Revision, and Archuleta County Master Plan revision.

During Phase II of the Upper San Juan Basin integrated water management plan, MSI will coordinate the steering committee, stakeholder group and consultants (Lotic & SJCD) to assess consumptive and non-consumptive values, including E&R and agricultural needs within the basin. This process will evaluate current and future water needs from both community input and scientific analysis, with the ultimate goal of outlining an assessment that can prioritize projects and processes to meet those needs. This assessment will inform the development of an integrated water management plan and ultimately project implementation in Phase III.

The specific needs, gaps and opportunities to be evaluated in Phase II of the project benefit from local knowledge and input gathered by committed representatives of the steering committee, established during Phase I. Continued inclusion and support of said group will ensure the sustainability of these planning efforts, while the modeling and evaluation from technical experts on current and future conditions will enhance the community's understanding of water needs and how best to conserve water resources in the Upper San Juan River Basin.

ATTACHMENT A: MAP

Figure 1: Proposed assessment area for Phase II San Juan Basin Integrated Water Management Plan
The map below illustrates the potential scope of the proposed IWMP assessment area (red boundary). The geographic scope for the IWMP has been developed through stakeholder and Steering Committee input during Phase I. GIS shapefiles and coordinates can be provided upon request.



Streams and waterways proposed for evaluation include the San Juan River mainstem including and above the Town of Pagosa Springs, East Fork of the San Juan River, West Fork of the San Juan River, Rio Blanco River, and Navajo River. Other tributaries may be included following consultation with local stakeholders. These tributaries may include Mill Creek, Four Mile Creek, and Martinez Creek. Primary focus will be on the Upper San Juan from the Continental Divide to the confluence with Mill Creek.

ATTACHMENT B: PROJECT BUDGET AND TIMETABLE

MSI respectfully requests $85,913.52 from the Colorado Watershed Restoration Program towards a total budget of $171,827.04 (a 50% match). MSI has developed a funding plan to request $42,956.76 from the Southwest Basin Roundtable (proposed, 25% match). Additionally, MSI will provide $2,000 from their general funds towards the $43,000.00 total in cash, along with local partners, including The Nature Conservancy, Trout Unlimited, Banded Peak Ranch, Southwestern Water Conservation District, San Juan Water Conservancy District, and others (25% match, unsecured). MSI anticipates in-kind contributions from 15 steering committee members (8 meetings), 25-35 stakeholders (2 public meetings), SJCD/NRCS, and local partners for $28,056.80 in-kind funding (16% match). Please find detailed description of in-kind and cash match sources in the tables below.

Table 1.1 Budget, Phase II

Task	Description	**CWCB WRP Funds**	CWCB WSRF Funds	Other Funding Cash	Other Funding In-Kind	Total
1	Coordination & Stakeholder Engagement	**$ 21,799.70**	$ 10,899.85	$ 2,000.00	$ 18,026.80	$ 52,726.35
2	Agricultural Water Needs Analysis	**$ 19,705.00**	$ 9,852.50	$ -	$ 10,030.00	$ 39,587.50
3	Environmental, Recreation, Municipal Water Needs Analysis + Modeling	**$ 36,598.50**	$ 18,299.25	$ 41,000.00	$ -	$ 95,897.75
	Subtotal	**$ 78,103.20**	$ 39,051.60	$ 43,000.00	$ 28,056.80	$ 188,211.60
	Grant Administration	**$ 7,810.32**	$ 3,905.16	$ 4,300.00		$ 18,821.16
	TOTAL	**$ 85,913.52**	$ 42,956.76	$ 47,300.00	$ 28,056.80	$ 207,032.76

The requested funding for Phase II will support the following tasks and expenses:

Table 1.2: Coordination & Stakeholder Engagement

Task	Responsible Party	Rate	Cost
Meeting Facilitation, Project Management	MSI Project Lead	120 hrs @ $65/hr	$ 7,800.00
Facilitation, Group(s) Coordination, Stakeholder Engagement Plan	MSI Project Coordinator	416 hrs @ $45/hr	$ 18,720.00
Community Outreach & Project Support	Western Wildscapes	334 hrs @ $45/hr	$ 15,030.00
		Total	**$ 41,550.00**

Table 1.3: Supplies & Mileage Expenses

Expense	Unit	Rate	Cost
Photocopies	750	$ 0.10	$ 75.00
Supplies (poster boards, maps, refreshments, etc.)	50	$ 20.00	$ 1,000.00
Mileage (120 miles round trip)	0.58	$ 69.60	$ 974.40
		Total	**$2,049.40**

Table 1.4: Agricultural Water Needs Analysis

Task	Responsible Party	Rate	Cost
Data Review, Inventory, Prioritize Projects	SJCD Team	840 hrs @ $35/hr	$ 29,400.00
Data Access & Inventory Oversight	SJCD Team	286 hrs @ $35/hr	$ 10,010.00
		Total	**$ 39,410.00**

Table 1.5: Environmental, Recreational, Municipal Water Needs Analysis + Modeling

Task	Responsible Party	Rate	Cost
Consultant Team & Stakeholder Meetings	Lotic Team	See Exhibit C	$ 2,500.00
Final Presentation	Lotic Team	Fee Structure	$ 417.00
Project Coordination	Lotic Team		$ 3,195.00
Travel	Lotic Team		$ 2,778.00
Kickoff Meeting	Lotic Team		$ 1,164.00
Stakeholder Engagement Plan Assistance	Lotic Team		$ 646.00
Review Existing Data	Lotic Team		$ 2,133.00
Characterize & Model Hydrological Regimes	Lotic Team		$ 4,769.00
Characterize Ecological Integrity	Lotic Team		$ 16,942.00
Explore Water/Forest Health Nexus	Lotic Team		$ 13,805.00
Characterize Recreational Uses	Lotic Team		$ 17,318.00
Identify Priority Management Issues	Lotic Team		$ 7,530.00
		Total	**$ 73,197.00**

Tasks	Responsible Party	Task Details	Rate	Cost
Coordination & Stakeholder Engagement	MSI Project Lead	Meeting Facilitation, Project Management	120 hrs @ $65/hr	$ 7,800.00
	MSI Project Coordinator	Facilitation, Group(s) Coordination, Stakeholder Engagement Plan	416 hrs @ $45/hr	$ 18,720.00
	MSI Project Team	Mileage (120 miles per trip x 14 trips)	$0.58/mile	$ 974.40
	MSI Project Team	Supplies & Printing	see Table 1.3	$ 1,075.00
	Western Wildscapes Staff	Community outreach & project support	334 hrs @ $45/hr	$ 15,030.00
Agricultural Water Needs Analysis	SJCD Team	Data Review, Inventory, Prioritize Projects	840 hrs @ $35/hr	$ 29,400.00
	SJCD Team	Data Access & Inventory Oversight	286 hrs @ $35/hr	$ 10,010.00
Environmental, Recreational, Municipal Water Needs Analysis + Modeling	Lotic Team	Consultant Team & Stakeholder Meetings	see Exhibit C	$ 2,500.00
	Lotic Team	Final Presentation	for fee structure	$ 417.00
	Lotic Team	Project Coordination		$ 3,195.00
	Lotic Team	Travel		$ 2,778.00
	Lotic Team	Kickoff Meeting		$ 1,164.00
	Lotic Team	Stakeholder Engagement Plan Assistance		$ 646.00
	Lotic Team	Review Existing Data		$ 2,133.00
	Lotic Team	Characterize & Model Hydrological Regimes		$ 4,769.00
	Lotic Team	Characterize Ecological Integrity		$ 16,942.00
	Lotic Team	Explore Water/Forest Health Nexus		$ 13,805.00
	Lotic Team	Characterize Recreational Uses		$ 17,318.00
	Lotic Team	Identify Priority Management Issues		$ 7,530.00
			Subtotal	$156,206.40
Grant Management	MSI Finance Team	Grant Management Indirect Fee	Subtotal x 10%	$ 15,620.64
			PROJECT TOTAL	**$171,827.04**

Project Total	$ 171,827.04	Percentage
CWCB WRP	**$ 85,913.52**	**50%**
CWCB/SWBRT WSRF	$ 42,956.76	25%
Total CWCB Fund Request	$ 128,870.28	75%
Match Needed	$ 42,956.76	25%
Cash Match	$ 43,000.00	25%
In-kind Match	$ 28,056.80	16%
Cash + In-kind Total	$ 71,056.80	41%

In-kind Match for Task 2 Ag Analysis	$ 10,030.00
In-kind + Cash Match for Task 1 Coord	$ 20,026.80
Cash Match for Task 3 E&R Analysis	$ 41,000.00
Total Cash & In-Kind Match	**$ 71,056.80**

In-kind Match	Amount
Trout Unlimited Advising Services (160 hrs @ $50/hr)	$ 8,000.00
Steering Committee/Consultant Meetings (2 hrs x 28.02 CO volunteer rate = $56.04 x 15 pax = $840.60 x 6 meetings)	$ 5,043.60
Mileage for 6 Steering Committee Meetings ($0.58/mile) ranges $50-$150	$ 348.00
Public meetings (2 hrs x 25.96 volunteer rate = $51.92 x 30 pax = $1,557.60 x 2 meetings)	$ 3,115.20
San Juan Conservation District Staff Time (57 hrs @ $35/hr)	$ 2,030.00
Natural Resources Conservation Service Staff Time (200 hrs @ $40/hr)	$ 8,000.00
Meeting Refreshments (Pagosa Brewing beverages $50 for 2 public meetings)	$ 100.00
CSU-Extension Office Facility Rental (2 public meetings at $350/day)	$ 700.00
Town Hall Facility Rental (6 meetings at $60/hr x 2)	$ 720.00
In-kind Total	**$ 28,056.80**

Cash Match	Amount	Status
Mountain Studies Institute Staff Time	$ 2,000.00	Committed
The Nature Conservancy	$ 1,000.00	Request
Trout Unlimited	$ 2,000.00	Request
Banded Peak Ranch	$ 11,000.00	Committed
Southwestern Water Conservation District	$ 20,000.00	Request
San Juan Water Conservancy District	$ 2,000.00	Request
Pagosa Tourism Board	$ 2,500.00	Request
Town of Pagosa Springs	$ 2,500.00	Request
Cash Match Total	**$ 43,000.00**	

SCHEDULE

The first month will be spent gathering available assessment resources (i.e. data, reports, models, community surveys, etc.). Field work and lab analysis will be conducted for 7 months to develop models, maps, and identify priority areas. Meetings (in person or remote) between the consultants and project management team (MSI, TU, WW) will occur monthly for the duration of the project scope. The Steering Committee established in Phase I will be actively engaged in the process, with a total of 6 meetings with the committee, consultants, and project management team during Phase II. Public stakeholder meetings will be convened 2 times to allow community feedback into initial findings and developing subsequent planning objectives and project options (expressed in the schedule below).

Table 1.6: Schedule, Phase II

Tasks	Month (After Contract Initiation)												Total # of Meetings
	1	2	3	4	5	6	7	8	9	10	11	12	
Data Review + Conduct Analysis	X	X	X	X	X	X	X	X					
Assessment Development									X	X	X	X	
Project Management Team/Consultants Meeting	X	X	X	X	X	X	X	X	X	X	X	X	**12** (6 in person, 6 remote)
Consultant/Steering Committee Meeting	X		X		X		X		X		X		**6**
Public Meeting						X						X	**2**

ATTACHMENT C: COORDINATION AND STAKEHOLDER ENGAGEMENT SCOPE OF WORK

GRANTEE AND FISCAL AGENT: Mountain Studies Institute
PRIMARY CONTACT: Aaron Kimple or Mandy Eskelson
ADDRESS: 679 East 2nd Avenue, Suite 8, Durango, CO 81301
PHONE: 970-387-5161
PROJECT NAME: Upper San Juan Basin Integrated Water Management Plan: Phase II

INTRODUCTION AND BACKGROUND:
Mountain Studies Institute (MSI), in close coordination with Western Wildscapes and support of Trout Unlimited (TU), will act as the Project Management Team to facilitate Phase II of a three-phased approach to develop an Integrated Water Management Plan (IWMP) for the Upper San Juan River Basin. The MSI-led Project Management Team (Team) will be primarily responsible for managing the work of the Consultants (Lotic and SJCD) and ensuring Steering Committee, stakeholder and community involvement in Phase II. As information is developed in Phase II, the Team will ensure Consultants communicate and coordinate with the steering committee, stakeholders, and public to develop a scope of work and funding proposal for moving forward with Phase III of the IWMP.

CRITERIA FOR INTEGRATED WATER MANAGEMENT PLANS:
The CWCB identifies gathering stakeholders to participate in plan development and identifying the plan's objectives as the first necessary steps for a successful IWMP. MSI and partners established, during Phase I, an engaged steering committee and group of public stakeholders, now called the Upper San Juan Watershed Enhancement Partnership, or WEP, to meet those objectives. The active participation and support from the WEP have created community-driven goals and objectives for the watershed assessment of Phase II. Additionally, the WEP collected and synthesized existing data and findings from historical and current efforts to identify information gaps necessary to address in Phase II.

In this second phase of the project, the WEP, Consultants, and partners will quantify specific recommendations, identify constraints and opportunities, and implement a stakeholder-driven process to identify and prioritize multi-beneficial projects and values, including environmental, recreational, agricultural and municipal projects.

This project's alignment with CWCB's Integrated Water Management plan Goals are further described in the four tasks below and in the Technical Analysis and Modeling Scope of Work (Attachment E).

OBJECTIVE

1. Ensure the IWMP process involves watershed-wide stakeholder and community involvement, support and decisions based on current, relevant science and assessments.

TASKS
Task 1- Coordinate efforts between the Consultants, steering committee, and public stakeholders

Description: The Team will continue engaging the established steering committee and public stakeholders with the Consultants' assessment process to ensure methodologies, variables and results are appropriate and aligned with identified community values and goals. The Team will work with consultants and steering committee to ensure stakeholders are engaged throughout the process with both broad and targeted outreach/education opportunities.

Method: The Team will follow the successful methods utilized in Phase I of this project to inform all affected parties of the timing and content of actions being conducted in Phase II. The Team will work with the Consultants and steering committee to develop deliverables with language and visuals easy to understand by the general public, to disperse assessment results, discuss project opportunities, and outline implementation priorities, challenges, and steps.

Deliverable: The Team will lead 6 meetings with steering committee members and consultants as well as 2 public meetings with stakeholders.

Task 2- Develop work scope for Phase III management plan and project implementation

Description: Support the stakeholder and steering committee groups to develop a scope of work for designing an integrated water management plan that includes future projects, management decisions, and priority actions.

Method: The Team will work with the consultants, steering committee, and stakeholders to develop a management plan that summarizes identified issues and needs, with a list of prioritized project options to organize and/or implement in Phase III.

Deliverable: A document detailing the scope of work for Phase III, guided by community-driven processes, to design an Upper San Juan Integrated Water Management Plan and project implementation.

REPORTING AND FINAL DELIVERABLE

MSI will provide CWCB with a progress report after the first six months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion of the tasks identified in the statement of work including a description of accomplishments, issues if any occurred, and any corrective actions taken. At completion of the project, MSI will provide CWCB a final report that summarizes the project and documents how the project was completed.

Phase II of the Upper San Juan IWMP is expected to commence in the spring of 2020 and continue for a period of approximately 12 months. A complete budget and schedule for the various tasks is included in Attachment B.

TABLE 1.2: Coordination & Stakeholder Engagement

Task	Responsible Party	Rate	Cost
Meeting Facilitation, Project Management	MSI Project Lead	120 hrs @ $65/hr	$ 7,800.00
Facilitation, Group(s) Coordination, Stakeholder Engagement Plan	MSI Project Coordinator	416 hrs @ $45/hr	$ 18,720.00
Community Outreach & Project Support	Western Wildscapes Staff	334 hrs @ $45/hr	$ 15,030.00
		Total	**$ 41,550.00**

TABLE 1.3: Supplies & Mileage Expenses

Expense	Unit	Rate	Cost
Photocopies	750	$ 0.10	$ 75.00
Supplies (poster boards, maps, refreshments, etc.)	50	$ 20.00	$ 1,000.00
Mileage (120 miles round trip)	0.58	$ 69.60	$ 974.40
		Total	**$2,049.40**

Task	Responsible Party	Rate	Cost
Grant Management Indirect Fee	MSI Finance Team	Project Subtotal x 10%	$ 15,620.64

ATTACHMENT D: LETTERS OF SUPPORT

Kindly find attached letters of support from:

1) Southwest Basin Roundtable
2) Pagosa Area Water and Sanitation District
3) Riverbend Engineering, LLC
4) The Nature Conservancy
5) Pagosa Outside
6) Resilient Archuleta
7) Colorado State University Archuleta County Extension Office
8) Trout Unlimited Five Rivers Chapter

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

October 30, 2019

Chris Sturm
Stream Restoration Coordinator
Colorado Water Conservation Board
1313 Sherman St., Rm. 721
Denver, CO 80203

SUBJECT: Upper San Juan Basin Integrated Water Management Plan, Phase II

Dear Chris:

The Southwest Basin Roundtable (SWBRT) has supported and approved funding for the Upper San Juan Basin Stream Management Plan, Phase I (2017) and the Upper San Juan Watershed Enhancement Partnership (WEP) Multiple Use Project (2019), coordinated by Mountain Studies Institute (MSI).

The SWBRT supports MSI's proposal for Phase II of Upper San Juan Integrated Water Plan, Phase II. Phase II tasks towards an Integrated Water Management Plan were reviewed at the July 10, 2019 Southwest Basin Roundtable meeting and approved for this letter of support. A quorum of Roundtable members was present.

This project addresses the CWP's goal to understand state water needs and the SWBRT's goal (Multi-Basin IPP #1-MB) to evaluate environmental and recreation water needs and gaps to improve non-consumptive and consumptive resources through collaborative approaches. Phase II will entail the hiring of a professional consultant to conduct a landscape scale assessment of the watershed's needs and identify priority areas to develop projects that enhance understanding of environmental, recreation, agriculture and municipal water needs in the San Juan Basin. The assessments and opportunities identified during Phase II will inform the development and implementation of an integrated water management plan for the final phase of this three-phase project.

Please give this application our favorable consideration. Feel free to contact me at 970-739-4181, or mpreston@frontier.net, if you have questions or wish to discuss this application in more detail.

Sincerely,

Michael Preston
Southwest Basin Roundtable Chair

October 17, 2019

Aaron Kimple
MOUNTAIN STUDIES INSTITUTE
1309 3rd Ave
Durango, CO 81301

Re: UPPER SAN JUAN WATERSHED ENHANCEMENT PARTNERSHIP

Dear Mr. Kimple:

The Pagosa Area Water and Sanitation District (PAWSD) Board Supports the Upper San Juan Watershed Enhancement Partnerships proposal to hire a consultant to identify the hydrological limitations of the San Juan River and quantify the various competing interests in this community resource.

PAWSD relies solely on the San Juan River flows for its source water necessary to meet its customer's water needs. PAWSD understands the importance of working with other entities, including agricultural and recreational users, which also rely on San Juan River flows. PAWSD wishes to be a good steward of this natural resource and minimize its impact on the environment.

Information provided from this proposed study will aid PAWSD in meeting its obligations into the future while maintaining positive relationships with other users.

Sincerely

Jim Smith
Pagosa Area Water and Sanitary District Board President

CC:
Enclosure(s):

100 Lyn Avenue
P.O. Box 4610

www.pawsd.org
Pagosa springs, Colorado 81157

(970) 731-2691
FAX (970) 731-2693

RIVERBEND ENGINEERING, LLC

October 25, 2019

Colorado Water Conservation Board
ATTN: Chris Strum
1313 Sherman St. Room 721
Denver, CO 80203

RE: Support for Mountain Studies Institute's "Upper San Juan Basin Stream Management Plan"

Dear Chris, CWCB Board, and staff:

Riverbend Engineering, LLC supports the Mountain Studies Institute's (MSI) proposed project "Upper San Juan Basin Integrated Water Management Plan"

This project assists in meeting the Colorado Water Plan's goal of seeking to understand state water needs, identifying gaps, and promoting projects and processes to meet those needs.

The next steps will incorporate the community input and stakeholder values, collected by the representative steering committee established in Phase I, into Phase II's science-based watershed assessment.

The watershed assessment will identify opportunities to sustain and improve water resources in the Upper San Juan Basin based upon inventories and modeling of environmental, agricultural, recreational, and municipal water uses. Current and future conditions and needs will be considered in conjunction with community values to develop a comprehensive and inclusive Integrated Water Management Plan.

Water continues to be a vital component of communities in the southwest and this project will assist in understanding and planning for future water use. Thank you for your support.

Sincerely,

Chris Pitcher, P.E.

Riverbend Engineering, LLC

102 N 3RD ST. POB 2979 • PAGOSA SPRINGS, CO 81147 • PHONE: 970.264.1195 • ADMIN@RIVERRESTORATION.COM
1309 RIO GRANDE BLVD. NW • ALBUQUERQUE, NM 87104 • PHONE: 505.344.3315 • WWW.RIVERRESTORATION.COM

The Nature Conservancy
Colorado

The Nature Conservancy in Colorado
1109 Oak Drive
Durango, CO 81301

tel (970) 375-0183

nature.org/colorado

Aaron Kimple
Mountain Studies Institute

Dear Aaron,

Please accept this letter from The Nature Conservancy supporting Mountain Studies Institute's (MSI) proposed project "Upper San Juan Basin Integrated Water Management Plan, Phase II". The Nature Conservancy participated in the steering committee established in Phase I of this project, and we strongly support the Phase II watershed assessment, which will identify opportunities to sustain and improve water resources in the Upper San Juan Basin based upon inventories and modeling of environmental, agricultural, recreational, and municipal water uses.

The Nature Conservancy is pleased to support a project that will build on community input and stakeholder values that the diverse steering committee collected in Phase I. The Upper San Juan Basin is well-prepared to execute Phase II of this project.

Sincerely,

Celene Hawkins

Celene Hawkins
Western Colorado Water Project Director

October 29, 2019

Colorado Water Conservation Board
ATTN: Chris Sturm
1313 Sherman St. Room 721
Denver, CO 80203

Dear CWCB Board:

I am the owner of Pagosa Outside and serving on the Upper San Juan Watershed Enhancement Partnership (WEP) Steering Committee as a representative of the boating/rafting community. I am writing to convey my support for Mountain Studies Institute's (MSI) grant application and concept proposal: "Upper San Juan Basin Integrated Water Management Plan."

My wife and I have owned the company since 2009 and are very interested in supporting activities that enhance our community. Having a healthy watershed is critical to our business's success and our community's long-term economic and environmental viability.

I am very committed to continue support and involvement in the WEP's efforts of promoting projects and processes that meet identified agricultural, municipal, environmental, and recreational needs in Archuleta County.

If I can be of further assistance in supporting MSI's efforts under the WEP please contact me at tobirohwer@gmail.com or (970)946-1233.

Sincerely,

Tobi Rohwer
Managing Partner
Pagosa Outside

October 28th, 2019

Dear Colorado Water Conservation Board members,

On behalf of Resilient Archuleta, I am writing in support of the Mountain Studies Institute's (MSI) proposed project "Upper San Juan Basin Integrated Water Management Plan, Phase II"

Our group is leading efforts on social, economic, and environmental resiliency in our community and feel the Watershed Enhancement Partnerships efforts in water needs for our area is vital.

We feel that water (our most precious resource) conservation needs to be a priority. The efforts of the Watershed Enhancement Partnership only furthers our mission of gaining our social, economic, and environmental resiliency.

Sincerely,

Robin Young
Resilient Archuleta

Colorado State University

Archuleta County
Extension
P.O. Box 370
Pagosa Springs, Colorado 81147
(970) 264-5931
FAX: (970) 264-5934

October 28th, 2019

Dear Colorado Water Conservation Board members,

I am writing in support of the Mountain Studies Institute's (MSI) proposed project "Upper San Juan Basin Integrated Water Management Plan, Phase II"

As a natural resource, agriculture, and community development Extension Agent, I feel this project is important to our community and region. It assists in meeting the Colorado Water Plan's goal of seeking to understand state water needs, identifying gaps, and promoting projects and processes to meet those needs.

The next steps will incorporate the community input and stakeholder values, collected by the representative steering committee established in Phase I, into Phase II's science-based watershed assessment.

Being an educator of stewardship, our communities will benefit from these efforts of the Watershed Enhancement Partnership. It will identify opportunities to sustain and improve water resources in the Upper San Juan Basin based upon inventories and modeling of environmental, agricultural, recreational, and municipal water uses.

Sincerely,

Robin Young
CSU Extension Director
Archuleta County

Five Rivers Chapter

TROUT UNLIMITED

October 30, 2019

Colorado Water Conservation Board
ATTN: Chris Sturm
1313 Sherman St. Room 721
Denver, CO 80203

Dear Chris, CWCB Board and Staff:

On behalf of the Five Rivers Chapter of Trout Unlimited, I am writing to convey our support for Mountain Studies Institute's (MSI) proposed project "Upper San Juan Basin Integrated Water Management Plan, Phase II", a science-based watershed assessment.

As this project assists in meeting the Colorado Water Plan's goal of seeking to understand State water needs, identify gaps, and promote projects and processes to meet those needs, we feel this is an important next step to benefit all stakeholders.

We recognize that water use and availability in the Upper San Juan River Basin are critical issues in maintaining the environmental and economic vitality of the area, and tourism and associated recreation are key elements of that vitality.

We understand this watershed assessment will identify opportunities to sustain and improve water resources in the Upper San Juan Basin based upon inventories and modeling of environmental, agricultural, recreational, and municipal water uses. Current and future conditions and needs will be considered in conjunction with community values to develop a comprehensive and inclusive Integrated Water Management Plan.

We believe this concept proposal will facilitate continued public involvement in the Upper San Juan Watershed Enhancement Partnership's (WEP) effort in meeting the State of Colorado's Water Plan goal of promoting projects and processes to meet identified needs.

Respectfully submitted:

Frank (Buck) Skillen
President, Five Rivers Trout Unlimited

ATTACHMENT E: TECHNICAL ANALYSIS AND MODELING SCOPE OF WORK

The technical assessment and modeling scope of work for Phase II is excerpted here, with further details included in Exhibit C. Because Phase II will be informed by the steering committee and stakeholder groups established in Phases I, the proposed task details may be adjusted and are currently informed by the Lotic's extensive experience developing Integrated Water Management Plans and Stream Management Plans. The agricultural water needs analysis (see Exhibit D), completed by the San Juan Conservation District, will compliment and inform this technical assessment and modeling scope of work.

Description of Phase

Assessing the effectiveness of alternative water management approaches in the San Juan watershed requires identification of quantifiable measures of change in stream structure and function. Based on Lotic's experience with the dynamic nature of efforts to evaluate non-consumptive needs and conduct similar water management planning in other areas of the state, selection of the specific tasks associated with each planning phase requires careful deliberation. Understanding the value that local communities place on the various goods and services they receive from streams and rivers will require close coordination with the Watershed Enhancement Partnership and stakeholder groups. All of this information is necessary to help identify high-priority management issues and geographies.

Proposed Methods/Procedures

- **Review Existing Data and Information.**

  Local organizations, federal and state agencies, the SWBRT, and others have produced information and data relevant to characterizing ecological integrity and the delivery of ecosystem goods and services on streams and rivers throughout the San Juan River watershed. This information will be aggregated by the project team for the focus stream segments to ensure that planning activities are informed by and grounded in the rich historical context of assessment activities.

- **Characterize Hydrological Regimes.**

  River systems subject to hydrological change under human management are vulnerable to shifts in the composition and resiliency of both structural and biological components of the ecosystem. Changes in the timing and magnitude of various elements of the hydrological regime can produce cascading effects (or positive feedback loops) between: 1) the availability and quality of aquatic habitat, 2) the condition and extent of riparian zones, and 3) the dynamics and evolutionary trajectory of channel structure. In order to provide this understanding in Colorado, it is necessary to characterize the administrative and operational conditions that govern the way that water is stored, diverted, consumed, and returned to river systems in time and place. Lotic previously refined the Colorado Decision Support System StateMod simulation model for the Southwest Basin to enable daily streamflow simulations in the San Miguel watershed. Lotic will utilize a similar approach to refine modeling tools produced by the Technical Update to Colorado Water Plan to understand the patterns of streamflow in wet, average and dry years across the study area. Lotic will also use this model to understand potential impacts of future shifts in climate, water use, and management on the hydrological regime across the planning area.

- **Characterize Ecological Integrity.**

Landscape and channel scale processes play a significant role in driving the condition of ecological resources that local communities typically derive value from. Interactions between hydrology, channel morphology, water quality, and sediment regime mediate riparian conditions and aquatic habitat quality and connectivity. Lotic will apply desktop assessment methods (e.g. GIS and aerial photography analysis, hydrological time series evaluation, etc.) and rapid assessment field techniques to corroborate and supplement existing information regarding the hydrological conditions necessary for supporting resilient ecological systems. Specifically, Lotic will consider applying methods for assessing aquatic habitat quality for fish, stream network connectivity for aquatic organism passage, floodplain inundation and riparian recruitment, and/or channel migration sediment conveyance. Lotic anticipates data reviews and field assessments will allow for adequate characterization of aquatic habitat connectivity as it is affected by infrastructure and water management, riparian responses to the flow regime, etc. In addition to characterizing ecological integrity on each stream reach in the project area, we will map the type and location of ecological attributes with particularly high ecological value and we will evaluate the natural recovery potential of ecologically impaired reaches. Mapped attributes may include, but will not be limited to, Colorado Natural Heritage Program (CNHP) Potential Conservation Areas, native and non-native fish ranges, presence of threatened and endangered species, location of rare or significant plant communities, etc.

- **Explore Water/Forest Health Nexus.**

Lotic will evaluate linkages between streamflow, water quality, climate change, forest structure, and wildfire risk in the upper San Juan watershed. The interplay between these factors is an area of intense and ongoing research and we do not expect to fully characterize these complex dynamics during this planning effort. However, we use current science to identify areas of the landscape where the risk of wildfire and downstream deleterious effects is greatest now. Lotic will also explore how climate change, beetle infestations and forest succession might conspire to increase or decrease wildfire risk in the future. All drainages where the risk for fire is high and the potential impact on downstream environmental, recreational, agricultural, or municipal use attributes is large will be mapped for consideration in subsequent planning tasks.

- **Characterize Recreational Uses.**

Lotic will work with stakeholders to map high-value recreational attributes throughout the project area. Mapped attributes will include reaches important for whitewater boating, and popular locations for angling by boat, wading or bank fishing. Where appropriate, Lotic will develop and distribute angler and boater streamflow preference surveys. Lotic will compile results from these surveys to create user preference curves that can inform assessments of the timing and number of days available to recreational users under optimal and sub-optimal use conditions. Specifically, results from survey efforts will help to characterize the number of “boatable days” and “fishable days” available in wet, dry, and average year-types. We will additionally work with stakeholders to characterize perceptions about the primary constraints on recreational use opportunity on each reach. Identified constraints may include: facilities, property/river access, river hazards, etc. Lotic will also endeavor to characterize the impacts of recreational water use on the local economy. Lotic will utilize local economic data, estimates of fishing and boating user days, and previously-published economic multipliers to characterize the monetary impact of a recreational user day. The number of user days available for different uses (e.g. tubing, rafting, drift-boat fishing etc.) under different streamflow scenarios will be evaluated using methodologies similar to the American Whitewater

Boatable Days methodology.

- **Identify High-Priority Management Issues and Locations.**

Lotic will work with stakeholders to prioritize river segments and management issues for subsequent planning steps. Lotic will consider invasive riparian species management, forest health, and recreational access points and channel modification, among other issues. The identification of high-priority issues will be the basis for the development and selection of alternative management strategies and projects in Phase 3. Throughout the issue identification process, Lotic will work with WEP and stakeholders to refine and/or expand the planning considerations to ensure they sufficiently reflect local concerns and perspectives.

- **Agricultural Water Needs Analysis**

Lotic will coordinate with the San Juan Conservation District to align scopes of work and analysis in order to incorporate an inventory of agricultural water usage and infrastructures into hydrological models and watershed assessment. For specific details on the San Juan Conservation District's tasks and deliverables see Exhibit D.

Expected Deliverables

- Annotated bibliography summarizing the availability of data relevant to non-consumptive needs assessments. Annotated bibliography will also summarize findings of existing reports or studies that relate land and water use activities to conditions of ecological or recreational attributes along the rivers in the study area.
- Refined hydrological and water rights simulation model results for the upper San Juan River watershed.
- Data tables containing statistical characterizations of "natural", existing, and potential future shifts in hydrology due to climate change at major tributary junctions and surface water diversions throughout the study area.
- Graphics characterizing typical hydrographs under wet, average, and dry conditions at major tributary junctions and surface water diversions throughout the study area.
- Technical report discussing the water/forest health nexus.
- Technical report summarizing ecological integrity assessment methodologies and results.
- Map of known high-value aquatic biota attributes throughout the project area.
- Map of known high-value riparian attributes throughout the project area.
- Map of known high-value recreational attributes throughout the project area.
- Technical report detailing conceptual models developed for stream reaches with at-risk environmental and/or recreational attributes.
- Memorandum detailing high-priority planning issues identified by stakeholders
- Map of high-priority stream reaches

ATTACHMENT F: BIOGRAPHIES AND EXAMPLES OF WORK

1.1 Biographies

Mr. Aaron Kimple, Mountain Studies Institute (applicant, fiscal agent) is a Program Director of Forest Health for Mountain Studies Institute (MSI). He has more than 10 years of experience in project management, nearly 20 years of experience with landscape ecology and environmental monitoring, and 7 years of experience in public facilitation and community outreach. In his role at MSI, Aaron facilitates partnership development and promotes community involvement. He manages MSI watershed projects, forest health initiatives, and facilitates community stakeholder groups (see San Juan Headwaters Forest Health Partnership & Connecting for Conservation below). Aaron works with the United States Forest Service, Bureau of Land Management, National Park Service, regional tribal entities, and the local governments of Archuleta, San Juan, La Plata and San Miguel Counties. Aaron will administer the grant and coordinate both the steering committee and stakeholder group.

Ms. Mandy Eskelson, Mountain Studies Institute is currently the Watershed Coordinator for MSI, assisting Aaron Kimple with organization, coordination/communications, and facilitation responsibilities for the Upper San Juan Watershed Enhancement Partnership. Her background in education, outdoor recreation, non-profits and water resource management helps MSI manage other watershed groups (Animas River Community Forum), monitor water quality and aquatic health, and organize public outreach/education events. Mandy assists with grant management; coordinating the steering committee, stakeholder groups, and local partners; and report deliverables.

Ms. Mely Whiting, Trout Unlimited Amelia (Mely) Whiting is legal counsel and project manager for Trout Unlimited, where she focuses on projects to protect, reconnect and restore Colorado's coldwater fisheries and their habitat. She has practiced water, public lands and environmental law in Colorado for over 25 years. She was an Assistant Attorney General for the Colorado Attorney General's office in the early 1990s, was in private practice in the late 1990s, and before joining Trout Unlimited, was regional legal counsel with the Solicitor's Office of the Department of the Interior. She has also taught environmental law courses to undergraduate students at Colorado Mountain College. Over the last three years, Mely's primary focus has been on working with partners to fund and implement habitat improvement projects. Mely was born in Montevideo, Uruguay, moving to the United States in the early 1980s. Mely's projects include The Upper Colorado River Wild & Scenic Stakeholder Group and the San Miguel Stream Management Plan. She serves on the Southwest Basin Roundtable as the environmental representative.

Mr. Al Pfister, Western Wildscapes Al is a natural resources manager and certified wildlife biologist that received his master's degree from Washington State University working on Postfire Avian Ecology in Yellowstone National Park. He has spent the past 36 years specializing in balancing sensitive and endangered species habitat needs with the surrounding communities' needs. These efforts have involved extensive interaction with Federal, State, County, and local governmental officials; private landowners; Tribal representatives; numerous user groups (recreation, ranching, energy, etc.), resolving aquatic and terrestrial management issues.

Mr. Seth Mason, Lotic Hydrological, (Attachment F), Seth completed his graduate level training in land Resources and Environmental Sciences at Montana State University. He received his B.A. in Environmental studies from the University of Colorado, Boulder. He specializes in hydrological modeling, stream characterization, deployment and operation of data collection and management systems, and

development and coordination for water quality monitoring and assessment activities. Seth works extensively with city and county governments, federal agencies, and 501 (c) 3 organizations.

Ms. Cynthia Purcell, San Juan Conservation District, (Attachment F), Cynthia received her B.A. in elementary education from the University of Northern Colorado. She has 19 years' experience in managing grants, projects, employees, budget and finances, as well as public outreach/educational efforts for several special districts within Archuleta County.

1.2 Examples of Work

a) **San Juan Headwaters Forest Health Partnership (MSI)**
The San Juan Headwaters Forest Health Partnership (SJHFHP) was established to provide a venue for stakeholders to share perspectives and develop science-based collaborative priorities for management and monitoring of mixed-conifer forests on the Pagosa Ranger District (PRD) of the San Juan National Forest in Southwestern Colorado. The groups focus has broadened to include other vegetation types and forest health issues. The SJHFHP identifies its current purpose as: 1) strengthening regional understanding of methods for improving forest health and watershed resilience; 2) broadening knowledge of forest conditions and needs; 3) generating viable management approaches; 4) initiating projects to address identified needs, and; 5) monitor treatments to guide adaptive management practices. The partnership members are people and groups representing business interests, conservation organizations, local and state governments, federal agencies, recreation interests, ranchers, homeowners associations and scientists, as well as many interested citizens. . MSI has been the coordinator for the San Juan Headwaters Forest Health Partnership for the past five years, during which time the partnership has leveraged over a million dollars in funding and accomplished over 5,000 acres of treatment around priority water resources for communities in Archuleta County.

b) **Connecting for Conservation (MSI)**
Since 2014, Connecting for Conservation (C4C) has provided networking opportunities and workshops to encourage partnerships and coordinate collection action across a range of non-profit, agencies, owners and disciplines in the Four Corners. C4C was an idea borne from the realization that many organizations in the Four Corners share conservation goals and interests but lack the resources to bring these goals to fruition as singular, isolated efforts. C4C is the proactive answer to the need for organizational collaboration and shared resources among conservation-minded entities in the Four Corners. Partners come together to identify issues and develop relationships that can address those issues. MSI (applicant) has coordinated C4C efforts since 2012.

c) **San Miguel Stream Management Plan (TU)**
Trout Unlimited and the San Miguel Watershed Coalition partnered up to develop this stakeholder-driven effort to identify environmental and recreational water supply needs in the San Miguel basin and explore opportunities to cooperatively address identified gaps.

d) **USFWS Region 6 Representative on San Juan River Recovery Implementation Committee – Southwestern Colorado, Southeastern Utah, Northwest New Mexico (WW)**
Western Wildscapes has served as USFWS representative on interregional committee comprised of Federal and State agencies, Tribal Nations, and environmental organizations directing management and implementation of endangered fish recovery program and water management.

e) **Cutthroat Trout Management Efforts (WW)**
Mr. Pfister served as USFWS representative in working with numerous stakeholder groups and Federal and State agency representatives in water, land use, and species management issues involving federally listed Lahontan and greenback cutthroat trout, and sensitive Colorado River and Rio Grande cutthroat trout.

f) **Pagosa Skyrocket Working Group (WW)**
Mr. Pfister facilitating and organizing local stakeholder group comprised of Federal, State, Archuleta County representatives, and private landowners, towards the long-term conservation and eventual delisting of the federally endangered Pagosa skyrocket, a local endemic plant.

g) **Gunnison Basin Strategic Committee—Gunnison and Saguache Counties, Colorado (WW)**
Served as the USFWS's representative on a 13-member committee comprised of Federal, state, and county representatives; stakeholder and environmental group representatives appointed by Gunnison County Commissioners to deal with issues related to Gunnison Sage-grouse management. Proclamation of Al Pfister Day in Gunnison County, CO. on June 15, 2011 in recognition of efforts with Gunnison Basin Sage-grouse Strategic Committee.

h) **Sage-grouse Local Working Groups—Western Colorado (WW)**
Served as the USFWS's representative on 11 working stakeholder groups dealing with management issues for activities conducted within greater and Gunnison sage-grouse habitats. USFWS signatory for 5 greater sage-grouse local working group plans.

EXHIBIT C: LOTIC TECHNICAL ANALYSIS & MODELING

Technical Services in Support of the Watershed Enhancement Partnership

Proposal: October 29, 2019

Lotic Hydrological
PO Box 1524
Carbondale, CO 81623

Team Overview

Lotic Hydrological formed a partnership with AMP Insights to deliver an assessment of river health and identify opportunities for meeting non-consumptive water use needs on streams and rivers in the San Juan River watershed.

Lotic Hydrological (Lotic)

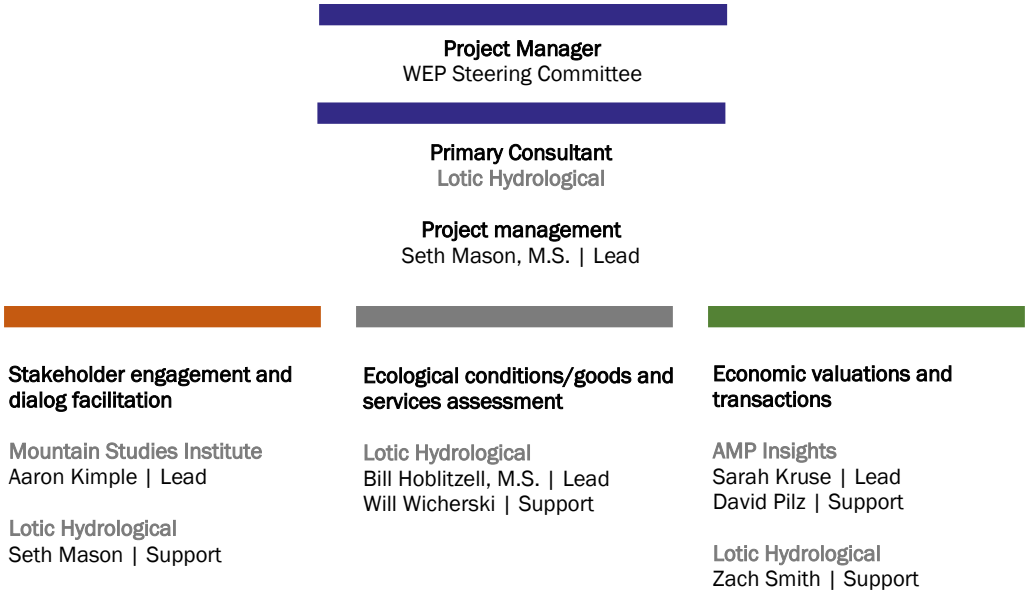
Headquartered in Carbondale, Colorado, Lotic generates the necessary high-quality data tools and interpretations to inform science-based decision-making in public policy development and natural resource management. With a small and responsive staff of engineers and scientists, Lotic provides technical expertise, water resource engineering services, and a firm commitment to scientific problem solving. Lotic's goal is to help clients implement strategies that protect diverse water uses while maintaining high levels of environmental quality and contributing to the long-term stewardship of water resources. Our eight-year history in the arena of water resource planning, science and engineering includes integrated water management planning on the Crystal River, the upper Roaring Fork watershed, the San Miguel watershed, and the Yampa River near Steamboat Springs. We also supported the Colorado Basin Roundtable in development of data sets and planning frameworks to assist non-consumptive water use planning efforts across the basin.

AMP Insights (AMP)

AMP is a small management consulting firm working with clients on some of the most challenging water and natural resources management issues in unique, creative, and energizing ways. AMP has extensive expertise and experience in water rights, water markets and natural resources economics. AMP grew out of Ecosystem Economics (founded in 2007) in 2016. Since that time, AMP has provided strategic advice, analysis, and capacity-building to agencies, non-profits, irrigation districts, cities and foundations across the US. The firm provides clients with expertise in economics, law, policy, hydrology, and ecology. Engagements vary from on-the ground transactional work with buyers and sellers of water rights, to planning and assessment studies for local governments, to strategic program assessments for environmental non-profits and foundations, and high level legal and economic assessments. AMP project staff are based in offices in Bend, Portland, Seattle, and Salt Lake City.

Team Structure

Our team has a vested interest in Colorado's watersheds and looks forward to collaborating with the Watershed Enhancement Partnership (WEP) to support strategic investment in conservation and restoration efforts that produce meaningful and lasting benefits.



Lotic - Carbondale, CO

Lotic's staff of four will manage the project and serve as the point of contact for all contract administration and communication activities with WEP and other project stakeholders. Lotic will manage the efforts of project team members, assign manpower, delegate responsibilities, review work progress, monitor budget and schedule, and direct the progress for the duration of each project. Lotic will also lead hydrological modeling efforts, conduct any necessary environmental flows analysis, geomorphological assessment and modeling activities, hydraulic modeling, and assessments of aquatic biota. Lotic will produce GIS data layers, data visualizations, and reporting deliverables for use by stakeholders. Lotic will also coordinate with any parallel assessment efforts aimed at characterizing the condition of agricultural and/or municipal water supply infrastructure.

AMP Insights – Beaverton, OR

AMP will work with Lotic to characterize the direct and secondary economic impacts of recreational uses, namely boating and angling, of streams and rivers within the assessment area. Where sufficient data is available, AMP will work to characterize the local economic impact of river-related recreation on a per-user-day basis. An effort will also be made to identify recreational users' willingness-to-pay for various ecological or recreational attributes of local streams. AMP will also support the stakeholder group during the project-identification planning phase through characterization of the relative costs/benefits/feasibility of any proposed water transactions or leasing arrangements.

References

Firm	Reference Name	Organization	Contact
Lotic	Kelly Romero-Heaney Water Resources Manager	City of Steamboat Springs	970-871-8205
Lotic	Kristen Bertuglia Environmental Sustainability Manager	Town of Vail	970-477-3455
Lotic	Rick Lofaro Executive Director	Roaring Fork Conservancy	970-927-1290
Lotic	April Long Stormwater Manager	City of Aspen	970-429-2781
Lotic	Nancy Smith Water Program Director	The Nature Conservancy	303-859-9082
AMP Insights	Aaron Citron Natural Resources Policy Advisor	The Nature Conservancy	720-974-7012
AMP Insights	Kate Fitzpatrick Program Director	Deschutes River Conservancy	541-382-4077

Ability to Perform Work

Our water resources planning experience will provide WEP with an understanding of key issues affecting the river and anticipate the return on investment of any planned management action.

Our combined expertise in river health assessment, water rights, hydrological, hydraulic, and sediment transport modeling, channel restoration assessment and design, GIS analysis, data visualization, and stakeholder engagement will provide WEP and local residents with a broader understanding of existing ecological conditions and how climate change, increasing water demands, or contemplated water management actions may impact river health and/or the delivery of important ecosystem goods and services to local communities. Our team of professionals offers an impartial perspective and vast water resources expertise to deliver on project goals in a timely and efficient manner.

Project Management Approach

Lotic employs a diverse technical skill set, strong leadership, interpersonal and communication skills, and a broad knowledge base for considering the multi-faceted nature of natural resource management issues. We are practiced and effective at engaging stakeholders and presenting technical material to diverse audiences in a variety of formats. We work independently or collaboratively to implement various phases of natural resource project management, including: problem identification, environmental data collection and management; quantitative data analysis; synthesis of results; and technical reporting.

Lotic adheres to the watershed approach to natural resource management. This approach focuses on addressing water resource concerns within a hydrologically defined area, rather than an area defined by jurisdictional boundaries, and often provides the best avenue for success when dealing with complex water management issues. Multi-stakeholder projects that transcend political boundaries require a thoughtful approach to partnership development and project management. We understand the multi-faceted nature of natural resource management and the fundamental importance of effective stakeholder engagement to ensuring positive project outcomes. We approach projects with the big-picture in mind and a focus on ensuring that they enjoy a wide base of public and stakeholder support.

Our project management capacity is demonstrated by our record of successful project implementation as the lead consultant on multiple-firm teams. We have also developed several integrated water management plans for watershed groups and municipalities on the western slope and continue to work with the Colorado Basin Roundtable to develop data, tools, and frameworks for guiding non-consumptive use planning efforts across the State. Lotic employs a small, responsive staff focused on exceeding client expectations and meeting project budgets. As a client-focused firm, we build our resume and reputation by forging long-term partnerships with our clients.

ProjectUnderstanding

We understand that WEP is looking to identify management actions in the San Juan River watershed that yield durable and sustained returns on investments to improve riverine conditions and deliver ecosystem goods and services to local communities.

This project intends to improve security for all water uses in the planning area by understanding and protecting existing uses and maintaining healthy riverine ecosystems in the face of increased future demand and climate uncertainty. The first phase of this effort will focus on addressing non-consumptive and consumptive use questions. This will require an assessment of ecological health and impairment that highlights areas where alterations in flow or floodplain structure may have the greatest impact. Understanding recreational use needs will require an inventory of existing use areas for whitewater boating and fishing, user flow preferences for a range of activities, and river access needs. We also understand that this planning effort will run parallel to a consumptive use needs assessment that engages the agricultural interests in the watershed. Strategic coordination with this parallel process will be critical for understating the location, frequency, and severity of consumptive use shortages that may provide opportunity or constrain future management options.

Planning Context

The recently completed Colorado Water Plan (CWP) seeks to understand the state's water needs, identify gaps, and promote projects and processes to fill those gaps. Importantly, the CWP gives special attention to the need for non-consumptive use planning on priority streams across the state. Similarly, the Southwest Basin Roundtable (SBRT) identified a significant gap in information necessary to understand E&R water needs in the basin during development of the Southwest Basin Implementation Plan (SWBIP):

> **"With respect to the Southwest Basin's Environmental and Recreational values and water needs, the Roundtable recognizes that there are significant gaps in the data and understanding regarding the flows and other conditions necessary to sustain these values. The Roundtable also recognizes that the tools currently available to help maintain those conditions are limited."**

This planning effort, thus, responds to calls for non-consumptive water-use planning in both the CWP and the SWBIP. Lotic recently developed a common framework for organizing and reporting on non-consumptive water use plans across the State of Colorado.

Goals and Objectives

Water planning efforts like the one proposed by WEP are critical tools for exploring opportunities to provide sufficient water for environmental and recreational needs while simultaneously satisfying the many other human uses and demands for water. Therefore, the resultant planning deliverables must strive to understand the connections between ecological conditions and the delivery of important regulatory, provisioning, or cultural services from streams to local communities. The RFP prioritizes restoring and protecting ecological processes that connect land and water while ensuring that local rivers also serve the needs of human populations. Critical goods and services provided by streams and rivers in the San Juan River watershed include:

- Irrigation water supply
- Municipal drinking water supply
- Flood regulation
- Pollutant assimilation
- Angling and boating opportunities
- Aesthetics

WEP requires a planning effort that reflects the broad goals laid out by the CWP and the SWBRT, while also responding to the specific conditions and concerns that present themselves in rivers and communities across the San Juan River watershed. Crucially, the RFP identifies the following planning objectives:

- Understand the hydrology of the upper San Juan watershed and the interactions between streamflows; environmental and recreational attributes, and consumptive uses under existing and potential future conditions
- Characterize environmental and recreational use needs in terms of ecosystem goods and services;
- Evaluate the ability of various alternative projects/processes/management actions that may be useful for achieving multi-use benefits now and in the future.

We are confident we can help WEP achieve its goals by defining the appropriate scope and scale of assessment activities, conducting targeted analysis, and providing data interpretations that support cost-benefit analysis of proposed restoration and/or water management actions.

Working together to achieve WEP's goals for water use and management in the San Juan River watershed.

General Approach

The project team will utilize integrative approach to data collection and assessment activities that support cost-benefit analyses and stakeholder oriented decision-making processes.

The primary goal of the project is to identify management options to restore or protect healthy geomorphic, riparian, and biological function and support recreational uses of water throughout the planning area. Meeting this goal will require completion of the following Tasks.

1. Definition of an appropriate scope, scale, and process for planning activities to ensure the delivery of actionable recommendations. The scope and scale should reflect the desires of the WEP and initial concerns or perspectives gathered from important stakeholders. The large geographic area covered by the San Juan River watershed presents certain challenges that must be carefully considered by the project team to ensure that satisfactory deliverables can be produced within the given timeline and budget. The process should reflect the need to incorporate perspectives and knowledge of a diverse stakeholder group.
2. Conduct assessments of ecological condition and function across the planning area, paying special attention to the feedbacks between hydrology, biology, and geomorphic responses in streams and rivers. Work with stakeholders to characterize perspectives on the delivery of ecosystem goods and services from rivers to local communities. Anticipate impacts to ecology and delivery of goods and services due to climate change and/or changes in local and regional water demands and climatic conditions.
3. Support cost-benefit analyses and decision-making processes by evaluating the potential impact (positive or negative) of contemplated structural projects, processes or management actions. Impact assessments should consider both ecological conditions and the delivery of a range of ecosystem goods and services to local communities.

We will work to ensure that project organization, implementation, and reporting throughout the planning process leverages existing data, information, and visualization tools provided by State of Colorado and local entities. We will also work to make our effort conformant to similar planning efforts in the Southwest Basin. Completion of each of the three phases listed below will require completion of a wide range of tasks.

Phase 1	Phase 2	Phase 3
Define Scope	**Conduct Analyses**	**Support Decision-Making**
Work with the WEP project manager and stakeholders to establish the specific geographic bounds of the planning area, a step-wise planning process, and the level of effort and methodologies required for subsequent planning steps. Finalize the overall project budget. Assist WEP with development of a grant application for submission to CWCB and the SWBRT.	Conduct rapid and detailed assessments of hydrology, geomorphology, riparian condition, and aquatic biota. Work with WEP and stakeholders to characterize the demand for and delivery of important ecosystem goods and services from local streams and rivers. Evaluate impacts due to changes in climate or water demands.	Utilize established methodologies to characterize the potential for structural projects or management actions to produce positive or negative impacts on river health and delivery of ecosystem goods and services to local communities.

Phase 1: Define Scope

Description of Phase

The planning effort will begin with refinement of the purpose and scope and will conclude with the evaluation and prioritization of alternative actions. Careful definition of the project scope will help ensure the project finishes on time and on budget. Identification of a structured process and tested methodologies will greatly assist WEP and its partners in reaching the desired ending point.

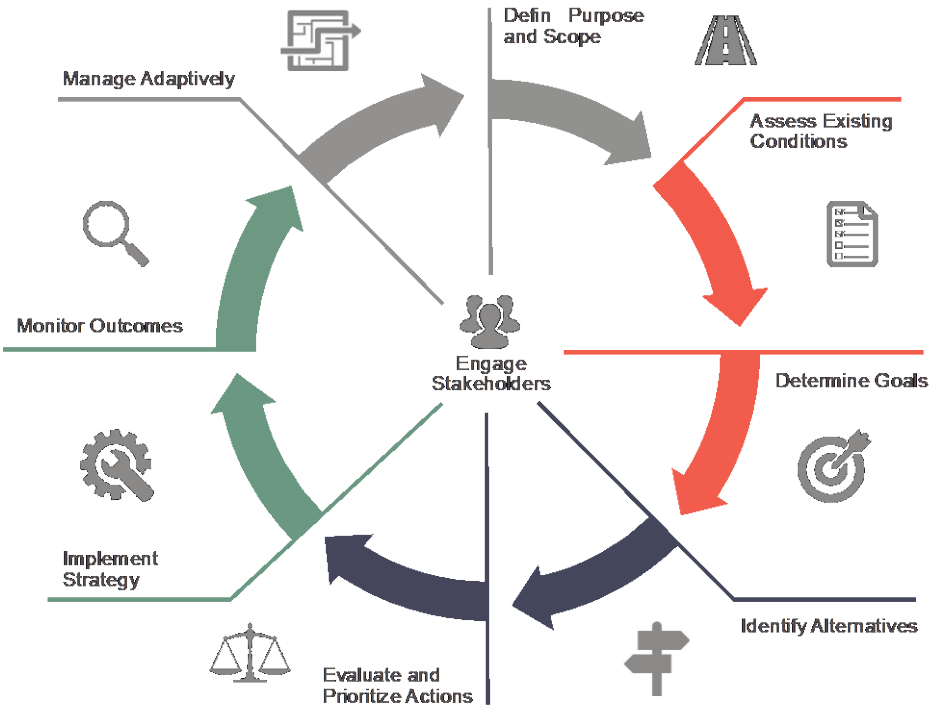


FIGURE 1. MODIFICATION OF THE RATIONAL PLANNING MODEL (TAYLOR, 1998) TO ACCOMMODATE THE UNIQUE NEEDS OF INTEGRATED WATER MANAGEMENT PLANNING ON COLORADO STREAMS AND RIVERS.

Proposed Methods/Procedures

Refine Purpose and Scope. We will work with WEP to review the proposed planning project approach. We will review/modify planning objectives and identify specific tasks that respond to local needs and expectations for the planning effort. We will also work with organizations and individuals developing a scope of work for an irrigation infrastructure assessment in order to identify important areas of overlap and complimentary deliverables expected from the two efforts. Critically, we expect the WEP project manager will be responsible for identification of relevant stakeholders and all activities related to scheduling, organizing, convening and facilitating stakeholder meetings so that the project team can assist WEP in the development of a grant application to CWCB and SWBRT in early November.

Kick-off Meeting. We will work with WEP in a review of the refined stepwise planning approach (Figure 1) following successful project funding. We will also work with WEP to organize a timeline for all proposed project meetings and stakeholder engagement activities that reflects the finalized planning process.

Expected Deliverables

- Finalized Scope of Work
- Grant application for submission to CWCB/SWBRT

Phase 2: Conduct Analyses

Description of Phase

Assessing the effectiveness of alternative water management approaches in the San Juan watershed requires identification of quantifiable measures of change in stream structure and function. Based on our experience with the dynamic nature of efforts to evaluate non-consumptive needs and conduct similar water management planning in other areas of the state, selection of the specific tasks associated with each planning phase requires careful deliberation. Understanding the value that local communities place on the various goods and services they receive from streams and rivers will require close coordination with WEP and the larger stakeholder group. All of this information is necessary to help identify high-priority management issues and geographies.

Proposed Methods/Procedures

Review Existing Data and Information. Local organizations, federal and state agencies, the SWBRT, and others have produced information and data relevant to characterizing ecological integrity and the delivery of ecosystem goods and services on streams and rivers throughout the San Juan River watershed. This information will be aggregated by the project team for the focus stream segments to ensure that planning activities are informed by and grounded in the rich historical context of assessment activities.

Characterize Hydrological Regimes. River systems subject to hydrological change under human management are vulnerable to shifts in the composition and resiliency of both structural and biological components of the ecosystem. Changes in the timing and magnitude of various elements of the hydrological regime can produce cascading effects (or positive feedback loops) between: 1) the availability and quality of aquatic habitat, 2) the condition and extent of riparian zones, and 3) the dynamics and evolutionary trajectory of channel structure. In order to provide this understanding in Colorado, it is necessary to characterize the administrative and operational conditions that govern the way that water is stored, diverted, consumed, and returned to river systems in time and place. Lotic previously refined the Colorado Decision Support System StateMod simulation model for the Southwest Basin to enable daily streamflow simulations in the San Miguel watershed. We will utilize a similar approach to refine modeling tools produced by the Technical Update to Colorado Water Plan to understand the patterns of streamflow in wet, average and dry years across the study area. We will also use this model to understand potential impacts of future shifts in climate, water use, and management on the hydrological regime across the planning area.

Characterize Ecological Integrity. Landscape and channel scale processes play a significant role in driving the condition of ecological resources that local communities typically derive value from. Interactions between hydrology, channel morphology, water quality, and sediment regime mediate riparian conditions and aquatic habitat quality and connectivity. We will apply desktop assessment methods (e.g. GIS and aerial photography analysis, hydrological time series evaluation, etc.) and rapid assessment field techniques to corroborate and supplement existing information regarding the hydrological conditions necessary for supporting resilient ecological systems. Specifically, we will consider applying methods for assessing aquatic habitat quality for fish, stream network connectivity for aquatic organism passage, floodplain inundation and riparian recruitment, and/or channel migration sediment conveyance. We anticipate data reviews and field assessments will allow for adequate characterization of aquatic habitat connectivity as it is affected by infrastructure and water management, riparian responses to the flow regime, etc. In addition to characterizing ecological integrity on each stream reach in the project area, we will map the type and location of ecological attributes with particularly high ecological value and we will evaluate the natural recovery potential of ecologically impaired reaches. Mapped attributes may include, but will not be limited to, Colorado Natural Heritage Program (CNHP) Potential Conservation Areas, native and non-native fish ranges, presence of threatened and endangered species, location of rare or significant plant communities, etc.

Explore Water/Forest Health Nexus. We will evaluate linkages between streamflow, water quality, climate change, forest structure, and wildfire risk in the upper San Juan watershed. The interplay between these factors is an area of intense and ongoing research and we do not expect to fully characterize these complex dynamics during this planning effort. However, we use current science to identify areas of the landscape where the risk of wildfire and downstream deleterious effects is greatest now. We will also explore how climate change, beetle infestations and forest succession might conspire to increase or decrease wildfire risk in the future. All drainages where the risk for fire is high and the potential impact on downstream environmental, recreational, agricultural, or municipal use attributes is large will be mapped for consideration in subsequent planning tasks.

Characterize Recreational Uses. We will work with stakeholders to map high-value recreational attributes throughout the project area. Mapped attributes will include reaches important for whitewater boating, and popular locations for angling by boat, wading or bank fishing. Where appropriate, we will develop and distribute angler and boater streamflow preference surveys. Lotic will compile results from these surveys to create user preference curves that can inform assessments of the timing and number of days available to recreational users under optimal and sub-optimal use conditions. Specifically, results from survey efforts will help to characterize the number of “boatable days” and “fishable

days" available in wet, dry, and average year-types. We will additionally work with stakeholders to characterize perceptions about the primary constraints on recreational use opportunity on each reach. Identified constraints may include: facilities, property/river access, river hazards, etc. We will also endeavor to characterize the impacts of recreational water use on the local economy. We will utilize local economic data, estimates of fishing and boating user days, and previously-published economic multipliers to characterize the monetary impact of a recreational user day. The number of user days available for different uses (e.g. tubing, rafting, drift-boat fishing etc.) under different streamflow scenarios will be evaluated using methodologies similar to the American Whitewater Boatable Days methodology.

Identify High-Priority Management Issues and Locations. We will work with stakeholders to prioritize river segments and management issues for subsequent planning steps. We will consider invasive riparian species management, forest health, and recreational access points and channel modification, among other issues. The identification of high-priority issues will be the basis for the development and selection of alternative management strategies and projects in Phase 3. Throughout the issue identification process, we will work with WEP and stakeholders to refine and/or expand the planning considerations to ensure they sufficiently reflect local concerns and perspectives.

Expected Deliverables

- Annotated bibliography summarizing the availability of data relevant to non-consumptive needs assessments. Annotated bibliography will also summarize findings of existing reports or studies that relate land and water use activities to conditions of ecological or recreational attributes along the rivers in the study area.
- Refined hydrological and water rights simulation model results for the upper San Juan River watershed.
- Data tables containing statistical characterizations of "natural", existing, and potential future shifts in hydrology due to climate change at major tributary junctions and surface water diversions throughout the study area.
- Graphics characterizing typical hydrographs under wet, average, and dry conditions at major tributary junctions and surface water diversions throughout the study area.
- Technical report discussing the water/forest health nexus.
- Technical report summarizing ecological integrity assessment methodologies and results.
- Map of known high-value aquatic biota attributes throughout the project area.
- Map of known high-value riparian attributes throughout the project area.
- Map of known high-value recreational attributes throughout the project area.
- Technical report detailing conceptual models developed for stream reaches with at-risk environmental and/or recreational attributes.
- Memorandum detailing high-priority planning issues identified by stakeholders
- Map of high-priority stream reaches

Phase 3: Support Decision-Making

Description of Phase

We will provide WEP and the larger stakeholder group with data interpretations, visualizations, and predictive assessments to aid in cost-benefit assessments of contemplated actions. We will assess the degree to which an action is likely to meet ecological or recreational planning goals and objectives. We will also help stakeholders understand secondary positive or negative impacts of any action on the delivery and/or use of water for consumptive uses. This approach will help stakeholders understand where opportunities and constraints exist and, ultimately, facilitate a prioritization of proposed projects or management actions.

Proposed Methods/Procedures

Select Management Goals and Objectives. We will work with stakeholders to articulate specific management goals and objectives that respond to the high-priority issues identified in the previous task. This effort will include discussions of morphologically-based, biologically-based, or flow-based management targets used as a direct or indirect measure of riparian area health, health of aquatic biota recreational use opportunity, or receipt of ecosystem services. Management targets may focus on a specific component of the aquatic or riparian ecosystem (e.g. fish biomass), a measure/indicator of whole ecosystem integrity (e.g. Multi-Metric scores for aquatic macroinvertebrates), or on the quality and quantity of ecosystem goods and services received by local communities (e.g. number of "boatable days" available to recreational users). Characterizations of environmental flows and recreational use preferences should inform (but not limit) these discussions. The characterization of planning goals and objectives is necessary to direct the type of focused study needed to identify and evaluate the feasibility and effectiveness of alternative management actions or projects.

Identify Alternatives. We will work with WEP to identify several candidate structural projects, collaborative processes or management actions that respond to the planning goals and objectives. Candidate actions will be drawn from several sources. We will initially identify alternatives through internal assessment of hydrological conditions, water use and administration, and ecological or recreational needs. Discussions with local stakeholders may also point to some unique local opportunities not apparent to us. Reference to the BIP list of IPPs may additionally provide candidate actions for implementation in the project area. Structural projects, collaborative processes or management actions may include, but will not be limited to, protection measures for high-value riparian areas, diversion structure improvements with fish bypass structures, agricultural efficiency improvements, in-channel habitat restoration, invasive species control, reservoir development and release schedule recommendations, recreational channel structures, and water leasing programs.

Evaluate and Prioritize Actions. We will utilize process-based conceptual models, environmental flow analysis results, and recreational use preferences to predict ecological and recreational use outcomes of each candidate alternative action. Where identified alternatives are expected to impact hydrology, we may use the hydrological simulation tools developed to assess the likely hydrological effects. For structural projects (e.g. diversion structure improvements), we may use conceptual level engineering assessments and/or hydraulic models to evaluate outcomes. These outcomes will be assessed against stakeholder-identified management goals and objectives. Actions will then be ranked against each other based on their predicted ability to meet stated goals and objectives. The characterization of feasibility for each alternative is a social exercise that requires careful evaluation of administrative, legal, financial, and institutional constraints. We will initially utilize streamflow records, hydrological simulation products, records from the Colorado Department of Water Resources, existing engineering reports, and discussions with local water users to characterize the demands, efficiencies, and use shortages associated with various uses of water from the high-priority reaches. We will utilize available engineering assessments or secure new conceptual level assessments to provide important information about the costs of structural projects. We will work with the local Water Commissioner to identify critical administrative constraints on water management alternatives. We will also work with stakeholders to further characterize land ownership and institutional constraints and understand local perceptions of equitable cost allocation for non-consumptive use projects. Through this process, we hope to identify likely proponents/champions for specific issues and areas of broad stakeholder interest and support. We will subsequently work with the project coordinators and local stakeholders to rank alternatives according to their relative feasibility.

Plan for Implementation. We will integrate the results from the effectiveness and feasibility assessments above to develop conceptual level implementation plan for each action. Each implementation plan will identify project champions, affected stakeholders, recommendations for overcoming technical, financial, or legal constraints, anticipated outcomes, and a monitoring plan for assessing long-term effectiveness. We will also work with WEP to develop a strategy for extending the planning effort to a larger geographical area (i.e. Blanco, Piedra and Navajo rivers). This strategy may include development of grant application materials, scopes of work, or general planning recommendations that reflect important 'lessons-learned' from the first phase of work. The scope and scale of this work will be limited by available project budget.

Expected Deliverables

- Memorandum detailing planning goals and objectives identified by stakeholders
- Technical report discussing the employed methodologies and assessment results characterizing the effectiveness of each proposed alternative.
- Table identifying candidate structural projects, collaborative processes or management actions that respond to the planning goals and objectives. Table will reference candidate actions against high-priority planning reaches and the management issues present on those reaches.
- Table indicating the relative effectiveness and feasibility rankings assigned to each alternative.
- Final report integrating all previous maps, graphics, memoranda, and technical reports. Report will additionally include identification of high-priority management recommendations and corresponding discussions for implementation and monitoring of each

Period of Performance

Work on Phase 1 and Phase 2 of this project is expected to commence in the spring of 2020 and continue for a period of approximately 12 months. Successful completion of several of the tasks outlined below depends on timely ongoing coordination and collaboration with representatives from WEP. Therefore, the consultant team's ability to meet the anticipated dates of completion associated with many of the Project's deliverables is partially dictated by those entities. Tasks listed under Phase 3 will be completed under a future contract and are **not** included in the schedule or budget presented here.

Recent Project Experience

Our Team has demonstrated experience in water resources planning.

Lotic Hydrological

San Miguel Pilot Project, *Trout Unlimited*
Prototyped an approach for assessing non-consumptive use needs and evaluating management opportunities for meeting those needs in Colorado's Southwest Basin using the San Miguel watershed as a test-case. Considered channel maintenance flows, riparian conditions, aquatic habitat quality and connectivity, and recreational use preferences. Use field data to develop and refine hydrological and hydraulic simulation models that characterize existing conditions and enable evaluation of 'what-if' scenarios. Engaged stakeholders to guide selection of management opportunities for evaluation in the assessment framework. Planning outcomes intend to instruct future water planning, granting and approval processes.

Community Water Plan, *Eagle River Watershed Council*
Worked with stakeholders in the Eagle River Watershed to develop a shared community vision of water use and management under different climate and water demand futures. Lead the technical work on the project, which included: 1) assessment of ecosystem condition, development of environmental flow needs, and evaluation of recreational use preferences, 2) characterization of the type and location of environmental and recreational attributes at risk, 3) identification of collaborative opportunities for projects and processes that support the diversity of use needs present in the basin, and 4) evaluation and prioritization of the relative effectiveness and feasibility of each identified opportunity.

Integrated Water Plan Management Plan, *Middle Colorado Watershed Council*
Worked with stakeholders in the Middle Colorado Watershed to develop an Integrated Water Management Plan that considered: water quality issues that could be exacerbated by reduced flows; designation of critical habitat for the three federally-listed threatened or endangered listed fish; three native fish species of concern (roundtail chub, bluehead sucker, and flannelmouth sucker) that require management actions to ensure that populations do not decline to the point requiring a Threatened and Endangered Species listing; aquatic habitat degradation and the resulting need to protect water quality and riparian habitat along the Colorado River; and secondary impacts to tourism and the recreational economy.

Yampa River Stream Management Plan, *City of Steamboat Springs*
Implemented the Stream Health Assessment Framework to identify and prioritize constraints on ecological function in the section of the Yampa River that flows through Steamboat Springs. Evaluated conditions for channel morphology, hydrologic regime behavior, riparian health and extent, water quality, and aquatic biota. Worked with city staff, NGOs, water resource management agencies, and other stakeholders to identify alternative projects and processes that may help alleviate problematic conditions. Assessed likely outcomes of each alternative to develop a prioritized restoration, conservation, and water management plan for the City of Steamboat Springs.

Upper Colorado River Basin Resource Guide, *Colorado Mesa University, Colorado Basin Roundtable*
Developed a data visualization dashboard for presenting diverse hydrological, water quality, water rights, and aquatic biota in an interactive web application. Worked with stakeholders from the Colorado Basin Roundtable to determine likely user workflows and data needs. Leveraged existing Colorado Decision Support Tools (CDSS) and simulation modeling projects to support efforts to identify locations in the basin in need of focused planning around environmental and/or recreational needs.

Upper Roaring Fork River Stream Management Plan, *City of Aspen and Pitkin County*
Synthesized existing research, characterized environmental and recreational use needs, and evaluated management opportunities for meeting those needs on the Upper Roaring Fork River near Aspen. Considered channel maintenance flows, riparian conditions, aquatic habitat quality and connectivity, and recreational use preferences. Managed a team of consultants, including aquatic biologists, water rights experts, and a dialog facilitation organization to implement the planning effort. Planning outcomes will inform management of City and County owned properties and water rights, development of policy and regulations, and participation in other regional water planning efforts (e.g. Twin Lakes Exchange) with diverse groups of stakeholders.

Riparian Health Assessment*, City of Aspen*
Evaluated the functional characteristics of the riparian areas along the Roaring Fork River through Aspen, Colorado. The assessment approached followed a modified version of the Colorado Natural Heritage Program Ecological Integrity Assessment protocol. Worked with local stakeholders to identified acceptable opportunities to protect existing riparian areas and improve degraded areas. Provided City of Aspen staff with a prioritized list of policies, projects, and management actions for improving the water quality buffering capacity of the riparian corridor.

Environmental Flow Management Decision Support for the Fryingpan River, *Roaring Fork Conservancy*
Investigated water releases from Reudi Reservoir that support multiple water uses on the Fryingpan River. Conducted an exhaustive review of published reports and data sets, hosted conversations with staff at Colorado Parks and Wildlife, Roaring Fork Conservancy, the Reudi Water and Power Authority, City of Aspen, Colorado Water Conservation Board, Colorado River Water Conservation District, and the Bureau of Reclamation. Performed new analyses and meta-analyses to identify important environmental flow targets and the degree of risk to aquatic communities when those targets are unmet or exceeded during different seasons and under different drought or flood conditions.

AMP Insights

Economic Analysis for the Colorado Water Plan

Worked with The Nature Conservancy's Colorado Chapter on an economic assessment of key Colorado economic sector responses to investing in the Colorado Water Plan. Carried out an econometric assessment of Colorado agriculture, recreation, and power sectors' responses to water supply at the state and basin levels, where possible. Performed scenario modeling of economic impacts to these sectors in the context of the Colorado Water Plan and decreased water supply due to climate change. Prepared a dashboard for applying econometric response functions and allied cost/benefit information for use in simulating the Return on Investment (ROI) of potential Colorado Water Plan project expenditures. Carried out an economic assessment of watershed health, particularly in the context of wildfire. Completed a literature review of available economic assessments of the costs of wildfire, inclusive of costs to ecosystem services, to determine the necessary cost of wildfire damage per acre to achieve a positive ROI from a widespread forest thinning program. The assessment included consideration of the probability of fire across the Colorado landscape and ecosystem services response to different fire severity thresholds. (2018-2019)

Instream Water Rights Economic Analysis for Oregon Department of Fish and Wildlife

AMP is currently working with the state of Oregon Fish and Wildlife Department (ODFW) to provide economic analysis of efforts to meet instream flow targets through environmental water transactions. Performed comprehensive statewide spatial analysis of existing instream flow rights and progress toward meeting restoration targets. Quantifying the statewide cost to close gaps in geographic distribution of instream flow protections and haps in effectiveness of current protections. Working to quantify the economic benefits of current and potential future instream flow protections throughout the state. (2019-Present).

Socioeconomic Analysis of Investments & Outcomes in Priority Watersheds (Great Lakes)

AMP Insights is working with the Great Lakes Commission (GLC) to conduct a socioeconomic assessment of the impacts of Great Lakes Restoration Initiative (GLRI investments aimed at improving water quality in four US EPA priority watersheds. The first project component involves developing watershed profiles and examining key socioeconomic characteristics both within and between watersheds in order to (a) determine whether changes have occurred since the beginning of GLRI investments in 2010 and; (b) draw comparisons between key characteristics in the different watersheds. The second project component is an assessment of the degree to which GLRI project funding structures, distribution pathways and project elements impact socioeconomic outcomes. The final component is an estimate of the total economic impact of GLRI investments to the local and regional economy and the cost-effectiveness, both within and between watersheds, of various conservation practices implemented as part of GLRI funded projects. (2019-Present)

Central Oregon Irrigation District Water Marketing Strategy

AMP is working with the Central Oregon Irrigation District (COID) and the Deschutes River Conservancy with funding from the Bureau of Reclamation's (BOR) WaterSMART Water Marketing program, to scope and design a water market to facilitate the scale-able trading of water between irrigation districts and between districts and the Deschutes River. The development of such a program is key to restoring Upper Deschutes flows in a way that continues to support our agricultural communities. AMP is leading scoping and planning and market design efforts including a comprehensive supply and demand analysis, economic analyses to support market pricing and determine willingness to pay for additional water supplies, and market design. (2019-Present).

Fee Structure

Standard methods of compensation including charges for reimbursable expenses and personnel hourly billing rates apply.

Lotic Hydrological

Name	Title	Rate
Seth Mason, M.S.	Principal Hydrologist	$140.00
Jessica Mason, M.S., P.E.	Water Resources Engineer	$140.00
Bill Hoblitzell, M.S.	Watershed Scientist	$125.00
Zach Smith	Water Transaction Specialist	$125.00
Will Wicherski, M.S.	Geomorphologist	$105.00

AMP Insights

Name	Title	Rate
Sarah Kruse, Ph.D.	Director	$141.00
David Pilz	Director	$136.00
	Research Associate	$105.00

Expenses

Direct costs passed through without markup to include: publication and data procurement, document copying, report reproduction and binding, graphics services, photo printing, mileage, travel expenses, and any other direct project costs not included in the labor rates.

Expectations

The Consultant Team expects WEP will assist in identifying data and stakeholder resources relevant to the project. WEP will be primarily responsible for engaging and managing stakeholders and in scheduling, organizing, and facilitating public discussions. The Consultant Team also expects that WEP staff will assist in requests for river access in the event that field data collection is required to complete project goals.

Estimated Budget

Lotic Hydrological estimates a fee of $73,197.00 to complete the objectives and tasks outlined above. This cost estimate includes periodic participation in project coordination meetings and anticipated travel time. Further refinement or adjustment of tasks following project coordinator and stakeholder discussions may lead to concomitant adjustment of estimated project costs.

Phase	Task	Description	Estimated Fee
Project Management		Constultan Team and Stakeholder Meetings	$ 2,500
		Final Presentation to WEP	$ 417
		Project Coordination Phone Calls and Emails	$ 3,195
		Travel (One-Way)	$ 2,778
1. Define Scope	1	Kickoff Meeting	$ 1,164
	2	Develop Stakeholder Engagement Plan	$ 646
2. Conduct Analysis	1	Review Existing Data	$ 2,133
	2	Characterize Hydrological Regimes	$ 4,769
	3	Characterize Ecological Integrity	$ 16,942
	4	Explore Water/Forest Health Nexus	$ 13,805
	5	Characterize Recreational Uses	$ 17,318
	6	Identify Priority Management Issues and Locations	$ 7,530
3. Support Decision-Making	1	Develop Management Goals and Objectives	TBD
	2	Identify candidate actions, projects and processes	
	3	Evaluate and prioritize alternatives	
	4	Plan for implementation	
	5	Develop final planning document	
		Time and Materials Subtotal	$ 73,197

Direct Costs	Lodging	$ -
	Mileage	$ -
	Imagery	$ -
	Direct Costs Subtotal	$ -

Project Total	$ 73,197

EXHIBIT D: AGRICULTURAL WATER NEEDS ANALYSIS

San Juan Conservation District will be responsible for conducting data collection, field surveys and analysis of agricultural water infrastructure and needs for the Upper San Juan, Navajo and Blanco rivers. This analysis will compliment and be incorporated into Lotic Hydrological's watershed assessment and modeling for the San Juan Basin.

Task	Description	Deliverables
Assist in Local Stakeholder Participation	Participate in WEP's efforts to obtain and integrate public input into the technical analysis and Assessment Report for Phase II	Participation and/or presentations of agricultural inventory results for 2 public meetings
Review Existing Data and Information	Compile and review existing information and data relevant to characterizing agricultural water needs within the project area	Report summarizing existing data and information and identifying data gaps
Inventory	Work with agricultural water users, appropriate ditch representatives and water right holders to inventory current conditions of irrigation systems and agricultural water use within project area	Data tables, maps, photos and narratives suitable for use with stakeholder engagement/public meetings
Evaluate	Evaluate irrigation systems within project area to determine deficiencies within each system	Assessment report, user friendly maps and graphics that illustrate results, and quantitative data on water deficiency gaps
Prioritize Projects	Prioritize agriculture water system improvements and develop cost estimates for each deficiency	Report and maps summarizing agricultural water user preferences and priorities
Identify Alternatives that Meet Planning Goals & Objectives	Identify candidate structural projects, collaborative processes, or management actions that could further the stakeholder identified goals and objectives within priority locations	Evaluation report and table that summarizes alternatives and their attributes

Table 1.4: Agricultural Water Needs Analysis Budget

Task	Responsible Party	Rate	Cost
Data Review, Inventory, Prioritize Projects	SJCD Team	840 hrs @ $35/hr	$ 29,400.00
Data Access & Inventory Oversight	SJCD Team	286 hrs @ $35/hr	$ 10,010.00
		Total	**$ 39,410.00**