Water Supply Reserve Fund – Grant and Loan Program
Water Activity Summary Sheet
January 28-29, 2019
Agenda Item 8(a)

Co-Applicants:	Upper Yampa River Working Group/Upper Yampa River Water Conservancy District
Grantee:	Upper Yampa River Water Conservancy District
Water Activity Name:	Characterization of Streamflow, Suspended Sediment & Nutrients in the Upper Yampa River Basin
Water Activity Purpose:	Study-Multipurpose (Environmental/Recreational/Ag/Education & Outreach/M&I)
County:	Routt
Drainage Basin:	Yampa-White-Green
Water Source:	Yampa River & Upper tributaries
Amount Requested:	$77,424 Yampa-White-Green Basin Account
Matching Funds:	Applicant & 3rd Party Match (cash) = $67,076 • 87% of the Basin Account request (meets 25% min)

Staff Recommendation:

Staff recommends **conditional approval** of up to $77,424 from the Yampa-White-Green Basin Account to help fund the project titled: Characterization of Streamflow, Suspended Sediment & Nutrients in the Upper Yampa River Basin, contingent upon the conditions stated in the **Issues/Additional Needs** section below.

Water Activity Summary: WSRF grant funds, if approved, will assist the United States Geological Survey, in cooperation with local stakeholders in the upper Yampa river basin water community, proposes to characterize streamflow, suspended sediments, and nutrients using historic and more recently acquired water-quality data. Streamflow, suspended sediment, and nutrients have been prioritized by local stakeholders because of pending or existing regulations and to better understand the potential causes of increased reports of prolific algal blooms in the UYRB, some of which have shown to be toxic.

The project objectives include obtaining a better understanding of the causes of increased prolific algal occurrences in the Upper Yampa River watershed. Applying stream flow data to the past eight years of USGS water quality data collected at sampling sites in the basin will allow the USGS to create accurate nutrient and sediment loading models. This analysis is designed to provide new data and subsequent understanding of the transport and fate of nutrients and sediment as well as seasonal fluctuations at sites throughout the watershed. As part of this analysis, a comprehensive evaluation of potential loading sources will be undertaken. Water suppliers, wastewater treatment operators, recreational users, and the citizenry at large will benefit from this analysis. Water managers, including those in the agriculture industry, will be better able to make informed decisions as the dynamics of these important constituents are better understood.

Discussion: This water activity will assist the Yampa/White/Green Basin Roundtable achieve goals set out in the 2015 Yampa/White/Green Basin Implementation Plan by addressing Section 1.2.8 which states that "Water quality and quantity are intrinsically linked in that quality directly affects the value of a water right for all uses: M&I, agriculture, recreation, and the environment." In addition, this effort assists the state achieve goals as stated in Chapter 7 (Water Resource Management and Protection) of Colorado's Water Plan.

Issues/Additional Needs: As noted above (and below), the applicant has identified $67,076 in cash matching contributions, however written verification for all matches have as yet to be provided, therefore staff recommends a **conditional approval** of this grant for the requested $77,424 contingent upon the applicant providing documentation verifying the all matching contributions prior to entering into a grant contract.

Eligibility Requirements: The application meets requirements of all eligibility components: General Eligibility, Entity Eligibility, Water Activity Eligibility, and Eligibility Based on Match Requirements.

Evaluation Criteria: This activity has undergone review and evaluation and staff has determined that it satisfies the Evaluation Criteria. Please refer to Basin Roundtable Chair's Recommendation Letter and the WSRF Grant Application for applicant's detailed response.

Funding Summary/Matching Funds:

Funding Sources	**Cash**	**In-kind**	**Total**	**Status**
USGS	$47,076	$0	$47,076	Secured
Mount Warner Water & Sanitation District	$5,000	$0	$5,000	Secured
Routt County	$5,000	$0	$5,000	Pending
City of Steamboat Springs	$5,000	$0	$5,000	Pending
Upper Yampa Water Conservancy District	$5,000	$0	$5,000	Secured
Sub-total	$67,076	$0	$67,076	
WSRF Yampa/White/Green Basin Account	$77,424	$0	$77,424	Secured
Total	**$144,500**	**$0**	**$144,500**	

CWCB Project Manager: Craig Godbout

Yampa-White-Green Basin Roundtable

November 27, 2018

Craig Godbout
Colorado Water Conservation Board
1313 Sherman St., Room 718
Denver, CO 80203

Dear Craig Godbout,

At the November 14th meeting, the Yampa White Green Basin Roundtable (YWG BRT) voted unanimously to approve the UYRWG Streamflow, Suspended Sediment & Nutrients Study Grant presented by Lyn Holiday, Ken Leib, and Andy Rossi in the amount of $77,424.

The grant request meets the Roundtable's goal to maintain and consider the existing natural range of water quality that is necessary for current and anticipated water uses. The Upper Yampa River Watershed Group (UYRWG) completed a Watershed Plan in 2016 which identified, among other trends, increased prolific algal blooms including positive tests for toxic blue-green algae in the basin as a priority for further examination. Investigations showing links between nutrients, sediment, and algae have been well documented in the United States. Utilizing the past ten years of water quality data at twelve sites throughout the basin (headwaters to the confluence of Elkhead Creek), and correlating this data with existing streamflow data, the US Geologic Survey will create nutrient and sediment loading models to increase the understanding of the transport and fate of these parameters specific to the Yampa, as well as seasonal fluctuations at sites throughout the upper watershed. As part of this analysis, a comprehensive evaluation of potential loading sources will be undertaken. Water suppliers, wastewater treatment operators, recreational users, and the citizenry at large will benefit from this analysis. Water managers, including those in the agriculture industry, will be better able to make informed decisions as the dynamics of these important constituents are better understood.

Please do not hesitate to contact me with any questions.

With Gratitude,

Jackie Brown

Yampa White Green Basin Roundtable, Chair

Last Update: August 3, 2017

Colorado Water Conservation Board

Water Supply Reserve Fund
Grant Application

Instructions

All WSRF grant applications shall conform to the current 2016 WSRF Criteria and Guidelines.

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

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

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

WSRF Submittal Checklist (Required)	
x	I acknowledge this request for funding was recommended for CWCB approval by the sponsoring Basin Roundtable(s).
x	I acknowledge I have read and understand the 2016 WSRF Criteria and Guidelines.
x	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.(1)
Exhibit A	
x	Statement of Work(2) *(Word – see Exhibit A Template)*
x	Budget & Schedule(2) *(Excel Spreadsheet – see Exhibit A Template)*
*	Letters of Matching and/or Pending 3rd Party Commitments(2) **Working on budget cycle requests*
Exhibit C	
x	Map(2)
	Photos/Drawings/Reports
x	Letters of Support
	Certificate of Insurance(3) (General, Auto, & Workers' Comp.)
Contracting Documents	
	Certificate of Good Standing(3)
	W-9(3)
	Independent Contractor Form(3) (If applicant is individual, not company/organization)
	Electronic Funds Transfer (ETF) Form(3)

(1) Click "Grant Agreements". For reference only/do not fill out or submit/required for contracting
(2) Required with application if applicable.
(3) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

Last Update: August 3, 2017

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

Desired Timeline	
Desired CWCB Hearing Month:	January 2019
Desired Notice to Proceed Date:	April 1, 2019

Water Activity Summary	
Name of Applicant	Upper Yampa River Watershed Group / Upper Yampa Conservancy District
Name of Water Activity	Characterization of Streamflow, Suspended Sediment, and Nutrients in the Upper Yampa River Basin

Approving Roundtable(s)	Basin Account Request(s)[(1)]
Yampa/White/Green Basin Roundtable	$77,424
Basin Account Request Subtotal	$ 77,424
Statewide Account Request[(1)]	$ 0
Total WSRF Funds Requested (Basin & Statewide)	$77,424
Total Project Costs	$144,500

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

Grantee and Applicant Information	
Name of Grantee(s)	Upper Yampa River Water Conservancy District
Mailing Address	PO Box 775529, Steamboat Springs, CO 80477
FEIN	84-0776538

Last Update: August 3, 2017

Grantee and Applicant Information	
Grantee's Organization Contact(1)	Andi Rossi
Position/Title	District Engineer
Email	arossi@upperyampawater.com
Phone	970.871.1035
Grant Management Contact(2)	same as above
Position/Title	
Email	
Phone	
Name of Applicant (if different than grantee)	Upper Yampa River Watershed Group
Mailing Address	Lyn Halliday, PO Box 883071, Steamboat Springs, CO 80488
Position/Title	Watershed Coordinator
Email	lhalliday@environmentalsolutionllc.com
Phone	970.879.6323

(1) Person with signatory authority

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

Description of Grantee
Provide a brief description of the grantee's organization (100 words or less).
In 2011, the Upper Yampa River Watershed Group (UYRWG) was established by individuals representing several local government and nonprofit organizations in the watershed for the purpose of collaborating to protect and enhance its long-term health. The UYRWG is one of more than 60 watershed protection groups in the Colorado Watershed Assembly. Since its formation, the UYRWG has completed several projects and reports, which has positioned them to seek future funding for the implementation of projects of benefit to the watershed. The UYRWG completed the State of the Watershed Plan in 2014 http://www.flipgorilla.com/p/23023990364732953/show and the Watershed Plan in July 2016 http://www.steamboatsprings.net/documentcenter/view/8714.

Type of Eligible Entity (check one)	
	Public (Government): municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.

Last Update: August 3, 2017

Type of Eligible Entity (check one)	
x	**Public (Districts):** authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises
	Private Incorporated: mutual ditch companies, homeowners associations, corporations
	Private Individuals, Partnerships, and Sole Proprietors: are eligible for funding from the Basin Accounts but not for funding from the Statewide Account.
	Non-governmental organizations: broadly, any organization that is not part of the government
	Covered Entity: as defined in Section 37-60-126 Colorado Revised Statutes

Type of Water Activity (check one)	
x	Study
	Implementation

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

Location of Water Activity	
Please provide the general county and coordinates of the proposed activity below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable.	
County/Counties	Routt
Latitude	please see attached map
Longitude	

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

Last Update: August 3, 2017

Water Activity Overview

The USGS, in cooperation with local stakeholders in the UYRB water community, proposes to characterize streamflow, suspended sediments, and nutrients using historic and more recently acquired water-quality data. Streamflow, suspended sediment, and nutrients have been prioritized by local stakeholders because of pending or existing regulations and to better understand the potential causes of increased reports of prolific algal blooms in the UYRB, some of which have shown to be toxic. Investigations showing links between nutrients, sediment, and algae have been documented in several lakes and streams across the United States. Algal blooms potentially harbor toxins that can have an on effect aquatic and human health.

The project objectives include obtaining a better understanding of the causes of increased prolific algal occurrences in the Upper Yampa River watershed. Applying stream flow data to the past eight years of USGS water quality data collected at sampling sites in the basin will allow the USGS to create accurate nutrient and sediment loading models. This analysis is designed to provide new data and subsequent understanding of the transport and fate of nutrients and sediment as well as seasonal fluctuations at sites throughout the watershed. As part of this analysis, a comprehensive evaluation of potential loading sources will be undertaken. Water suppliers, wastewater treatment operators, recreational users, and the citizenry at large will benefit from this analysis. Water managers, including those in the agriculture industry, will be better able to make informed decisions as the dynamics of these important constituents are better understood.

Measurable Results

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

	New Storage Created (acre-feet)	
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive	
147,603	Existing Storage Preserved or Enhanced (acre-feet)	
	Length of Stream Restored or Protected (linear feet)	
	Efficiency Savings (indicate acre-feet/year OR dollars/year)	
1,800	Area of Restored or Preserved Habitat (square miles)	
	Length of Pipe/Canal Built or Improved	
	Other	Explain: Basin-wide benefits

Water Activity Justification

Provide a description of how this water activity supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the respective Roundtable Basin Implementation Plan and Education Action Plan [1]. The Applicant is required to reference specific needs, goals, themes, or

Last Update: August 3, 2017

Water Activity Justification
Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers). For applications that include a request for funds from the Statewide Account, the proposed water activity shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan criteria for state support (CWP, Section 9.4, pp. 9-43 to 9-44;) (Also listed pp. 4-5 in 2016 WSRF Criteria and Guidelines).
To be a truly integrated system, water quality and watershed health must be considered when managing water quantity and supply. The Water Quality section of Chapter 7 of the Colorado Water Plan refers to Executive Order D 2013-005 which states "Colorado's water quantity and quality questions can no longer be thought of separately, each impacts the other and our state water policy should address them conjunctively". Environmental and recreational needs encompass good water quality and a healthy watershed. Delivering water that is of good water quality, during times of plenty as well as times of shortage, is a priority for all aspects of administration. As stated in the measurable objectives chapter of the Colorado Water Plan, "environment and recreation are too critical to Colorado's brand not to have robust objectives: a strong Colorado environment is critical to the economy and way of life." The Yampa/White/Green Basin states that "more than one third of its jobs are dependent on water quality which is influenced by watershed health." Chapter 7 of the Colorado Water Plan acknowledges the "critical role watershed health plays in ensuring Colorado's water future." The Plan specifically identifies watershed health, environment and recreation as a desired measurable objective and part of the implementation/action plan. It calls for 80 percent of critical watersheds to have protection plans by 2030 as well as including the WQCC's strategic water quality objective to have fully supported classified uses (drinking water, agriculture, recreation, aquatic life, and wetlands) by 2050. It states "these plans will address a variety of concerns, including …water quality impairments, aquatic and riparian habitat enhancement, and land use change." It goes on to state that "..watershed health influences water quality, which is of utmost importance to water providers, and Colorado's wildlife, which depends on healthy streams. These elements help to ensure that Colorado is adequately prepared to not only manage, but to protect, the water resources upon which all Coloradans rely." Without information gained from studies such as this proposed analysis by USGS in the Upper Yampa River Watershed, these objectives will not be able to be met. Efforts that will take place as part of this project directly follow the process outlined in the Plan, i.e. that successful watershed management will require coalition-building, data collection, planning based on sound science, prioritization, implementation and monitoring. This project further meets the Plan's suggested actions including #3 "Assist stakeholders in existing watershed groups to identify tools and resources that address gaps and build capacity in existing plans." The Yampa/White/Green Basin Implementation Plan (BIP) states in Section 1.2.8 , "Water quality and quantity are intrinsically linked in that quality directly affects the value of a water right for all uses: M&I, agriculture, recreation, and the environment." The BIP further encourages and supports water quality protection and monitoring programs in the sub-basins of the YWG through watershed groups, municipalities, land management agencies and other

Water Activity Justification
efforts (BIP pg. 1-11). The proposed analysis will provide water storage facility managers with necessary information required to maintain and modernize facilities and infrastructure operations in reaction to the current water quality characteristics of the Yampa Basin. This is especially pertinent for Stagecoach Reservoir as load calculations are useful for estimating source areas for a given water-quality constituent. This accounting enables land managers to identify regions of concern and assess suitable land management options. A USGS Scientific investigations report will be provided at the end of the analysis, containing discussions and findings related to:1) The impact that streamflow variability can have on water-quality concentrations in the UYRB (primarily nutrients); 2) What sites have the highest nutrient and sediment loads and when they typically occur; 3) Standard exceedances (for nutrients) as well as more accurate calculations of percentiles or other statistical values used in regulatory or biological assessments; 4) Newly acquired data in and near Stagecoach Reservoir; 5) Trends in streamflow, nutrients, and sediment at network sites in the UYRB; 6) Trends resulting from changes in land use, population, and water consumptive use; 7) Climatic impacts to the region upstream of Stagecoach Reservoir (if trends in streamflow or water quality are detected) and possible implications within Stagecoach Reservoir; 8) Comparisons of results from this study to results from other similar study's in the Western United States. Public involvement and education is a cornerstone of maintaining and protecting watershed health. However, in order to make any education program effective, we must first understand the driving forces of an existing trend, in this case increased nutrient and sediment loading and its possible effect on prolific algae blooms/harmful algae blooms. This study will increase our understanding of how this is affecting the system and potential sources/stressors, which will then lead to public education programs that address ways to potentially mitigate the furtherance of the impactful trends we are experiencing. Understanding and maintaining a healthy watershed is vital for all water users, both consumptive and non-consumptive, including current and future agricultural uses (goal 2), municipal and industrial uses (goal 4), fisheries and endangered fish recovery, and environmental and recreational uses.

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

Matching Requirements: Basin Account Requests	
Basin (only) Account grant requests require a 25% match (cash and/or in-kind) from the Applicant or 3rd party and shall be accompanied by a **letter of commitment** as described in the 2016 WSRF Criteria and Guidelines (submitted on the contributing entity's letterhead). Attach additional sheet if necessary.	
Contributing Entity	Amount and Form of Match (note cash or in-kind)
U.S. Geologic Survey	$47,076 cash

Last Update: August 3, 2017

Matching Requirements: Basin Account Requests	
Routt County*	5,000 cash
City of Steamboat Springs*	5,000 cash
Mount Werner Water and Sanitation District	5,000 cash
Upper Yampa Water Conservancy District	5,000 cash
*anticipated	
Total Match	$67,076 cash
If you requested a Waiver to the Basin Account matching requirements, indicate the percentage you wish waived.	

Matching Requirements: Statewide Account Requests	
Statewide Account grant requests require a 50% match as described in the 2016 WSRF Criteria and Guidelines. A minimum of 10% match shall be from Basin Account funds (cash only). A minimum of 10% match shall be provided by the applicant or 3rd party (cash, in-kind, or combination). The remaining 30% of the required match may be provided from any other source (Basin, applicant, or 3rd party) and shall be accompanied by a **letter of commitment.** Attach additional sheet if necessary.	
Contributing Entity	Amount and Form of Match (note cash or in-kind):
Total Match	$
If you requested a Waiver to the Statewide Account matching, indicate % you wish waived. (Max 50% reduction of requirement).	

Related Studies
Please provide a list of any related studies, including if the water activity is complimentary to or assists in the implementation of other CWCB programs.
-Upper Yampa State of the Watershed Report, 2014 -Upper Yampa River Watershed Plan, 2016 -Water-quality Assessment and Macroinvertebrate Data for the Upper Yampa River Watershed, Colorado, 1975 through 2009: U.S. Geological Survey Scientific Investigations Report, 2012

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

Last Update: August 3, 2017

Previous CWCB Grants
The CWCB helped to fund the development of the 2016 Upper Yampa River Watershed Plan.

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

Last Update: January 9, 2018

Colorado Water Conservation Board	
Water Supply Reserve Fund	
Exhibit A - Statement of Work	
Date:	**August 30, 2018**
Water Activity Name:	Characterization of Streamflow, Suspended Sediment, and Nutrients in the Upper Yampa River Basin
Grant Recipient:	**Upper Yampa River Watershed Group/Upper Yampa Water Conservancy District**
Funding Source:	**Yampa/White/Green Basin Roundtable**

Water Activity Overview: (Please provide brief description of the proposed water activity (no more than 200 words). Include a description of the overall water activity and specifically what the WSRF funding will be used for.

The USGS, in cooperation with local stakeholders in the UYRB water community, proposes to characterize streamflow, suspended sediments, and nutrients using historic and more recently acquired water-quality data. Streamflow, suspended sediment, and nutrients have been prioritized by local stakeholders because of pending or existing regulations (CDPHE 2012 & 2014) and to better understand the potential causes of increased reports of prolific algal blooms in the UYRB, some of which have shown to be toxic. Investigations showing links between nutrients, sediment, and algae have been documented in several lakes and streams across the United States. Algal blooms potentially harbor toxins that can have an on effect aquatic and human health.

Objectives: (List the objectives of the project)

The project objectives include obtaining a better understanding of the causes of increased prolific algal occurrences in the Upper Yampa River watershed. Applying stream flow data to the past eight years of USGS water quality data collected at sampling sites in the basin will allow the USGS to create accurate nutrient and sediment loading models. This analysis is designed to provide new data and subsequent understanding of the transport and fate of nutrients and sediment as well as seasonal fluctuations at sites throughout the watershed. As part of this analysis, a comprehensive evaluation of potential loading sources will be undertaken. Water suppliers, wastewater treatment operators, recreational users, and the citizenry at large will benefit from this analysis. Water managers, including those in the agriculture industry, will be better able to make informed decisions as the dynamics of these important constituents are better understood. The full USGS study proposal including timeline and summary of costs are attached with this application.

Tasks

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

Task 1 - Characterize streamflow timing, rate, and usage for the UYRB

Description of Task:

Tasks
An analysis of streamflow timing, rate, and usage will be done at 12 sites on the Yampa River and one Tributary to the Yampa River.
Method/Procedure:
Sites with partial or no streamflow gage record will be compared to sites with streamflow gages and record extension techniques (Granato, 2008) will be used to generate synthetic hydrographs and subsequent statistical summaries. Streamflow data will be apportioned into wet, dry, and average periods for analysis. Also considered will be the construction of impoundments or other physical structures that may impact post-construction streamflow characteristics.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
These and other streamflow conditions will be used to help determine the impact that streamflow variability can have on water-quality concentrations (primarily nutrients). This may be particularly important in systems where decreasing trends in streamflow are observed. The streamflow gage analysis will also form the basis of the nutrient and sediment loading analysis described herein.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Summary report

Task 2 - Estimate trends in streamflow, suspended sediment, and nutrient loads and concentrations
Description of Task:
Review results of Task 1 and determine trends.
Method/Procedure:
Trends in flow and water-quality data As with the loading budgets, trends in streamflow and water-quality data will be assessed using trend Weighted Regressions on Time, Discharge, and Season (WRTDS) methods (Hirsch and others, 2010; Moyer, 2012). The method is designed to provide internally consistent estimates of the actual history of concentrations and loads as well as histories that eliminate the influence of year-to-year variations in streamflow. It employs the use of weighted regressions of concentrations on time, streamflow, and season. The method is designed to be useful as a diagnostic tool regarding the kinds of changes that are taking place in the watershed related to point sources, groundwater

sources, and surface-water nonpoint sources (Hirsch, 2010). This additional analysis will also be used to explore the timing and spatial patterns of observed seasonal and longer term trends. It is important to not only look at trends in annual data but also inter-annual data periods that may offset or be masked when looking at annual data. The trend analysis will contribute to the loading analysis by providing insight into which sites might be most important for understanding how land use affects the Yampa River
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Data for next tasks.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Summary report.

Tasks
Task 3 - Develop a mass balance for suspended sediment and selected nutrients including total nitrogen and phosphorus as well as nitrate, nitrite, and orthophosphate
Description of Task:
Mass balance for select nutrients and total suspended solids will be calculated at the 12 sites where sufficient data are available.
Method/Procedure:
The mass of a given water-quality constituent is defined as the streamflow rate times the concentration of a given constituent times a conversion factor. Units for mass typically are in pounds or tons per day but can be converted to any units designating mass per time. Load calculations are useful for estimating source areas for a given water-quality constituent. This accounting enables land managers to identify regions of concern and assess suitable land management options. Loads for a given constituent can be calculated directly from sample data; however; regression techniques are generally preferred. Regression models derived from sample data typically need a period of continuous record (such as streamflow or specific conductance) that can be used as model input to estimate periods between sample events (Helsel and Hirsch, 2002). The continuous record is used to estimate concentrations and loads at a time step that exceeds the

Tasks
frequency of the sample data. Regression analysis produces a more complete picture of the variability of a given water-quality constituent as well as more accurate estimates of annual concentrations and loads. Weighted Regressions on Time, Discharge, and Season (WRTDS) methods (Hirsch, 2010) will be used to estimate loads at sites with sufficient data. Comparisons of loads among sites allows the user to determine what reaches of a river have the highest loads and when they typically occur. Concentration estimated from a regression model can be used to understand if and when standards are exceeded as well as help more accurately calculate percentiles or other statistical values used in regulatory or biological assessments. The sample site in Stagecoach reservoir will be evaluated for stratification or abundance of selected constituents including total dissolved solids, nutrients, field parameters and any available data associated with algal species (including blue green algae) and algal toxicity. The data will also be compared to historical data collected in Stagecoach just after the reservoir filled in the early 1990's. A comprehensive assessment of Stagecoach reservoir (Tobin, 1996) was conducted during construction of the reservoir which can serve as a baseline for which to compare historical and current data collection efforts.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
The resulting models can be used to estimate loads during wet and dry periods. The calculations provide a more accurate estimate of loads relative to other sites with regression models. Sites can be compared in order to assess where and when the highest loading occurs.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Summary report.

Tasks
Task 4 - For the areas where trends are observed, provide an assessment of land use activities, population, and water consumption.
Description of Task:
Data permitting, an assessment of land use activities, population, and water consumption will be included at sites where trends are detected.

Tasks
Method/Procedure:
Changes in land use, land cover, population, and water consumption will be obtained from the US Department of Agriculture's Geospatial Data Gateway (https://datagateway.nrcs.usda.gov/GDGOrder.aspx?order=QuickState) as well as from Maupin and Others (USGS,2014), Dieter (USGS,2017) and US Energy Balance Model Output (SSEBop) https://earlywarning.usgs.gov/useta/eta8dayhist.php, among others. The assessment of land use, population, and water consumption will be done through time to look for changes that might coincide with changes in water-quality (if any). For example, in the Grand Valley, near Grand Junction Colorado, salinity and streamflow decreased in several arroyos and washes as a result of land use transitioning from agricultural to residential and improvements to irrigation systems (Leib, 2008; Butler, 1997). The decreases in salinity concentration and streamflow coincided with an increase in population and no discernable change in water consumptive use. Improvements in water use efficiency was determined to be the reason why baseflow and salinity loads decreased The results of this study helped land managers in the Grand Valley better understand the potential effects of population growth and residential development on water quality. In addition to the hydrologic and land use assessments at the 9 UYRB sites, a climatic assessment will be done upstream of Stagecoach Reservoir if trends are detected at the inflow site (table 1, Yampa River above Stagecoach Reservoir). This region is of interest to stakeholders primarily because of the effects that land use and climate can potentially have on public water supplies (primarily regulatory concerns and toxicity associated with nuisance algal blooms). This assessment will help determine if observed changes in the hydrology or water-quality (if any) of this region resulted from anthropogenic and or climatic changes (or both). Climatic information is available from the National Oceanic and Atmospheric Administration (NOAA, https://www.ncdc.noaa.gov/climate-information) for use in characterizing historical variability in precipitation intensity, type, and timing. Regional comparisons of water-quality A general comparison of UYRB concentrations and loads for selected constituents will be made to provide context to the magnitude and environmental significance of the findings. Comparisons will be made and will take into account ancillary conditions like climate, population, and general land use types. Areas determined to be appropriate for this analysis will be compared to published water-quality or similar characterization reports. Geologic formations and parent material will also be considered during comparisons. Regions for comparison are not limited to the state of Colorado, but regions within Colorado will be looked at as a first step. Colorado will be prioritized primarily because of the similarity in Colorado water law as well regional similarities in

Tasks
climate. Results may indicate commonality and deviation from other similar systems. Depending on the outcome, land managers may use the analysis to identify better land use strategies, land use practices that are working well, and data gaps that could help better characterize and explain variations in water-quality and usage in the UY.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
This analysis is intended to help land managers better identify land use practices that could be evaluated and potentially modified to benefit water-quality as well as identify land use types that tend to have less impact.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Summary report.
Task 5 – Draft Report
Description of Task:
USGS will provide a draft Scientific Investigations Report following the completion of Tasks 1-4. The report will contain discussion and findings related to: 1) The impact that streamflow variability can have on water-quality concentrations in the UYRB (primarily nutrients); 2) What sites (from the USGS UYRB sampling network) have the highest nutrient and sediment loads and when they typically occur; 3) Standard exceedances (for nutrients) as well as more accurate calculations of percentiles or other statistical values used in regulatory or biological assessments; 4) Newly acquired data in and near Stagecoach Reservoir; 5) Trends in streamflow, nutrients, and sediment at network sites in the UYRB; 6) Trends resulting from changes in land use, population, and water consumptive use (at sites where trends in streamflow and water quality are detected, data permitting); 7) Climatic impacts to the region upstream of Stagecoach Reservoir (if trends in streamflow or water quality are detected) and possible implications within

Tasks
Stagecoach Reservoir. 8) Comparisons of results from this study to results from other similar study's in the Western United States.
Method/Procedure:
USGS will prepare a draft report for peer review and stakeholder review.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Draft report.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Draft report.
Task 6 – Final Report
Description of Task:
USGS will provide a final printed Scientific Investigations Report following acceptance of stakeholder and peer review comments and associated revisions to the draft report.
Method/Procedure:
USGS will prepare a printed final report.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Final report (electronic and printed).
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Final report (electronic).
Task 7 – Project Administration/Coordination
Description of Task:
Provide day-to-day task oversight and grant administration duties to ensure project stays on point, on deadline and on budget. Submit required reports and paperwork to CWCB staff including invoices and required documentation.
Method/Procedure:

Last Update: January 9, 2018

Tasks
The UYWCD District Engineer and the UYRWG Coordinator will team up to accomplish this task throughout the project lifetime. The UYWCD has agreed to provide this service via a written contract with UYRWG on an in-kind basis. The UYRWC Coordinator will be paid a nominal fee.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Day to day task oversight and grant administration to ensure project stays on point, on deadline and on budget.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Efficient and effective grant and project management including timely reporting and budget oversight.

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

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

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

Performance Requirements
Performance measures for this contract shall include the following: (a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as

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

Last Update: July 31, 2018

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Supply Reserve Fund

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

Date: August 30, 2018

Water Activity Name: Characterization of Streamflow, Suspended Sediment, and Nutrients in the Upper Yampa River Basin

Grantee Name: Upper Yampa River Watershed Group/Upper Yampa Water Conservancy District

Task No.[1]	Description	Start Date[2]	End Date	Matching Funds (cash & in-kind)[3]	WSRF Funds (Basin & Statewide combined)[3]	Total
1	Characterize streamflow timing, rate, and usage for the UYRB	April 1, 2019	June 30, 2019	$ 8,300.00	$ 7,900.00	$ 16,200.00
2	Estimate trends in streamflow, suspended sediment, and nutrient loads and concentrations	July 1, 2019	September 30, 2019	$ 9,400.00	$ 9,200.00	$ 18,600.00
3	Develop a mass balance for suspended sediment and selected nutrients including total nitrogen and phosphorus as well as nitrate, nitrite, and orthophosphate	October 1, 2019	March 31, 2020	$ 9,450.00	$ 8,980.00	$ 18,430.00
4	For the areas where trends are observed, provide an assessment of land use activities, population, and water consumption.	April 1, 2020	June 30, 2020	$ 13,500.00	$ 13,644.00	$ 27,144.00
5	Draft report/stakeholder & peer reviews	August, 2020	October, 2020	$ 12,750.00	$ 22,200.00	$ 34,950.00
6	Final Report	December, 2020	December, 2020	$ 8,676.00	$ 10,500.00	$ 19,176.00
7	Grant administration	April 1, 2019	December, 2020	$ 5,000.00	$ 5,000.00	$ 10,000.00
			Total	$67,076	$ 77,424.00	$ 144,500.00

(1) The single task that include costs for Grant Administration must provide a labor breakdown (see Indirect Costs tab below) where the total WSRF Grant contribution towards that task does not exceed 15% of the total WSRF Grant amount.

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

(3) Round values up to the nearest hundred dollars.

• Additional documentation providing a Detailed/Itemized Budget may be required for contracting. Applicants are encouraged to coordinate with the CWCB Project Manager to determine specifics.

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

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

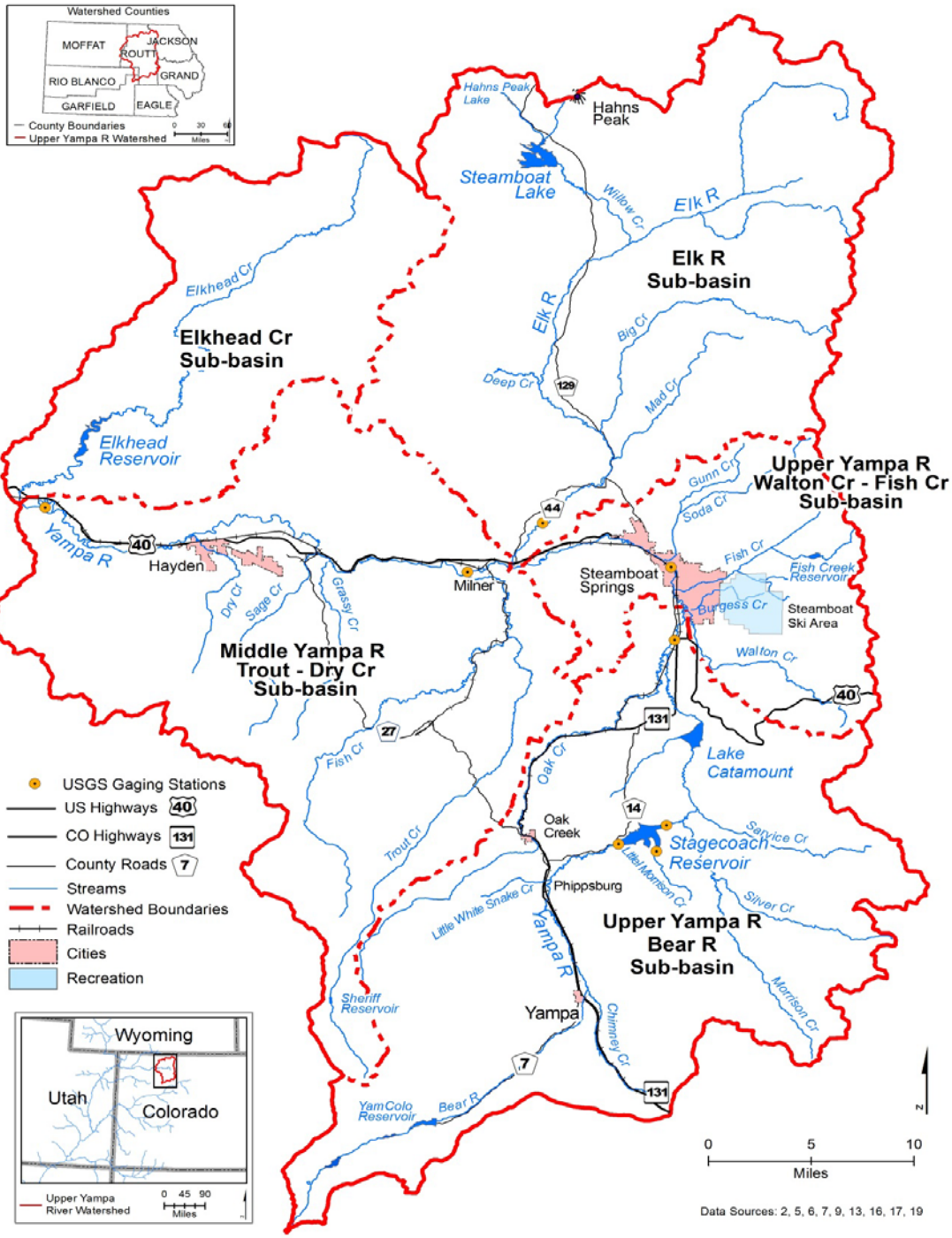
The CWCB will pay the last 10% of the entire water activity budget when the Final Report is completed to the satisfaction of the CWCB staff project manager. Once the Final Report has been accepted, the final payment has been issued, the water activity and purchase order (PO) or contract will be closed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

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

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

Last Update: August 3, 2017

AREA OF STUDY



Mount Werner Water

November 29, 2018

Upper Yampa River Watershed Group
Lyn Halliday, Watershed Coordinator

RE: Funding Commitment, Water Supply Reserve Fund, Yampa White Green Basin Roundtable and the Colorado Water Conservation Board (CWCB)

Dear Lyn,

Please accept this commitment letter in support of the request by the Upper Yampa River Watershed Group for funding assistance for a USGS study titled *Characterization of Streamflow, Suspended Sediment, and Nutrients in the Upper Yampa River Basin.* Mt. Werner Water and Sanitation District agrees to provide $5,000 towards the study.

Thank you for coordinating this important project. Please feel free to contact Frank Alfone should you need additional information.

Sincerely,

Frank Alfone
General Manager, Mt. Werner Water

Location ⊙ Fish Creek Filtration Plant ⊙ 3310 Clear Water Trail
Mailing Address ⊙ P.O. Box 880339 ⊙ Steamboat Springs, CO 80488-0339
Ph (970) 879-2424 ⊙ Fax (970) 879-8169 ⊙ E-mail: info@mwwater.com ⊙ Website: www.mwwater.com

Ken Leib, Office Chief
U.S. Geological Survey
Colorado Water Science Center
445 W. Gunnison Ave, Suite 130
Grand Junction, CO, 81501
970-628-7150
kjleib@usgs.gov

November 28, 2018

Craig Godbout
Colorado Water Conservation Board
1313 Sherman St., Room 718
Denver, CO 80203

Dear Craig,

This correspondence is sent in support of the WSRF grant application entitled "Characterization of Streamflow, Suspended Sediment, and Nutrients in the Upper Yampa River Basin". The USGS has committed to working with the Upper Yampa River Watershed Group/Upper Yampa Conservancy District on this initiative and has proposed a USGS Cooperative Matching Funds contribution in the amount of $47,076.00 to the project.

The mission of the USGS Cooperative Matching Funds Program is to provide reliable, impartial, and timely information needed to understand the Nation's water resources through a program of shared efforts and funding with State, Tribal, and local partners to enable decision makers to wisely manage the Nation's water resources. The proposed USGS work outlined in the Upper Yampa River Watershed Group and Upper Yampa Conservancy District WSRF grant is directly in-line with this mission and the USGS is dedicated to the pursuit of these types of efforts. With that said, USGS funds are subject to annual Federal appropriations, meaning that our formal commitment for funds in fiscal year 2019 will be contingent on approval of the related appropriations, anticipated to occur in calendar 2019. In the past the USGS has been able to meet our proposed commitments after a Federal budget is approved. Because the proposed grant is in-line with our mission and the work is relevant to on-going national algae issues, it is likely that the funding commitment proposed by USGS for this grant will be available.

Please feel free to contact me if you have any questions.

Sincerely,

Ken Leib, U.S. Geological Survey

UPPER YAMPA WATER
CONSERVANCY DISTRICT

January 9, 2019

Upper Yampa River Watershed Group
Lyn Halliday, Watershed Coordinator

RE: Funding Commitment, Water Supply Reserve Fund, Yampa White Green Basin Roundtable and the Colorado Water Conservation Board

Dear Lyn,

Please accept this commitment letter in support of the Upper Yampa River Watershed Group for funding assistance for a USGS study titled *Characterization of Streamflow, Suspended Sediment, and Nutrients in the Upper Yampa River Basin*. The Upper Yampa Water Conservancy District's approved 2019 budget includes $5,000 to be provided for this study. The final appropriation of the $5,000 for the study will be completed on January 23, 2019.

Thank you for your continued work and support for this important project.

Sincerely,

Andy Rossi
District Engineer
Upper Yampa Water Conservancy District
P.O. Box 775529
Steamboat Springs, CO 80477
arossi@upperyampawater.com
970-871-1035