



WaterSMART Cooperative Watershed Management Program Phase 1 Grants

CFDA Number 15.554

FOA BOR-19-F010

Task B – Watershed Restoration Planning

Proposal by New Mexico Wilderness Alliance

SF-424 Item 14

Areas Affected by Project: Rio Arriba County, New Mexico

Wilderness | Wildlife | Water

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Funding Opportunity Announcement BOR-19-F010

Task B – Watershed Restoration Planning

Proposal Title:

Employing Citizen Science to Establish Baseline Water Quality Conditions in the Wild and Scenic Reach of the Rio Chama to Assess the Environmental Impacts of Changing Water Quality

Applicant:

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Technical Proposal

1. Executive Summary

This proposal dated November 8, 2019 is being submitted by the New Mexico Wilderness Alliance (New Mexico Wild), located in the City of Albuquerque, Sandoval County, New Mexico. The proposed work will be conducted in Rio Arriba County, NM.

Water quality in the Rio Chama downstream of the El Vado Dam has been impacted by two main factors: excessive cold-water temperatures and increased levels of sediment in the water resulting from dam operations. This affects the food chain in the river, from the midge larvae up to the brown trout that feed on them, which is a key indicator species for river health. Under the aegis of New Mexico Wild, several cooperative watershed entities are collaborating to implement citizen science to collect data over a two-year period by studying the aquatic insects in the Rio Chama, in order to identify potential solutions to the problem and to evaluate the ecological resilience of the river's ecosystem.

New Mexico Wild requests \$99,956 over a two-year period to fund the outreach and citizen science needed to collect samples and to process the resulting data. The project start date will be March 1, 2020. The estimated completion date for the proposed project is March 1, 2022.

El Vado Dam is a Federal facility managed by the U.S. Bureau of Reclamation, but the project itself will be conducted on the Rio Chama Wild and Scenic River, which is co-managed by the Bureau of Land Management (BLM) and US Forest Service (USFS). According to the BLM Taos Field Office, which is primarily responsible for managing the river (Ryan Besser, personal communication), the proposed research would be considered incidental and no permit is required. There are no Federally listed endangered or threatened species in the Wild and Scenic reach of the Rio Chama.

2. Background Data

El Vado Dam and Reservoir, located on the Rio Chama in Rio Arriba County, New Mexico with a storage capacity of about 180,000 acre-feet, was constructed by the Middle Rio Grande Conservancy District (MRGCD) between 1933 and 1935. It was acquired and upgraded by Reclamation in the 1950's and is currently the subject of a Safety of Dams Corrective Action that will involve repairs to the dam membrane and service spillway (Reclamation, 2019a). Correction of the deficiencies, based on the Preferred Alternative, will result in an approximately 1-year period when the reservoir storage will be significantly reduced to approximately 2,400 acre-feet (WSE 6,785 ft, the elevation of the higher outlet) to allow the dam membrane to be repaired. During a further approximately 2-year period it will be increased to about 81,000 acre-feet (WSE 6,859 ft) while the service spillway is being repaired.

The changes in reservoir storage will cause significant changes to the hydrograph in the downstream Wild and Scenic reach of the Rio Chama during the first year as native water is either stored downstream in Abiquiu Reservoir or by exchange in Heron Reservoir, where Reclamation's San Juan Chama Project water is stored. In addition, because of the low head during construction (about 10 ft), hydropower generation will not be possible during the first

year and thus the low-level outlet that is at the elevation (El. 6,775 ft) of the accumulated sediment in the reservoir (Reclamation, 2008) will not be used, thereby significantly reducing the turbidity in the river. It is expected that the first phase of implementation of the Corrective Action will commence in May 2021. The changes in operation will provide a unique opportunity to evaluate existing water quality and associated environmental issues in the Rio Chama and to identify potential solutions as well as the ability to evaluate the ecological resilience of the novel ecosystem (Hobbs et al., 2006; Morse et al., 2014) that has developed in the Rio Chama in the 84 years since El Vado Dam was constructed.

New Mexico Game and Fish Department identified brown trout as the target management species in the 1990 Rio Chama Management Plan for the Congressionally designated (1988) Wild and Scenic reach located between El Vado and Abiquiu reservoirs. Under present conditions, the macroinvertebrate (aquatic insects) food base for the high-value brown trout fishery, as well as the native Rio Chama fish species (Hanson, 1992; Gustina, 2013), is categorized as impaired due to water quality issues including: 1) the stable, cold, stenothermic temperature regime below the dam (Jacobi and McGuire, 1992), and 2) continuous release of fine sediment from the dam for the last 35 years (Fogg et al., 1992; RCFP, 2019), the result of sediment accumulation in El Vado Reservoir to the elevation of the low-level hydropower outlet by 1984 (Reclamation, 2008; RCFP, 2019).

As part of Reclamation's Rio Chama Reservoir Operations Pilot Program, The Rio Chama Flow Project (RCFP) Team from the University of New Mexico (UNM) (*Cooperative Ecosystems Studies Unit (CESU) Cooperative Agreement Project Title: Rio Chama Flow Project Cooperative Agreement No: R17AP00321*) has prepared an exhaustive summary and analysis of past and on-going Rio Chama Technical Studies, developed a "Law of the Chama" legal analysis to evaluate Reclamation's operational flexibilities and conducted an Economic Analysis of resulting ecological and recreational opportunities in the Rio Chama (Reclamation, 2019b in preparation).

New Mexico Wild staff will oversee the project and coordinate the collection of samples by citizen scientists. New Mexico Wild will perform outreach via social media and other platforms to gather a diverse group of boaters to perform the sampling on the river. We will prepare the sampling kits and training materials, coordinate the data analysis, and write the interim and final reports to Reclamation. New Mexico Wild River Rangers will pass out the kits and collect them from participating boaters.

Rio Grande Restoration, our non-profit partner in this proposal, whose role is to provide outreach to commercial and private boating and other watershed stakeholders, received a WaterSMART Cooperative Watershed Management Program Phase 1 Grant in 2015 to establish the very successful San Juan Chama Watershed Partnership (*Rio Grande Restoration Cooperative Watershed Management Program Phase I Project: Grant Title: Rio Grande Restoration: Rio Chama Watershed Restoration, Grant No. R15AP0002*).

Dr. Becky Bixby, our partnering Aquatic Ecologist from the Biology Department at UNM, has conducted ecological and environmental studies of bendway weirs on the Rio Grande for Reclamation (*Hydrological and Biological Monitoring of Bendway Weirs in the Middle Rio*

Grande: Project NO. R15AC00014) and has extensive knowledge of the Rio Chama aquatic insects through her supervision of UNM student, Monika Hobbs' MS thesis work on this topic (Hobbs, in preparation).

Additionally, Dr. Jeff Muehlbauer, Research Ecologist from the USGS Grand Canyon Monitoring and Research Center, is a co-investigator on the proposed project and has significant expertise in monitoring adult aquatic insects downstream of dams in western U.S. rivers.

3. Project Location

Reclamation's El Vado Dam and the downstream Wild and Scenic reach of the Rio Chama are located in Rio Arriba County in northwest New Mexico (Figure 1). Upstream of the dam, the contributing watershed area is 602 sq. miles and the U. S. Geological Survey HUC for the Rio Chama watershed is 13020102. The Wild and Scenic reach extends 28.6 miles downstream of El Vado Dam to 1.8 miles upstream of the backwater from Abiquiu Reservoir, which is considered a joint management section between the U. S. Army Corps of Engineers (USACE) and U.S. Forest Service (USFS). The Wild and Scenic reach is co-managed by the BLM (Rio Chama Wilderness Study Area) and the USFS (Chama River Canyon Wilderness). Within the Wild and Scenic reach there are about 30 camp sites where paired adult aquatic insect and water quality data could be collected, thereby providing extensive spatial coverage of the river between the dam and the Rio Gallina.

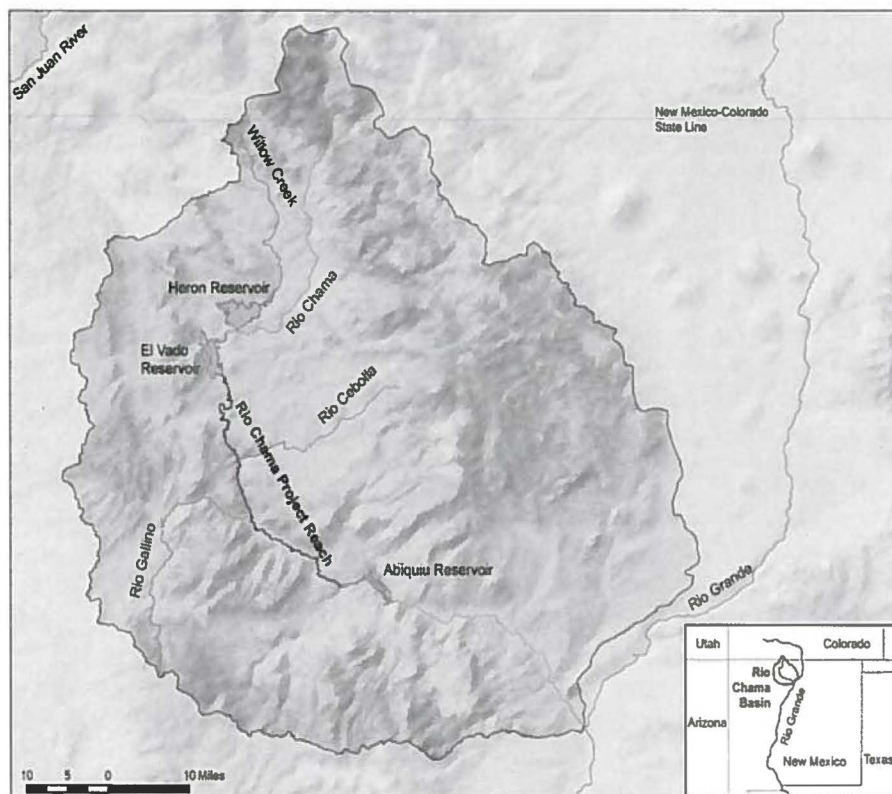


Figure 1. Map showing the location of the Rio Chama Watershed and the Rio Chama Wild and Scenic reach between El Vado Dam and Abiquiu Reservoir.

4. Technical Project Description

Applicant Category

The project will be implemented through a citizen science approach under the aegis of New Mexico Wild, a watershed non-profit. Our partner watershed non-profit Rio Grande Restoration, scientists from the University of New Mexico and U. S. Geological Survey, and an enthusiastic group of volunteers who make up the Rio Chama Flow Project (RCFP) will collaborate and lend their expertise. This Existing Watershed Group has worked together in the Wild and Scenic reach of the Rio Chama over the last 10 years. As described in detail below, the Safety of Dams Corrective Action provides a unique opportunity to explore aquatic ecosystem response, via macroinvertebrate sampling, to acute and chronic water quality stressors in a novel ecosystem. This condition is common throughout western U.S. rivers impacted by dam operations.

Eligibility of Applicant

New Mexico Wild is the state's largest independent grassroots organization dedicated exclusively to land and water conservation and wilderness protection. Founded in 1997, New Mexico Wild is a 501(c)(3) nonprofit organization with a four-star rating (the highest possible) on Charity Navigator. More than two decades ago, the organization's founders articulated a conservation ethic in the state of New Mexico aligned with our nation's landmark Wilderness Act of 1964. Dedicated to the concept of citizen involvement, we are focused exclusively on land and water conservation, wilderness protection, and stewardship. The organization has conducted volunteer wilderness stewardship projects, riparian restoration, wilderness character monitoring, and other citizen science for over 20 years. New Mexico Wild engages thousands of volunteers each year to provide citizens with the opportunity to experience their public lands and to conduct a range of important stewardship activities and citizen science. New Mexico Wild promotes the practice of watershed protection through wilderness preservation, since many of our state's key headwaters lie within designated wilderness areas. This includes the Pecos Wilderness (Pecos River), Gila Wilderness (Gila River), and Columbine Hondo Wilderness (Red River).

New Mexico Wild has extensive recent experience with the USDA Forest Service, Southwestern Region, to engage youth, volunteers, and other interested individuals to develop an ethic of wilderness stewardship and civic responsibility, and to coordinate completion of Wilderness Stewardship Performance Measures that fall under the Wilderness and Wild & Scenic Rivers (WWSR) Program. Through this program we have hired Seasonal Wilderness Rangers to complete a range of wilderness monitoring activities including invasive species monitoring, trails assessments and recreational site inventories. From 2017 through 2019, we have had Wilderness Rangers stationed in the Santa Fe National Forest and have completed monitoring activities within the Chama River Canyon Wilderness. For over ten years, New Mexico Wild has also partnered with local river outfitters to provide annual group river trips to our members.

Our members and supporters include diverse stakeholders that are affected by the Rio Chama watershed, including ranchers, recreational users, river guides, farmers, pueblos, municipalities, acequia associations, and private property owners. New Mexico Wild also represents the

interests of the environment itself, as essential to the quality of life for New Mexicans, as well as the health and survival of the species that rely on the river for life.

Mission: New Mexico Wild is dedicated to the protection, restoration, and continued respect of New Mexico's wilderness, wildlife, and water.

Goals & Objectives

The first-year goal of this proposed study is to establish baseline water quality conditions for the Wild and Scenic reach of the Rio Chama in advance of a Safety of Dams Corrective Action on El Vado Dam. In the second year, we will monitor the changes in water quality associated with the first phase of the Corrective Action. Results of the comparison of the two sets of data will assist Reclamation in managing future flow releases and hence improve water quality to effect improvements in the novel ecosystem that has developed in the Rio Chama.

The primary goal of this Existing Watershed Group is to facilitate and implement citizen science-based data collection. We propose to use the extremely cost-effective methodology that was developed and very successfully implemented by the USGS as part of the Grand Canyon Monitoring and Research Center (GCRMC) (Kennedy et al., 2016) work on the Colorado River in the Grand Canyon. The data will be used to address existing water quality issues in the Rio Chama downstream of El Vado Dam (Figure 2).

Outreach to, and recruitment of, commercial rafting guides and private boaters with BLM-issued rafting permits (the citizen scientists), will be a critical part of the project. The value of citizen science as a pathway to watershed and other public lands stewardship cannot be overstated. Participants come to better understand why the protection of public lands is essential, and they develop a sense of ownership and a deeper connection to the places where the fieldwork is performed. At the same time, resource management agencies receive much-needed volunteer assistance that makes it possible to accomplish projects that might otherwise not be possible while building positive relationships with the participating citizen scientists.

Our specific scientific objectives are as follows:

- 1) quantify the extent of the existing water quality impairment (water temperature and turbidity) in the Wild and Scenic reach of the Rio Chama downstream of El Vado Dam to establish baseline conditions both spatially and temporally prior to implementation of the Corrective Action;
- 2) quantify the changes in water quality as demonstrated by the spatial and temporal adult insect response to changed operation and subsequently altered hydrology and turbidity during the first phase of the Corrective Action;
- 3) utilize the results of the baseline vs. changed operation data to identify potential solutions to the existing water quality impairment. Water temperature and turbidity measurements will be made at each aquatic insect data collection site to quantify any spatial and temporal changes that might impact the insect assemblage.

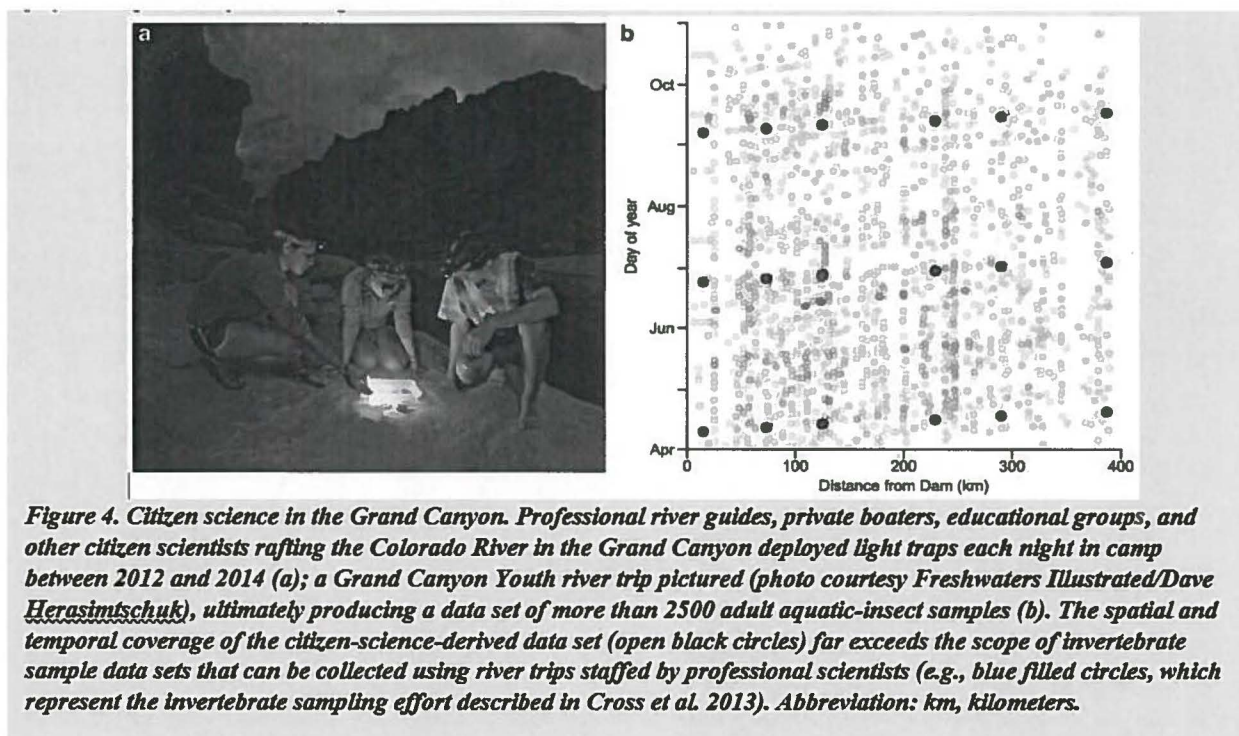


Figure 2. Illustration of the value of citizen-science data collection (from Kennedy et al., 2016).

Although not addressed as part of this 2-year limited proposal, we will be looking for opportunities for additional funding to collect and analyze data during Year 2 and Year 3 of the corrective action when the reservoir storage will be increased to about 81,000 acre-feet and as a result water quality will revert to the current conditions. We believe this will allow us to reverse test our hypothesis on the effects of water quality on the aquatic insect populations in the Rio Chama, thereby strengthening our initial conclusions from the first two years of study.

Approach

The aquatic insect assemblage in the Rio Chama downstream of El Vado Dam is impaired (dominated by chironomid midge larvae) as a result of two primary water quality factors: cold, non-varying water temperatures (Jacobi and McGuire, 1992; Olden and Naiman, 2010) and chronic turbidity (Jacobi and McGuire, 1992; Fogg et al, 1992; RCFP, 2019; Hobbs in preparation).

The Corrective Action for El Vado Dam provides a unique opportunity to test the hypothesis that changes in water temperature and turbidity will improve the aquatic insect assemblage to the benefit of the novel ecosystem (Morse et al., 2014) that has developed in the 84 years since El Vado Dam was built. Aquatic insects rapidly respond to changing environmental conditions (Resh et al., 1988). The commonly used Ephemeroptera (mayfly) - Plecoptera (stonefly) - Trichoptera (caddisfly) EPT Index will be used to characterize the insect populations (Lenat, 1988). We will use EPT percent abundance—computed as the mean of all available benthic samples in each year as our metric for assessing insect diversity. EPT percent abundance is widely used in river bioassessment investigations (Carlisle et al. 2013).

Most aquatic insects have complex life cycles with a winged adult life stage that is terrestrial, whereas the egg, larval and pupal stages are aquatic. Most investigations of aquatic insects have traditionally focused on collecting aquatic life stages, which is also true of the Rio Chama (e.g. Jacobi and McGuire, 1992; Gustina, 2013; Hobbs in preparation). However, within the Grand Canyon, the USGS (Kennedy et al., 2016) demonstrated that capture with light traps of adult insects at river margin camp sites located throughout the 400 km's of the Grand Canyon between April and November over a 3-year period by citizen scientists (commercial and private boaters) was a very cost-effective way of collecting extensive spatial and temporal data (Figure 2) to assess the effects of varying flows on the composition of aquatic insects. Accordingly, we propose to use the USGS methodology to assess the adult insects in the Rio Chama for establishing the baseline, pre-Corrective Action condition and to record impacts to the aquatic insect community subsequent to the first year of the Corrective Action. Dr. Jeff Muehlbauer of the GCMRC, one of the authors of the Grand Canyon study (Kennedy et al., 2016), is a co-investigator on this project. Our baseline adult terrestrial stage insect data will be compared with existing aquatic macroinvertebrate data collected by Jacobi and McGuire (1992), Gustina (2013) and more recently by the BLM in 2012, 2013 and 2015 at their Puerto Chiquito (RM 7), Rio Cebolla (RM 15) and Huckbay Canyon (RM 18) monitoring sites. Additionally, these data will be compared to data collected using the same methodology by GCMRC throughout river ecosystems in the West, to better place conditions in the Rio Chama within a broader, regional context.

Depending on the length of the boating season, between 2000 and 3000 people float the Rio Chama each year. About 25% are commercial. In order to recruit citizen scientists for this project, Steve Harris of Rio Grande Restoration will reach out to three entities: New Mexico River Outfitters Association, Adobe Whitewater Club, and the BLM Taos Field Office. BLM issues (by lottery) private boating permits for the Wild and Scenic reach of the Chama between May 1 and the end of the first week in September (Labor Day). In cooperation with the BLM Taos Field Office, a flyer describing the project, soliciting co-operation in the project and providing project contact information will be given to all successful permit holders. In addition, New Mexico Wild will promote the project on its website and through social media to gain participants.

The goal will be to recruit 4 launching groups per weekend (17) between the beginning of May and Labor Day, each of which will spend 2 nights at different camps distributed between the launch site at El Vado Ranch, located about 1 mile downstream of the dam, and approximately at River Mile (RM) 20 downstream of the dam. Groups will collect 1 sample at each camp. In this way we hope to collect approximately 150 samples per year that are spatially distributed over about 20 miles of river. New Mexico Wild staff will provide each permitted group with a data collection package at the launch site on Friday and will train volunteers on how to collect and record the data. The pre-labeled collected samples and filled-in data sheets will be checked for completeness and collected at the Big Eddy take-out on Sunday afternoons by New Mexico Wild staff.

Sample collection methodology:

A complete list of campsites and their specific locations (River Miles below the dam) will be provided to each group to standardize locations. A light trap will be deployed at dark at each camp site for each of the two nights. Each light trap will consist of a small plastic storage container and a battery-operated fluorescent light that is placed along the short edge of the container (Figure 2). Citizen scientists will be provided with a table of sunset times to facilitate the consistent timing of trap deployment and will be instructed to turn on light traps within 1 hour after nautical sunset. At the start of each deployment, citizen scientists will pour the contents of a 250-milliter (ml) bottle pre-filled with 95% ethanol into the plastic containers and turn on the lights. After one hour, the lights will be turned off, and the contents of the trays will be poured back into the pre-labeled 250-ml bottles for storage. The samples will be sent to the USGS Grand Canyon Monitoring and Research Center laboratory in Flagstaff for processing, EPT taxa identification and quality control.

Water temperature and air temperature measurements at each data collection site will be recorded on the supplied data sheets and general observations of the site and weather conditions will also be recorded. A 250-ml sample of the river water at the camp site will be collected for subsequent laboratory measurement of turbidity and suspended sediment concentration. The discharge in the river for each weekend data collection period will be determined from the USGS Below El Vado gage (#08286500), located about 2 miles downstream of the dam.

Standardized Data Collection Package

Data Collection Field Sheets
Laminated Instruction Sheet with Camp Site Map and Mileage Table
Nautical Sunset Tables
Thermometer
2 pre-labeled 250 ml water sample bottles
2 pre-labeled 250-ml bottles of 95% ethanol
2 collector trays
2 lights with batteries
Plastic funnel

Once the EPT data are received back from the USGS, Drs. Bixby and Muehlbauer will oversee the analysis of the adult insect and environmental data (water temperature, air temperature and turbidity/suspended sediment concentration). It is expected that there will be variation of the EPT index values both spatially and seasonally in the two annual sets of data, but the comparison of the baseline and year-1 Corrective Action data should demonstrate the response of the aquatic insect community to the improved water quality and support our working hypothesis. The results of our data analyses and interpretations will be summarized and provided to Reclamation in Draft and Final Reports.

This project is eligible for funding under the Cooperative Watershed Management Program Phase I funding opportunity under Task B, Watershed Restoration Planning, in multiple ways:

- Conducting Water Quality Studies Needed to Provide Baseline Information about the Watershed.

As indicated in Sections 2 and 4, water quality in the Wild and Scenic reach of the Rio Chama downstream of El Vado Dam is impaired as a result of cold, non-varying temperatures of the

released water and chronic turbidity, the result of reservoir sedimentation to the elevation of the low-level hydropower outlet. We propose to collect water temperature and turbidity baseline data within the 20-mile long reach of the river downstream of the dam in the first year and relate these parameters to the adult aquatic insect assemblage that is the food base for the targeted brown trout and native fish species in the river. Data collected in the second year, when the flows and turbidity are likely to be significantly different, will be compared to the baseline data with the objective of testing the hypothesis that warmer and varying water temperatures and significantly reduced turbidity will improve the macroinvertebrate diversity and population thereby benefitting the river ecosystem and meeting Reclamation's goal of creating a legacy of conservation stewardship.

- **Obtaining Data and Developing Goals for the Restoration Plan**

As indicated in Section 4.4, we plan to use citizen scientists to collect spatial data within the 20 miles downstream of the dam and temporal data from May through September for a pre-Corrective Action baseline year and during the first year of the Corrective Action. Data will include water quality parameters, water temperature and turbidity and adult aquatic insect taxa, as well as air temperature and flow data. We estimate that about 150 paired water quality and adult insect samples will be collected each year, which will provide us with a robust data set. The primary purpose of the baseline data collection is to quantify the water quality impairment. Collection of data in the second year will provide us with a comparative data set that will allow us to test our basic hypothesis. If our hypothesis is supported by the data, we will have a basis for identifying a potential solution, which could be addition of a gated inlet tower to the low-level dam outlet.

- **Working with Federal Agencies and State and Local Governments and Watershed Stakeholders to Determine how the Watershed can be Improved**

The Wild and Scenic reach of the Rio Chama downstream of El Vado Dam is co-managed by the BLM and USFS. We have reached out to both Federal Agencies to discuss the existing water quality impairment of the macroinvertebrate population and hence food base for the New Mexico Department of Game and Fish-identified target species for the Wild and Scenic reach and have discussed potential solutions to the problem. Both agencies support our proposed watershed plan and BLM has indicated that we will not need research permits. Our proposed work will build on the many years of aquatic macroinvertebrate data collected by BLM as part of their monitoring program for the Wild and Scenic reach, as well as basic hydrologic, hydraulic, geomorphic and vegetation data collection and analysis initiated by a grant to Rio Grande Restoration under the State of New Mexico's River Ecosystem Restoration Initiative (RERI) program in 2011.

Aquatic insect taxa will be identified by the USGS-GCMRC laboratory and Dr. Jeff Muehlbauer from GCMRC will assist us in analyzing and interpreting the data. In addition, the Rio Chama Flow Team at UNM, including Dr. Bixby, has worked closely with Reclamation's Reservoir Operations Pilot Program for the Rio Chama to explore operational flexibilities to manage water supply, increase economic benefits to Rio Arriba County and benefit the novel ecosystem that has developed over the last 85 years since El Vado Dam was constructed. In cooperation with Reclamation and its water supply clients, the Middle Rio Grande Conservancy District

(MRGCD), Albuquerque Bernalillo County Water Use Authority (ABCWUA), the Middle Rio Grande Pueblos and City of Santa Fe, the RFCP has successfully implemented environmental flow releases to benefit the Rio Chama novel ecosystem since 2009. The key to successfully implementing our proposed project will be close and effective collaboration with key watershed stakeholders including El Vado Ranch (David Cooper) and the commercial river guides and private boaters who will be our citizen scientists.

A potential solution to both the cold water and turbidity problems is installation of a gated inlet tower on the low-level hydropower outlet at El Vado Dam that would permit water temperatures to be varied for the downstream ecosystem as was successfully demonstrated at Reclamation's Flaming Gorge Dam (Peters, 1978) and also would allow sediment to pass through the reservoir during the spring runoff period when it would naturally be elevated (Wohl et al., 2015), thereby also maintaining reservoir capacity to Reclamation's benefit. To date, El Vado Reservoir has only lost about 3.7 percent of its original capacity (Reclamation, 2008).

5. Evaluation Criteria

E.1.1. Criterion A—Watershed Group Diversity and Geographic Scope

A1. Watershed Group Diversity

On an average annual basis, 3-400,000 acre-feet of both native Rio Chama and imported San Juan Chama Project trans-basin water is released from El Vado Dam and passes non-consumptively through the BLM-USFS co-managed Wild and Scenic reach of the Rio Chama. The flows support a very diverse group of both agricultural and urban water users, including the MRGCD, ABCWUA, Rio Chama Acequia Association, Rio Grande Pueblos and City of Santa Fe, all of whom in cooperation with Reclamation are actively involved in the management of storage and flows on the Rio Chama. The Rio Chama has a very diverse recreational constituency as well. As a result of cooperation between water owners (MRGCD, ABCWUA, City of Santa Fe) and Reclamation, rafting and kayaking flows are released from the dam on weekends between Memorial Day weekend and Labor Day, providing one of the longest recreational boating seasons in the Southwest, thereby enabling this proposed data collection program.

In addition, due to the high-value cold-water fishery in the Wild and Scenic reach, there is a very active fishing community (both guided and private) on the Rio Chama with NM Game and Fish stocking the upper reaches, with rainbow trout and brown trout naturally reproducing farther downstream. Water quality impairment has reduced the value of the fishery over time, primarily as a result of the chronic turbidity issue that commenced in the late 1970's when sediment accumulated behind the dam to the level of the low-level outlet (Reclamation, 2008).

The success of our proposed watershed plan depends heavily on our outreach to the commercial and private boating community, who will provide the citizen scientists. We will actively recruit commercial river guides and contact private boaters in cooperation with the BLM. The Watershed Group led by New Mexico Wild will strive to inform all the above-listed entities about this project through press releases, online publications, and social media. Additional outreach to members and supporters will strengthen the citizen science aspect of the project, ensuring participation among a diverse cross-section of New Mexicans.

A2. Geographic Scope

The Wild and Scenic reach of the Rio Chama between El Vado and Abiquiu Reservoirs is located within the approximately 3,000 square mile Rio Chama Drainage Basin (Figure 1) (USGS HUC 13020102). Upstream of El Vado Dam the contributing drainage basin area is 602 square miles. The project reach identified on the watershed map (Figure 1) is primarily owned and co-managed by the BLM and USFS, both of whom are important collaborators with our Watershed Group.

E1.2. Criterion B—Addressing Critical Watershed Needs or Issues

B1. Critical Watershed Needs or Issues

Water quality in the Wild and Scenic reach of the Rio Chama downstream of El Vado Dam is impaired due to cold, non-fluctuating temperatures and chronic turbidity, both of which adversely affect the macroinvertebrate food base that the existing target fish species (brown trout) for the Management Plan for the Wild and Scenic designation and native fishes depend upon (Jacobi and McGuire, 1992; Fogg et al., 1992; Hanson, 1992; RCFP, 2019). In addition, the high turbidity of the reservoir outflows (5-10 times higher than inflows) adversely affects fish communities through indirect effects of light extinction and the accompanying decrease in the production of aquatic plants and fish food (Lloyd et al. 1987). While effects of light penetration are usually associated solely with primary production, turbidity is also associated with elevated stress in fish (Sigler et al., 1984), decreased predator efficiency (Sweka and Hartman, 2001), inducement of invertebrate drift, and suffocation of incubating salmonid embryos. The chronic water turbidity and associated annual average suspended sediment concentration (190 mg/l) in the Rio Chama (RCFP, 2019) exceeds the EPA-identified threshold for biological impairment of 100 mg/l (Mills et al., 1985). The water quality impairment is likely to be reducing the ecological resiliency of the novel ecosystem that has formed since the dam was constructed in 1935.

B2. Developing Strategies to Address Critical Watershed Needs or Issues

TASK A – Water Group Development: By involving the water-based recreational community, we believe that our proposal serves to further Reclamation’s goal of communicating with the public. Our proposal is focused on using sound citizen science to address an existing water quality impairment on the Rio Chama. The results of the work will help inform Reclamation’s future management of the reservoir and flow releases to meet changed downstream environmental needs while at the same time introducing members of the public to meaningful citizen science opportunities and the importance of watershed stewardship to future generations of New Mexicans.

TASK B – Watershed Restoration Planning: Collection of paired water quality and adult insect samples by citizen scientists over the Spring-Fall period at multiple locations within the 20-mile reach of the Wild and Scenic river will characterize the existing impaired baseline water quality and ecological conditions during the year before the El Vado Corrective Action is implemented. Comparison with similar data collected during the first year of the Corrective Action, when the hydrology and turbidity will change significantly, will provide Reclamation with a scientifically sound basis for solving the water quality impairment issues. We hypothesize that changes in water temperature and elimination of the chronic turbidity in the river downstream of the dam will result in significant improvements to the aquatic insect assemblage and to the ecosystem as a whole. Such improvement could then be achieved in the long-term with the addition of a gated intake tower on the low-level hydropower outlet from the dam. Based on the seasonal flow duration curves for the USGS Below El Vado Dam gage (No: 08286500), the capacity of the powerplant (about 1,200 cfs) is only exceeded about 1 percent of the time in the Winter, Summer and Fall and for about 40 percent of the time in the Spring, primarily due to Rio Grande Compact releases during Article VII storage restrictions (RCFP, 2019).

TASK C – WATERSHED MANAGEMENT PROJECT DESIGN: The data collected over the 2-year period will build on a significant body of previous scientific investigation that started as part of the Interagency Rio Chama Instream Flow Assessment (Fogg et al., 1992) that was initiated following finalization of the Rio Chama Management Plan (USFS, BLM, USACOE, 1990). The management plan identified meeting delivery requirements of the Rio Chama water rights holders and San Juan-Chama Project contractors as the highest priority for flow management followed by maintenance of the aquatic ecosystem. As part of Reclamation’s Reservoir Operations Pilot Program, the existing scientific literature on the Rio Chama was compiled and summarized in a document entitled Summary of Rio Chama Technical Studies (RCFP, 2019) and this information will be utilized as part of our project.

E.1.3. Criterion C—Implementation and Results

C1. Understanding of and Ability to Meet Program Requirements

Details of the implementation of the proposed scope of work are provided in the Technical Proposal (Section 4.4.). The schedule for implementation of the proposed scope of work during the 2-year period following contract award is summarized in the following Table. The schedule as shown is predicated on award of a contract by the beginning of March 2020.

Tasks	Schedule	Cost \$
Outreach to Citizen Scientists and purchase and preparation of Data Collection Packages	March 1–April 30, 2020	\$26,128.84
Baseline Data Collection and Data Analysis	May 1–December 31, 2020	\$29,953
Year 1 Corrective Action Data Collection and Data Analysis	March 1–December 31, 2021	\$23,537
Draft and Final Reports	January 1–March 1, 2021	\$20,233

C2. Building on Relevant Federal, State or Regional Planning Efforts

Congressional designation of the Rio Chama between El Vado and Abiquiu reservoirs as a Wild and Scenic river in 1988 required the development of a Management Plan. The initial plan was finalized by the BLM, USFS and USACE in 1990 and was expected to be current for about 10 years. Updating of the plan will occur in the near future (BLM Taos Field Office, personal communication), and the results of the proposed activities of our watershed plan will provide significant information for formulation of the next Management Plan. In addition, the proposed scope of work will provide valuable information on the likely positive downstream impacts of Reclamation's El Vado Dam Corrective Action that can then be used by Reclamation to inform future flow and sediment management in the Wild and Scenic reach.

E.1.4. Criterion D—Department of the Interior Priorities

D1. Creating a Conservation Stewardship Legacy Second only to Teddy Roosevelt

New Mexico Wild is a leading advocate for balancing stewardship and the use of public lands and thus fully supports this DOI priority. Our campaigns cover a broad range of watershed-preservation issues, including robust support of the Land and Water Conservation Fund, protecting the sensitive headwaters of the Pecos River, and supporting Wild and Scenic River designation for the Gila River and its tributaries. Our ongoing support of the Rio Grande del Norte National Monument helps protect the lifeblood of New Mexico—the Rio Grande River.

Our project supports the following Department priorities:

1a. Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment;

By employing citizen science to establish baseline water quality conditions in the Wild and Scenic reach of the Rio Chama to assess the environmental impacts of changing water quality, this project will provide valuable data that can be used to identify best practices for managing El Vado Dam and the Rio Chama downstream of the dam.

1d. Review DOI water storage, transportation, and distribution systems to identify opportunities to resolve conflicts and expand capacity;

The results of the work will help inform Reclamation's future management of the reservoir and flow releases to meet changed downstream environmental needs while at the same time introducing members of the public to meaningful citizen science opportunities and the importance of watershed stewardship to future generations of New Mexicans.

1e. Foster relationships with conservation organizations advocating for balanced stewardship and use of public lands;

The key to successfully implementing our proposed project will be close and effective collaboration with key watershed stakeholders including El Vado Ranch (David Cooper) and the commercial river guides and private boaters who will be our citizen scientists. New Mexico Wild has a long and successful track record of working with partner conservation organizations advocating for balanced stewardship and use of public lands. We will work closely with the Rio Chama Flow Project, Rio Grande Restoration, Trout Unlimited, and

other conservation organizations as opportunities present themselves during the data collection portion of the project.

D3. Restoring trust with local communities

3a. Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands;

With an emphasis on citizen science that benefits users of the Rio Chama through better management, there is great potential for improving dialog and relationships with persons and entities affected by the river's overall health. In addition, due to the high-value cold-water fishery in the Wild and Scenic reach, there is a very active fishing community (both guided and private) on the Rio Chama. The success of our proposed watershed plan depends heavily on our outreach to the commercial and private boating community, who will provide the citizen scientists. We will actively recruit commercial river guides and contact private boaters in cooperation with the BLM. New Mexico Wild will strive to inform all the above-listed entities about this project through press releases, online publications, and social media. Additional outreach to members and supporters will strengthen the citizen science aspect of the project, ensuring participation among a diverse cross-section of New Mexicans.

The value of citizen science as a pathway to watershed and public lands stewardship cannot be overstated. Participants come to better understand why the protection of public lands is essential, and they develop a sense of ownership and a deeper connection to the places where the fieldwork is performed. At the same time, resource management agencies receive much-needed volunteer assistance that makes it possible to accomplish projects that might otherwise not be possible, while building positive relationships with the participating citizen scientists.

3b. Expand the lines of communication with Governors, state natural resource offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.

The future management decisions supported by the data from this project involve a very diverse group of both agricultural and urban water users, including the MRGCD, ABCWUA, Rio Chama Acequia Association, Rio Grande Pueblos and City of Santa Fe, all of whom in cooperation with Reclamation are actively involved in the management of storage and flows on the Rio Chama. The Rio Chama has a very diverse recreational constituency as well. As a result of cooperation between water owners (MRGCD, ABCWUA, City of Santa Fe) and Reclamation, rafting and kayaking flows are released from the dam on weekends between Memorial Day weekend and Labor Day, providing one of the longest recreational boating seasons in the Southwest, thereby enabling this proposed data collection program.

The Wild and Scenic reach of the Rio Chama downstream of El Vado Dam is co-managed by the BLM and USFS. We have reached out to both Federal Agencies to discuss the existing water quality impairment of the macroinvertebrate population and hence food base for the New Mexico Department of Game and Fish-identified target species for the Wild and

Scenic reach and have discussed potential solutions to the problem. This type of multi-agency management overlap provides a unique opportunity to strengthen communications by sharing the data collected during this project for the benefit of all.

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New Mexico Wild WaterSMART Proposal Project Budget

Budget Item Description	\$/unit	Quantity		Total Cost	IN-KIND matching
Salaries and Wages					
NM Wild Associate Director, Tisha Broska, Program Manager	\$ 34.83	30	Hours	\$ 1,044.90	
NM Wild Stewardship and Outreach Coordinator	\$ 21.63	152	Hours	\$ 3,287.76	
NM Wild River Ranger - Part time Employee	\$ 17.00	684	Hours	\$ 11,628.00	
Fringe Benefits					
NM Wild Associate Director, Tisha Broska, Program Manager	\$ 2.78	30	Hours	\$ 83.40	
NM Wild Stewardship and Outreach Coordinator	\$ 1.72	152	Hours	\$ 261.44	
NM Wild River Ranger	\$ 1.50	684	Hours	\$ 1,026.00	
IN-Kind Volunteer hours (\$25.43 Federal Volunteer Rate 3 hours per trip @ 4 trips per week for 34 weeks)	\$ 25.43	408	Hours		\$ 10,375.44
Total personnel				\$ 15,960.66	
Total benefits				\$ 1,370.84	
Total Salaries, Wages, Benefits				\$ 17,331.50	
Travel					
Local Mileage Per Trip (350 miles per week @ 0.45/mile)	\$ 0.45	350	Miles	\$ 157.50	
Total Travel (17 trips per year for 2 years)	\$ 157.50	34	Trips	\$ 5,355.00	
Supplies					
Sampling Supplies	\$ 18.00	300	samples	\$ 5,400.00	
Total Supplies				\$ 5,400.00	
Contractors					
Steve Harris Outreach to River Guides	\$ 5,000.00	2	years	\$ 10,000.00	
Jeffrey Muehlbauer, USGS bug analysis oversight	\$ 5,000.00	2	years	\$ 10,000.00	
UNM, data analysis	\$ 5,000.00	2	years	\$ 10,000.00	
Sample Analysis	\$ 85.00	300	samples	\$ 25,500.00	
Total Contractors				\$ 55,500.00	
Other					
Sample Shipping (priority flat rate box - 1 per week)	\$ 14.35	34	weeks	\$ 487.90	
Outreach Materials	\$ 3,700.00	1	lump sum	\$ 3,700.00	
Project Video	\$ 3,000.00	1	lump sum	\$ 3,000.00	
Total Other				\$ 7,187.90	
Subtotal				\$ 90,774.40	
Indirect Costs to New Mexico Wild 10%		10	percent	\$ 9,077.44	
Total				\$ 99,851.84	\$ 10,375.44
Total Project and Inkind	\$ 110,227.28				

New Mexico Wild WaterSMART Proposal Budget Narrative

This section provides explanation and justification of expenditures in the preceding table.

Salaries and Wages: This item represents 30 hours for Program Manager, Tisha Broska's time to oversee the project and ensure coordination between contractors, staff and Reclamation for 2 years. For a total of 152 hours over 2 years, the New Mexico Wild Outreach Coordinator will hire, train and manage a part-time New Mexico Wild River Ranger, and will be responsible for developing, coordinating and implementing communications and outreach to partners and volunteers. For a total of 684 hours for 2 years, the New Mexico Wild River Ranger will be a part-time employee hired for this project. S/he will be responsible for engaging, training and distributing sampling kits to volunteers, as well as collecting completed samples and shipping the samples to the lab. We estimate 18 hours per week for the Ranger, which includes roundtrip travel time from the Santa Fe area to the launch and to the take-out.

Fringe Benefits: This item represents an estimate of federal and state withholding taxes, including SSA and Medicare, on the salaries described above.

Third-Party In-Kind Contributions: For this item, it is estimated that 4 volunteers will contribute 3 hours per week, for 34 weeks. The value of \$25.43, the current Federal Volunteer rate was used to calculate an estimated \$10,375.44 for in-kind volunteer time from boaters collecting samples on the river.

Travel: This item represents local mileage for the New Mexico Wild River Ranger, traveling from the Santa Fe area to the launch site, roundtrip, on Friday and traveling from the Santa Fe area to the take-out point, roundtrip on Sunday. The New Mexico Wild mileage rate is \$0.45 per mile. An estimated 350 miles per week was used to calculate the total for 17 trips per year.

Supplies: Sampling supplies represents costs estimated at \$18 per sample. This includes costs for sample bottles, preservative, and field supplies (lights, trays, thermometers and boxes for each sampling kit). Costs are based on prices currently available on-line or through local suppliers.

Contractual: Steve Harris of Rio Grande Restoration will provide outreach and coordination to commercial and private boating and other watershed stakeholders. Dr. Becky Bixby, our partnering Aquatic Ecologist from the Biology Department at UNM, will provide analysis, comparison and summary of data results. Additionally, Dr. Jeff Muehlbauer, Research Ecologist from the USGS Grand Canyon Monitoring and Research Center, is a co-investigator on the proposed project and has significant expertise in monitoring adult aquatic insects downstream of dams in western U.S. rivers. Dr. Muehlbauer will oversee the sample analysis and work with Dr. Bixby to summarize the results and provide the final report. Each of these contracted partners will receive a lump sum of \$5,000 per year.

Other: This section includes shipping costs of the samples, estimated at 1 box per week shipped at a rate of \$14.35 each, for 34 weeks. Outreach Materials is a total estimate for flyers, social media and blog posts, training materials, and publication of the project in the New Mexico Wild newsletter (35,000 copies printed and distributed throughout the state). Costs are based on

experience and existing prices paid by New Mexico Wild. A Project Video at \$3,000 is also included under this section to help recruit volunteers and educate the public about the important project being conducted on the Rio Chama.

Environmental and Regulatory Compliance Costs: No costs are expected for this project.

Indirect Costs: A *de minimis* rate of 10% is included to calculate indirect costs for the project.

New Mexico Wild Watershed Team Capsule Curricula Vitae

New Mexico Wild Staff:

Tisha Broska, Deputy Director, Program Manager

Tisha has worked for New Mexico Wild since 1999. She has served as Interim Executive Director, Development Director, and Membership Coordinator in her years with New Mexico Wild. Tisha was a member of the Wilderness50 Executive Committee in 2014, when the 50th Anniversary of the Wilderness Act was celebrated in Albuquerque. With a degree in environmental science and a background in environmental consulting, Tisha manages fundraising, communications and membership for the New Mexico Wild. Tisha also works to build community partnerships and lead youth outreach and volunteer service projects. Before her time at New Mexico Wild, Tisha worked as an environmental consultant for 7 years in Tampa, Florida.

Will Ribbans, Stewardship and Outreach Coordinator

Will's passion for the outdoors began as a young kid playing by the river in his hometown of Corrales. His passion for conservation grew at Bosque School through programs like BEMP (Bosque Ecosystem Monitoring Program) and he went forward to pursue a degree in Environmental Studies at Eckerd College on the Gulf Coast of Florida. Upon graduation he returned home to Albuquerque to continue his passion for conservation work and environmental stewardship. He worked for Rocky Mountain Youth Corps for 5 seasons doing a variety of conservation projects such as conservation outreach, backcountry trail maintenance, volunteer coordination, invasive species removal and more. He loves hiking mountains and experiencing New Mexico's beautiful wilderness areas.

Additional Participants:

Becky Bixby, Ph.D., Research Assistant Professor, UNM Department of Biology

Dr. Bixby is an aquatic ecologist with an expertise in freshwater algae and their roles in aquatic food webs. Becky is currently working with Cliff Dahm and Laura Crossey on EPSCoR-funded research on snowmelt effects on stream dynamics in the Valles Caldera. Her interests in the project include the connections between hydrological and biogeochemical signals from snowmelt, groundwater inputs and monsoonal flows and the biological responses in the East Fork of the Jemez River. Becky's overall research program utilizes freshwater algae as model organisms to ask broader questions about microbial biogeography and species responses to environmental and biological stressors. Her current research projects also include human and natural impacts on primary producers and food webs in aridland rivers. She is a graduate of the University of Michigan, Ann Arbor with her Ph.D. in Natural Resources and did postdoctoral research at the Odum School of Ecology, University of Georgia. She was on the Editorial Board for Diatom Research from 2005-2010 and is active in the Society for Freshwater Science public information program.

Steve Harris, Rio Grande Restoration Executive Director

Mr. Harris has a Bachelor's Degree in Journalism/Sociology from the University of Oklahoma. He was a project co-manager of the Archuleta Ranch Riparian Restoration Project (at Mile 6-Rio Chama). He has been closely involved in the formulation of New Mexico environmental flow policy, including drafting the Strategic Water Reserve statute, organizing an ongoing study of hydrologic alterations to New Mexico rivers and several collaborative river management efforts involving a diversity of stakeholders. He has contracted to perform field studies with the US Army Corps of Engineers, NM Environment Department and NM Interstate Stream Commission. His grassroots organizing experience includes directing the Alliance For Rio Grande Heritage, for which he was also the fiscal agent.

Jeffrey D. Muehlbauer, Ph.D., Research Ecologist, USGS Grand Canyon Monitoring and Research Center, Southwest Biological Science Center

Dr. Muehlbauer is a river and stream ecologist who specializes in macroinvertebrate communities and food webs. His research is focused on linking hydrological and geomorphic conditions in rivers to the structure of aquatic communities. He earned his BS in Biology and Chemistry from Northern Arizona University and his MS and PhD in Ecology from the University of North Carolina at Chapel Hill. He has been involved in basic and applied research in a variety of river ecosystems worldwide, including dam removal in Fossil Creek, Arizona, wetland mitigation in North Carolina, and food web studies on the Danube River in Austria/Hungary/Serbia and glacially-fed rivers in Italy. His current research with USGS explores how physical conditions created by the management of Glen Canyon Dam affect macroinvertebrate communities and food webs within the Colorado River Basin, its riparian zone, and its tributaries.

Mark Stone, Ph.D., Professor of Civil Engineering, UNM

Dr. Stone is an associate professor in the Department of Civil Engineering at the University of New Mexico. He holds a B.S. degree in biological systems engineering from the University of Nebraska and M.S. and Ph.D. degrees in civil engineering from Washington State University. Dr. Stone's research interests include ecohydraulics, ecohydrology, stream restoration, and ecological flows. He has been involved with dozens of field, laboratory, and computational research projects covering topics such as fish passage through dams and culverts, vegetation response to floods, design guidance for stream restoration projects, climate change impacts, and water availability in developing countries.

Environmental and Cultural Resources Compliance

This project involves some scientific monitoring and fieldwork, none of which require even minor alterations of the environment, access to private lands, or other approvals:

1. The citizen science detailed in this proposal does not require any surface disturbance activities.
2. Endangered Species populations and habitats are not known to be present in the Project area.
3. There are several identifiable wetlands in the vicinity of the sampling area, but there would be no effect on these areas.
4. The proposed project will not affect any water delivery systems.
5. There are no buildings listed on the National Register of Historic Places within the proposed project area.
6. No known archaeological sites have been identified as being within the proposed project area.
7. The proposed project will not have an adverse effect on low income or minority populations.
8. The proposed project will not limit access to or otherwise impact tribal lands.
9. The proposed project will not contribute to the state of noxious weeds in the project area. Non-native invasive species will not be affected by the proposed project.



United States Department of the Interior



BUREAU OF LAND MANAGEMENT

Taos Field Office
226 Cruz Alta Road
Taos, New Mexico 87571-5983
www.blm.gov/nm

In Reply Refer To:

Mark Allison
New Mexico Wilderness Alliance
312 Commercial St NE, Ste. 300
Albuquerque, NM 87102

Re: Rio Chama Wild and Scenic River project proposal 10-31-2019

Dear Mark Allison,

This letter is in support of New Mexico Wilderness Alliance's (New Mexico Wild) application to the Bureau of Reclamation Funding Opportunity for WaterSMART Cooperative Watershed Management Program Phase I Grants. New Mexico Wild, a local non-profit group, has led many successful volunteer efforts on public lands that are valuable to the long-term health of our protected public lands and rivers.

Acceptance of this grant would be valuable in assessing the environmental impacts of changing water quality and flow in the Wild and Scenic Reach of the Rio Chama. We are also supportive of the volunteer engagement proposed in this project. With limited resources available, a collaborative effort with volunteer contributions is important for sampling efforts of this scope.

New Mexico Wild has a proven track record of volunteer engagement throughout the state and collaboration with partners to support watershed projects as described in the proposal. For these reasons, I fully support this application.

Sincerely,

Ryan Besser
Aquatic Habitat Management Specialist
BLM Taos Field Office
226 Cruz Alta Road
Taos, New Mexico 87571



Forest
Service

Southwestern Region
Santa Fe National Forest

11 Forest Lane
Santa Fe, NM 87552
V/TTY (505) 438-5300

Date: November 6, 2019

Mark Allison
New Mexico Wilderness Alliance
312 Commercial St NE, Ste. 300
Albuquerque, NM 87102

Re: Rio Chama Wild and Scenic River project proposal

New Mexico Wild, a local non-profit partner, is submitting a grant proposal to employ citizen science to establish baseline water quality conditions on the Rio Chama Wild and Scenic River to assess the environmental effects of changing water quality. The Santa Fe National Forest works with the Bureau of Land Management Taos Field Office to manage the Rio Chama Wild and Scenic River, which includes coordinating with Bureau of Reclamation given their role in the management of flows on the Rio Chama associated with operations of El Vado Dam. This letter is in support of New Mexico Wild's proposal.

In a public/private partnership, the Forest Service has relied upon New Mexico Wild to collaboratively develop and deliver projects, programs, and other education opportunities that engage youth, volunteers, and other interested individuals to develop an ethic of wilderness stewardship and civic responsibility across New Mexico, including on the Santa Fe National Forest. We currently have formal agreements in place where New Mexico Wild has coordinated the completion of projects that advance wilderness character monitoring and protection, address Forest Service wilderness stewardship priorities, and engage and educate volunteers and youth. New Mexico Wild has also started working in partnership with the Santa Fe National Forest in the past year on wild and scenic river stewardship.

The mission, goals and objectives of the USDA Forest Service wild and scenic rivers program are complementary to those of New Mexico Wild. Our partnership has established a framework for the collaborative development of annual projects that leverage resources to meet shared stewardship goals and objectives. We have partnered on projects since 2010 and look forward to continuing to grow this partnership.

New Mexico Wild also has the ability to leverage funding from private sources unavailable to the Forest Service and provide staff expertise to complete projects. Working with non-profit helps the Forest Service complete projects that we often do not have the capacity to address and allows us to engage with stakeholder networks that are at times not available to us.

For all these reasons, I fully support this proposal and believe that New Mexico Wild will be an excellent partner that plays a deep, supportive role in developing a baseline for water quality conditions on the Rio Chama Wild and Scenic River, and in investigating potential opportunities to improve water quality and associated ecological outcomes.

BJORN FREDRICKSON
Public Services Staff Officer





November 4, 2019

Mark Allison
New Mexico Wilderness Alliance
312 Commercial St NE, Ste. 300
Albuquerque, NM 87102

Re: Rio Chama Wild and Scenic River project proposal

Dear Mark:

This letter is to express Trout Unlimited's support of New Mexico Wilderness Alliance's (New Mexico Wild) application to the Bureau of Reclamation Funding Opportunity for WaterSMART Cooperative Watershed Management Program Phase I Grants. Trout Unlimited has collaborated successfully with New Mexico Wild on many conservation projects over the years. New Mexico Wild's work to protect public lands, wildlife and water is essential to the ongoing health of our environment and the quality of life for our citizens.

Assessing the environmental impacts of changing water quality in the Wild and Scenic Reach of the Rio Chama is critical in determining future management practices to preserve the Chama's fisheries and recreational values. TU also supports the project's volunteer data collection aspects, and we look forward to encouraging our members to participate in this citizen science opportunity.

The Rio Chama is an excellent brown trout fishery, with great potential to support native fish as well. We hope that this project will help improve the aquatic insect food base for this outstanding fishery.

Sincerely,

A handwritten signature in black ink that reads "Toner Mitchell".

Toner Mitchell
Trout Unlimited
New Mexico Water and Habitat Program Manager
(505) 231-8860
142 Rio Seco
Santa Fe, NM 87501

CERTIFIED RESOLUTION OF THE BOARD OF DIRECTORS OF THE NEW MEXICO
WILDERNESS ALLIANCE a New Mexico Nonprofit Corporation.

RESOLVED, that the Executive Director Mark Allison, be and is hereby authorized to enter into an agreement with the U.S. Bureau of Reclamation and has legal authority to act on behalf of the New Mexico Wilderness Alliance/New Mexico Wild; and

FURTHER RESOLVED, that the board of directors have reviewed and supports Employing Citizen Science to Establish Baseline Water Quality Conditions in the Wild and Scenic Reach of the Rio Chama to Assess the Environmental Impacts of Changing Water Quality application submitted; and

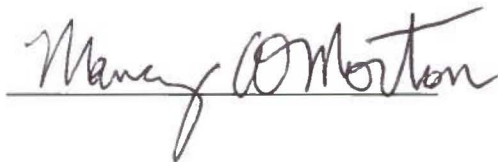
FURTHER RESOLVED, that New Mexico Wilderness Alliance will provide volunteer support to add non-required matching contribution to the project.

FURTHER RESOLVED, that New Mexico Wilderness Alliance will work with Bureau of Reclamation to meet established deadlines for entering into a grant or cooperative agreement.

Certificate

I, the undersigned, hereby certify that the foregoing is a true and correct copy of the resolutions presented and adopted by the Directors of the New Mexico Wilderness Alliance, a New Mexico non-profit corporation, on November 1, 2019 and that the resolutions remain in full force and effect on the date hereof.

Dated: November 1, 2019



Nancy Morton, Chair



Mark Allison, ED, Witness