

Sage Creek Watershed Restoration for Drought Resilience and Sediment Control



WaterSMART Environmental Water Resources Projects for Fiscal Year 2023
Notice of Funding Opportunity No. R23AS00089



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Executive Summary

Applicant Name: Nick Walrath, Trout Unlimited

City, County, and State: Green River, Sweetwater County, Wyoming

Length of time: Three years

Applicant Type: Category B in partnership with Category A Partners Wyoming Game and Fish

Trout Unlimited (TU), in partnership with Wyoming Game and Fish, Rock Springs Grazing Association, Greater Little Mountain Coalition, Ramsay Ranch, U.S. Fish and Wildlife Service, and Wyoming Landscape Conservation Initiative, will reduce erosion and sedimentation, increase floodplain aquifer recharge and static water table levels, and increase riparian and wet meadow plant community extents for species of concern through the Sage Creek Watershed Restoration Project (Project). The Project will target substantial portions of Sage and Trout Creek, south of Green River, Wyoming and adjacent to Flaming Gorge Reservoir through the Sage Creek Watershed Restoration Project. The Sage Creek area is a biologically unique, high desert region that provides: a stronghold for a population of native Colorado River Cutthroat trout in one of the driest regions of their historic range; spawning habitat for flannelmouth sucker; core habitat for Sage Grouse; crucial mule deer winter, transition, and parturition range; and a portion of the Salt Wells Creek Wild Horse Herd Management Area. This drainage is a priority area for restoration among numerous stakeholders in the region due to severe erosion issues, increasingly pronounced droughts, and rapid spread of noxious annual grasses that affect terrestrial and aquatic habitat, irrigators, and downstream water users. Aquatic habitat is further threatened by the presence of invasive aquatic species in Flaming Gorge Reservoir that compete for resources and hybridize with imperiled native trout.

Through the Sage Creek Watershed Restoration Project, TU will install 50 beaver dam analogs (BDAs) on 2 miles of Trout Creek, install 160 aggradation structures on 5.6 miles of Sage Creek, install an aquatic invasives barrier, and conduct riparian re-seeding and plantings along both banks of 7.6 miles of Sage and Trout Creek to restore 453 acres of valley floor habitat. An estimated 8050 US tons of sediment, 2500 lbs. of soil phosphorus, and 4750 lbs. of soil nitrogen are expected to be captured by the project structures per year, protecting approximately 5 AF of water storage in Flaming Gorge Reservoir each year of the project's life. An estimated 1428 AF of groundwater is expected to be restored to floodplain aquifers via restored channel grades and aquifer recharge processes, increasing the drought resilience of plant communities comprising critical terrestrial and aquatic habitat. The entire Sage Creek watershed – 79.5 linear miles of aquatic habitat – will be protected from invasive rainbow trout in Flaming Gorge Reservoir that threaten native Colorado River Cutthroat Trout. These project areas are identified in the Little Mountain Watershed Restoration Plan, and they implement strategies identified in the BLM Resource Management Plan for the Greater Red Creek Areas of Critical Environmental Concern (ACEC), Wyoming Game and Fish Department's Wyoming Mule Deer Initiative, State of Wyoming Executive Order 2019-3 for Greater Sage-Grouse Core Area, Wyoming State Wildlife Action Plan, and the interagency Wyoming Landscape Conservation Initiative. These strategies and planning documents have been supported by elected officials, conservation groups, local, state, and federal agencies, and water users.

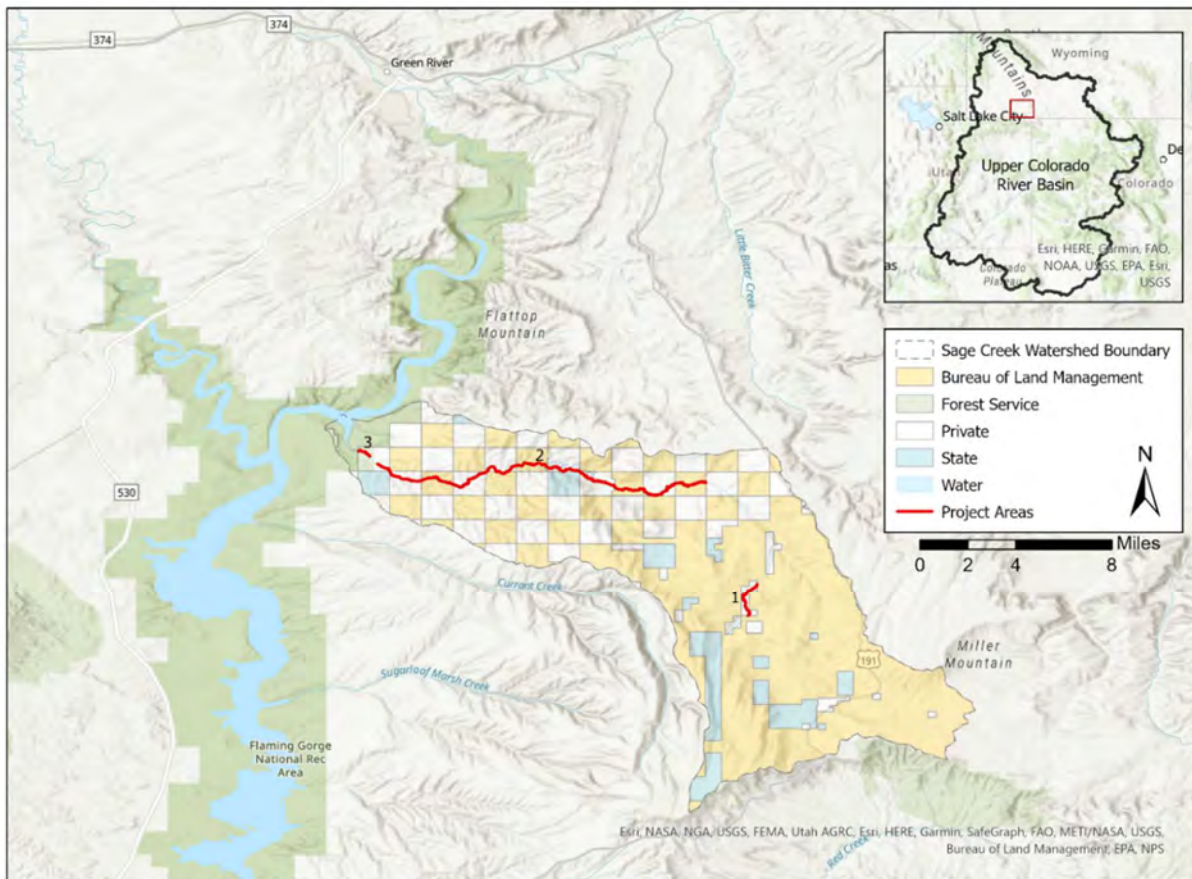
Depending on timing of contract executions, BDAs can begin construction as soon as October 2023 and be completed by September 2024; construction of aggradation structures and the fish barrier can begin in May 2024 and be completed by September 2026.

Project Location

The Sage Creek Watershed Restoration Project is located in Sweetwater County, Wyoming, approximately 20 miles south-southeast of the town of Green River (Map 1). Sage Creek is part of the Upper Green River drainage system within the Colorado River Basin and flows directly into Flaming Gorge Reservoir. The project areas' center points are included in the table below.

Project Area	Activity	Latitude	Longitude
1	Beaver Dam Analogs	41.197991°	-109.253196°
2	Aggradation Structures	41.285894°	-109.348243°
3	Artificial Barrier for Invasives	41.298076°	-109.478149°

Map 1: Sage Creek Watershed Restoration Proposed Project Area Locations



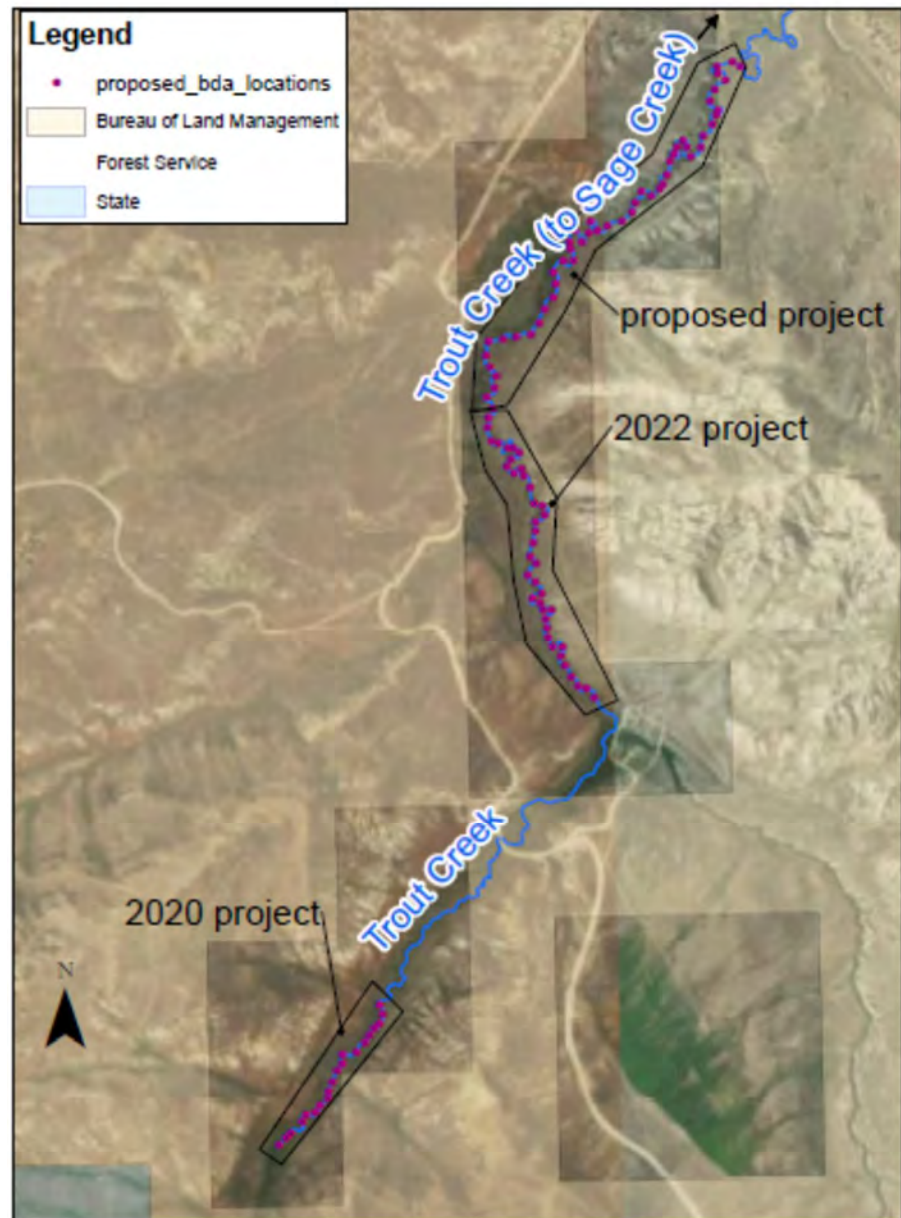
Technical Project Description

The Sage Creek Watershed Restoration Project includes three approaches to reduce erosion and sedimentation, increase floodplain aquifer recharge and static water table levels, and increase riparian and wet meadow plant community extents for species of concern: the construction of 50 new beaver dam analogs, expansion of 20 existing beaver dam analogs, and material supplements to approximately 15 naturally occurring beaver dams on 2 miles of Trout Creek; 160 aggradation structures on 5.7 miles of Sage Creek; and an artificial barrier upstream of the confluence of Sage Creek with Flaming Gorge Reservoir, above full pool elevation (6047 ft).

Project Area 1

Map 2: Sage Creek Watershed Restoration Proposed Project Area 1 Draft Designs

The beaver dam analogs will be built on Trout Creek out of small-diameter (<8") wooden material harvested off hillsides (e.g., juniper) using chain saws and supplemented with untreated fence posts. Two main structure types will be used: woven post and post-less (ref. Figures 4-9). Woven post structures will use 6-8" diameter logs harvested off hillsides that have had branches removed and one end sharpened with a chainsaw as stabilizing posts, with un-treated fence posts brought in, as necessary. Materials will be harvested, transported, and staged at project sites using chainsaws and a flatbed truck. Woven material will comprise removed branches and smaller diameter wooden material (<6"). Posts will be installed



perpendicular to the direction of flow both within the channel bed and extending onto adjacent terraces by 1-3 feet, depending on local valley floor morphology. Posts will be installed to depths equivalent to 33% of their overall length using hand tools. Smaller diameter material will be woven between the posts until the overall structure reaches a height between 60%-110% of the channel depth, as determined by local depths and widths of surrounding valley floor. Additional branches, earthen material, and rock will be placed on the upstream side of the structure to dissipate incoming velocity and help reduce vertical and lateral scour. Woven post structures will be used in locations with vertical banks and limited inset floodplain development.

Post-less structures will be built of similar wooden material (<8") but will target locations with incipient to moderately developed inset floodplains and stream banks with evidence of slumping and lateral erosion. These structures will be stabilized by a framework of larger diameter logs (4-8") with branches attached that will be keyed into banks 6 – 12", and filled with smaller diameter wooden material, earthen material, and rock as appropriate. Structures will be built to a height between 30-100% of the channel depth, depending on channel depth and width of surrounding valley floor. Post-less structures will be installed using hand tools.

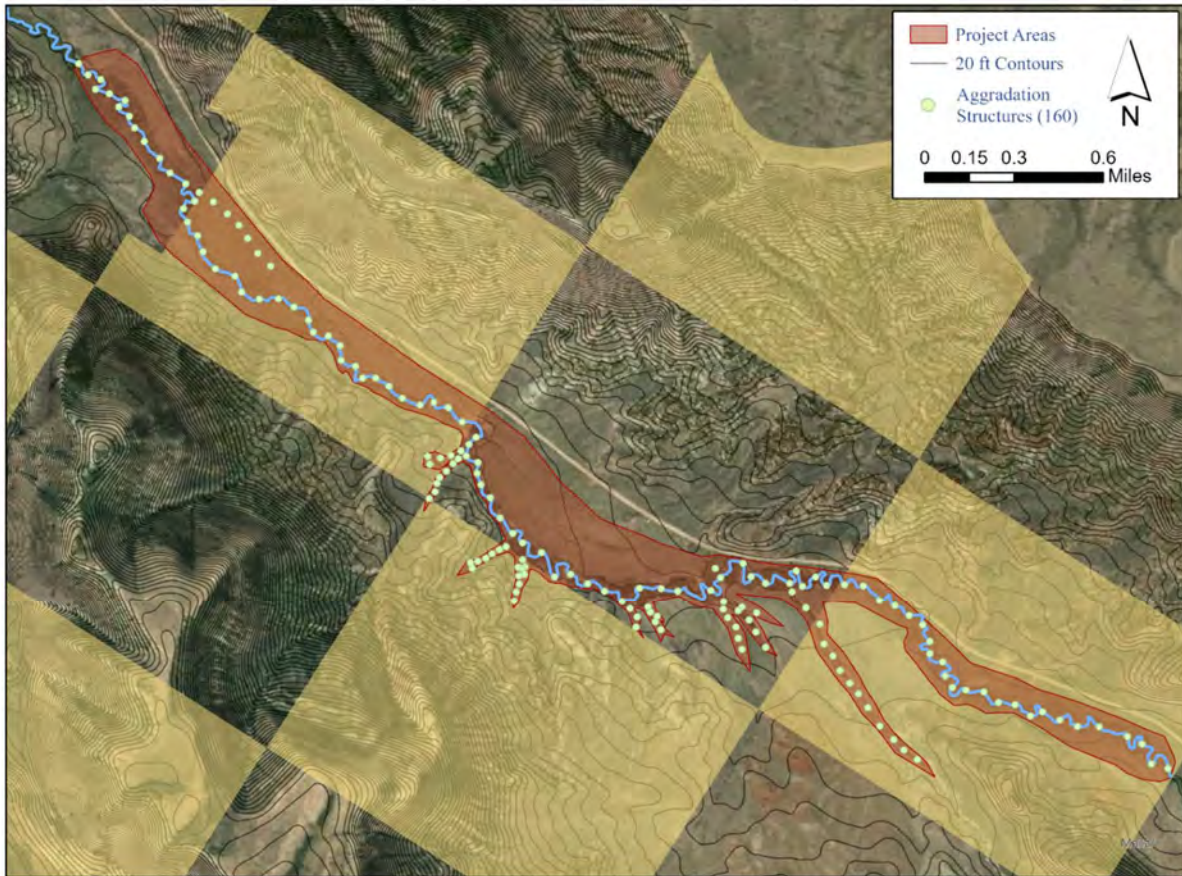
Existing BDAs will have additional material added to them using the same sources of material as the woven-post and post-less structures to bring them to heights between 60-110% of the channel depth. Additional woody or earthen material may be added in locations with incipient scour. Supplemental material for active dam-building beavers will be staged near existing natural beaver dams during staging for other structure types for beavers to use to add on to their own dams.

Project Area 2

Aggradation structures will be built along the deeply incised portions of Sage Creek below its confluence with Trout and Gooseberry Creeks, starting at the upstream end and moving downstream. These 160 structures would comprise the first of three construction phases in lower Sage Creek. Of these, 81 structures will be located on the main stem of Sage Creek and 79 structures will be located on side draws and head cuts eroding into terraces. These aggradation structures will be permeable to impermeable low-head earthen weirs designed to fill the channel entirely and to temporarily retain surface water, with installed dimensions a function of the level of channel entrenchment and surrounding floodplain/terraces (ref. Figures 1-3).

Structures will be constructed of successive, mechanically compacted layers from material containing the appropriate soil moisture content. The width of the crest of the structure will be 10-14' across. The height will be determined by the channel depth, with structures built to rise 6-12" above the floodplain width to facilitate spreading of high flows. Structure width will similarly be determined by channel width, with structures extending in both directions onto floodplains/terraces to minimize potential for lateral scour and erosion. The steepness of up and downstream slopes will be controlled by the physical properties of materials available for construction, including cohesion and tested permeability of the material. Non-cohesive materials will result in steeper slopes, while cohesive materials will require shallower slopes. Material will be sourced from the nearest available borrow pit with suitable materials to minimize hauling and associated air and earth disturbances. The foundation of the structures will not be explicitly

designed given the importance of considering site-specific conditions in their construction but will be built in accordance with fundamental requirements for its functioning, namely that the structure is keyed into banks and bed and the material comprising the foundation provides stable support for the structure under all conditions of saturation and expected conditions of loading.



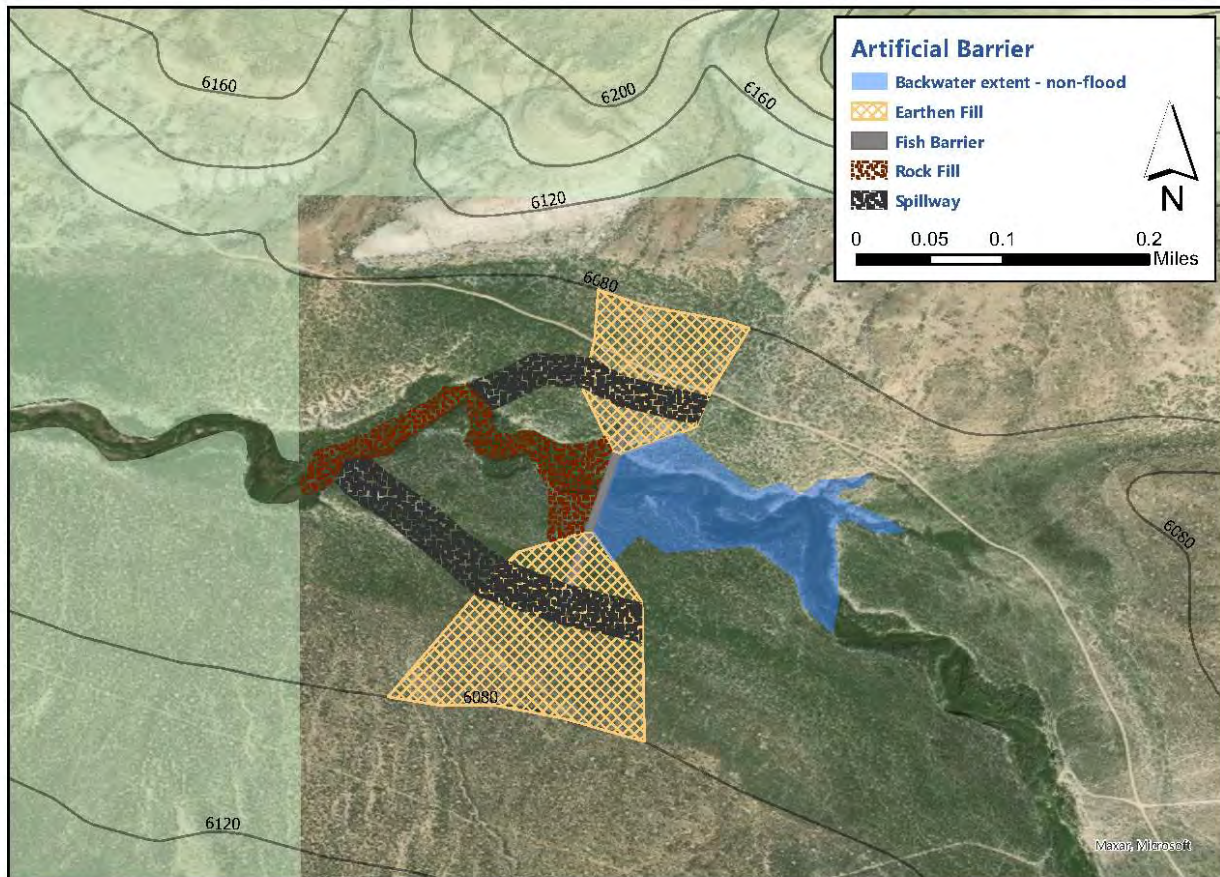
Following construction, disturbed ground will be scarified and covered with spent hay as necessary and will subsequently be seeded with mixes selected in collaboration with Wyoming Game and Fish, BLM and/or the private landowner responsible for the property depending on location. Once static growing-season water table levels are documented in the top 30-50 cm of the soil, riparian plantings will be installed and their lower 3' will be protected from browse.

Map 3: Sage Creek Watershed Restoration Proposed Project Area 2 Draft Designs

Project Area 3

An artificial barrier upstream of the confluence of Sage Creek with the Flaming Gorge reservoir will be built to create a vertical barrier to the upstream movement of RBT out of Flaming Gorge reservoir. The structure will comprise a central compound weir sized to accommodate 2-, 10-, and 25- year floods and two hardened spillways to accommodate 50- and 100- year floods. A hardened apron will be installed downstream of the central weir to prevent the development of a scour pool exceeding 6", which could undermine the structure and provide a resting-jumping pool for invasive salmonids. The lowest aggradation structures will provide

subsequent barriers, in accordance with reviews of best practices for ensuring no aquatic



Note: These are conceptual designs and will be finalized in consultation with an engineering firm and RSGA following a detailed survey.

invasives move upstream¹.

Map 4: Sage Creek Watershed Restoration Proposed Project Area 3 Draft Designs

Best Management Practices

All construction and maintenance activities will follow best management practices related to the operation and staging of heavy equipment to prevent erosion, soil compaction, invasive species, and contamination. Heavy equipment will not be used in flowing water or existing riparian wetlands. Work will occur during the low-flow period of the year when there is sufficient soil moisture to allow installation of posts (for BDAs) or appropriate compaction and keying in of structures (for aggradation structures).

¹ Carpenter, J., & Terrell, J. W. (2005). *Effectiveness of Fish Barriers and Renovations for Maintaining and Enhancing Populations of Native Southwestern Fisheries* (Interagency Agreement No. 201814N756; p. 111). United States Geological Survey. <https://www.usbr.gov/lc/phoenix/biology/azfish/pdf/BarrierEval.pdf>

Figure 1. SECTION THROUGH AGS VIEW – TYPICAL

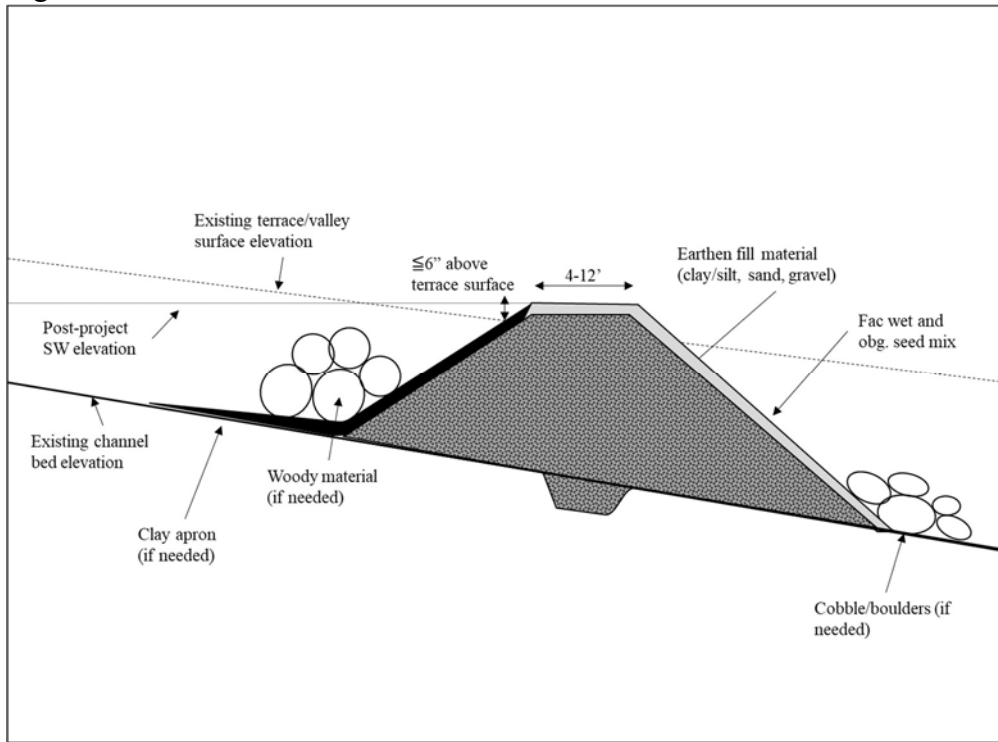


Figure 2. BANK-TO-BANK AGS SECTION VIEW – TYPICAL

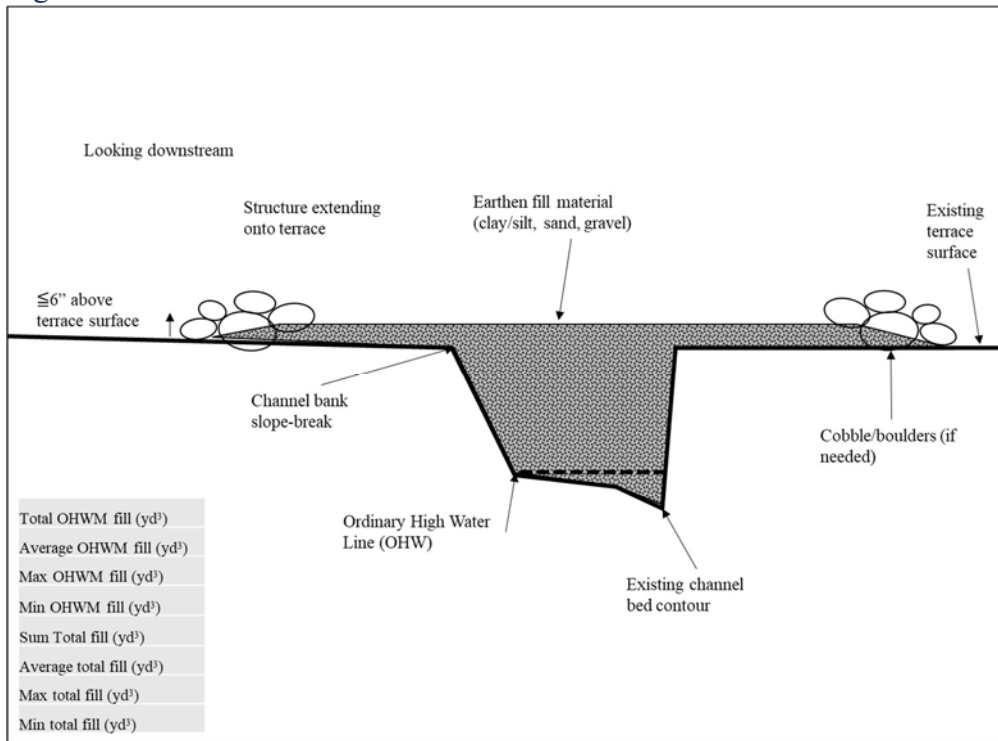


Figure 3. BANK-TO-BANK AGS PLAN VIEW – TYPICAL

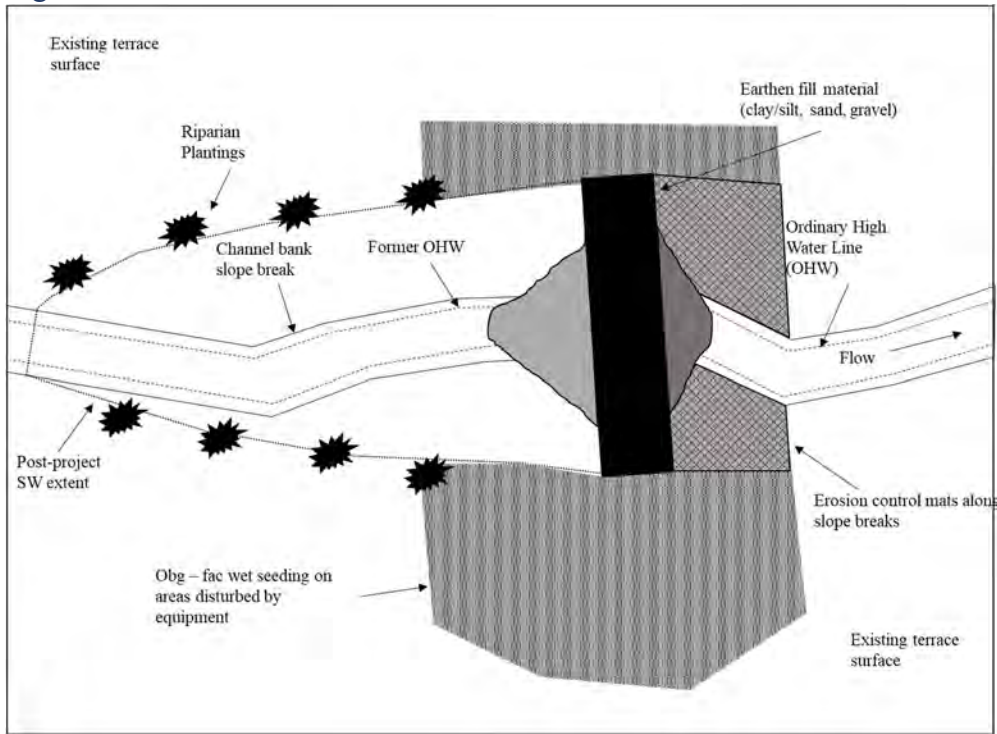


Figure 4. SECTION THROUGH WOVEN POST BDA VIEW - TYPICAL

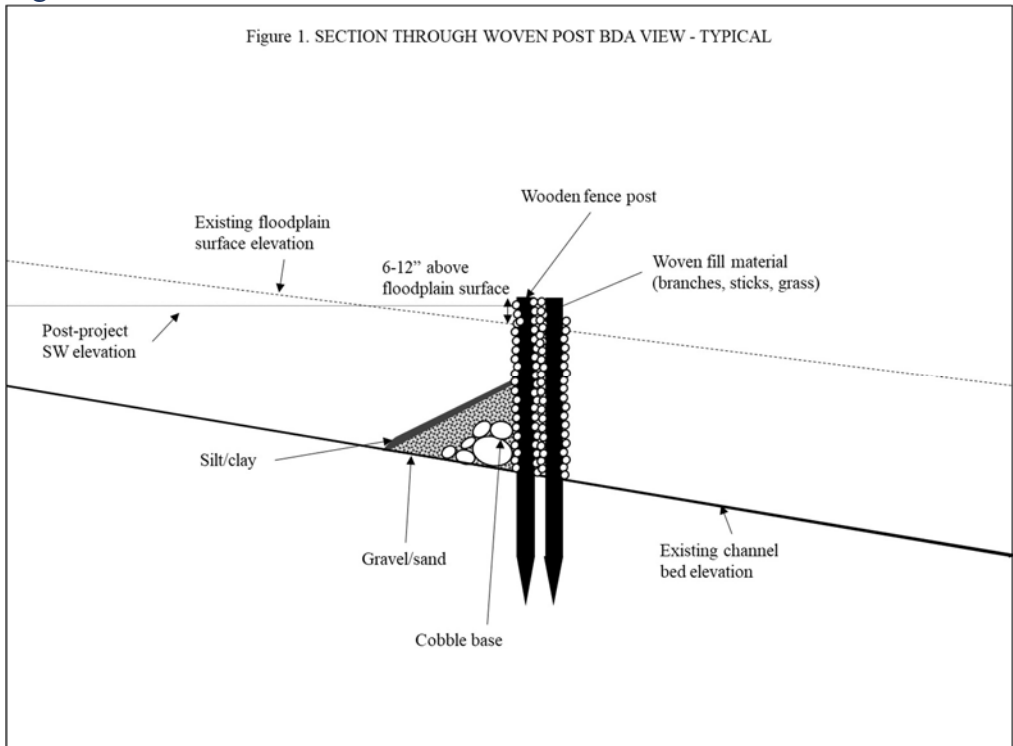


Figure 5. WOVEN POST BDA SECTION VIEW – TYPICAL

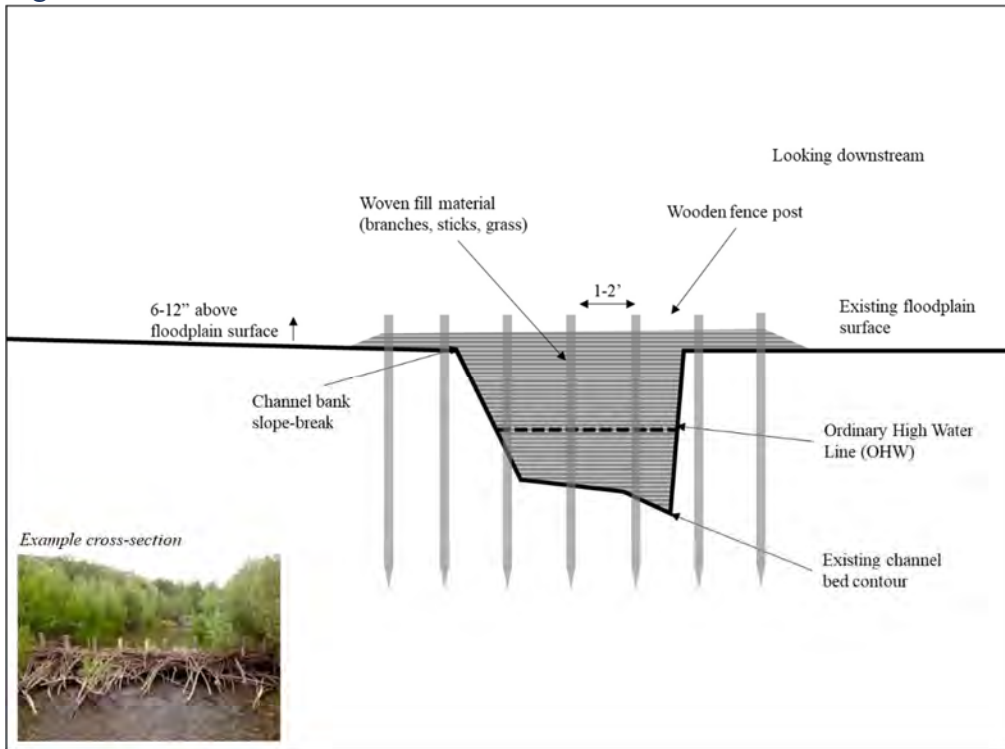


Figure 6. WOVEN POST BDA PLAN VIEW – TYPICAL

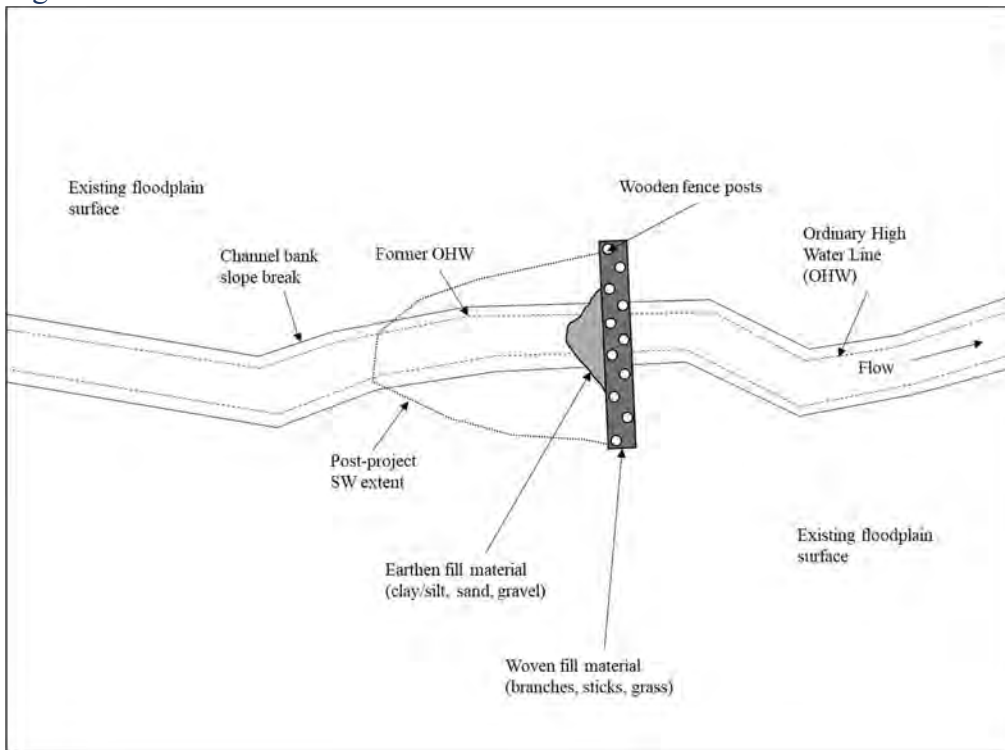


Figure 7. SECTION THROUGH POSTLESS BDA VIEW - TYPICAL

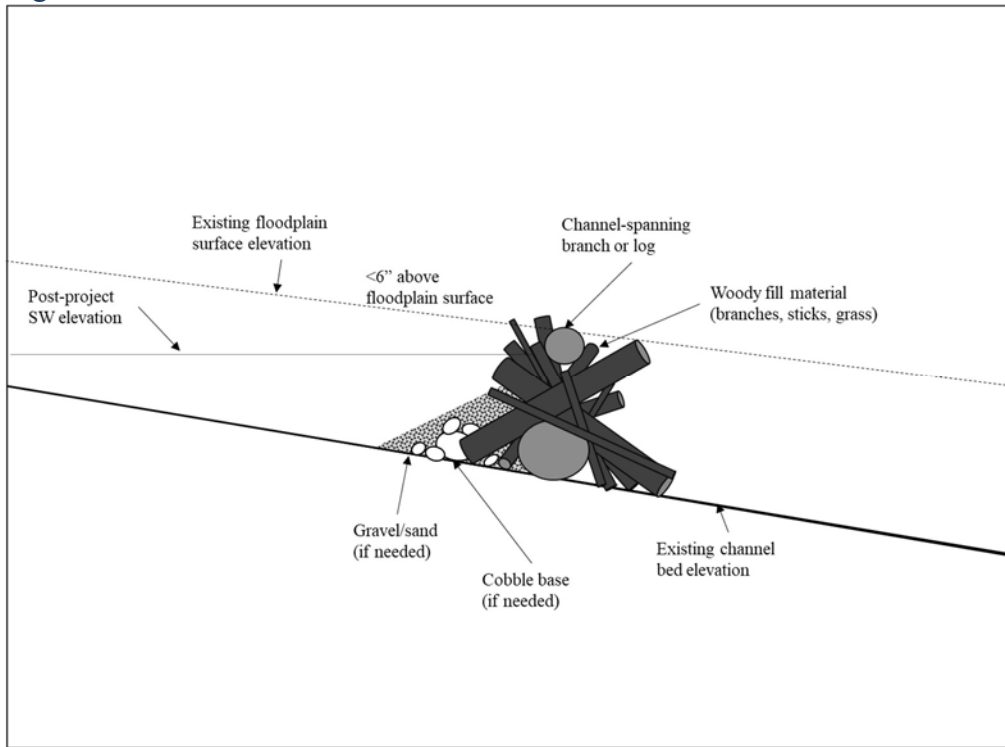


Figure 8. POSTLESS BDA SECTION VIEW – TYPICAL

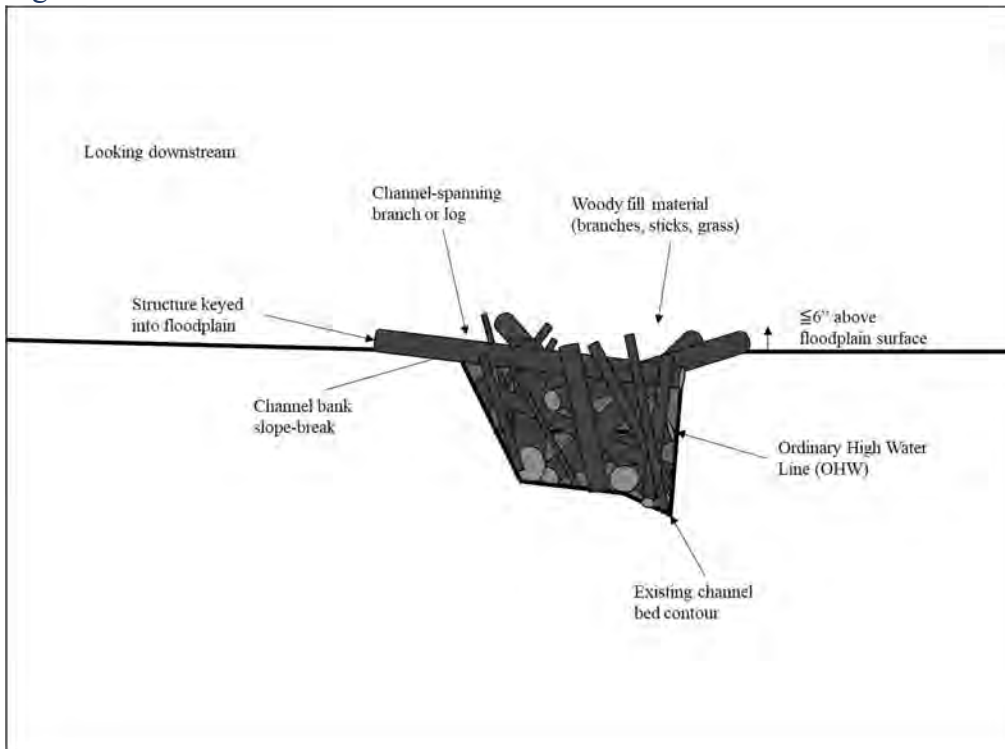
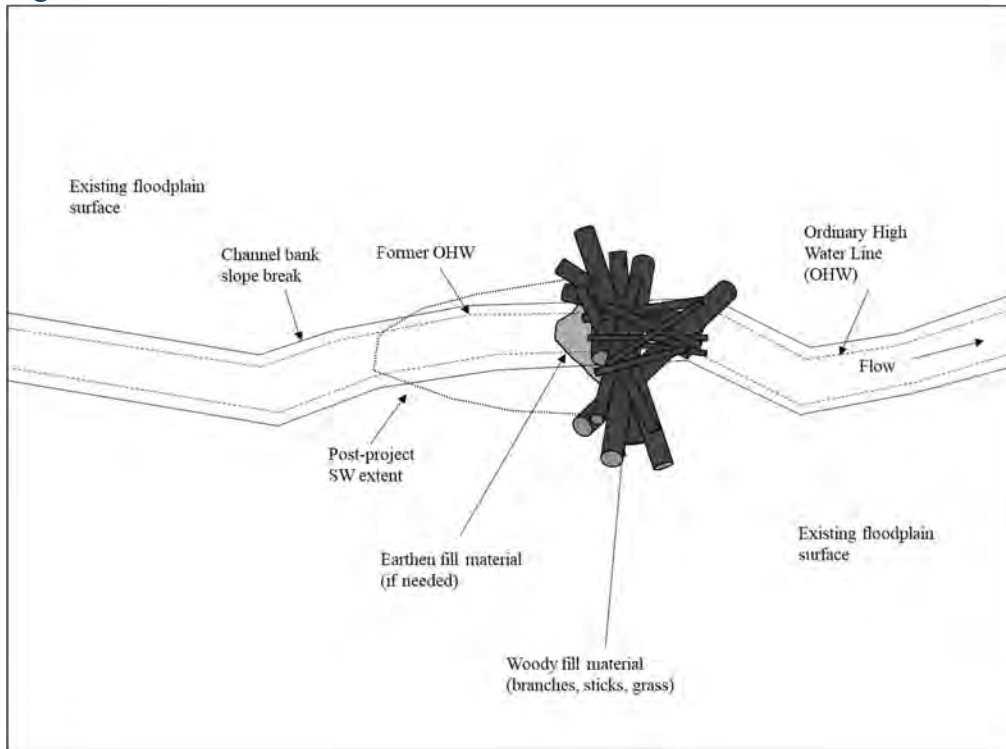


Figure 9. POSTLESS BDA PLAN VIEW – TYPICAL



Applicant Category and Eligibility of Applicant

Trout Unlimited is applying as a Category B acting in partnership with Category A Partners Wyoming Game and Fish. Trout Unlimited and Wyoming Game and Fish Department have worked together to develop shared priorities and goals in this watershed, as they have on previous projects in the Basin. WGFD has shared data from which initial plans were developed by Trout Unlimited, and reviewed and updated those plans prior to submission.

Wyoming Game and Fish Department qualifies as a Category A Partner because it is a state agency that has water or power delivery authority in Wyoming. It is responsible for managing and conserving the state's fish, game, and wildlife resources, which includes regulating water use and quality for aquatic habitats. The department also operates several fish hatcheries that produce fish for stocking Wyoming waters.

Performance Measures

The proposed project will take advantage of in-kind partner contributions and requisite permitting timelines to establish transects and collect baseline data in project areas from which to evaluate direct benefits of the project. The following performance measures will be used to quantify project benefits of the BDAs and aggradation structures:

1. Annual structure surveys show more than 80% of structures are functioning as designed.
2. Annual surveys indicate structures are capturing sediment and event-scale vertical or lateral erosion has reduced relative to baseline data.
3. Ongoing data collection demonstrates at least two of the following outcomes are documented (all relative to baseline data):

- a. raised groundwater levels in areas adjacent to structures.
- b. increased surface water extent and depth
- c. increased recurrence of over-bank flooding
- d. increased aerial extent of riparian and/or wetland species.
- e. decreased aerial extent of cheatgrass and/or upland species.
- f. expanded habitat suitability for Greater sage-grouse (GRSG), mule deer, and cutthroat trout.
- g. improvements in trajectory of water quality downstream of structures (turbidity, sediment-bound minerals)

The performance of the artificial barrier will be evaluated on whether it maintains structural integrity, does not generate additional headward erosion, and prevents RBT from passing.

To supplement and contextualize these quantitative data, a performance evaluation committee comprising stakeholders will convene annually for a field tour in which they review quantitative data collected to date; evaluate project progress; complete a qualitative survey describing perceived successes, challenges, and opportunities; and provide general feedback. Quantitative and qualitative data will be compiled into an annual report for project partners, stakeholders, and funders each year of the project and through till 2033. The specifics of data collection timelines, responsible agencies, management, instrumentation, and analysis methods are provided in Section E.1.5.

Evaluation Criteria

Evaluation Criterion A—Project Benefits

Subcriterion A.1—Project Benefits

General Project Benefits

Explain how the project will benefit ecological values that have a nexus to water resources or water resources management, including benefits to plant and animal species, fish and wildlife habitat, riparian areas, and ecosystems that are supported by rivers, streams, and/or other water sources, or that are directly influenced by water resources management

The project aims to benefit ecological values by improving the timing and quantity of water available, addressing rampant erosion, and improving water quality and temperature. Alterations to the natural flow regime of Sage Creek, such as increased frequency of drought and ongoing sedimentation issues, currently limit the habitat for several species of concern, including the Columbia River redband trout (CRCT), greater sage-grouse (GRSG), mule deer, elk, pronghorn, and migratory birds. The key condition limiting habitat is 10-30 feet of vertical incision and associated lateral erosion, which concentrates peak flows, increase flow velocity, increases sediment transport and erosion, and simplifies habitat types available for aquatic species. As floodplain aquifers drain, channels often shift from perennial to intermittent or ephemeral.

This project will benefit CRCT and migratory birds by introducing a series of grade controls to the drainage that slow water velocity, induce sediment deposition, aggrade channel beds, raise surface water elevations, and restore overbank flooding on a 2-3 year recurrence period. These

changes will increase the pool habitat and wetted width of aquatic habitat, introduce more diverse hydraulics, and create persistent surface water of varying depths, including in some locations where the channel seasonally goes dry. These changes will benefit CRCT habitat, and the surface water increases will also benefit migratory birds who overwinter in the Sage Creek Drainage, but require deep water habitat that does not ice over, along with a diversity of hydraulic environments and plant communities for shelter and protection.

This project will benefit riparian and wetland areas used by mule deer, elk, pronghorn and GRSG by raising surface water elevations and, consequently, adjacent groundwater elevations by reducing the hydraulic gradient driving groundwater discharge as well as increasing the recurrence of overbank flooding and flood recharge to aquifers. Currently, deep incision and these associated low groundwater levels limit the benefits of conservation-minded grazing practices used by RSGA and other landowners. The proposed project will raise water table levels to within plant root zones, which will support native regeneration of riparian ecosystems. This will be supplemented by the planting of 20,000 native shrubs and trees through the project and repeated cheatgrass treatments to address invasive annual grass competition. These ecosystems support succulent forbs critical to GRSG brood rearing and ensuring chick survival; provide succulent forage to support the health of mule deer, elk and pronghorn while lactating and prior to harsh winter conditions, thus influencing the survival rates of fawns.

Will the project improve watershed health in a river basin that is adversely impacted by a Reclamation water project?

The proposed project will improve watershed health in a drainage that has been adversely impacted by the completion of Flaming Gorge Reservoir by addressing rampant channel incision and erosion which has reduced the reliability of surface water availability and groundwater throughout the project areas. The completion of Flaming Gorge Reservoir in 1964 seems to have marked the beginning of channel incision in Project Area 2. This is suggested by the fact that local landowners reported irrigating their pastures with gravitational systems before the mid-1960s when surface water elevations were much higher. However, after the reservoir was completed, channels began to down cut, lowering the surface water elevation and necessitating the installation of alternative water delivery infrastructure. The fluctuating levels of the reservoir, coupled with the ongoing drought in the Colorado River Basin, will likely exacerbate channel incision and erosion in the area. As water levels in the reservoir continue to fluctuate, the sediment transported downstream will increase, leading to the degradation of aquatic habitat and the potential loss of critical riparian ecosystems.

Additionally, the presence of rainbow trout in Flaming Gorge Reservoir poses a significant threat to the native Colorado River cutthroat trout. Efforts to reduce the population of rainbow trout and protect the habitat of Colorado River cutthroat trout are essential to ensure the long-term health and survival of this important native species. Rainbow trout are not native to the Colorado River Basin and were introduced to Flaming Gorge Reservoir in the 1970s as a sport fishery. They have since become established in the reservoir and have been documented to hybridize with

Colorado River Cutthroat Trout². Hybridization can lead to genetic introgression, which can result in a loss of genetic diversity and adaptive traits that are important for survival and reproduction³. In addition, rainbow trout are known to outcompete native trout for food and habitat⁴. Barriers are one of the few non-chemical strategies to effectively manage against hybridization⁵. A barrier like the one proposed has been installed on Currant Creek, the drainage to the south of Sage Creek, and is considered successful by regional wildlife managers.

Is the project for the purpose of meeting existing environmental mitigation or compliance obligations under Federal or State law?

No.

If the project will benefit aquatic or riparian ecosystems within the watershed (e.g., by reducing flood risk, reducing bank erosion, increasing biodiversity, or preserving native species), explain the extent of those benefits (i.e., magnitude and geographic extent). Estimate expected project benefits to ecosystems and provide documentation and support for this estimate, including a detailed explanation of how the estimate was determined.

The proposed project will benefit both aquatic and riparian ecosystems in the watershed by decreasing flood intensity, reducing bank erosion, supporting regionally unique biodiversity, and restoring hydro-geomorphic conditions suitable for riparian and wetland plant communities. Specifically, the project will restore floodplain aquifers with 1510 AF of transient groundwater storage and raise static water tables in floodplains by 2-10 feet, which will support increased drought resilience riparian habitats in the watershed.

The project will benefit aquatic ecosystems in the watershed by increasing transient surface water storage on the main channel and side channels by 1660 AF and attenuating peak flow along Trout and Sage Creek by between 3-10 days. The increased surface water elevation and concomitant rise in groundwater levels will increase plant-available water in late summer and fall, increasing drought resilience of valley flood habitat for species of concern. In addition, the project will capture up to 8050 US tons of suspended sediment annually and reduce rates and magnitudes of lateral and vertical erosion along 7.5 miles of channel. The expected benefits to water quality include conserving an additional 2500 lbs. of phosphorus, 4750 lbs. of nitrogen, 800 US tons of carbon, and 160 US tons of soil carbon in the drainage rather than discharging them into Flaming Gorge Reservoir annually. The project will also increase overbank flood recurrences, altering channel morphology along 5.7 miles of stream such that 2 – 2.33-year floods (i.e., bankfull) overtop banks. These estimates were produced using mapped landforms, channel dimensions and project locations, and regression models of streamflow in the drainage.

² [Understanding Factors Influencing Rainbow Trout Growth in the Colorado River | U.S. Geological Survey \(usgs.gov\)](#)

³ [Hybridization between Native and Invasive Trout is Increasing in the West | U.S. Geological Survey \(usgs.gov\)](#)

⁴ [Understanding Factors Influencing Rainbow Trout Growth in the Colorado River | U.S. Geological Survey \(usgs.gov\)](#)

⁵ [Proactive Rainbow Trout Suppression Reduces Threat of Hybridization in the Upper Snake River Basin - Kovach - 2018 - North American Journal of Fisheries Management - Wiley Online Library](#)

These values were estimated based on field data and modeled outputs. Changes to surface water were calculated based on design dimensions of Project Areas 1, 2 and 3 relative to channel and valley floor morphology, design permeability of structures, regional regressions to estimate flow recurrence volumes and drainage-area ratio downscaling from nearby streamflow records. These values were processed through a simple physically based model to estimate change in flow duration. Calculated values were corroborated with published literature estimates of changes in flow timing and attenuation in similar structures as normalized to the current location. Changes to flood recurrence used the same input data and estimated typical flow depths at various flow levels using Manning' equation with a conservatively high roughness for the current channel conditions ($n= 0.06$). Streamflow attenuation was estimated by performing baseflow separation on modeled streamflow and comparing annual flow statistics to design parameters of channels. Changes to groundwater were calculated based on structure design elevations, soil hydraulic properties (i.e., porosity, field capacity and wilting point of sandy clay loams), estimation of present longitudinal and lateral groundwater gradients and acreage of geomorphic surfaces where structures are expected to raise water tables to within a foot of the surface. Water quality benefits were estimated using delineated drainage areas, USGS SPARROW model outputs for the region and normalizing the data to the percentage of area impacted by the project and further reducing the estimated benefit by literature values of capture efficiency in similar projects. Flow timing and magnitude was estimated based on mapped surface water inundation and field surveyed channel depths to identify potential transient storage capacity and compared against regression models of streamflow recurrence in the drainage.

If the project will benefit specific species and habitats, describe the species and/or type of habitat that will benefit and the status of the species or habitat (e.g., native species, game species, federally threatened or endangered, State listed, or designated critical habitat). Describe the extent (i.e., magnitude and geographic extent) to which the project will benefit the species or habitat, including an estimate of expected project benefits and documentation and support for the estimate.

The proposed project will benefit several species and types of habitats. CRCT are the only trout native to the Green and Little Snake drainages in Wyoming. The proposed project would protect 79.5 linear miles, or 13% of present distribution in Wyoming, of CRCT habitat from invasive rainbow trout (RBT). They require clear, cold water, naturally fluctuating flows, low levels of fine sediment and complex habitat. Though they historically lived in larger streams and lakes, most of their habitat is now in headwater streams, in part due to the filling of large reservoirs and introduction of nonnative species. Headwater dewatering during drought can further reduce their already limited stream habitat. They are also impacted by drought-driven reductions in streamflow, reduced vegetation cover and shading, and subsequent increases in erosion and sedimentation associated with wildfire and reduced vegetation cover. CRCT spawn after peak flows and altered timing and magnitude of those pulses due to drought can limit spawning. CRCT are further limited by the reduction in beavers' dam building in their distribution, as the dams create heterogenous habitat with deep, cold-water pools to protect trout from prey.

Mule deer are valued in Wyoming for the important aesthetic, cultural, economic, and ecological roles they fill. WGFD modelling has indicated that the 2020 population, 2850, was trending downwards over the past four years, and still falls far below the objective range of 7000-10,000 in the South Rock Springs management area where Sage Creek is located, which is partially attributed to increased drought conditions. Drought cycles reduce the amount and quality of forage and the availability of water source. When mule deer cannot accumulate sufficient fat reserves, they enter winter in a weaker condition and suffer higher mortality rates. Recent research from WGFD has established that birth rates and fawn survival are also closely linked to drought. Moreover, persistent drought can exacerbate natural boom-bust population fluctuations so greatly that populations fail to completely recover, and increased intensity and frequency of wildfire can further eliminate food sources. Mule deer obtain most of their water from succulent plants, but freestanding water becomes important if most vegetation is cured or deer are lactating. The proposed project would improve and restore hydrologic conditions across 503 acres and increase surface water availability by 54 acres in mule deer winter range. These actions would include treating 400 acres for cheatgrass, thinning 50 acres of mixed conifers, improving hydrologic conditions and increasing water content of vegetation across 420 acres.

The Greater sage-grouse is an iconic western species that serves as an umbrella species for sagebrush obligate species, including many that comprise Wyoming's species of greatest conservation need. Though the species is typically associated with sagebrush, during summer female sage-grouse and their broods also utilize meadow habitats, which provide forbs as forage for juveniles. Drought can reduce the spatial extent of hydrologic conditions that promote succulent forbs necessary for brood rearing, reducing chick-survival and threatening populations further. The proposed project will increase surface water by 60 acres and raise groundwater levels to support succulent forbs across 504 acres adjacent to sage-grouse Core Areas, potentially augmenting suitable brood habitat.

Pronghorn antelope and elk populations are both within their target ranges in the Sage Creek area (5550 and 920, respectively). Most pronghorn occupy an area of 3-4 miles of water and will move to within 700 yards when fawns are young and require milk. Pronghorn can acquire water from succulent vegetation, but as drought cures out vegetation, they increasingly rely on freestanding water. Elk typically graze in locations $\frac{1}{4}$ mile from water sources, depending on weather conditions. A local water source is particularly important during lactation. Both species' habitat and forage are also threatened by increasing frequency and intensity of wildfire. The project will increase drought resilience of 83 acres of known elk and pronghorn summer habitat and increase surface water extent by 6 AF.

Birds and waterfowl migrating within the Pacific and Central Flyway administrative areas (USFWS) pass through the project area. Human-made wetlands >200 ha, have been noted to dramatically increase the distribution of abundance of waterfowl wintering on the High Plains as they provide ice-free deep water and provide foods on nearby rangelands, particularly those that encourage flooding onto range or croplands⁶. The proposed project will expand surface water

⁶ Smith, L. M., Pederson, R. L., & Kaminski, R. M. (1989). *Habitat Management for Migrating and Wintering Waterfowl in North America*. Texas Tech University Press.

available for migratory waterfowl by 54 acres and create more mesic to hydric conditions on 420 acres of contiguous area adjacent to Flaming Gorge Reservoir, providing increased habitat diversity and forage types for wintering populations.

These estimates were produced from areas and lengths calculated by mapping geomorphic landforms, channel dimensions and project locations. The overlap between project areas and current known distributions for species of concern was processed to calculate area of impact. Hydrologic benefits were estimated using aforementioned project areas, soil hydraulic properties, depths to present static groundwater, estimated design elevations and placements of structures, and design surface water elevation.

If the proposed project will benefit federally listed threatened or endangered species, address the following: Is the species subject to a recovery plan or conservation plan under the ESA? What is the relationship of the species to water supply? What is the extent of the proposed project that would reduce the likelihood of listing or would otherwise improve the status of the species? Is the species adversely affected by a Reclamation project?

There are no known federally listed threatened or endangered species in the proposed project area. Flannelmouth sucker are a native federally listed nongame species found in Flaming Gorge. These species prefer larger rivers, but spawn in shallower areas. This project has been designed to avoid impacting the 1 mile of known spawning habitat at the confluence of Sage Creek with Flaming Gorge through consultation with WGFD and USFWS representatives.

Will the project address drought conditions or drought-related impacts on water supplies, habitat, species, or the ecosystem as a whole? Is yes, describe past and current drought conditions and impacts and forecasted drought conditions and anticipated impacts. How will this project help build resilience to drought?

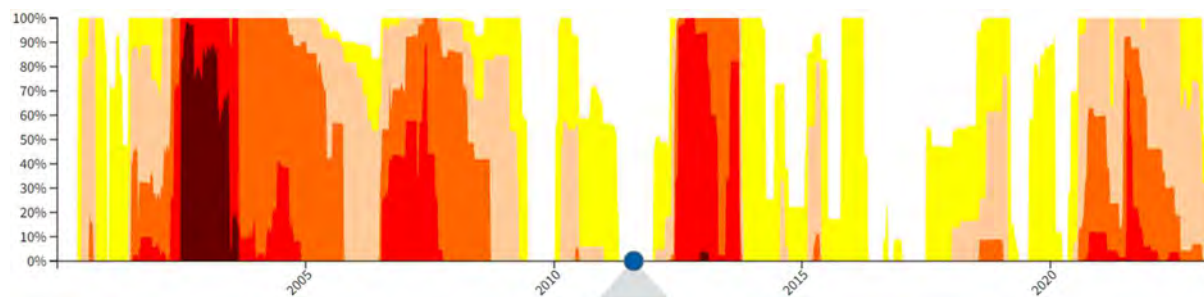
The proposed project will help protect and increase the drought resilience of one of the headwaters of the Green River – a portion for the Upper Colorado River Basin expected to see some of the largest climate-driven declines in baseflow in the next 50 years⁷. The proposed project embodies several strategies being proposed to increase the resilience of the entire CRB (Ten Strategies for Climate Resilience in The Colorado River Basin Report), namely, the implementation of natural distributed water storage and restoration at large enough scales to produce impacts measurable at the scale of the entire Colorado River Basin. Upstream users and the health of their watersheds indirectly affects all downstream users and the ability of federal entities to meet their required water contributions.

The Sage Creek Watershed has been experiencing increasingly pronounced droughts, and multiple state and federal plans specific to the area (GRRMP, GRCA ACEC, WMDI, SWAP,

⁷ Miller, O. L., Miller, M. P., Longley, P. C., Alder, J. R., Bearup, L. A., Pruitt, T., et al. (2021). How will baseflow respond to climate change in the Upper Colorado River Basin? *Geophysical Research Letters*, 48, e2021GL095085. <https://doi.org/10.1029/2021GL095085>

WLCI Priorities) have identified water supply and drought as limiting factors to the viability of Sage Creek’s habitat.

Figure 1 U.S. Drought Monitor for 2000-2023 for Sweetwater County, WY.



This project will build long-term ecological, geomorphic, and economic resilience to drought. As described in detail above, this project will address persistent drought-driven ecological impacts restoring groundwater and aquifer recharge processes to a large floodplain aquifer, which will raise water tables 2 – 10 feet nearer the root zone of riparian and wetland facultative and obligate plant communities. Increasing the annual duration and volume of plant available water supports plant growth through hotter growing seasons and reduces the likelihood of severe fires igniting the area. Remote sensing analyses of similar project types have used long-term historic relationships between precipitation timing and magnitude to vegetation NDVI (normalized difference vegetation index) and observed that aggradation structures create valley floors less dependent on that year’s precipitation. These benefits were observed to persist while the structures maintain structural integrity. As such, these benefits are expected to persist for more than a decade, and with regular maintenance, more than a century.

This project will also address drought-driven geomorphic limitations regulating hydrographs to reduce flashy flows that can generate excess erosion and sedimentation and protecting the drainage from future headcut formation if the operating elevation of Flaming Gorge Reservoir continues to lower. Climate change projections through the region indicate a shift towards earlier, warmer precipitation that will result in flashier hydrographs. Smoothing the hydrograph by increasing the transient surface and groundwater storage capacity of the watershed will reduce the peak stream power and competence of flows, reducing the risk of extreme erosion events. Improving drought resilience of ecological communities will also reduce the risk of extreme wildfire events that create hydrophobic soils and lead to erosion. These benefits will persist so long as the structures maintain structural integrity and as such are expected to persist for more than a decade, and with regular maintenance and depending on the magnitude of warming temperatures and altered climate regimes, more than a century.

Stakeholders in the drainage raised concerns during the field tour that recent water shortage announcements from Reclamation will mean that the operating elevation of Flaming Gorge will continue to lower, driving the formation of new head cuts that will propagate through the drainage and further reducing plant available water. A drop of as little as 1 foot could introduce as much as 310,000 cubic yards of sediment and nutrients into Flaming Gorge, further reducing its water storage capacity by 192 AF and threatening aforementioned habitat types and values.

This project will build long-term economic resilience to drought by protecting and improving conditions for agricultural operations, protecting wildlife that drive recreational tourism, and reducing long-term sediment dredging costs in Flaming Gorge Reservoir. Big game hunters and anglers have spent a combined 12 million dollars annually in Sweetwater County owing to the recreational opportunities available in the Greater Little Mountain Area. Increasing the drought resilience of the habitats supporting those species also increases the drought resilience of the recreational economy they support. Ranching and agriculture are critical cultural and economic engines in Sweetwater County. Ensuring the long-term economic resilience of these landowners ensures long-term stewardship of the ground and protection from oil and gas development. The project will increase plant available water in areas used for grazing by cattle, increasing the AUM available per acre. This project is also expected to reduce sediment deposition in Flaming Gorge reservoir by up to 5 AF annually and protect the reservoir from the risk of larger deposition events driven by future headcuts. Conservatively assuming the project captures sediment for only 5 years, prevents one 1-foot headcut from propagating halfway up the drainage (20 miles), and a per CY dredging cost of \$10, this could prevent \$800,000 in dredging costs.

If the project will result in long-term improvements to water quality please explain the extent of those benefits. Please estimate expected project benefits to water quality and provide documentation and support for this estimate, including a detailed explanation of how the estimate was determined.

The proposed project is expected to result in long-term improvements to water quality by decreasing sediment and nutrient loading and mitigating the impacts of floods that can spike both sediment and nutrient loading. Water quality concerns in Flaming Gorge Reservoir have been linked to high phosphorus and nitrogen contributions from tributaries, the majority of which are transported as sediment-bound minerals. The proposed project is expected to reduce erosion and sedimentation by slowing the velocity of streamflow, reducing competence of streamflow, and encouraging deposition of sediment in the channel and on floodplains. In Sage Creek, 96.91% of suspended sediment is from channel sources. The project will directly reduce erosion along 5.7 miles of channel, reducing the erosion sourcing sediment by 8% across the entire watershed.

The distribution of the project throughout the watershed, including a structure near its confluence with Flaming Gorge Reservoir, is designed to capture 90% the outgoing suspended sediment, subject to design capture efficiencies of the structures. The proposed project is expected to capture 8050 US tons of suspended sediment, 2500 lbs. of phosphorus, and 4750 lbs. of nitrogen annually. These values were calculated using SPARROW model outputs calibrated off 2012 data for the region (Miller & Wise, 2020). Median values for aggregated yield were selected for each variable within the spatial area of reference (e.g., 48.7 MT/km² suspended sediment, 11.1 kg/km² phosphorus, 23.1 kg/km² nitrogen) and further normalized by the percentage contributed by known processes in Sage Creek, removing the portions of those estimate that may be generated by proceses (e.g., municipal water) not present in the drainage. These numbers were scaled by literature reported capture ratio for similar projects elsewhere (i.e., 90% capture efficiency for suspended sediment; 70% capture efficiency for P and N).

Restoration Project Benefits:

Invasive Species – Vegetation: *For projects that include removal of invasive vegetation, will the project include revegetation with native species at the removal site? If not, explain why revegetation is not necessary for the specific ecosystem in which the project is located. In addition, describe how removal of invasive vegetation will benefit water resources or water resource management. Provide references and citations.*

This project will treat cheatgrass (*Bromus tectorum*) in lower Sage Creek and re-vegetate with native species, which can benefit water resources and water resource management in several ways. Cheatgrass often outcompetes native vegetation and disrupting ecosystems⁸. Cheatgrass has a higher water consumption rate than native vegetation, leading to reduced water availability for other plant species⁹. Removing cheatgrass allows native plants to access more water, which can enhance their growth and contribute to better overall watershed health. Cheatgrass-dominated landscapes are more susceptible to soil erosion due to its shallow root system and the tendency to create a continuous ground cover that is easily disturbed¹⁰. Removing cheatgrass and replacing it with native vegetation with deeper root systems can help stabilize the soil, reduce erosion, and protect water quality. Native vegetation typically has deeper root systems that promote better water infiltration into the soil, recharging aquifers and increasing water storage capacity¹¹. Removing cheatgrass and restoring native vegetation can lead to improved water infiltration rates, contributing to more sustainable water resource management. Cheatgrass can also contribute to a higher frequency and intensity of wildfires, which can negatively impact water resources through increased sedimentation and changes in runoff patterns¹². Removing cheatgrass and reestablishing native vegetation can help reduce wildfire risk and protect water resources from associated impacts.

Subcriterion A.2—Multiple Benefits

If the project will benefit multiple water uses (e.g., benefits to ecological values AND benefits to other water uses, including municipal; agricultural; Tribal; commercial, recreational, subsistence, or Tribal ceremonial fishing; and river-based recreation), explain how and to what extent the project will benefit multiple water uses.

The proposed project will benefit agricultural, and recreation uses in Sage Creek and municipal uses in Flaming Gorge Reservoir. Sage Creek abuts the Flaming Gorge National Recreation Area and is located within a region in southwestern Wyoming popular among big game hunters and anglers due to the scenery and high percentage success rates in hunts, who spend a combined 12

⁸ Bradley, B.A., Mustard, J.F., & Csillag, F. (2005). Invasive grass reduces aboveground water storage in desert ecosystems. *Ecology*, 86(2), 543-549

⁹ D'Antonio, C.M., & Vitousek, P.M. (1992). Biological invasions by exotic grasses, the grass/fire cycle, and global change. *Annual Review of Ecology and Systematics*, 23(1), 63-87

¹⁰ Chambers, J.C., et al. (2007). Consequences of changing land use practices on plant and bird communities in sagebrush ecosystems. In *Transactions, North American Wildlife and Natural Resources Conference* (Vol. 72, pp. 226-246)

¹¹ Wilcox, B.P., et al. (2008). A strategy for monitoring and managing declines in western US rangelands with a focus on watershed-scale management. *Environmental Management*, 42(5), 756-769

¹² Balch, J.K., et al. (2013). Introduced annual grass increases regional fire activity across the arid western USA (1980–2009). *Global Change Biology*, 19(1), 173-183

million dollars annually on recreational activities in the Greater Little Mountain Area (GLMA). The National Recreation Area further attracts campers, boaters, and OHV users. The proposed project will improve conditions for wildlife on 503 acres of ground, accounting for 0.1% of the GLMA, but a larger percentage of mule deer, elk, pronghorn, GRSG and CRCT habitat within the area, directly contributing to the experience that drives recreation. Agricultural users will benefit from reduced erosion and sedimentation, increased plant-available water, and reduced risk of fire ignition on properties. Post-fire erosion in 2000 led to channel incision so deep on Trout Creek that existing diversion points could no longer access water. TU partnered with the landowner to install a new pipe and grade control structures in 2014-2015, costing \$200,000. The project will further increase plant-available water in 453 acres of private and leased public ground, improving forage quality, and increasing reliability of water supply for agricultural operations. The project will benefit municipal uses by improving the quality of water entering Flaming Gorge reservoir. The project is expected to capture 8050 US tons of sediment, 2500 lbs. of phosphorus, and 4750 lbs. of nitrogen that would otherwise end up in the reservoir, reducing water storage by 5 AFA and contributing to algal blooms.

If the project will provide multiple restoration benefits (e.g., benefits to ecological values or watershed health; fish and wildlife habitat; protection against invasive species; enhancement to commercial, recreational, subsistence, or Tribal ceremonial fishing; enhancement of river-based recreation), explain how.

As described above, the proposed project will provide restoration benefits to ecological values, fish and wildlife habitat, protection against invasive species in ways that benefit the considerable recreational economy in the Flaming Gorge Recreational Area. This includes protecting habitat for CRCT from invasives and improving water quality in the Flaming Gorge Reservoir, expanding habitat available for terrestrial big game and GRSG, and addressing rampant cheatgrass through lower Sage Creek.

Will the project reduce water conflicts within the watershed? If so, explain how.

By restoring groundwater recharge processes and enhancing water storage capacity, the project ensures a more stable water supply for agricultural operations, wildlife habitats, and recreational activities. In addition, preventing further dewatering protects the water table, maintaining plant-available water for diverse land uses. By addressing these interconnected issues, the project fosters collaborative water management, promoting a more sustainable balance of competing water needs and reducing scarcity-driven conflicts among stakeholders in the Sage Creek Watershed.

Evaluation Criterion B—Collaborative Planning

Please attach a copy of the applicable strategy or plan as an appendix to your application

Please see Appendix A: Little Mountain Watershed Restoration Plan and associated links.

Strategy or Plan: Is your proposed project supported by a specific strategy or planning document?

The proposed project areas are identified in the Little Mountain Watershed Restoration Plan (LMWRP) (2021), which was written to integrate strategies outlined in several new and long-standing planning documents and develop actionable projects that could jointly address multiple management criteria and priorities. Those plans include the BLM Green River Resource Management Plan (GRRMP), the GRSG Amendment to the RMP (ARMP, 2015), BLM's Greater Red Creek Area of Critical Environmental Concern (GRCA ACEC, 1997), Wyoming Game and Fish Department's Wyoming Mule Deer Initiative (WMDI, 2018), State of Wyoming Executive Order 2019-3 for Greater Sage-Grouse Core Area (2019), Wyoming State Wildlife Action Plan (SWAP, 2017), and WLCI's 2008 strategy and priorities.

The LMWRP was developed to integrate and actionize long-standing planning efforts, addresses multiple issues including water quality, water supply reliability, terrestrial and aquatic habitat quality and extent, and species health. This includes a particular focus on protecting, improving, and restoring habitat for CRCT, GRSG, mule deer, and migratory birds given the importance of the area for their populations. LMWRP further identifies potential long-term concerns around wildfire, water availability and sedimentation related to the project's nexus to Flaming Gorge Reservoir and identifies how projects might address these concerns.

The GRCA ACEC specifically outlines concerns related to the ongoing sedimentation and erosion problems creating water quality issues in the drainage, restoring and maintaining aquifer recharge zones; protecting and expanding on riparian and upland habitat treatments; restoring aquifer recharge zones to protect groundwater quality; achieving proper functioning condition of uplands and riparian areas; and lists specific projects related to fencing, sediment and erosion control and the construction of fish habitat structures to improve habitat quality for CRCT.

SWAP identifies the Middle Flaming Gorge area (including Sage Creek) as a priority conservation area for CRCT, itself a species of greatest conservation need. The plan identifies historic and present changes to natural flow regimes as a high risk and drought and climate change as a moderate risk to CRCT, as they can lower water tables, reducing plant growth, reducing bank stability, increasing siltation, and reducing aquatic habitat quality. Recommended conservation actions specifically include restoring native fish assemblages in Sage Creek by building a fish migration barrier and addressing water-limited fish passage; to implement stream riparian restoration projects in the Red Creek area to enhance habitat for CRC; and to identify opportunities to work with private water right holders to manage water use with the goal of restoring natural flow regimes.

WMDI, SWAP, and EO 2019-3 all outline specific strategies intended to benefit both ecosystem health, habitat and species of concern, including working collaboratively across projects to identify opportunities to expand habitat availability for sage-grouse; enhance and restore habitat necessary for GRSG; incorporate mule deer habitat needs to any project occurring in shrub-dominated winter and transitional ranges; implement vegetation management practices and treatments to enhance and protect mule deer habitat at a landscape scale, including timber management to thin habitat and protect aspen and ensuring regular rapid habitat assessments to evaluate changes to mule deer habitat. The 2015 Strategic Mule Deer Habitat Plan explicitly prioritized winter, summer, and transitional ranges for habitat enhancement work.

ARMP identifies threats to GRSG habitat as including cheatgrass invasion, conifer encroachment, and loss of habitat due to wildfire and a major objective to restore native plants and create landscape patterns that benefit GRSG. Further, seasonal habitat objectives for the Wyoming Basin Ecoregion as including an objective to increase the height of perennial grasses and forbs, increase perennial forb cover to 5% for arid and 10% for mesic sites, and to restore riparian areas and mesic meadows to Proper Functioning Condition. Specific actions identified in related WGFD documents include building water control structures to spread water and promote succulent forbs into late summer, particularly in areas with limited free water (Habitat Extension Services, n.d.).

Each of these plans identifies water supply and drought as a limiting factor to the viability of the habitat in question (GRRMP, GRCA ACEC, WMDI, SWAP, WLCI Priorities). For instance, drought is explicitly identified as a contributor to recent increases in mule deer fawn mortality that have kept populations below target levels and as a threat to CRCT populations. As such, the LMWRP explicitly describes the need to restore transient groundwater storage and aquifer recharge processes to the floodplains throughout the drainage as a means of supporting more drought resilient plant communities comprising critical habitat for mule deer, GRSG, and migratory birds, and increasing the quality of habitat (e.g., % pool habitat) available for CRCT.

Strategy or Plan Development: Was the strategy or plan developed through a collaborative process?

The proposed project was developed as part of a collaborative process among a group of stakeholders with diverse interests, including Trout Unlimited (TU – applicant), Greater Little Mountain Coalition (GLMC), Ramsay Ranch, Bureau of Land Management (BLM), Rock Springs Grazing Association (RSGA), Wyoming Game and Fish Department (WGFD), Wyoming Landscape Conservation Initiative (WLCI), U.S. Fish and Wildlife Partners for Fish and Wildlife program (USFWS PFW) and Blueshift. Water users in the drainage include Ramsay Ranch and Rock Springs Grazing Association. The project concept has been shared with and incorporated feedback from the Sweetwater County Conservation District (SCCD), Sweetwater County Commissioners, Wyoming Wildlife Natural Resources Trust, and grazing lessees on state and BLM ground through the drainage. The proposed project builds on decades of collaborative work among partners in the Greater Little Mountain Area which have included over 80 projects and \$9.8 million of investment between 1990-2020 as reported by the GLMC. All listed partners provided input, prioritization, and review of the proposed plan through in-person meetings, phone calls, and email. Partners held a collaborative field tour to generate ideas and refine the proposed project concept; presented at two conservation district meetings; solicited and incorporated written and verbal feedback from all project partners through individual meetings, e-mail, and phone correspondence.

Agricultural water-users include RSGA and Ramsay Ranch, who are the two largest private agricultural operators in the drainage and comprise all the private ownership and leased acreage in the project area. SCCD represents both agricultural and conservation interests throughout the drainage, as their mission is to provide for the conservation of soil and water resources in the county and to encourage control and prevention of soil erosion and flooding to stabilize ranching

and farming natural resources, preserve wildlife and promote the welfare of people in the county. Recreational water-users and interests are represented by TU and GLMC, both of whom represent hunters and anglers who travel to the project area for its unmatched hunting and fishing opportunities, including Bowhunters of Wyoming, Muley Fanatics, Theodore Roosevelt Conservation Partnership, Wyoming Wildlife Federation, and landowners in the drainage. Environmental water-users and interests are represented by BLM, WGFD, and USFWS PFW, who comprise the state and federal agencies responsible for the wildlife, habitat, and most of the public land in the drainage. GLMC also represents NGOs with missions to protect natural resources, including Trout Unlimited, Theodore Roosevelt Conservation Partnership and Wyoming Wildlife Federation. WLCI is a multi-agency initiative that comprises agencies with agricultural and environmental interests, including representatives from Wyoming Department of Agriculture, WGFD, Southwest Wyoming County Commissioners, Southwest Wyoming Conservation Districts, BLM, U.S. Geological Survey, USFWS, USDA Forest Service, National Park Service, and Natural Resources Conservation Service. WLCI is further affiliated with the University of Wyoming and Reclamation.

Strategy or Plan Support for Project: Describe how the plan or strategy provides support for your proposed project.

The proposed project includes the three highest priority projects identified in the watershed plan: Little Mountain Project #1: non-native fish barrier; Little Mountain Project #2: Lower Sage Creek (Reach 1); Little Mountain Project #3: Middle Trout Creek. The use of in-channel structures to address habitat limitations is explicitly recommended for Sage Creek in the GRCA ACEC and GRRMP. Riparian restoration and cheatgrass management are supported in numerous plans, including the GRRMP, ARMP, SWAP, and WMDI. The concept for the artificial barrier was proposed during a field tour in September 2021 among stakeholders and integrated into the plan. This action is explicitly recommended as a conservation action for CRCT in Sage Creek in SWAP. The project is designed to address sediment and erosion concerns listed as critical limitations in the GRCA ACEC and to restore natural flow regime, which is the highest listed risk to aquatic habitat in SWAP.

Evaluation Criterion C—Stakeholder Support

Describe the level of stakeholder support for the proposed project. Are letters of support from stakeholders provided? Are any stakeholders providing support for the project through cost-share contributions, or through other types of contributions to the project?

Letters have been provided by WGFD, RSGA, Blueshift/C&K, and BlueCommons. RSGA has committed access to their private land for the carrying out project. WGFD has indicated their willingness to participate in the design and performance evaluation of the project. Blueshift and C&K have committed in-kind contributions in the form of donated effort and reduced rates. BlueCommons has committed \$350,000 of cash. The project also maintains support from the BLM, USFWS PFW, GLMC, WLCI, Ramsay Ranch and Sweetwater County Commissioners. BLM and USFWS PFW have indicated their willingness to coordinate with Reclamation to develop appropriate compliance activities.

Please explain whether the project is supported by a diverse set of stakeholders

The proposed project was developed collaboratively with input from local landowners with agricultural operations in the drainage; state and federal agencies responsible for the management of land, fish, and wildlife in the area; NGOs representing conservation and recreational interests; the local steelworker's union and elected county officials.

Is the project supported by entities responsible for the management of land, water, fish and wildlife, recreation, or forestry within the project area? Is the project consistent with the policies of those agencies?

The proposed project areas are on land owned or managed by Rock Springs Grazing Association and the BLM, all of whom have been involved in the development of the project and have provided letters attached to this proposal. The project is consistent with the policies of these groups/agencies. USFWS, BLM and WGFD are responsible for the management of fish and wildlife within the project areas. They have been engaged in the development of the project and the plans on which they are based and have provided a letter attached to this proposal. The project is consistent with the policies of these agencies. GLMC represents a group of NGOs representing recreational users in the area. They have been engaged in the development of the project and have provided a letter attached to this proposal. The project is consistent with the policies of these groups.

Will the proposed project complement other ongoing water management activities by state, Federal, or local government entities, non-profits, or individual landowners within the project area? Please describe other relevant efforts, including who is undertaking these efforts and whether they support the proposed project. Explain how the proposed project will avoid duplication or complication of other ongoing efforts.

The proposed project was developed to complement recent and long-standing activities by state and federal government entities, NGOs and individual landowners and address issues of scale identified in successfully implementing previous projects. Specifically, the proposed project expands on a project between TU and Ramsay Ranch to improve irrigation infrastructure damaged by extreme channel erosion (2017); a recent restoration project carried out among TU, USFWD, WLCI, Ramsay Ranch and volunteer partners installing 20 BDAs on Trout Creek to benefit riparian vegetation and CRCT (2020); ongoing cheatgrass management projects by WGFD, Ramsay Ranch and RSGA to manage terrestrial habitat for mule deer and agriculture; research efforts by WLCI partners to better understand sedimentation and hydrogeomorphic processes in cold-desert headwater streams in the area (2018); and research efforts by WGFD and partners to understand mule deer population dynamics.

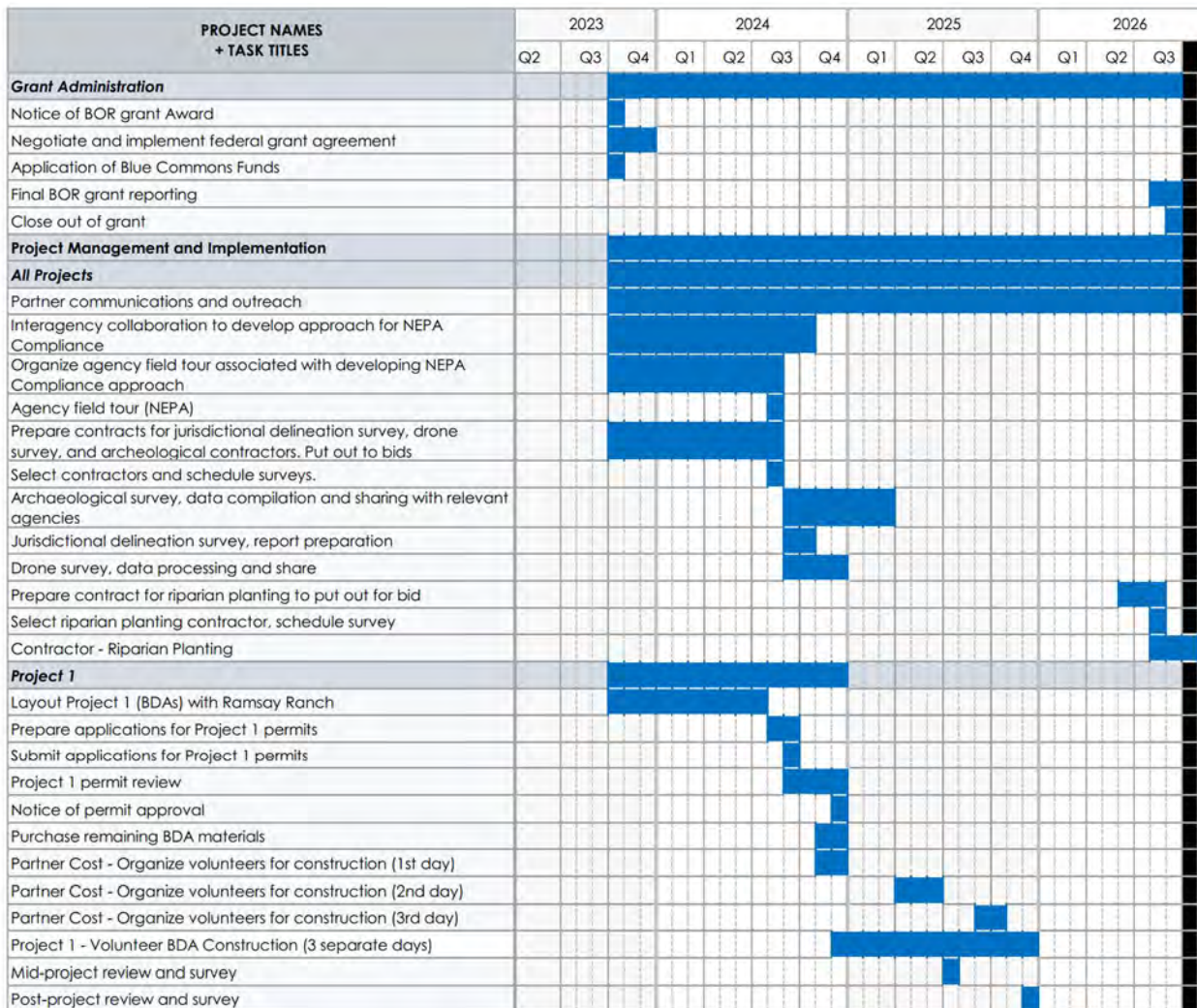
The project will avoid duplication or redundancy of effort by regularly engaging with representatives from all agencies and managers responsible for these projects. Modes of engagement will include quarterly updates on upcoming activities, compilation and sharing of annual data reporting, annual field tours for a performance review committee and interested stakeholders to provide comments on the project and inform the project manager of any new initiatives in the area. Such processes are already being used to facilitate coordination among

partners, as seen on a multi-stakeholder tour in September 2021 where WGFD was able to articulate past issues with the effectiveness of cheatgrass management related to timing and scale of implementation that were incorporated into the revised project proposal.

Is there opposition to the proposed project? If so, describe the opposition and explain how it will be addressed. Opposition will not necessarily result in fewer points.

One lessee on state ground upstream of the influence of the project areas has raised concerns about the sources of funding for this project and long-term maintenance responsibilities. TU's project manager has presented at two Conservation District meetings to engage with concerned lessees and provide materials to answer questions and address concerns and has committed to continue attending SCD meetings to answer questions and address concerns as they are raised. All project partners, including TU, are committed to ensuring proper compliance with environmental evaluations and permit requirements, and have agreed to revise project designs to best accomplish the stated goals of the project in the event any components of the project are not permitted by an agency.

Figure 20. Sage Creek Watershed Restoration Project Timeline



PROJECT NAMES + TASK TITLES	2023			2024				2025				2026		
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Project-specific reporting														
Final project report shared to funders and stakeholders														
Project 2														
Organize collaborative project design meetings with stakeholders														
Collaborative Stakeholder Project Design														
70% Designs Complete														
NEPA Compliance Process for Project 2														
Prepare applications for Project 2 permits														
Organize agency field tour associated with developing permitting approach for Project 2														
Agency field tour (Project 2)														
Incorporate agency feed-back into designs at collaborative project design meetings														
100% Designs Complete														
Submit applications for Project 2 permits														
Project 2 permit review														
Notice of permit approval														
Lay out project site														
Prepare contract for construction to put out for bid														
Select construction contractor, schedule														
Contractor - aggradation structure construction														
Project 2 contract administration														
Prepare contract for cheatgrass management to put out for bid (annually)														
Select cheatgrass contractor, schedule (annually)														
Contractor - cheatgrass management (annually)														
Partner - cheatgrass contract administration (annually)														
Post-project review and survey														
Project-specific reporting														
Final project report shared to funders and stakeholders														
Project 3														
Organize collaborative project design meetings with stakeholders														
Collaborative Stakeholder Project Design + Design Review														
Partner Cost - USFWS PFW NEPA Compliance Process for Project 3														
Prepare contract for engineering survey to put out for bid														
Select engineer, schedule														
Contractor - engineering survey + design														
70% Designs Complete														
Organize agency field tour associated with developing permitting approach for Project 2														
Agency field tour (Project 3)														
Incorporate agency feed-back into designs at collaborative project design meetings														
100% Designs Complete														
Prepare applications for Project 3 permits														
Submit applications for Project 3 permits														
Project 3 permit review														
Notice of permit approval														
Prepare contract for construction to put out for bid														
Select construction contractor, schedule														
Contractor - Barrier construction														
Project 3 contract administration														
Mid-project review and survey														
Post-project review and survey														
Project-specific reporting														
Final project report shared to funders and stakeholders														
Performance Evaluation														
Build Project GIS														
Finalize performance evaluation design with partners														
Implement performance evaluation instrumentation at site														
Collect baseline data for performance evaluation and design														
Field surveys, data collection and management														

Evaluation Criterion D—Readiness to Proceed

Describe the implementation plan for the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.

The proposed project will be conducted in staggered phases starting at the upstream-most end of the project area and moving downstream and in a manner that will efficiently account for the varying levels of permitting and compliance each requires. The implementation plan has been developed to take advantage of permitting timelines to collect baseline data from which to evaluate benefits and engage in repeated stakeholder meetings to develop design and follow-up actions that meet all stakeholder objectives and address any concerns. These activities are outlined in the project schedule shown in Figure 10.

Upon notice of award, TU will begin working with Reclamation to contract funds, and with Reclamation, BLM and USFWS, develop an appropriate approach for compliance and negotiate costs. TU will organize a field tour for all agency representatives to tour project sites and discuss appropriate compliance and permitting approaches. Project managers will begin writing and putting contracts out to bid for jurisdictional delineations and archeological surveys to have materials in hand for permit applications. Project partners will organize collaborative project design teams for each project and begin hosting meetings with relevant stakeholders to finalize plans. Project partners will install monitoring instrumentation and begin collection baseline data. These data will be used by the collaborative project team and project partners to finalize designs. Monitoring and data collection will continue annually and sub-annually through the course of the project and continue upon completion.

Project Area 1, which is the furthest upstream, will include an initial permitting phase, a second material procurement phase, and a third construction phase. This project is the highest of the three in the watershed. This project should be ready for construction within six months following the notice of grant award.

Project Area 2 will include an initial phase for environmental and cultural compliance, collaborative design and permitting and a second and third phase for construction. Construction will be implemented in phases to allow for stakeholder feedback and adaptive design and construction based on initial performance. This project will be ready for construction, pending compliance and permits, within approximately 18 months following the notice of grant award

Project Area 3 will include an initial phase for environmental and cultural compliance, collaborative design and permitting and a second phase for construction. This project will be ready for construction, pending compliance and permits, within approximately 20 months following the notice of grant award

Describe any permits and agency approvals that will be required, along with the process and timeframe for obtaining such permits or approvals.

The proposed project will require TU as the lead applicant to coordinate with federal and state agencies, including: the U.S. Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service

(USFWS), Bureau of Land Management (BLM), the Wyoming State Engineer, Wyoming State Trust Lands, Wyoming Department of Environmental Quality (DEQ), and the Wyoming State Historic Preservation Office (SHPO). These agencies will be consulted for action on permit applications and agency approvals, in addition to the NEPA compliance. Consistent with project partners' experience permitting and acquiring materials to build BDAs on private ground in 2023, state permit requirements for Project Area 1 are 80% completed and could be ready to submit shortly following fund contracting. Construction of BDAs could begin as soon as November 2023.

One of the primary permit applications will be the ACOE Section 404 permit under Nationwide Permit (NWP) 27, seeking approval for construction and placement of the in-channel structures and associated restoration actions within the stream channel and associated wetlands. For the Section 404 permit application, TU will contract for a wetland jurisdictional delineation (JD) for the project area to be completed after run-off and as soon as vegetation growth occurs, likely May 2024. Preliminary structure designs and placement locations within the project area will be completed to be submitted as part of the NWP 27 application, as well as a description of anticipated ecological uplift resulting from the project. Part of the ACOE NWP 27 application will be coordination with Wyoming SHPO and Wyoming State Trust Lands for identification of any archeological or historic sites within the project area. In addition, TU will work with the USFWS to identify the presence of any species listed as threatened or endangered under the Endangered Species Act (ESA) within the project area, as well as a review of any relevant critical habitat designations to accompany the NWP 27 application and inform NEPA review. NWP 27 application submission is anticipated before the end of July 2024.

Parallel with the ACOE 404 permit process, TU will work with Wyoming DEQ to obtain certification under Clean Water Act Sections 401 and 318 that the proposed project will use best management practices (BMPs) to control any temporary increase in sediment during the construction phases (318) and that post-project conditions will not violate state water quality standards (401). This work with Wyoming DEQ will be done in parallel with ACOE site visits and NWP 27 application, anticipated before the end of July 2024. TU will also work with BLM and Wyoming State Trust Lands to evaluate and describe the likely impacts to grazing leased lands during project implementation and describe the anticipated improvement in range conditions resulting at project completion in parallel with the ACOE and associated processes.

Finally, TU will work with the Wyoming State Engineer's Office on a demonstration of no adverse impact on other water rights resulting from the project. In connection with this review, if the Wyoming State Engineer's Office determines that a new water permit is required for all or a portion of the project, TU will work with the Office to timely submit a water right permit application in the spring of 2024. TU has acquired a water right permit from the Wyoming State Engineer's Office for similar projects in the past when necessary, and we do not anticipate any obstacles to obtaining a permit.

Identify and describe any engineering or design work performed specifically in support of the proposed project, or that will be performed as part of the project.

A geographic information system has been developed for all three project areas that includes requisite environmental, management, and wildlife data. These data have been subset and processed to represent the conditions on the site and will be updated as new data are produced. Initial geomorphic and hydrologic mapping and digitization have been completed to identify limiting or facilitating conditions for project implementation. Initial hydrologic modelling has calculated expected flow recurrence through the drainage and will provide inputs to more detailed hydraulic models following successful grant award. Initial sediment transport and yield analyses have identified baseline suspended sediment yields, expected capture efficiency of proposed structures, and the feasibility of the project.

Project Area 1 designs are at 90% and will be finalized in collaboration RSGA after spring 2023 run-off to account for any potential changes to channel morphology. Project applicant and partners have recently conducted a similar project elsewhere on the property and have the materials ready to apply for requisite permits and acquire and prepare construction materials as soon as the notice of funding is received. See Map 2, Figures 4-9.

Project Area 2 designs are at 30% and will be finalized in collaboration with BLM, RSGA, and WGFD upon successful grant award. Project partners have identified the project areas where they will hire a contractor to perform the requisite jurisdictional delineation and fly a detailed photogrammetric survey and create a digital terrain model with sufficiently fine resolution to develop a HEC-RAS model for the project reaches, which will contribute to refined structure location and elevations. Initial borrow pit locations have been identified but will require material testing to ensure appropriate size, cohesion, and permeability for the structure construction. This testing will occur following notice of funding. Project partners have implemented similar scales of projects elsewhere in the region and have already developed scripting tools to expedite calculation of total fill, fill within wetlands and fill within ordinary high-water mark as required by NWP 27 permits. See Map 3, Figures 1-3.

Project Area 3 designs are at 30% and will be finalized in collaboration with BLM, RSGA and WGFD upon successful grant award. Project partners are planning to continue to engage in collaborative project planning prior to the grant award using partner contributed funds, during which time they will develop the appropriate permitting pathway to take. The project site has been selected based on known reservoir elevations, geomorphic confinement, and local lithological conditions. Project managers have performed initial survey to identify backwater area under typical flows. notice of grant award, the project partners will put out an engineering contract for bid to perform a detailed survey and produce 70% designs for use in compliance processes. See Map 4.

Does the applicant have access to the land or water source where the project is located?

Yes – the proposed project has been developed in collaboration with the private landowners in the project areas, who are also the lessees on BLM ground, as well as the BLM. This access is indicated in the RSGA letter attached to the proposal. No easements are required for this project.

Identify whether the applicant has contacted the local Reclamation office to discuss the potential environmental and cultural resource compliance requirements for the project and the associated

costs. Has a line item been included in the budget for costs associated with compliance? Describe any new policies or administrative actions required to implement the project.

TU has had conversations with Reclamation’s Katrina Grantz, Assistant Regional Director for the Upper Colorado River Regional Office in Salt Lake City, and John Morton, Manager of the Flaming Gorge Field Division in Dutch John, Utah with regard to expected Reclamation compliance requirements. They were unable to provide an estimate, given uncertainty around who would take lead on various aspects of federal compliance, so we have provided a rough estimate of \$30,000 was provided based on a good faith estimate of the cost associated with the duties described by those employees.

The Rock Springs BLM Office and USFWS PFW are both prepared to coordinate with Reclamation to develop the appropriate compliance plan, as indicated in letters attached to the proposal. The implementation of the project does not require any new policies or administrative action, but the permitting process would be streamlined were Reclamation to agree to adopt the USFWS Categorical Exclusion for small stream restoration codified at page 5 [in DOI’s Departmental NEPA Manual](#), Part 516, Chapter 8, USFWS, Categorical Exclusion 8.5B(3).

Is the project completely or partially located on Federal land or at a Federal facility? If so, explain whether the agency supports the project, whether the agency will contribute toward the project, and why the Federal agency is not completing the project.

Proposed project areas 2 and 3 will occur partially on BLM ground. The agency is aware of the project and has stated that the goals and objectives of the projects are consistent with their management objectives, though will necessarily require compliance with NEPA processes that they plan to coordinate with Reclamation and USFWS PFW. The project is located on the “Wyoming checkerboard,” a large expanse of ground in southwestern Wyoming where sections alternate between BLM management and private land ownership, which has made it difficult for federal agencies to unilaterally implement coherent projects across continuous sections. A project led by TU can engage both sets of land managers to implement a coherent project that addresses environmental concerns from both entities.

Evaluation Criterion E—Performance Measures

The performance of this project will be evaluated using both quantitative and qualitative measures. Quantitative performance measures will be collected annually by a team that will include TU and Blueshift. These data will be reviewed annually by a performance oversight committee that will include five members representing local land management and other interests. This committee will provide feedback regarding the performance of the project to produce a set of joint qualitative performance measures that will guide the project managers in each year’s restoration actions as well as in the design and development of subsequent grant proposals.

Quantitative Performance Measures

The aggradation structures and BDAs (Project Areas 1 & 2) will be evaluated using a combination of field measurements, remote sensing, and modeling. Field measurements will include annual sediment surveys to measure aggradation behind representative structures;

pressure transducers to measure depth to groundwater in an array of 3-6 piezometers installed on floodplains; regular streamflow measurements to develop a rating curve for deployed stream gages at upstream and downstream ends of project; bi-annual water quality measurements for turbidity and sediment-bound minerals; photo point monitoring of riparian and valley floor vegetation along the aggradation structures, annual greenline and valley floor transect vegetation surveys (e.g. Winward 2000 protocols, MiMs) and annual structure surveys to assess structural integrity and identify any maintenance needs. Impacts to wildlife will be evaluated both through the evaluation of physical habitat criteria outlined by WGFD for mule deer, GRSG and Colorado cutthroat trout as well as through direct observation of populations in question using camera traps and wildlife surveys (e.g., electrofishing, ongoing WGFD ocular surveys). Specific metrics for evaluation of CRCT habitat will be developed in partnership with WGFD, but may include stratified random sampling of wetted width, % pool habitat, substrate type and composition, percent cover, water depth and large woody debris.

Remote sensing measurements will include the use of OpenET and Climate Engine tools to evaluate changes to NDVI and evapotranspiration in the restoration areas relative to the annual precipitation amounts and repeat digital mapping to identify changes to channel planform, surface water distributions, and vegetation community types over time. Drone-based photography will be done annually to complement ground-based photos and remote sensing analyses of channel planform and surface water distributions during various flow events. Detailed topographic data for the restoration area will be collected prior to construction from publicly available LiDAR data and will be used both for detailed design as well as a baseline for sediment aggradation measurements. Hydraulic modeling (HEC-RAS) will be used to calibrate stream gages, assess structure performance, and estimate habitat benefits across a range of flows. Habitat suitability models will be used to evaluate spatial changes in habitat quality for species of interest.

Performance of project areas 1 and 2 will be evaluated on positive trends related to: 1) Structures can be kept intact with minimal maintenance after three years and 2) Structures capture more sediment than they release; and 3) At least two of the following outcomes are documented: raised groundwater levels; increased surface water extent and depth; increased aerial extent of riparian and/or wetland species; decreased aerial extent of cheatgrass and/or upland species; increased ET on valley floors; expanded habitat suitability for GRSG, mule deer, and cut-throat trout; improvements in trajectory of water quality downstream of structures (turbidity, sediment-bound minerals). Performance of project area 3 will be evaluated in annual surveys to assess its structural integrity, the condition of the ground both ½ mile upstream and ½ mile downstream of the barrier, and the presence/absence of rainbow trout upstream of the structure. The barrier will be considered successful if it maintains structural integrity, does not generate additional headward erosion, and prevents rainbow trout from passing.

These measures were selected as appropriate proxies by which to evaluate the evolution of the structures themselves as well as the ways in which they contribute to the listed objectives of this project. The appropriateness of these proxies in terms of representing conditions on the site and implementation feasibility was determined collaboratively among project partners with

experience implementing and maintaining monitoring programs. Collectively, these data should provide insight into how the structures alter the timing, magnitude and distribution of surface and groundwater and how those changes lead to improvements in the drought resilience of terrestrial and aquatic habitat critical to species of concern in the drainage. The data should also allow project managers to quantify sediment conservation and improve the design of subsequent projects to improve performance.

Qualitative Performance Measures

Prior to the start of construction, a performance oversight committee will be established. Representatives will include representatives from BLM, the local Conservation District, private landowners, WGFD and a representative from GLMC. Prior to construction, the committee will work with project managers to collaboratively develop a qualitative survey that includes questions or prompts about the perceived success of the project to date. Qualitative indices will include questions related to perceptions of visual changes to vegetation greenness, extent, and timing of green-up; wildlife distribution or utilization; streamflow magnitude, timing, and distribution; and vegetation composition. Indices will also include feedback related to the collaborative nature of the planning and implementation of the project, including questions about if damage has occurred to property and incurred costs, if any operations needed to change due to the project, whether the planning has been well-communicated and incorporated feedback.

The committee will convene annually to review the summary of the quantitative performance measures, participate in a field tour, and complete their qualitative surveys assessing performance to date while on the field tour. These surveys will be reviewed by the project managers and reported in the performance reports given to funders and incorporated into updates for any necessary maintenance and subsequent project plans.

Five-year Benefit Monitoring Plan following Project Completion

TU and its project partners are committed to long-term monitoring and maintenance of the structures and associated monitoring infrastructure given the unique opportunity to understand the hydrologic, geomorphic, and ecological benefits and potential climate resilience conferred by large-scale restoration projects. As such, the project team plans to establish the monitoring program as described above in the first year of the grant that will be continued through the three years of the grant and a subsequent seven years, at a minimum. This program will include the requisite permanent monitoring sites, data management infrastructure and repository, and standards of practice for data collection, metadata, and maintenance.

Funding from the Bureau of Reclamation will support the acquisition of key supplies for establishing data collection sites that will both serve project development and design as well as benefit evaluation. Funding to support long-term maintenance of those sites, monitoring, and data analysis relevant to evaluation rather than design will be developed from separate sources as part of the project's long-term operating costs. TU and Blueshift are collaborating with leaders in the fields of corporate sustainability efforts to develop instruments to financially support future projects of this sort, which will require robust data supporting expected outcomes. Project partners are also working to develop funding 1) to produce a remote sensing tool that would use data from this project to help inform prioritization tools for future natural distributed storage and

2) to develop an educational and workforce training program at Western Wyoming Community College where students could receive internship and CTE credits for work performed under the supervision of a skilled technical experts.

Evaluation Criterion F—Presidential and Department of the Interior Priorities

Presidential Executive Order (E.O.) 14008: Tackling the Climate Crisis at Home and Abroad

How will the project build long-term resilience to drought? How many years will the project continue to provide benefits? Please estimate the extent to which the project will build resilience to drought and provide support for your estimate.

As discussed previously, this project will build long-term ecological, geomorphic, and economic resilience to drought by restoring groundwater recharge processes, regulating hydrographs to reduce erosion, and protecting agricultural operations and recreational tourism. Raising water tables will support plant growth, reduce fire risks, and create valley floors less dependent on yearly precipitation. Benefits will persist as long as structures maintain integrity, potentially for over a century with regular maintenance. Climate change projections indicate a need to reduce the risk of extreme erosion and wildfire events. Addressing stakeholders' concerns, the project will also mitigate potential sediment and nutrient influxes into Flaming Gorge Reservoir due to water shortages. Lastly, the project will enhance economic resilience by safeguarding habitats for wildlife, supporting ranching and agriculture, and reducing long-term sediment dredging costs, ultimately preventing up to \$800,000 in dredging expenses.

In addition to drought resiliency measures, does the proposed project include other natural hazard risk reductions for hazards such as wildfires or floods?

The proposed project includes activities that will reduce the risk of wildfires and floods. The expected effects of the proposed project on flood attenuation are discussed in Criteria A. These flow attenuation benefits may also translate to improved timing of incoming flows for Flaming Gorge Dam operators. The installation of beaver dam analogs and aggradation structures create wetted areas protected from burning and provide terrestrial refugia during wildfires. The maintenance of aboveground vegetation and reduced burn intensity can reduce post-fire erosion and protect aquatic habitat sensitive to fine sediment. The presence of valley-scale wet meadows can also improve the predictability of fire behavior and allow for more proactive fire-fighting decision making, increasing the effectiveness and safety of firefighting activities, and reducing costs associated with prescribed burn management.

Will the proposed project reduce greenhouse gas emissions by sequestering carbon in soils, grasses, trees, and other vegetation?

The proposed project may reduce greenhouse gas emissions by sequestering carbon in soils, grasses and other vegetation, as well as protecting existing soil carbon and organic materials from eroding into Flaming Gorge Reservoir where fluctuating water levels may enhance CH₄ ebullition rates and decrease the fraction of methane oxidized to the less potent CO₂, particularly

as temperatures warm¹³. This project will protect existing soil organic carbon in Sage Creek by reducing channel erosion and capturing mobilized sediment behind structure. This project will enhance carbon sequestration by increasing plant available water, which will allow for an increased spatial extent and density of riparian and wet meadow species, who capture carbon in their root-mass and above-ground biomass. Anaerobic conditions in wetland soils can create uniquely effective carbon sinks as both above and below-ground biomass are decomposed into histosols, particularly as temperatures in southwestern Wyoming warm¹⁴.

Does the proposed project seek to reduce or mitigate climate air or water pollution?

As described previously, projected increases in the flashiness of hydrographs with climate change will increase the capacity of flood events to erode and mobilize sediment and sediment-bound minerals. This proposed project seeks to improve water quality by reducing suspended sediment, phosphorous and nitrogen in streamflow at their present levels and reducing the capacity of future flows to erode soils.

Does the proposed project have a conservation or management component that will promote healthy lands and soils or serve to protect water supplies and its associated uses?

Yes, these benefits are described previously and include reduced erosion; reduced downstream sediment delivery to Flaming Gorge Reservoir; improved downstream water quality; reduced drought stress for valley floor habitat; expanded riparian and wetland habitat; improved conditions for GRSG, mule deer, elk, and pronghorn; improved CRCT habitat; and the protection and recovery of historically viable ranching and agricultural grounds.

Does the proposed project contribute to climate change resiliency in other ways?

As discussed, in the report: “Ten Strategies for Climate Resilience in The Colorado River Basin,” it is critical that project managers, partners, and funders implement projects at much larger scales than they have traditionally to realize climate resilience benefits at a magnitude and on a timeframe relevant to preventing the worst consequences of climate change. One key limitation to the implementation of projects at such a scale is the lack of data regarding implementation, cost, and the timelines of potential outcomes. The rigorous, partner-supported monitoring and analysis components of this project aim to produce materials and GIS tools for other project managers to use in prioritizing locations for projects and designing them at large enough scales to generate impact. A second limitation is the availability, timing, and risk tolerance of non-federal funding typically available for project managers to use as match. The participation of BlueCommons’ revolving funds in this project will provide potential non-federal funders with the information needed to drive additional investment into such projects in the future.

¹³ Deemer, B. R., Harrison, J. A., Li, S., Beaulieu, J. J., DelSontro, T., Barros, N., Bezerra-Neto, J. F., Powers, S. M., dos Santos, M. A., & Vonk, J. A. (2016). Greenhouse Gas Emissions from Reservoir Water Surfaces: A New Global Synthesis. *BioScience*, 66(11), 949–964. <https://doi.org/10.1093/biosci/biw117>

¹⁴ Whiting, G. J., & Chanton, J. P. (2001). Greenhouse carbon balance of wetlands: Methane emission versus carbon sequestration. *Tellus B*, 53(5), 521–528. <https://doi.org/10.1034/j.1600-0889.2001.530501.x>

Funding Plan

The non-federal share of project costs will be obtained through a combination of non-federal, private philanthropic grant funding and partner in-kind contributions, as detailed further below. As noted in the budget narrative, valuation of third-party in-kind contributions have been made in compliance with the applicable cost principles contained in 2 CFR Part 200.

Partner In-Kind Contributions

CK Blueshift, LLC and Culp & Kelly, LLP (“Blueshift”).

As detailed in its partner commitment letter, Blueshift (encompassing contributions from both CK Blueshift, LLC and Culp & Kelly, LLP) expects to contribute a significant fraction of its personnel time/costs to this project beyond that for which it can expect to receive funding under either the proposed WaterSMART grant or the privately committed BlueCommons grant (each received by Blueshift as a subaward from TU). This includes time for personnel with CK Blueshift, LLC and Culp & Kelly, LLP, as detailed in the budget line items and accompanying budget narrative. These costs are presented together because Culp & Kelly, LLP is the parent company of CK Blueshift, LLC. These uncovered personnel time/costs are valued at the same rate as covered time/costs in the project budget and are reflected as in-kind contributions. Costs of all clerical and administrative personnel are assumed within the indirect cost figure identified in the budget and are not included as part of any in-kind match.

Wyoming Game and Fish Department (WGFD).

Wyoming Game and Fish Department has provided a commitment letter in support of the project, covering their investment of time, travel, and resources necessary to administer cheatgrass contracts and conduct annual evaluations of wildlife populations and habitat. That letter was still under preparation at the time of the application, as such only the travel costs are included as in-kind contributions in the submitted project budget. detailed in its partner commitment letter, WGFD expects to provide in-kind personnel time/costs to this project. These in-kind personnel time/costs are valued at their standard rates and contributed travel costs are estimated at FY23 GSA M&IE and mileage for travel from Green River, WY. Costs of all clerical and administrative personnel (indirect costs) are not included as part of any in-kind match. The letter of commitment from WGFD is expected to be provided within 30 days of this grant submission, as the agency is just finishing managing hunting season.

Non-Federal Grants

BlueCommons/New Venture Fund (NVF).

BlueCommons is a fiscally-sponsored project of the NVF, a 501(c)(3) organization that will be providing a \$350,000 subgrant to TU in support of the project. This project aligns closely with the objectives of the BlueCommons project and its pilot revolving fund, which is seeking to use limited philanthropic funding to help match federal grant dollars and aid rural communities and watershed groups that are carrying out the type of restoration proposed in the Grant Application, and to help solve some of the challenges that project applicants face in planning, designing, and implementing projects of this type.

As explained in the BlueCommons/NVF commitment letter, the commitment of these funds to the project is only conditioned on the approval of this WaterSMART grant application. This subgrant will be made as part of an existing, executed grant from the Walton Family Foundation, which has made a larger grant to BlueCommons/NVF to establish a pilot fund that is specifically designed to support the type of watershed restoration effort proposed in the Grant Application. That grant specifically authorizes BlueCommons/NVF to provide subgrant funding for this project on the condition that this Grant Application is approved by Reclamation. These funds will be available to BlueCommons/NVF, and can be dispensed to TU via subgrant, within a few weeks of receipt of evidence of a successful WaterSMART grant award. TU will enter into a formal subgrant agreement with BlueCommons/NVF as soon as it receives notice of the award.

To help ensure that the project moves forward promptly, once the subgrant agreement is executed, TU will be in a position to begin expending these private grant funds in support of the project, as well as advancing project costs that would be later reimbursed from the WaterSMART grant. As part of the subgrant arrangement, TU will also be making efforts to identify additional sources of funding that can help to cover both the current phases of this project addressed by the WaterSMART grant as well as future phases of the project. It is anticipated that these efforts will potentially raise significant additional funding for this project and its future phases, as well as supporting efforts elsewhere.

This project expects that \$48,440 of indirect will also be brought in through non-federal grants. This amount represents 13.84% (TU's federally negotiated NICRA rate) of 350,000.

Other Contributions (not budgeted)

Not all potential project costs or contributions are included in the project budget. This project will also involve many hours of contributed efforts from community members, agricultural enterprises, private landowners, and agencies that are expected to participate in the project and provide feedback. We expect later phases of the project to generate additional private philanthropic, state, and other funding as the project proceeds and gains greater visibility in the surrounding communities and watershed.

Pre-award project costs

In no event would any project costs be claimed by TU or other project partners that are incurred prior to **notice that environmental and cultural resources compliance is complete and a Reclamation Grants Officer has provided written notification that all such clearances have been obtained.**

Federal Funding Request

The federal WaterSMART funding requested under this proposal, in the amount of \$1,565,233, will cover all costs expected to be associated with this project that are not addressed by either the BlueCommons grant funding (cash) or committed in-kind contributions. As reflected in the project budget, in combination the cash and in-kind contributions being provided by Trout Unlimited and the other project partners total \$529,281, or 25% of the total project budget.

Budget Proposal

Table 1 – Summary of Non-Federal and Federal funding sources

Funding Source	Amount
Non-Federal Entities	
1. BlueCommons	\$350,000
2. Blueshift	\$129,945
3. Wyoming Game and Fish Dept.	\$896
4. Trout Unlimited	\$48,440
Non-Federal subtotal	\$529,281
Requested Reclamation funding	\$1,513,538

Table 2. – Total Project Cost Table

Source	Amount
Costs to be reimbursed with the requested Federal funding	\$1,513,538.14
Costs to be paid by the applicant	\$ 398,440.00
Value of third-party contributions	\$ 130,841.00
TOTAL project cost	\$2,042,819.14

Budget Detail, per BOR's Template, follows on pages 42 - 55

Budget Narrative

Personnel

Costs of all personnel are described below and in the budget. Costs specific to compliance with grant reporting requirements, including final project evaluation, are specifically identified for each person below. Costs of all clerical and administrative personnel are assumed within the indirect cost figures identified in the budget. As required by the NOFO, all costs, including the valuation of third-party in-kind contributions, have been developed or estimated in compliance with the applicable cost principles contained in 2 CFR Part 200.

Hourly rate: Green River Project Manager, Nick Walrath is the full-time Green River Project Manager for Trout Unlimited, and will be responsible for organizing and overseeing essentially all aspects of the project, including project management and administration, leading design, permitting, construction, and construction oversight and review, contracting and contract administration, and other major activities. Mr. Walrath will also be the main point of contact for the numerous project partners, will lead all landowner and land manager outreach and coordination, and will be responsible for keeping all partners apprised of progress, organizing collaborative design sessions, and incorporating their feedback into documents.

Stakeholder engagement, management and implementation of these projects is estimated to occupy approximately 3000 hours over three years, which includes approximately 100 hours spent on compliance with reporting requirements, including the final project report and evaluation. The hourly rate for year two includes a 5% increase and year three includes a 3%, which are the average annual increase in compensation for all Trout Unlimited employees.

Compensation rates are consistently applied to both Federal and non-Federal activities.

Nick Walrath	Year 1		Year 2		Year 3		Task Totals
	Rate	Hours	Rate	Hours	Rate	Hours	
Task 1: Grant + contract management	\$ 33.34	360	\$ 35.00	350	\$ 36.05	390	\$38,312.90
Task 2: Site Work: Design, Layout	\$ 33.34	400	\$ 35.00	300	\$ 36.05	200	\$31,046.09
Task 3: Permit applications + coordination	\$ 33.34	300	\$ 35.00	200	\$ 36.05	100	\$20,606.83
Task 4: Project Inspection: contract administration and project evaluation	\$ 33.34	120	\$ 35.00	330	\$ 36.05	450	\$31,775.32
Task 5: Reporting	\$ 33.34	20	\$ 35.00	20	\$ 36.05	60	\$ 3,529.98
Yearly Totals:	\$	28,002.49	\$	29,752.64	\$	29,203.09	\$86,958.22

Hourly rate: Local/Regional Trout Unlimited Project Manager will assist Mr. Walrath with organizing and overseeing the jurisdictional delineations for all projects as well as construction crew oversight and administration. This person will assist Mr. Walrath in supervising the Wyoming Conservation Crew during each hitch, and will provide additional assistance as required with layout and administration of the aggradation structures. Compliance surveying, monitoring implementation, crew supervision and other assistance as required are estimated to occupy approximately 900 hours, which includes approximately 30 hours spent on compliance with reporting requirements, including the final project report and evaluation. The hourly rate for year two includes a 5% increase and year three includes a 3%, which are the average annual increase in compensation for all Trout Unlimited employees. Compensation rates are consistently applied to both Federal and non-Federal activities

TU Local/Regional Support Staff	Year 1		Year 2		Year 3		
	Rate	Hours	Rate	Hours	Rate	Hours	
Task 1: Conduct Jurisdictional Delineations	\$ 33.34	70	\$ 35.00	40	\$ 36.05	0	\$ 3,733.67
Task 2: Coordinate and supervise work crews	\$ 33.34	160	\$ 35.00	160	\$ 36.05	160	\$ 16,702.82
Task 3: Project Administration + Evaluation	\$ 33.34	70	\$ 35.00	90	\$ 36.05	120	\$ 9,810.20
Task 4: Reporting	\$ 33.34	0	\$ 35.00	10	\$ 36.05	20	\$ 1,071.10
Total:	\$	10,000.89	\$	10,500.93	\$	10,815.96	\$31,317.78

Fringe Benefits

Trout Unlimited's fringe benefits costs are estimated at 54% of employee compensation costs and consist of annual/sick leave/holidays (19.65%), medical and dental (19.04%), taxes and unemployment insurance (7.59%), 403b (5.5%), worker's compensation (1.88%). TU's NICRA agreement has been provided as an attachment.

Travel

The budget includes \$10,218 in estimated travel costs for Nick Walrath and Local/Regional TU Support Staff to travel to the field site for installation of monitoring equipment, project design and layout, construction administration, reporting, and stakeholder engagement tours. It is expected that TU staff will, in sum, require a minimum of 48 days in the field per year for project oversight, and 4 days in the field per year for stakeholder tours, totaling 52 trips per year between the two staff.

The project site is 30 miles from both Rock Springs and Green River, WY and will require on-site off-road driving of approximately 40 miles per trip, totaling 100 miles per trip. There are no accommodations available nearer the field site than Green River, WY, requiring daily trips. Costs have been estimated based on mileage, with assumed 100 miles round trip to the field from Green River, WY paid at GSA 2023 mileage rate (\$0.655/mile). Personnel are assumed to be driving separate vehicles for field work, given the large project area and different responsibilities they hold. Personnel are also expected to drive separate vehicles for field tours, when it is expected they will be driving visiting partners in their vehicles.

Equipment

No equipment, as defined in §200.1 as tangible personal property (including information technology systems) having a useful life of more than one year and a per-unit acquisition cost which equals or exceeds the lesser of the capitalization level established by the applicant organization for financial statement purposes, or \$5,000, will be purchased for this project.

Materials and Supplies

Itemized materials and supplies are noted in the table below. Cost estimates are based on recent invoices for materials required on similar projects managed by Trout Unlimited with these costs for the 2020 pilot project with BDAs on Trout Creek. These should be regarded as deliberately conservative. Only materials and supplies directly required for restoration/construction that are not expected to be undertaken pursuant to a third-party contract and related monitoring equipment are included in the budget; materials/supplies associated with third-party contracts are incorporated into total contract cost estimates.

4" x 7' pointed untreated fence posts	600	\$8	\$4,800
Fencing	2000	\$10	\$20,000
Camera traps and mounts	10	\$900	\$9,000
Staff Gages	10	\$35	\$350
Pressure transducers	8	\$800	\$6,400
Installation and maintenance materials and supplies	NA		\$4,500
Printouts	120	\$3	\$360
Total			\$45,410

The fence posts will be used for BDA installation in Project 1. The fencing will be used to protect installations at all three project sites. Camera traps, mounts, staff gages, pressure transducers and the requisite installation and maintenance materials (e.g., PVC pipe, anti-seize, bentonite, etc). will be used to establish groundwater and streamflow monitoring locations to both inform design of project sites and evaluate impact on downstream flow. Required installation and maintenance materials will be determined on the site conditions agreed upon by all stakeholders following environmental and cultural compliance analysis. Printouts will be provided to stakeholders during field tours (2 per year through project life).

Contractual

CK Blueshift/Culp & Kelly

CK Blueshift, and its parent firm, Culp & Kelly, LLP, worked in partnership with Trout Unlimited to develop this project. Dr. Nash is a geomorphologist/water resources engineer who will undertake many of the core activities associated project planning, design, and oversight, including the planning and design of in-stream restoration projects, mid-stream and final reviews of constructed projects, and the design of monitoring protocols and monitoring approaches, the selection of monitoring sites and installation and implementation of monitoring equipment and activities, overseeing data collection, and analyzing resulting monitoring data and conducting outcomes evaluations. She will also provide key support to Mr. Walrath on some landowner and agency outreach activities, including support for the Performance Oversight Committee. These efforts are expected to occupy 1200 hours of her time over the three-year grant period.

Ms. Ziemer is an experienced water and policy attorney who will aid in the development of grant agreements and compliance with federal grant reporting, will support required project permitting and local/regional agency outreach, support some aspects of landowner/land management relations, will undertake permit compliance-related reporting, and will undertake post-project review efforts and project-specific performance reporting associated with the

BlueCommons/NVF support grant. These efforts are expected to occupy 345 hours of her time over the three year grant period.

Their rates have been calculated using each of their 2023 discounted rates, which are applied to mission-driven work at Large NGOs like Trout Unlimited. Dr. Nash’s large NGO rate is \$161/hour and Ms. Ziemer’s large NGO rate is \$320/hour. These rates include take-home, retirement contributions, professional insurance, workers compensation, and other costs typically considered fringe and indirect administrative support.

Travel cost estimates: As a key contributor for design, monitoring and construction, Dr. Nash will require 3 trips to the site a year - one trip for field tours, two for design and oversight and stakeholder meetings. To minimize unnecessary travel, Dr. Nash will schedule fieldwork to coincide with stakeholder meetings. As Dr. Nash will require a field vehicle while on site and given the distance of the field site from a large airport, it was deemed more financially prudent for her to drive from Boise, ID rather than fly to Salt Lake City, UT or Rock Springs, WY and rent a car and pay for gas. The round-trip mileage from Boise, ID to the field site is 1200 miles. It is expected that Ms. Ziemer will only require travel to the field site annually for stakeholder engagement tours. Given the distance of the field site from a major airport, it is more financially prudent for Ms. Ziemer to drive from Bozeman, MT to the field site rather than rather than fly to Salt Lake City, UT or Rock Springs, WY and rent a car and pay for gas. The round-trip mileage from Bozeman, MT to the field site is 1200 miles. The travel estimates for both include GSA estimates for typical hotel costs in the area and mileage at \$0.655/mile for round trip travel from Boise, ID. M&IE has been intentionally excluded.

	Discounted 2023 Rate	Hours	Travel	
Water resource engineering + restoration design services	\$ 161.00	1200	\$10,602.00	\$ 203,802.00
Legal and permit development services	\$ 320.00	345	\$3,534.00	\$ 113,934.00

Construction

Project Area 1 includes an estimate for a contract to hire a fuels management crew to procure and stage a portion of the materials for BDAs construction and three separate hitches from the Conservation Corps to build the structures and carry out additional layout and monitoring as time allows. Project Area 2 includes an estimate for a contract to hire equipment operators to develop borrow pits, haul material, build structures, and carry out requisite BMP and site closing; as well as a contract to apply herbicide to cheatgrass via fixed-wing aircraft in three successive years, per best practices. Project Area 3 includes an estimate for a contract to hire an engineering and construction contractor to perform detailed site surveys, develop designs, implement, and oversee construction of the artificial barrier. All project areas will be treated following implementation by a riparian planting crew contract to plant and protect native shrubs and trees.

All of the listed contracts other than the Conservation Crew are expected to require use of a competitive procurement method under the applicable rules, and contractors will be selected based on the lowest bid with relevant experience.

Wyoming Conservation Corps	Beaver Dam Analog construction - Project 1; Monitoring, layout.	\$45,000
TBD	Aggradation structure construction - Project 2	\$553,640
TBD	Barrier construction - Project 3	\$388,940
TBD	Riparian re-vegetation - All projects	\$20,000
TBD	Cheatgrass management - Project 2	\$22,050
TBD	Upland thinning - Project 1	\$5,000
Subtotal		\$989,630

Other Construction-related Costs.

The budget includes \$60,000 for archeological surveys, which are expected to be required on 500 acres of project site based on prior experience meeting NHPA requirements. This estimate is based on recent experience hiring a private cultural consultant where the federal agencies will assume a review role.

Third-Party In-Kind Contributions

As detailed in the various partner commitment letters, the project partners intend to provide significant in-kind contributions of time, materials, and effort beyond those activities that will be funded by this grant or by the BlueCommons' matching funds. Breakdowns of time, rates, supplies, and materials and associated in-kind contribution value are provided in the tables included in each commitment letter, which were prepared in compliance with the applicable administrative and cost principles criteria established in 2 CFR Part 200.

Wyoming Fish and Game, will provide in-kind time to support project evaluation and stakeholder engagement on site. The contribution is valued at \$895 to conservatively only account for mileage at 2022 GSA rates from state offices in Cheyenne to the field site for 6 tours throughout the course of the project.

As detailed above, CK Blueshift will provide many of their key supporting service at no cost, including absorbing all indirect costs and the direct costs of legal research, and will provide all services at a substantial discount from its regular rates to reflect the public-interest nature of the project. Rates for both Dr. Nash and Ms. Ziemer have also intentionally been kept at 2023 values, despite expected increases, in keeping with the mission-driven nature of the project. As a private consultant and principal of Blueshift, Dr. Nash's regular (market) hourly rate for 2023 will be \$223/hr for services to private sector clients in her field of expertise, and will thus be providing services at a \$60/hr discount. As a private attorney, Ms. Ziemer's regular (market) hourly rate for 2023 will be \$481/hr for services to private sector clients in her field of expertise, and will thus be providing a \$161/hr discount.

Environmental and Regulatory Compliance Costs

Within the various elements of the project budget, TU has budgeted for a number of expected legal costs associated with permitting and water rights research, expected efforts associated with permit applications and generation of related studies/surveys, costs to federal agencies, and anticipated state agency expenditures related to environmental permitting and regulatory compliance that are expected to be associated with the implementation of the BDAs, aggradation structures, and artificial barrier. Given both the size and scope of the project site and planned activities, as well as the innovative nature of the restoration work that is contemplated on the project sites, we are anticipating the potential for relatively high environmental and regulatory compliance costs.

It is anticipated that USFWS PFW will conduct the required NEPA compliance in partnership with Reclamation and BLM; USFWS has provided a figure for expected federal in-kind contribution associated with this activity as reflected in the project budget.

Local/Regional TU Project Managers are certified to conduct jurisdictional wetland delineations, which are expected to be potentially required in connection with the Section 404 permitting described in the Technical Proposal. Estimated effort for this work is included in their listed hours.

In addition, the project budget includes a specific line item for archeological survey costs (\$5,000 per 40 acre project area), covering approximately 12 x 40-acre areas (around 500 acres

in total) of the project site where these surveys are expected to be potentially required. Based on prior experience, meeting this NHPA requirement will necessitate the hiring of a private cultural consultant where the federal agencies will assume a review role. The costs listed for a NHPA private consultant are based on recent partner experience with this compliance.

As detailed in the personnel and contractual hours estimates above, the project budget also includes a significant number of hours of effort for project personnel, including supporting partners' attorneys, to help undertake permitting and water rights research, prepare permit applications, and address other issues related to state and federal environmental, water rights, and other regulatory compliance. These estimates are based on experience with similar projects in which TU has had to take the lead on environmental compliance activities, including for State of Wyoming permits. However, to the extent that Reclamation may intend to take the lead on one or more aspects of this regulatory compliance and permitting, these costs may be lower than projected.

TU has had conversations with Reclamation's Katrina Grantz, Assistant Regional Director for the Upper Colorado River Regional Office in Salt Lake City, and John Morton, Manager of the Flaming Gorge Field Division in Dutch John, Utah with regard to expected Reclamation compliance requirements. They were unable to provide an estimate, given uncertainty around who would take lead on various aspects of federal compliance, so we have provided a rough estimate of \$30,000 was provided based on a good faith estimate of the cost associated with the duties described by those employees.

We recognize that the actual allocation of compliance costs to Trout Unlimited and the other project partners will be identified during the process of developing a final project budget for inclusion in the financial assistance agreement.

Indirect Costs

TU has a federally negotiated indirect cost rate (NICRA) of 13.84%. This indirect cost rate is applied against (1) TU's in-kind contributions for salary/fringe benefit costs and (2) the modified direct costs for which federal funding is being requested pursuant to this grant application, each as calculated pursuant to 2 CFR Part 200.68.

Letters of Funding Commitment

Letters of commitment have been provided by Wyoming Game and Fish Department, BlueCommons/New Venture Foundation (NVF) and CK Blueshift, LLC/Culp & Kelly, LLP.



WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

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wgfd.wyo.gov

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March 20, 2023

Bureau of Reclamation
Financial Assistance Operations
Attn: Application Review Committee
P.O. Box 25007, MS 84-27815
Denver, CO 80225

To: Bureau of Reclamation
RE: WaterSMART Environmental Water Resources Program Grant

Please accept this letter of commitment from Wyoming Game and Fish Department (WGFD) for Trout Unlimited's (TU) proposal for WaterSMART grant funding for the *Sage Creek Watershed Restoration for Drought Resilience and Sediment Control Project*. The project, on which WGFD has provided comments and feedback, has the stated aims of accomplishing sediment control in tandem with aquatic habitat and valley floor restoration through the installation of an artificial barrier near the confluence with the reservoir, aggradation structures along lower Sage Creek, beaver dam analogs on Trout Creek; and riparian planting and cheatgrass management throughout the project area.

WGFD has lead and participated in several long-standing research, management, and monitoring projects within the Sage Creek Watershed. WGFD has recently partnered with TU to install steel jack fencing on Trout and Gooseberry creeks to enhance riparian woody vegetation, and cut/hailed aspen to active beaver on Trout Creek to encourage stable dam building (2017). WGFD also has extensive experience designing and administering cheatgrass management projects and contracts. The proposed project broadly aligns with strategies and objectives outlined in the Statewide Habitat Plan (2020), State Wildlife Action Plan (2017), Wyoming Mule Deer Initiative (2018), and habitat requirements for Sage Grouse that were prioritized in Executive Order 2019-3 (replacing 2015-4 and 2017-2)

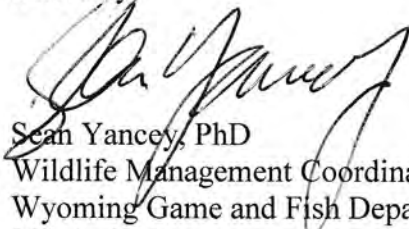
Provided that the project team commits to a collaborative design process that engages WGFD and considers implications for fish and wildlife under WGFD's management, WGFD commits to contributing time from our Green River Terrestrial Habitat Biologist and Wildlife Biologist to assist in writing and administering grants/contracts for cheatgrass management in the project area and to carry out wildlife monitoring activities that will contribute to project benefit evaluation.

A commitment from a WGFD Fisheries Biologist is also anticipated for individual project site visits, coordination with project partners, and providing formal comments for permitting of instream improvements.

Project Contribution	Unit Cost/Hourly Rate Equivalent	Quantity /Hours	Estimated Value	Description/Notes
Personnel Costs				
Terrestrial Habitat Biologist	\$360/day	10 days	\$3,600	Oversight of grants/contracts for cheatgrass treatments. Project site visits and partner coordination.
Wildlife Biologist	\$360/day	14 days per year @ 3years	\$15,120	Annual Big game classification surveys, and JCR data summary and reporting. Sage grouse lek surveys and reporting.
Fisheries Biologist	\$360/day	10 days	\$3,600	Project site visits, project coordination, permitting comments
Other Costs				
Terrestrial Habitat Biologist	.56/mile	6 trips	\$370	110 mile round trips to project site from Green River, WY office.
Wildlife Biologist	.56/mile	4 trips/yr 12 total trips	\$806	120 mile round trips to project site from Green River, WY office.
Fisheries Biologist	.56/mile	5 trips	\$308	110 mile round trips to project site from Green River, WY office.

In the event that Reclamation chooses to fund this grant, we have indicated to TU that WGFD would work with the project team to engage in detailed design work and implementation planning.

Sincerely,


 Sean Yancey, PhD
 Wildlife Management Coordinator
 Wyoming Game and Fish Department
 351 Astle Avenue
 Green River, WY 82935
 307-875-3223



Robert Keith
 Fisheries Supervisor
 Wyoming Game and Fish Department
 351 Astle Avenue
 Green River, WY 82935
 307-875-3223

SY/RK/ks

cc: Nick Walrath, TU Green River Project Coordinator
 Todd Graham, WGFD Regional Wildlife Supervisor
 Patrick Burke, WGFD Wildlife Biologist
 John Walrath, WGFD Fisheries Biologist
 Kevin Spence, WGFD Terrestrial Habitat Biologist

March 20, 2023

Nick Walrath, Green River Project Manager
Trout Unlimited
520 Wilkes Drive, Suite 4B
Green River, Wyoming 82935

Cc:

Application Review Committee
U.S. Bureau of Reclamation
WaterSMART Program
Environmental Water Resources Program

**RE: Letter of Commitment – Trout Unlimited – Little Mountain Project - WaterSMART
Environmental Water Resources Program Grant**

Dear Mr. Walrath,

On behalf of New Venture Fund (NVF) and the BlueCommons project, please accept this letter of commitment for the WaterSMART Environmental Water Resources Program Grant application being submitted by Trout Unlimited (TU) for the Little Mountain Project (the "Grant Application").

BlueCommons is a fiscally-sponsored project of NVF, which is a District of Columbia non-profit corporation organized as a 501(c)(3) public charity. Through the BlueCommons project, NVF operates a pilot revolving fund that is specifically designed to support the type of watershed restoration effort proposed in the Grant Application. As part of an existing, executed grant agreement with a private donor foundation, the provision of a subgrant in support of this project has already been specifically authorized, on the condition that the Grant Application is approved by Reclamation.

As such, and conditioned upon the approval of the Grant Application by Reclamation, BlueCommons/NVF will provide a subgrant in the amount of \$350,000 to Trout Unlimited (TU) for use by TU and its project partners in support of the Little Mountain Project (as further described in the Grant Application). As noted above, these funds are part of an executed grant agreement with a private donor foundation and will be available to BlueCommons/NVF, and can be dispensed to TU via this subgrant, within a few weeks of receipt of evidence of a successful federal grant award.

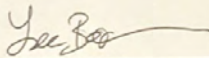
BlueCommons has been working in close collaboration with TU and its partners on the development of the proposed Little Mountain Project, which aims to accomplish sediment control in tandem with aquatic habitat and valley floor restoration through the installation of an artificial barrier near the confluence with the reservoir, aggradation structures along lower Sage Creek, and additional beaver dam analogs on Trout Creek. Riparian planting and cheatgrass management will be carried out following the installation of

structures. TU is a proven partner in the region and well positioned to continue building on decades of work in the Greater Little Mountain Area and Sage Creek Watershed.

This project aligns closely with the objectives of the BlueCommons project and its pilot revolving fund, which is seeking to use limited philanthropic funding to help match federal grant dollars and aid rural communities and watershed groups that are carrying out the type of restoration proposed in the Grant Application, and to help solve some of the challenges that project applicants face in planning, designing, and implementing projects of this type.

We are looking forward to the opportunity to support this project and encourage the most favorable consideration for funding of this Grant Application.

Sincerely,



Lee Bodner
President

BlueCommons, Inc
C/O New Venture Fund
1828 L Street NW Suite 300A
Washington, DC 20036

March 24, 2023

VIA ELECTRONIC DELIVERY

U.S. Bureau of Reclamation
WaterSMART Program
Environmental Water Resources Program
P.O. Box 25007, MS 84-27815
Denver, CO 80225

**RE: Letter of Commitment – Trout Unlimited – Little Mountain Project - WaterSMART
Environmental Water Resources Program Grant**

Dear Grant Program Manager(s),

We are writing on behalf of CK Blueshift, LLC (“Blueshift”) and Culp & Kelly, LLP’s (“C&K”) to express our support for and document our mutual commitments to Trout Unlimited, Inc.’s (“TU”) proposal for WaterSMART grant funding for the *Sage Creek Watershed Restoration for Drought Resilience and Sediment Control Project*, titled “Northern Rockies Range Improvement and Stream Restoration.”

Blueshift is a mission-driven project incubation and consulting firm that is focused on the critical challenges facing water and natural resource managers in the American West. We work in close partnership with our parent firm, C&K, which is an experienced water and natural resources law and policy firm that works at the intersection of water and climate risk. Together, we are working to build innovative solutions for water management, water infrastructure, watershed restoration, and climate change in support of our vision for vital and resilient working landscapes, communities, and ecosystems.

For several years, our organizations have been working closely with TU and other partners to pioneer innovative approaches to re-invest in working landscapes, restore western stream systems, support natural storage infrastructure, and address growing local and regional water challenges. A key focus of this effort has been to develop strategies and implement projects that can cost-effectively recover degraded, incised stream systems and associated rangelands, and restore historic wet meadow and associated riparian systems.

Among other activities, TU and C&K (together with other partners) completed an investigation known as the Liquid Assets Project (supported in part by an NRCS CIG grant), which explored a series of investment-driven models for rangeland enhancement in the West. As part of that and other efforts, we have been actively developing approaches for the use of artificial beaver dams (ABDs) and beaver dam analogs (BDAs) as a stream restoration tool. Initial experimentation with this type of restoration has suggested that, properly implemented, ABD/BDA-based restoration can help to significantly improve range conditions and associated ranch productivity and economics, manage wildfire risks, improve wildlife

habitat, and create important water-related benefits both locally and downstream by enhancing or creating new wetland, wet meadow, and riparian habitat, combating erosion and controlling flooding, and increasing water retention and baseflows by rebuilding natural bank and floodplain aquifer storage. Subsequent investigations have suggested that, if this approach could be adequately systematized, this type of restoration could ultimately help support other revenue generating benefits via subsequent improvements in ranch productivity and/or associated fire, habitat, and water benefits.

Blueshift's effort on this project will be led by one of its principals, Dr. Caroline Nash, who will lead much of the project's technical work. Dr. Nash is uniquely qualified to assist with the development of ABD/BDA-based restoration projects. An expert in the field, Dr. Nash completed her PhD work investigating and evaluating hydrologic, geomorphic and ecological changes associated with the implementation of ABD/BDA-based restoration projects at the Silvies Valley Ranch in eastern Oregon, and the Diamond Cross Ranch in eastern Montana. She is one of only a handful of experts in the West that have extensively studied the hydrologic, geomorphic and ecological process effects of ABDs and BDAs, and has also been intimately involved in the design, critical review, monitoring, and evaluation of similar projects. In addition to her expertise in this area, Dr. Nash has previously designed, programmed and installed numerous hydro-meteorological monitoring networks to support environmental monitoring in conjunction with producers to help ensure installed instruments do not interfere with agricultural activities, and has conducted numerous inventories and data-gathering exercises on conservation efforts for reporting and permitting-related evaluations. This has included extensive on-site work with producers to develop and calculate project outcomes, manage projects, and develop partnerships to accomplish project goals.

C&K's efforts on this project will be led by one of its founding partners, Peter W. Culp, with support from other highly-qualified members of the C&K team. Mr. Culp is a nationally-recognized expert in Western water law, water policy, and other relevant fields, and has extensive experience with project siting, permitting, and regulatory compliance, and a broad range of private and public lands management issues.

Assuming that the Grant Application is selected for funding, Blueshift and C&K are collectively committing to provide in-kind contributions of approximately \$129,945.00. Of this, \$74,800 will be associated with contributions from Blueshift and Dr. Nash, with the balance of \$55,545 contributed from the C&K team.

To calculate the value of these contributions, we estimated the value of the services that will be provided to the project by Blueshift and C&K personnel as they would be charged based on their actual market (2023) rates. As a private consultant and principal of Blueshift, Dr. Nash's regular (market) hourly rate for 2023 is \$223/hr for services to private sector clients in her field of expertise. Ms. Ziemer's regular (market) hourly rate is \$481/hr

As a core project partner, and consistent with the public benefit mission of Blueshift and our interest in supporting innovative efforts of this type, Blueshift and C&K are committing to provide a portion of these key supporting services at no cost, including absorbing all indirect costs and the direct costs of legal research, and to provide all services at a substantial discount from our regular rates to reflect the public-interest nature of the project. After accounting for our donated and discounted services, this translates to a net discount of \$60 per hour for services provided by Blueshift (Dr. Nash), and \$161 per hour for services provided by Ms. Laura Ziemer. The actual value of these donated and discounted

services are then calculated based on the number of hours that Blueshift and C&K are committing to provide to the project (as requested by TU pursuant to their detailed budget narrative).

Estimated Value of In-Kind Contributions

Project Contribution	2023 Hourly Rate (Market)	Quantity / Hours	Estimated Value of Services (Market)	In-Kind Contribution Amount	Description
Personnel Costs					
Dr. Caroline Nash (Blueshift)	\$223	1200	\$278,496.00	\$74,400.00	Site investigations, project design, construction oversight, outreach activities, and other support as described in project budget narrative.
Ms. Laura Ziemer (C&K)	\$481	345	\$169,185.00	\$55,545.00	Legal support for implementation agreements and grant/subgrant agreements, permitting, water rights research/analysis, and other regulatory compliance, post-project review and grant compliance

We can provide further documentation related to the value of this in-kind contribution and our donated services as requested by TU. It should also be noted that these in-kind contributions also reflect a commitment not to raise hourly rates charged to the project during its 3-year term; while this will further increase the actual value of the in-kind contribution, that additional value is not claimed as part of the in-kind contribution budget above.

We greatly look forward to working with TU on this project, which we believe has significant promise as a strategy to improve degraded rangelands and stream systems, and we urge the United States Bureau of Reclamation to give this proposal the strongest possible consideration for funding.

Sincerely,

Peter Culp
 Managing Partner
 Culp & Kelly, LLP
 2901 N. Central Ave. Ste. 1800
 Phoenix, AZ 85012
 (602) 888-7011
 pculp@culpkelly.law

Ana Olaya
 Managing Director
 CK Blueshift, LLC
 2901 N. Central Ave. Ste. 1800
 Phoenix, AZ 85012
 (602) 888-7011
 aolaya@ckblueshift.com

Letters of Support and Letters of Partnership

Letters of support and partnership have been provided by Rock Springs Grazing Association and Wyoming Game and Fish Department.

THE ONLY LAND CLAIMED BY THIS COMPANY WITHIN ITS RANGE IS SUBSTANTIALLY ALL THE ODD NUMBERED SECTIONS AND VARIOUS EVEN NUMBERED SECTIONS, WHERE RIGHTS OF WAY ARE NOT ESTABLISHED TO THE PUBLIC DOMAIN THE COMPANY OFFERS TO ESTABLISH AND DEFINE SUCH RIGHTS OF WAY UPON APPLICATION TO THE SECRETARY. ALL PERSONS ARE HEREBY WARNED NOT TO TRESPASS UPON ANY PORTION OF SUCH COMPANY CLAIMED SECTIONS WHICH ARE NOT TO BE USED AS A RIGHT OF WAY TO THE PUBLIC DOMAIN.

ROCK SPRINGS GRAZING ASSOCIATION

P.O. BOX 247

ROCK SPRINGS, WYOMING 82901

rsga@wyoming.com

March 17, 2023

Bureau of Reclamation
Financial Assistance Operations
Attn: Attn: Application Review Committee TKTKTK
P.O. Box 25007, MS 84-27815
Denver, CO 80225

RE: WaterSMART Environmental Water Resources Program Grant

Dear Committee:

Rock Springs Grazing Association (RSGA) is writing to express our support of Trout Unlimited's (TU) proposal for WaterSMART grant funding for the *Sage Creek Watershed Restoration for Drought Resilience and Sediment Control Project*. The project, which has been shared with Rock Springs Grazing Association (RSGA), plans to do sediment control and aquifer recharge work on Sage Creek by installing aggradation structures along lower Sage Creek, where RSGA is the landowner and lessee, and installing an artificial barrier to prevent upstream migration of invasive rainbow trout near the confluence with the reservoir, also on RSGA ground.

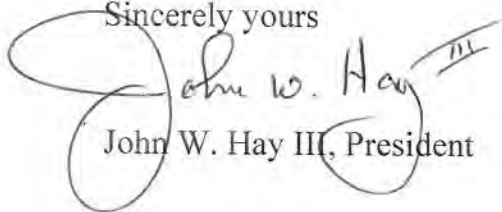
RSGA manages nearly two million acres of deeded and leased lands in southwestern Wyoming. For over 120 years, RSGA has been implementing best rangeland and grazing management practices in partnership with the BLM, USFS, State of Wyoming and Sweetwater County on the checkerboard grounds in Sage Creek Drainage. RSGA contributes to the high value recreational opportunities in the area by allowing access to citizens for hunting, fishing, and has partnered with WGFD, BLM and TU in the past on projects to improve riparian areas and restore habitat for Colorado River cutthroat trout. As a result of this legacy of leadership, vision, and management, RSGA was awarded the Landscape Stewardship Certification of Appreciation and Citation by the Public Lands

Foundation; Landowner of the Year by Wyoming by Game and Fish; and Rangeland Management Stewardship Award by BLM. The proposed projects would build on the long-standing work RSGA does to promote science-based management of whole landscapes.

TU has had ongoing conversations with leadership at RSGA with regards to the proposed projects and has incorporated feedback from RSGA to make sure the projects align with RSGA's needs and benefit from RSGA's experience with similar structures in the region. We appreciate TU's proactive efforts on this and other projects to engage private landowners and to help advance collaboration among the federal, private, and state interests in the watershed.

If Reclamation chooses to fund this grant, we have indicated to TU that RSGA will provide access to the ground in the project areas and collaborate with them on finalizing project designs.

Sincerely yours

A handwritten signature in cursive script that reads "John W. Hay III". The signature is written in dark ink and is positioned above the printed name. The "I" in "III" is written as a small superscript.

John W. Hay III, President



WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

Phone: (307) 777-4600 Fax: (307) 777-4699

wgfd.wyo.gov

GOVERNOR
Mark Gordon

DIRECTOR
Brian R. Nesvik

COMMISSIONERS
Ralph Brokaw-President
Richard Ladwig-Vice President
Mark Jolovich
Ashlee Lundvall
Kenneth D. Roberts
John J. Masterson
Rusty Bell

March 20, 2023

Bureau of Reclamation
Financial Assistance Operations
Attn: Application Review Committee
P.O. Box 25007, MS 84-27815
Denver, CO 80225

To: Bureau of Reclamation
RE: WaterSMART Environmental Water Resources Program Grant

Please accept this letter of commitment from Wyoming Game and Fish Department (WGFD) for Trout Unlimited's (TU) proposal for WaterSMART grant funding for the *Sage Creek Watershed Restoration for Drought Resilience and Sediment Control Project*. The project, on which WGFD has provided comments and feedback, has the stated aims of accomplishing sediment control in tandem with aquatic habitat and valley floor restoration through the installation of an artificial barrier near the confluence with the reservoir, aggradation structures along lower Sage Creek, beaver dam analogs on Trout Creek; and riparian planting and cheatgrass management throughout the project area.

WGFD has lead and participated in several long-standing research, management, and monitoring projects within the Sage Creek Watershed. WGFD has recently partnered with TU to install steel jack fencing on Trout and Gooseberry creeks to enhance riparian woody vegetation, and cut/hailed aspen to active beaver on Trout Creek to encourage stable dam building (2017). WGFD also has extensive experience designing and administering cheatgrass management projects and contracts. The proposed project broadly aligns with strategies and objectives outlined in the Statewide Habitat Plan (2020), State Wildlife Action Plan (2017), Wyoming Mule Deer Initiative (2018), and habitat requirements for Sage Grouse that were prioritized in Executive Order 2019-3 (replacing 2015-4 and 2017-2)

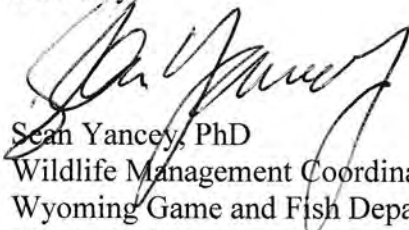
Provided that the project team commits to a collaborative design process that engages WGFD and considers implications for fish and wildlife under WGFD's management, WGFD commits to contributing time from our Green River Terrestrial Habitat Biologist and Wildlife Biologist to assist in writing and administering grants/contracts for cheatgrass management in the project area and to carry out wildlife monitoring activities that will contribute to project benefit evaluation.


A commitment from a WGFD Fisheries Biologist is also anticipated for individual project site visits, coordination with project partners, and providing formal comments for permitting of instream improvements.

Project Contribution	Unit Cost/Hourly Rate Equivalent	Quantity /Hours	Estimated Value	Description/Notes
Personnel Costs				
Terrestrial Habitat Biologist	\$360/day	10 days	\$3,600	Oversight of grants/contracts for cheatgrass treatments. Project site visits and partner coordination.
Wildlife Biologist	\$360/day	14 days per year @ 3years	\$15,120	Annual Big game classification surveys, and JCR data summary and reporting. Sage grouse lek surveys and reporting.
Fisheries Biologist	\$360/day	10 days	\$3,600	Project site visits, project coordination, permitting comments
Other Costs				
Terrestrial Habitat Biologist	.56/mile	6 trips	\$370	110 mile round trips to project site from Green River, WY office.
Wildlife Biologist	.56/mile	4 trips/yr 12 total trips	\$806	120 mile round trips to project site from Green River, WY office.
Fisheries Biologist	.56/mile	5 trips	\$308	110 mile round trips to project site from Green River, WY office.

In the event that Reclamation chooses to fund this grant, we have indicated to TU that WGFD would work with the project team to engage in detailed design work and implementation planning.

Sincerely,


 Sean Yancey, PhD
 Wildlife Management Coordinator
 Wyoming Game and Fish Department
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 Green River, WY 82935
 307-875-3223


 Robert Keith
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SY/RK/ks

cc: Nick Walrath, TU Green River Project Coordinator
 Todd Graham, WGFD Regional Wildlife Supervisor
 Patrick Burke, WGFD Wildlife Biologist
 John Walrath, WGFD Fisheries Biologist
 Kevin Spence, WGFD Terrestrial Habitat Biologist