

Abrams Creek Project

Cutthroat Habitat Flow Restoration and Irrigation Efficiency Project

Eagle River Watershed Council

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Executive Summary

Date of Submission: February 15, 2017

Organization: Eagle River Watershed Council

County: Eagle

City, State: Eagle, Colorado

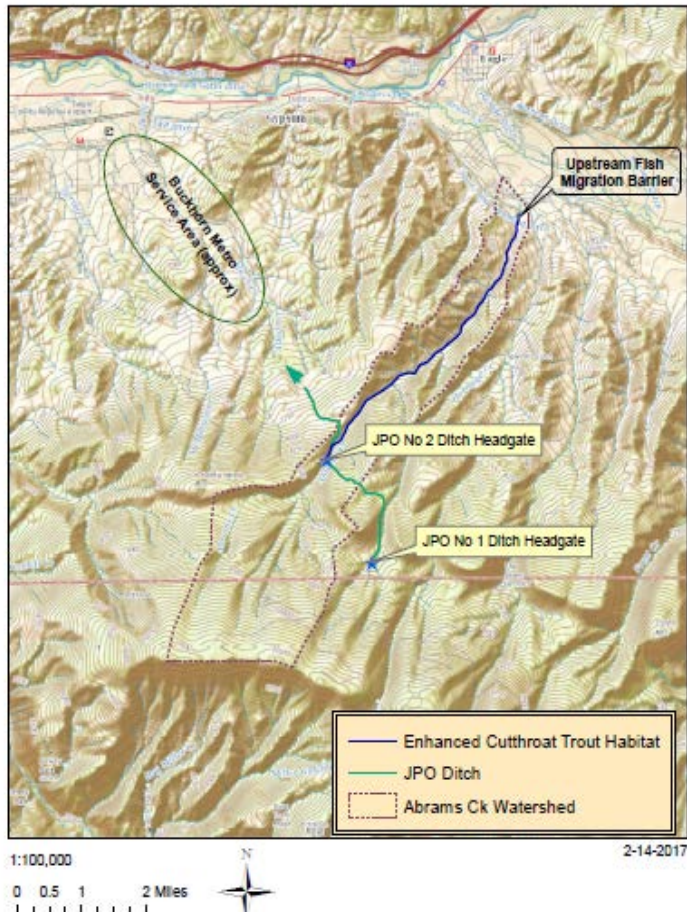
Length of Project: Two years beginning May 1, 2017

Estimated Completion Date: July 1, 2019

The Abrams Creek project will implement a local solution to improve the ecological resilience of Abrams Creek and its riparian area; conserve water for multiple uses; and reduce conflicts over water through a collaborative conservation effort. The project satisfies three of the seven eligible projects outlined by the Bureau of Reclamation WaterSMART program's FOA. These include improving stream channel structure and complexity, improving ecological resilience through water conservation activities, and improving ecological resilience through water management activities. It is through a collaborative management plan and grant funding that this project will increase stream flows for the benefit of a Core Conservation population of Green-Lineage cutthroat trout in Abrams Creek, a stream in the Upper Colorado River basin near Eagle, Colorado. The portion of Abrams Creek where the project is located is entirely within lands managed by the Bureau of Land Management (BLM). Increased flows will also widen the riparian area, increase canopy cover, and enhance habitat for terrestrial insects, an important food source for resident cutthroat. Flows will be increased through the installation of a pipeline that will improve the efficiency of water delivery to irrigated lands managed by Buckhorn Valley Metropolitan District (Buckhorn), thereby reducing the amount of diversion needed from Abrams Creek. Grant funds will be used to pipe portions of the JPO Ditch.

Background Data

Abrams Creek Cutthroat Trout Project Overview Map



Abrams Creek originates on the northeastern flank of Hardscrabble Mountain approximately seven miles southwest of the Town of Eagle. This project covers a reach that starts at the headwaters and extends downstream to the confluence with Brush Creek. The confluence with Brush Creek is located within the Eagle town limits. The BLM and U.S. Forest Service manage the upper 3.5 miles of the creek, while the lower 1.8 miles are located on private lands and lands managed by the Town of Eagle. The project is on BLM land exclusively.

The project includes installation of a new diversion structure at Abrams Creek, in the same location originally constructed by Julius Olsen in 1906. The two 3.0 cfs water rights were decreed under two pre-Compact priorities (1908 and 1916). The current ditch owner is Buckhorn. The past and current uses for the JPO ditch are identified by the State of Colorado's District Court, Water Division No. 5 and include irrigation, piscatorial, recreation, dust control, and other construction uses. The ditch diverts water in the middle of the territory occupied by a special population of native trout.

Abrams Creek supports a core conservation population of Green-Lineage cutthroat trout (*Oncorhynchus clarkia pleuriticus*) that is the only known aboriginal cutthroat population in the Eagle River watershed. One of a few remnant indigenous populations left in the Upper Colorado River, the Abrams Creek Green-Lineage cutthroat trout population was not only found to be genetically pure, it also possesses a unique haplotype that is genetically more distinct than other populations – making a significant contribution to the genetic diversity of cutthroat trout species and the local lineage. Furthermore, Abrams Creek cutthroat are distinctive because they reside in a relatively low elevation drainage, giving them probable adaptations to warmer temperatures and drought conditions that may benefit reintroduction efforts in the face of climate change.

State and BLM biologists have determined that low flows are a limiting factor for the Abrams Creek cutthroat trout population. The JPO Ditch significantly reduces Abrams Creek flows, sometimes completely drying up the stream. In the spring, diversions reduce flows needed to flush sediment, scour pools, and maintain the riparian corridor. In the summer, low flows reduce wetted habitat, affect habitat connectivity and availability and result in increased stream temperatures. Increasing peak flows would help flush fine sediments through the system, therefore improving and possibly increasing spawning habitat, as well as pool depths which provide refuge in warm summers and cold winters. Increased flows would allow for riparian area widening, increase canopy cover, and enhance habitat for terrestrial insects, an important food source for resident cutthroat.

Ultimately, the goals of the project include boosting the resiliency of the existing cutthroat trout population, protecting the future of expansion efforts for the aboriginal cutthroat trout within the Eagle River watershed, enhancing water use efficiency for all stakeholders involved, improving ecological resiliency of Abrams Creek as a whole, and establishing a model for collaborative watershed management actions in future watershed improvement efforts.

Eagle River Watershed Council has not received funds from the Bureau of Reclamation in the past, to the knowledge of the current staff.

Project Description

According to CPW, preservation and improvement of the Abrams Creek cutthroat trout population is one of the highest priorities for cutthroat conservation efforts in Western Colorado. This valuable population is limited by reduced flows due to diversions by a single irrigation ditch, the JPO Ditch. This relatively small diversion of 3.0 cfs truncates about 50% of the useable cutthroat trout habitat in Abrams Creek. In dry years, the ditch has historically taken all of the water from the creek with long lasting impacts on the trout population. Because the ditch takes Abrams Creek water to a different drainage, none of the water lost to leakage returns to Abrams Creek.

Trout Unlimited, Eagle River Watershed Council and CPW have partnered with Buckhorn, the ditch owner, in an effort to improve flow conditions in Abrams Creek while respecting Buckhorn's irrigation rights. The partners, with grant support, are proposing to pipe portions of the ditch. This is expected to improve delivery efficiency by 40%, which is the estimated current loss to leaks prior to the water reaching Buckhorn's irrigated lands. In exchange, Buckhorn will reduce Abrams Creek diversions by 40% and will curtail all diversions if creek flows fall below 1.25 cfs. This arrangement will become a covenant running with the land and will be effective in perpetuity – even if the desired 40% delivery efficiency is not reached. The added flows will be protected by an instream

flow water right expected to be appropriated by the Colorado Water Conservation Board (CWCB) for the benefit of the Abrams Creek cutthroat trout fishery. The flows will also be protected by virtue of the fact that the reach of Abrams Creek occupied by the trout population is entirely within USFS and BLM lands.

The total efficiency savings is estimated to average ~300 acre-feet per year, which will be translated directly into increased streamflow in Abrams Creek. The approximate 300 AF/yr savings is valued at \$2.9 million over 100 years based upon the lease value of irrigation water in the Eagle River basin.

Increasing flows is expected to increase resiliency within the cutthroat trout population and, potentially, allow it to expand. If successful, the Abrams Creek cutthroat trout will aid reintroduction efforts elsewhere in the Eagle River watershed.

The project's technical aspects include installation of approximately 21,790 linear feet of 18-inch fused-joint HDPE pipe and related structures as specified in the Final Design and Construction Plans (available upon request). Simultaneously, the contractor will commence construction of the head gate and fish screen. This work will likely occur at the very end of the season (September to October). More details are included in section D: Project Implementation.

The project aligns with established species conservation and restoration plans in a number of ways. First, the project aligns with the conservation strategies for the Upper Colorado River by addressing threats to native fishes – in particular, diversions and canals, land and water quality degradation, and climate change. Second, the project addresses the primary goal of the range-wide conservation strategy for Colorado River cutthroat trout (CRCT Coordination Team 2006) by increasing the likelihood of long-term persistence of the species. Specifically, it addresses five of the 11 conservation strategies identified for CRCT: *secure* genetically pure populations (Strategy 2), *restore and enhance* (Strategy 3) populations with distinct life-history traits, *monitor and maintain watershed conditions* (Strategy 6) to ensure long-term persistence of cutthroat populations, and *improve habitat* (Strategy 7) by securing adequate instream flows to protect cutthroat habitat and water quality, and *monitor land management actions* (Strategy 11) to evaluate the administrative restoration of Abrams Creek by increasing both water delivery efficiency and in-stream water availability. Third, the proposed project aligns with state-level management plans and agreements. Particularly, Colorado's Comprehensive Wildlife Conservation Strategy (CDOW 2006), which designated Colorado River cutthroat trout a conservation priority by maintaining and restoring cutthroat habitat and controlling nonnative fish. It also ensures that objectives in the 2006 Conservation Agreement for Colorado River Cutthroat Trout are being met, including: securing and enhancing conservation populations, protecting watershed conditions, and expanding cutthroat trout in their native streams.

Eagle River Watershed Council will raise awareness about the historic project and its numerous and varied benefits within the community. The Watershed Council will also provide site visits to the project to discuss the successful implementation of the collaborative initiative and will provide a forum for similar opportunities throughout the watershed.

Anticipated outcomes for the project include increasing available flows to boost the resiliency of the existing cutthroat trout population, protecting the future of expansion efforts for the aboriginal

cutthroat trout within the Eagle River watershed, improving water use efficiency for all stakeholders involved in the project, strengthening the ecological resiliency of Abrams Creek as a whole, and establishing a model for collaborative watershed management actions in future watershed improvement efforts and projects.

Evaluation Criteria

Evaluation Criterion A: Watershed Restoration Planning

- *Describe your watershed restoration plan.*

The Eagle River Watershed Plan was first adopted in 1996 and then updated in 2013. It provides information, goals, strategies and action items related to water and land management practices in the Eagle River basin. It also discusses issues and opportunities associated with the Colorado River as it flows through the northwestern portion of the county.
- *When was the restoration plan prepared and for what purpose?*

Starting in 2010, it was agreed that given the nature of lifestyles and the economy in Eagle County, the loss of healthy aquatic ecosystems in the basin would have negative and far-reaching implications. Participants in the planning process voiced a strong desire for coordinated action, and for more information regarding water supply and demand, water quality, wildlife habitat, recreational impacts, and water-related land use practices. In 2013 the updated Eagle River Watershed Plan was published to address these desires.
- *What types of watershed management issues are addressed in the plan? For example, does the restoration plan address water quantity issues, water quality issues, and/or issues related to ecosystem health or the health of species and habitat within the watershed?* The 2013 Eagle River Watershed Plan is organized around five water-related topics: Quantity, Quality, Land Use, Wildlife and Recreation. There is also a chapter devoted to the status of the Colorado River, which was not included in the 1996 Plan. The foundation of the Plan is a series of vision statements, developed by a Partnership Advisory Team (PAT) with the help of interested stakeholders. Each chapter of the Plan provides an overarching goal, a background discussion, and a list of recommended objectives, strategies and actions that can be employed to retain or achieve desired conditions.
- *Who was involved in preparing the plan? Was the plan prepared with input from stakeholders with diverse interests (e.g., water, land or forest management interests, or environmental, agricultural, municipal, tribal, recreation uses)? What was the process used for interested stakeholders to provide input during the planning process?* Local governments initiated the 1996 Eagle River Watershed Plan after protection of the Eagle River was identified as a top community concern through town and county master planning forums and surveys. The perception among local citizens and community leaders at the time was that the Eagle River and its tributaries were a tremendous asset

that had been negatively impacted by historic mining and increasing development. Their concerns were focused primarily on water quality, water quantity, habitat, aesthetic quality, and impacts from adjacent land use and recreation. Those concerns continue to be expressed today. Additionally, a number of stream segments in the county have been identified by the State Water Quality Control Division as impaired or potentially impaired due to the presence of metals, sediment, or other contaminants affecting aquatic life.

The decision in 2010 to update the Eagle River Watershed Plan was based on a strong belief in the continued relevance and value of it to Eagle County and its water resource partners, especially given the magnitude of changes that had occurred since adoption of the original Plan in 1996. The process of updating the Plan began with the production of a State of the Rivers Report in 2010. This effort included research and compilation of data regarding water issues on the Eagle River and all of its major tributaries, as well as on the Colorado River. Six public open houses were held in different communities to gather input on important watershed issues. Citizen's at-large, property owners, business owners, rafting, fishing and other special interest groups, government officials and water and wastewater providers participated in these sessions. The State of the Rivers Report exists as a separate document, and can be found at www.erwc.org.

Eagle River Watershed Council (ERWC) facilitated both the State of the Rivers Report and the Watershed Plan update process, with assistance from Eagle County planning staff. Work to update the Plan began in earnest in January of 2011, utilizing a public process that included the PAT made up of local water experts, planners, officials and stakeholders. The PAT began reviewing text and information proposed for each chapter of the updated plan. Over the course of numerous meetings, the group discussed water-related topics and strategies, and helped to develop a draft, which was delivered to the Eagle County Planning Commission for preliminary consideration in early 2012.

Additional adjustments were made by the Planning Commission prior to the Plan being released for public review. A 30-day public referral period commenced on July 20, 2012. The first official adoption hearing was held on September 5, 2012, followed by additional hearings in October, November, and January. During these meetings all public comments were considered, and additional revisions occurred. Text was finalized and the Eagle County Planning Commission adopted the updated Eagle River Watershed Plan on May 15, 2013.

- *If the restoration plan was prepared by an entity other than the applicant, explain why the watershed group applying did not prepare its own plan. In cases where the applicant did not prepare the restoration plan, the applicant must provide documented support for the proposed project by the entity that authored the plan.*

Eagle River Watershed Council (applicant and fiscal agent for this grant) prepared the Plan.

- *Describe how the existing restoration plan provides support for your proposed watershed management project.*

- *Does the proposed project implement a goal or need identified in the restoration plan?*

This project aligns with **all** of water quantity issues and concerns listed in the Eagle River Watershed Plan:

- The need to assess impacts on the watershed from increasing water supply demands.
- The need for flows for rivers and streams in the Eagle River watershed that adequately protect and enhance ecological health and recreational uses.
- The need for uniformly implemented management strategies that protect and enhance instream flows.
- The need for up-to-date water supply information and improved education.
- The need for increased cooperative water and land use planning between water providers and local land use decision makers.

In response to the identified issues and concerns, the following objectives were developed in the watershed plan. All of the following objectives have been adopted for the Abrams Creek project.

1. Manage water storage, water diversions and water releases within the Eagle River watershed in a manner that protects or enhances stream health and recreational uses.
2. Minimize and/or mitigate adverse impacts to stream flows from existing development and future growth.
3. Continue to collect and make available comprehensive water quantity and stream flow information, increasing awareness of the social, ecological and economic importance of maintaining adequate flows in local streams and rivers. Water Quantity Goal: Streams, rivers, lakes and reservoirs in the watershed are managed and cared for in a manner that insures adequate amounts of water for domestic, agricultural, recreational and ecological needs to the greatest degree possible at all times of year.
4. Create a collaborative and transparent system of administration, oversight and decision-making between government entities and affected management agencies on matters pertaining to water quantity.

- *Describe how the proposed project is prioritized in the referenced restoration plan.*
Since the restoration and water use efficiency improvements on Abrams Creek fall within every water quantity objective in the Watershed Plan, the project benefits multiple stakeholders, and because the preservation and improvement of the Abrams Creek cutthroat trout population is one of the highest priorities for cutthroat conservation efforts in Western Colorado, this project is one of the highest priorities in fulfilling the Watershed Plan.

Evaluation Criterion B: Project Benefits

- *Describe the expected benefits of the proposed project. Address all of the following sub-bullets that apply to the project (the described benefits are not listed in order of priority). In your responses, describe the extent and significance of the benefits associated with the project, including the geographic extent, the magnitude of expected project, and the significance of the benefits to addressing important issues within the watershed. Project benefits should be supported and quantified where appropriate, including support for the type of project and the methodology. Support for project benefits can include the existing watershed restoration plan, or other relevant planning efforts, research and science.*
 - *Will the project make more water available to meet water needs, or make water available at a more advantageous time or location? If so, how and to what extent?*

The project will make more water available to meet the Abrams habitat and cutthroat trout needs. Once the project is completed, 40% of water formerly diverted out of the Abrams Creek basin by the JPO Ditch for delivery to Buckhorn's irrigated lands will stay in Abrams Creek for the benefit of the fishery. No water will be diverted if flows in Abrams Creek are at or below 1.25 cfs. The project will also deliver water to irrigated lands in a more efficient manner. This arrangement will become a covenant running with the land and will be effective in perpetuity. It is estimated that the arrangement will yield, on average, approximately 300 acre-feet per year for the benefit of Abrams Creek.
 - *Will the project result in long-term improvements to water quality? For example, will the project decrease sediment or nutrient pollution, improve water temperature, or mitigate impacts from mining or wildfires? If so, how and to what extent?*

State and BLM biologists have determined that low flows are a limiting factor for the Abrams Creek cutthroat trout population. The JPO Ditch sometimes completely dries the stream. In the spring, diversions reduce flows needed to flush sediment, scour pools, and maintain the riparian corridor. In the summer, low flows reduce wetted habitat, affect habitat connectivity and availability and result in increased stream temperatures. The increased flows in Abrams Creek from the project implementation will help to address these water quality concerns.
 - *Will the project benefit aquatic or riparian ecosystems within the watershed? For example, will the project reduce flood risk, reduce bank erosion, increase biodiversity, preserve native species, or mitigate wildfire impacts? If so, how and to what extent?*

Increased flows will also allow for riparian area widening, increase canopy cover, and enhance habitat for terrestrial insects, an important food source for cutthroat. Flows will be increased by reducing irrigation diversions through the installation of a pipeline that will improve the efficiency of water delivery to irrigated lands managed by Buckhorn, thereby reducing the amount of diversion needed from Abrams Creek. Increasing peak flows would help flush fine sediment through the system, therefore improving and possibly increasing spawning habitat, as well as pool depths which provide refuge in warm summers and cold winters.

- *Will the project benefit specific species and habitats? If so, describe the species and/or type of habitat that will benefit. How and to what extent will the project benefit the species or habitat? Please explain the status of species and habitat that will benefit (e.g., native species, game species, federally threatened or endangered, state listed, and whether critical habitat has been designated).* Abrams Creek supports a unique population of Green-Lineage Colorado River cutthroat trout (*Oncorhynchus clarkia pleuriticus*) that is the only known aboriginal cutthroat population in the Eagle River watershed. The Abrams Creek Green-Lineage cutthroat trout population is genetically pure and possesses a unique haplotype that is genetically more distinct than other Green-Lineage cutthroat populations. This population significantly contributes to the genetic diversity of cutthroat trout species and the local lineage. Abrams Creek cutthroat are also distinctive because they reside in a relatively low elevation drainage, suggesting this population is better adapted to warmer temperatures and drought conditions that may benefit reintroduction efforts in the face of climate change. Please see the Project Description section of this application for specific strategies in the CRCT accomplished by this project.
- *Will the project benefit multiple water uses within the watershed (e.g., municipal, agricultural, environmental, tribal, recreation uses)? If so, how and to what extent?* Eagle River Watershed Council, Trout Unlimited, BLM and Colorado Parks and Wildlife have partnered with Buckhorn Valley Metropolitan District (the ditch owner) in an effort to improve flow conditions in Abrams Creek while respecting Buckhorn's irrigation rights. This collaborative effort benefits Buckhorn, the ecosystem of Abrams Creek and conservation efforts to protect and expand populations of Green-Lineage cutthroat trout.

The project will also benefit the Town of Eagle, which will see additional flows in Brush Creek, its source of water supply. Although this is not an astronomical amount of water, it will have beneficial impacts on municipal water supplies, as well as agricultural, environmental and recreational uses.

- *Will the project benefit watershed stakeholders in ways not addressed in the preceding questions? If so, how? Will the project reduce water conflicts within the watershed? Will the project increase resiliency to drought? Will the project provide benefits other water uses not mentioned above? If so, how and to what extent?* The project is a partnership between the Buckhorn, Colorado Parks and Wildlife, BLM, Trout Unlimited and Eagle River Watershed Council. The project is an example of how irrigators, conservation interests, and regulatory agencies can work together to achieve outcomes that are beneficial to all and are respectful of property rights. By increasing the resiliency and potentially expanding the habitat of a species of particular concern, the project furthers recovery of threatened species, thereby

reducing future conflict and water use restrictions and meeting the goals of the Colorado Water Plan and the Colorado River Basin Roundtable's Implementation Plan. The collaborative project also provides an opportunity for education about water issues and solutions within the Eagle River watershed raising awareness of not only this special native population, but about water quantity and quality as well.

- *Will the project address multiple issues of concern within the watershed (e.g., both water supply and fish habitat issues)?* The project addresses issues with a protected species in a manner that fully preserves the use of a pre-Compact water right. By improving efficiencies which leave more flows for protected species and riparian habitat improvements without reducing irrigation use, the project also promotes maximum utilization of state waters.

Evaluation Criterion C: Stakeholder Support

- *Please describe the level of stakeholder support for the proposed project. Are letters of support from stakeholders provided (see Section D.2.2.8. Letters of Support)? Are any stakeholders providing support for the project through cost-share contributions, or through other types of contributions to the project?*

There is extensive and varied stakeholder support for this project. Agencies and organizations providing letters of support include Colorado Parks and Wildlife, Bureau of Land Management, U.S. Forest Service, State Representative Diane Mitsch Bush, U.S. Senator Michael Bennet, Eagle County Board of County Commissioners, Trout Unlimited and its Eagle Valley Chapter, Eagle Valley Land Trust, Town of Gypsum, Buckhorn Valley Metropolitan District, the water counsel for Buckhorn (Porzak, Browning & Bushong), American Rivers and the Colorado River Basin Roundtable.

In addition to letters of support, Colorado Basin Roundtable has granted \$45,000 for the project and recommended to the CWCB to approve our request for \$405,000 out of the statewide Water Supply Reserve Account fund. BLM has committed \$10,000 and CPW is committing \$22,000. In addition to the water for the project, Buckhorn Valley Metropolitan District is providing legal and engineering services to help facilitate the project. Buckhorn has already invested the amount of \$300,000. If the project costs exceed \$1.2 million, Buckhorn will cover the expenses above and beyond that amount. This is further outlined by the Buckhorn and TU agreement (attached). Trout Unlimited, CPW and Eagle River Watershed Council are providing significant in-kind contributions. Trout Unlimited has invested over \$150,000 in in-kind services so far.

- *Please explain whether the project is supported by a diverse set of stakeholders (appropriate given the types of interested stakeholders within the watershed and the scale, type and complexity of the proposed project). For example, is the project supported by entities representing environmental, agricultural, municipal, tribal, or recreation uses?*

In addition to having the support of U.S. Representatives Jarod Polis and Scott Tipton, U.S. Senator Michael Bennet, and State Representative Diane Mitsch Bush, this project also has a very diverse stakeholder group with support from federal agencies (Bureau of Land Management and U.S. Forest Service), state agencies (Colorado Parks and Wildlife), regional agencies (Colorado River Basin Roundtable), Eagle County, the Town of Gypsum, Buckhorn Valley Metropolitan District, the water counsel for Buckhorn (Porzak, Browing & Bushong), and nonprofit environmental and recreational groups, such as American Rivers, Eagle Valley Trout Unlimited, and Eagle Valley Land Trust. As the project moves forward, the project partners will broaden its outreach to include additional stakeholders in the process.

- *Is the project supported by entities responsible for the management of land, water, recreation, or forestry within the watershed? Is the project consistent with the policies of those agencies?*

Yes. The entire project is located on BLM land. BLM is supporting the project as evidenced in their letter of support and will provide funding in the amount of \$10,000. The project is consistent with BLM policies.

Buckhorn will be primarily responsible for final design, permitting, and construction of the JPO pipeline and associated structures (“JPO Pipeline Project”). Once the JPO Pipeline is constructed, Buckhorn will be responsible for its operation and maintenance. Thus far, Buckhorn has spent \$300,000 in legal and engineering services, which is a significant in-kind contribution for the project. A letter of support explaining Buckhorn’s support of the project is included in the attachments. Buckhorn plans on continuing their direct participation with this process.

- *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.*

No opposition to this project has been documented.

- *Will the proposed project complement other, ongoing watershed management activities by state, Federal, or local government entities, nonprofits or individual landowners within the watershed? 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 project will act as a model for other water efficiency projects throughout the watershed and Eagle County. For instance, Eagle River Watershed Council has partnered with Eagle County Conservation District and SGM, an engineering firm, on a large scale project to improve agricultural ditches and their efficiency throughout Eagle County. A ditch assessment was completed by SGM in 2016 on 25 different ditches in both the Eagle River and Colorado River watersheds. Using the Abrams Creek project as a model, collaborative initiatives with multi-use benefits will take precedent in prioritization of ditch improvements. Varied stakeholders will work together to improve water systems for

multiple purposes and benefits. Ultimately, the improvements will culminate with increased awareness, improved water efficiency practices, increased instream flow rates, and overall watershed improvement.

Evaluation Criterion D: Project Implementation

- *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.*

Task 1- Permitting (September 1, 2017 to June 1, 2018)

Description of Task: Once funding is in-place, Buckhorn will finalize permitting with the Bureau of Land Management (BLM) and US Army Corps of Engineers (USACE).

Method/Procedure:

BLM Permitting. Buckhorn has had numerous pre-application project planning meetings with BLM, including extensive on-the-ground location and construction methods discussions. In addition, much of the evaluations associated with BLM's permitting have already been conducted. Buckhorn will file the appropriate permit applications with BLM and will complete analyses needed, if any, to finalize the permitting process. Buckhorn will meet with BLM staff as needed to complete the process.

USACE Permitting. The project will involve some wetlands modifications permitting at the JPO Ditch diversion structure. Buckhorn has held introductory discussions with the USACE Grand Junction field office staff. Buckhorn will file the appropriate permit applications with the USACE and will complete analyses needed, if any, to finalize the permitting process. Buckhorn will meet with USACE staff as needed to complete the process. It is hoped that the field environmental officers will support a 'Nationwide Permit' process, which would substantially shorten the review period. This work will be performed concurrently with the BLM permitting, with the goal being simultaneous finalization of permits in 60-90 days.

Deliverables: BLM and USACE permit applications and supporting permitting documents.

Task 2 - Final Design and Construction Plans (September 1, 2017 to June 1, 2018)

Description of Task: Complete final design and construction plans for the project; select and sign contracts with one or more contractors to install the pipeline and conduct associated work.

Method/Procedure: Concurrent with permitting (Task 1 above), Buckhorn and its engineers will finalize the details of the construction plans, identify final construction staging areas and construction sequence, and enter into contracts with one or more contractors to conduct the on-the-ground work.

Deliverables: Final Design and Construction Plans. Final documents will include the provisions required by BLM and USACE permits.

Task 3 – Construction of Project (July 1, 2018 to July 1, 2019)

Description of Task: Install approximately 21,790 linear feet of 18-inch pipeline and related structures as specified in the Final Design and Construction Plans. While the project route is rugged terrain and presents challenges, Buckhorn anticipates using materials and methods that will allow the project to be constructed in the post-runoff season, before hard winter sets in. Construction materials and equipment will be staged and ready to work, starting about mid-July of the construction year. Fused-joint HDPE pipe will be used to allow the contractor to assemble lengths of 1000' feet or more, and 'drag' the pipe into position in the existing channel. Simultaneously, when flow in the Abrams channel drops to a reasonably low rate, the contractor will commence construction of the head gate and fish screen. This work will probably be at the very end of the season, September to October.

Method/Procedure:

A. Pre-Construction Mobilization and Staging

The District has construction easements and owns the lands surrounding the Buckhorn Reservoir, which will be where the contractor can accept delivery of materials and can store and stage equipment. This area is serviced by an all-weather accessible road, within ¼ mile of paved public street. The contractor will have ample room also to start preassembly. The HDPE pipeline material will be pre-assembled in multiple-joint sub-assemblies for later relocation to upstream staging areas and near the Abrams Diversion location. The contractor will accept periodic deliveries from nearby supply yards, in keeping with the sequence of construction, thus the area to be disrupted for mobilization and staging will be kept to about 1 acre, although much more land is available as needed.

From the reservoir, the contractor will transport sub-assemblies, and lay them out beside the JPO ditch alignment. Pipe installation will commence at the east side of Buckhorn Reservoir and progress upstream. By this sequence, and because of the ability of the District to stage the materials as needed, disruption of the BLM 'landscape' will be minimized. As construction proceeds upstream, the contractor will relocate equipment as needed to subsequent staging areas and Abrams Diversion area.

B. Pipe Installation

The project engineers and consulting contractor have selected the pipeline material HDPE, because of its high-strength, competitive pricing, and particularly, the ease of installation. HDPE pipe is lightweight enough to be easily handled by installers with lightweight and small footprint equipment. The HDPE pipeline will be assembled at staging areas and pulled into place, then backfilled to cover, protect and prevent erosion.

In-channel check dams will be located during construction, based on grade changes and channel sections in order to prevent channel erosion and incision. These check dams will be constructed with native soils, rocks and brush, trees, and native materials so that rainfall and runoff will be slowed and detained. In some locations, these check-dams will be more "formalized" with local rocks.

C. Erosion Control and Re-Vegetation.

All construction work will be compliant with State of Colorado and Eagle County Stormwater Pollution Protection guidelines operating under an approved Stormwater Pollution Protection Plan, and monitored by Buckhorn's engineers and construction supervisors. Typical guidelines are included in the State's guidelines, and further details will be included in the BLM and USACE permit stipulations.

Revegetation will be carried out by the Contractor, also in accordance with the permit restrictions of BLM and USACE. In particular, the project will comply with applicable sections of the "BLM Northwest Colorado District Recommended Outline for Surface Reclamation Planning" as may be directed by BLM when construction occurs on BLM lands.

D. Reconstruction of Diversion Structure at Abrams Creek.

The project includes installation of a new diversion structure at Abrams Creek, in the same location originally constructed by Julius Olsen back in 1906. As part of this project, the Abrams instream flume will be improved; the current in-channel flume needs to be enlarged for early season flows, which frequently inundate the entire flume, with significant bypass flow. Improvement of the flume will also improve fish passage. The downstream flume, at the head of JPO2 is going to be replaced. Over the years, the flume has become inadequate and insufficient for the purposes of monitoring and reporting the flow management per the TU-Buckhorn project agreement.

The four components to be built in the Abrams Diversion are:

1. The Abrams Channel flume upstream from the diversion
2. The diversion control headgate to control the diversion flow in accordance with the operating agreement
3. The fish screen to keep the cutthroat trout in the Abrams habitat, not washed down in the JPO2 channel
4. The JPO2 flow measuring flume for monitoring actual diversion to JPO2

Because of the remote location, the project engineers, in concert with CPW biologist, Kendall Bakich, have chosen a self-cleaning design manufactured in Colorado, designed and developed by a member of the Colorado State engineering faculty.
(<http://www.corrugatedwaterscreens.com>)

Deliverables: Final report describing project as-built.

Task 4 – Monitoring (September 1, 2017 to July 1, 2019)

Description of Task: Monitor stream conditions to evaluate impact on stated goals

Method/Procedure: Develop a monitoring plan to measure flow improvement and its effects. The plan will include evaluation of physical habitat (including wetted widths, pool frequency, depths, and sediments); stream temperature; macroinvertebrate surveys; and fish surveys.

Deliverables: Monitoring Plan

- Include a detailed project budget outlining costs for specific tasks.

BUDGET AND TIMELINE						
Task	Description	Target Start Date	Target End Date	WSRA Funds	Other Funds/In-Kind	Total
1	Permitting	09-01-17	06-01-18	\$33,400	\$44,000	\$77,400
2	Final Design and Construction Plans	09-01-17	06-01-18	\$43,400	\$54,000	\$97,400
3	Project Construction	07-01-18	07-01-19*	\$351,500	\$805,000	\$1,156,500
4	Monitoring	09-01-17	07-01-19	\$21,700	\$27,000	\$48,700
Total				\$450,000	\$930,000	\$1,380,000

The total cost of the project is estimated at \$1,380,000. Eagle River Watershed Council respectfully requests \$90,000 from the Bureau of Reclamation through the WaterSMART Grant Program. This amount constitutes approximately 6.5% of the total cost of the project, with the remaining 93.5% to be derived from other sources including federal, state sources, local government, private grants (corporate and foundations), in-kind and individual donors. Current estimates from these other sources are as follows:

Funding Sources	Amount
Non Federal Entities	
Colorado Basin Round Table (Committed)	\$45,000
CWCB WSRA Fund (Pending)	\$405,000
Western Native Trout Initiative (to be applied for)	\$100,000
Colorado Parks and Wildlife	\$22,000
Private Grants (to be applied for)	\$130,000
Local Governments (to be applied for)	\$50,000
Individual Donors (to be applied for)	\$50,000
Trout Unlimited In-Kind	\$150,000
Buckhorn In-Kind	\$350,000
Eagle River Watershed Council In-Kind	\$1500
Non-Federal Subtotal	\$1,273,500
Other Federal Entities	
Bureau of Land Management (Committed)	\$10,000
Native Species Conservation Fund (to be applied for)	\$100,000
Other Federal Subtotal	\$110,000
REQUESTED RECLAMATION FUNDING	\$90,000

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

Once funding is in-place, Buckhorn will finalize permitting with the

BLM and USACE. This is described above under Task 1.

Timeline: September 1, 2017 to June 1, 2017

- *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.*

The following consultants will be involved in the design, engineering and permitting of the Abrams Creek project:

Conceptual Design and Engineering Coordination: RG & Associates: Civil Engineers (www.rgengineers.com). The project's final design, engineering, oversight, and implementation will be under the direction of founder Rick Gonçalves, P.E. Mr. Gonçalves has 47 years of civil engineering experience. He personally acts as city engineer and district engineer for a number of the firm's clients. He has completed a wide range of projects, including water and wastewater treatment, collection and distribution systems, pumping and storage facilities, roadways, storm drainage facilities, and land/site development. Mr. Gonçalves serves as the chairman of the Technical Advisory Committee of the Cherry Creek Basin Water Quality Authority and an active member of the American Consulting Engineers Council, the American Waterworks Association, Water Environment Federation, and the American Society of Civil Engineers. In addition, RG Engineers senior project manager Nicholas Marcotte, P.E. has been involved with this project since its inception, and will be leading his team in the finalization of plans and permitting. Nick's specialty is in environmental aspects of civil engineering.

Justin Yarnell, P.E. has been retained by Buckhorn as the local, supervisory engineer in charge of permitting and construction coordination. Based in Eagle, Mr. Yarnell is well versed in local conditions, weather and soils implications of the project area, and has a strong local reputation for getting projects implemented on time and on budget.

Doug Clements, P.E. is Buckhorn's water resource engineer. Doug Clements has been working for several years with TU and CPW personnel to perfect the agreement and reach the best possible solution for all parties, and especially to the benefit of the Abrams Creek habitat. Mr. Clements has more than 30 years of experience performing engineering analysis relating to water rights, water resources, and hydrology throughout the Western United States. Mr. Clements will continue to monitor and advise the parties with regards to reporting requirements, compliance matters, and preservation of District and project flow parameters.

Surveys for the Abrams Creek Project have been completed. Given the steepness of the terrain, field surveys were conducted, using on-the ground reconnaissance, GPS, and satellite imagery. Buckhorn's staff, engineers and contractors have spent several hundred hours on in-field observations and documentation to determine the best location, means and methods to construct the diversion-screen structure and the downstream pipeline. In addition, Buckhorn staff has relied on 16 years of operations experience to determine

which sections of the present JPO ditch system have the most leakage. The cost incurred by Buckhorn for this effort is in excess of \$30,000.

Preliminary construction drawings for the Abrams Creek Project and conceptual designs for a fish screen-diversion structure at Abrams Creek have been completed. This set is about 70% of what will be the final construction plan set and is sufficient to proceed with required permitting. The cost incurred by Buckhorn for this effort exceeds \$30,000.

- *Does the applicant have access to the land or water source where the project is located? If so, please provide documentation. If the applicant does not yet have permission to access the project location, please describe the process and timeframe for obtaining such permission.*

See Buckhorn and TU agreement attached.

Evaluation Criterion E: Performance Measure

- *Please describe the performance measures that will be used to quantify actual project benefits upon completion of the project. Include support for why the specific performance measures were chosen.*

Species Conservation Metrics

Progress on the species and habitat conservation related metrics will be measured through a monitoring program that will compare baseline conditions with conditions after pipe installation and initiation of JPO Ditch bypass protocols. Baseline surveys have been conducted and will continue as necessary to evaluate environmental variability prior to project construction. Following completion and water management implementation, surveys will be conducted annually for years 1-5 and biannually from years 6-10 to evaluate biological impacts to increased water availability. Monitoring will include:

- *Physical habitat.* The status of physical habitat, including wetted widths, pool frequency, depths, and sediments will be monitored and evaluated on a periodic basis to determine effects of increased flows.
- *Stream temperature.* Two stream temperature probes – one above and one below the JPO Ditch have been installed. These will provide baseline temperature conditions and monitor changes that result from increased flows that would help maintain desired stream temperatures.
- *Macroinvertebrates.* Samples have been collected and will continue to be collected to monitor and evaluate changes in macroinvertebrate community health. Macroinvertebrate health is indicative of habitat diversity, suitability, and water quality. Macroinvertebrate surveys will evaluate forage availability and presence of sediment tolerant species in response to changes in water management in Abrams Creek. Metrics may include Ephemeroptera, Plecoptera, and Trichoptera (EPT) index, taxa composition and richness. Macroinvertebrate community health and availability subsequently impacts forage quality for resident trout.
- *Fish.* Fish surveys will evaluate population fitness through documentation of fish abundance (fish per acre) and age-class diversity (presence and number of individuals in multiple age-

classes); fish condition including length (growth potential) and relative weight (body condition or plumpness); and seasonal presence and distribution of cutthroat throughout the stream. Evaluation of these metrics should detect improvements in habitat availability, quality, and quantity with increased water availability.

Water Innovation Metrics

Progress on the Water Innovation related metrics will be measured as follows:

- *Achieved efficiency.* Will compare diverted flows with delivered flows to assess the level of efficiency achieved by piping portions of the JPO Ditch.

Community Education Metrics

Changes in community awareness and understanding of the project will be measured as follows:

- Number of presentations
- Number of individuals reached
- Number of articles, blogs and other media hits

Evaluation Criterion F: Nexus to Reclamation

- *How is the proposed project connected to a Reclamation project or activity?*

The Abrams Creek project will implement a local solution over a two year period (September 1, 2017 to July 1, 2019) to improve the ecological resilience of Abrams Creek and its riparian area by increasing stream flow through an agreement between local conservation groups, CPW and Buckhorn. The project will also conserve water for multiple uses by increasing efficiency of the JPO Ditch for irrigation, recreation, piscatorial, dust control, and other construction uses. This improvement to all affiliated uses will reduce conflicts over water through a collaborative conservation effort. The project also satisfies three of the seven eligible projects outlined by the Bureau of Reclamation WaterSMART program's FOA. These include improving stream channel structure and complexity, improving ecological resilience through water conservation activities, and improving ecological resilience through water management activities.

As a large portion of the Colorado River is transported from the Western Slope of Colorado across the Continental Divide to the Front Range for Bureau of Reclamation projects such as the Colorado-Big Thompson and Ruedi Reservoir, the Abrams Creek project will assist in protecting existing flows on the Western Slope.

- *Is there a Reclamation project within the watershed or is the watershed otherwise affected by a Reclamation project?*

There are currently no Reclamation projects in the Eagle River watershed. There are, however, Reclamation projects in the Roaring Fork watershed which is nearby, but out of the Eagle River watershed. This project will not have any impact on the Roaring Fork Reclamation projects, but both of these watersheds are part of the larger Colorado River

basin and will both contribute to water quality and quantity improvements to the Colorado River basin.

- *Will the proposed work contribute water to a basin where a Reclamation project is located?*
Though no water will be added or contributed to the basin, the pipeline installation and improved water-use efficiency will reduce salinity and sediment issues. This will contribute to the Colorado River basin's overall improved water quality and aquatic habitat.
- *Will the project help Reclamation meet trust responsibilities to any tribe(s)?*
This project does not help Reclamation meet trust responsibilities to any tribe as there are no reservations within or remotely near the project area.
- *Does the proposed project support implementation of a relevant Department of the Interior initiative?*

The proposed project supports initiatives of both the U.S. Fish and Wildlife Service and the Bureau of Land Management.

A primary objective of the Abrams Creek project is to boost the resiliency of the existing cutthroat trout population, protecting the future of expansion efforts for the aboriginal cutthroat trout within the Eagle River watershed. This objective aligns perfectly with the U.S. Fish and Wildlife Service's initiative to engage in water-resource planning, management and research that conserves, protects and enhances our nation's fish, wildlife and plants.

The project also supports the BLM in managing water resources and water-dependent environments on public lands to promote healthy, productive ecosystems that support its multi-use mission. The entire project is located within BLM lands and is fully supported by the BLM as is evidenced by their letter of support.

D.2.2.7. Environmental and Cultural Resources Compliance

- *Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.*

The proposed project would result in short-term localized emissions from vehicle operations associated with the removal of the current diversion structure and installation of a new piping system, in-channel work, and transportation of personnel, equipment, and materials to and from the project area. Additionally, there is a potential for some dust generation if these activities occur in dry conditions while removing and installing water-use infrastructure. These effects would be minor, of short duration, and overall would have little or no effect on local air quality. Since emissions and dust would be minimal and short-lived, no mitigation is recommended for these activities.

- *Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?*

Plants species:

According to the latest species list from the US Fish and Wildlife Service (USFWS) the only federally-listed, proposed, or candidate threatened or endangered plant species that may occur, have habitat, and/or be impacted by actions in Eagle County is the Ute ladies'-tresses orchid (*Spiranthes diluvialis*). Habitat for this threatened species is found below 6,500 feet along streams, lakes or in wetland areas with seasonally saturated or subirrigated soils. The project area is at approximately 8,000 feet elevation, which is above the elevation range of this orchid species. Furthermore, this species has not been found in the project area.

Terrestrial species:

According to the latest species list from the USFWS, the following federally-listed, proposed, or candidate terrestrial wildlife species may occur within or be affected by actions within the project area. These species, along with their status, distributions, habitat associations, and their potential association to the project area, are summarized below.

Black-footed Ferret (*Mustela nigripes*). Federally-listed as endangered. Black-footed ferrets have ranged statewide but never have been abundant in Colorado. Their habitat included the eastern plains, the mountain parks and the western valleys – grasslands or shrub lands that supported some species of prairie dog, the ferret's primary prey. Little is known about their natural history. They mate in early spring and give birth to a litter of three or four mouse-sized pups after a seven-week gestation period. They are susceptible to distemper, predators like owls and coyotes, and vehicles. It is assumed that plowing for agriculture and programs to eradicate prairie dogs have driven the black-footed ferret to the verge of extinction. State and federal biologists have established two major black-footed ferret colonies: one at Coyote Basin (Colorado-Utah border west of Rangely) and another at the BLM's Wolf Creek

Management Area southeast of Dinosaur National Monument. Because no known occurrences have been documented and the occurrence of the species in this area is unlikely due to range and habitat conditions, this species is not considered further.

Canada Lynx (*Lynx canadensis*). Federally-listed as threatened. The Canada lynx was listed as a federally threatened species, effective April 24, 2000 (Federal Register Volume 65, No. 58). Canada lynx occupy high-latitude or high-elevation coniferous forests characterized by cold, snowy winters and an adequate prey base (Ruggiero et al. 1999). The preferred prey of Canada lynx throughout their range is the snowshoe hare (*Lepus americanus*). In the western United States, lynx are associated with mesic forests of lodgepole pine, subalpine fir, Engelmann spruce, and quaking aspen in the upper montane and subalpine zones, generally between 8,000 and 12,000 feet in elevation. Although snowshoe hares are the preferred prey in Colorado, lynx also feed on other species such as the mountain cottontail (*Sylvilagus nuttallii*), pine squirrel (*Tamiasciurus hudsonicus*), and dusky grouse (*Dendragapus obscurus*). The U.S. Forest Service (USFS) has mapped suitable denning, winter, and other habitat for lynx within the White River National Forest (WRNF). The mapped suitable habitat in the WRNF comprises several areas known as lynx analysis units (LAUs). These are management areas that contain suitable lynx habitat and approximate the size of a female's home range. Several LAUs border BLM lands, but no areas large enough to be considered LAUs occur within the project area. BLM lands within the project area generally support the dispersal of lynx to a new area or, potentially, to lower elevations during severe winter weather in search of prey. No mapped habitat or linkage areas occur within the project area, and this species is not considered further.

Mexican Spotted Owl (*Strix occidentalis*). Federally-listed as endangered. This owl nests, roosts, and hunts in mature coniferous forests in canyons and foothills. The only existing populations in Colorado are in the Pikes Peak and Wet Mountain areas of south-central Colorado and the Mesa Verde area of southwestern Colorado. Because no known occurrences have been documented and the occurrence of the species in this area is unlikely due to range and habitat conditions, this species is not considered further.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*). Candidate for federal listing. This secretive species occurs in mature riparian forests of cottonwoods and other large deciduous trees with a well-developed understory of tall riparian shrubs. Western cuckoos breed in large blocks of riparian habitats, particularly woodlands with cottonwoods (*Populus deltoides*, *P. angustifolia*) and tall willows (*Salix* spp.). A few sightings of yellow-billed cuckoo have occurred in western Colorado along the Colorado River near Grand Junction (USFWS 2009c). Riparian areas in the project area do not provide suitable habitat for this species due to the patchy nature of the stands and the general lack of a tall-shrub understory. Because occurrence in the area is unlikely due to range and habitat conditions, this species is not considered further.

Uncompahgre Fritillary Butterfly (*Boloria acrocneuma*). Federally-listed as endangered. The butterfly has been verified at only two areas in the San Juan Mountains in Colorado. There is anecdotal evidence of other colonies in the San Juans and the southern Sawatch Range in Colorado. The butterfly occurs above treeline in patches of its larval host plant, snow willow.

The butterfly is most often found on north- and east-facing slopes, which provide a moist, cool, microclimate. The greatest known controllable threat is butterfly collecting. Climatological patterns, disease, parasitism, predation, and trampling of larvae by humans and livestock might pose additional threats. Because no known occurrences have been documented and the occurrence of the species in this area is unlikely due to range, elevation and habitat conditions, this species is not considered further.

The following paragraphs address species with a habitat potential for presence in the project area.

Townsend's Big-eared Bat (*Plecotus townsendii*) and Fringed Myotis (*Myotis thysanodes*). Occur as scattered populations at moderate elevations on the Western Slope of Colorado. Habitat associations are not well defined. Both of these bats forage over water and along the edge of vegetation (pinyon-juniper woodlands, montane conifer woodlands, and semi-desert shrublands) for aerial insects. Although they commonly roost in caves, rock crevices, mines, or buildings, they also may roost in tree cavities. Both species are widely distributed and usually occur in small groups. They roost in rock crevices, caves, mines, buildings, and trees. Townsend's bigeared bat is not very abundant anywhere in its range and this is attributed to patchy distribution and limited availability of suitable roosting habitat (Gruver and Keinath 2006).

Northern Goshawk (*Accipiter gentilis*). The Northern goshawk is the largest North American accipiter. The goshawk is a forest habitat generalist that uses a variety of forest type, forest ages, structural conditions, and successional stages. Goshawks prey on small-medium sized birds and mammals. It breeds in coniferous deciduous and mixed forests. The nest is typically located on a northerly aspect in a drainage or canyon and is often near a stream. Nest areas contain one or more stands of large, old trees with a dense canopy cover. A goshawk pair occupies its nest area from March until late September. The nest area is the center of all movements and behaviors associated with breeding from courtship through fledging.

Greater Sage-grouse (*Centrocercus urophasianus*). Sage-grouse, as the name implies, are found only in areas where sagebrush is abundant, providing both food and cover. Although these birds are found at altitudes of 6,000 to 8,500 feet, they are not forest grouse and prefer relatively open sagebrush flats or rolling sagebrush hills. In winter, sagebrush accounts for 100% of the diet for these birds. In addition, it provides important escape cover and protection from the elements. In late winter, males begin to concentrate on traditional strutting grounds or leks. Females arrive at the leks 1 to 2 weeks later. Leks can occur on a variety of land types or formations (windswept ridges, knolls, areas of flat sagebrush, and flat openings in the sagebrush). Breeding occurs on the leks and in adjacent sagebrush, typically from March through May. Females and their chicks remain largely dependent on forbs and insects for food well into early fall. Cultivated herbaceous broad-leaved plants (alfalfa, clover) are important early fall food sources when available (CDOW 2009b). The Northern Eagle/Southern Routt population, while small (<500 birds), probably has, or formerly had, a relationship with the larger population in Moffat, Rio Blanco, and western Routt counties, and probably with the Middle Park population to the east. Sage-grouse are still present in the

Radium area between State Bridge and Kremmling (Northern Eagle/Southern Routt Greater Sage-Grouse Work Group 2004) and likely to occur in the Gypsum Hills area and the area north of Wolcott.

Environmental Consequences/Mitigation:

Federally-Listed, Proposed or Candidate Species – Terrestrial Wildlife

No USFWS-designated critical habitat for any of the above terrestrial wildlife species is found within the project area. No occupied habitat is present within the vicinity that could be directly or indirectly affected by the Proposed Action. Due to the absence of any known occurrences, suitable habitat or landscape linkage for any listed, proposed or candidate terrestrial wildlife species, the Proposed Action should have “**No Effect**” on these species.

Aquatic Wildlife Species:

Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*). Federally-listed as threatened. Although the greenback cutthroat trout was not identified on the USFWS list for Garfield County, recent surveys have identified a population in Cache Creek, located several drainages east of the project area. The greenback is the subspecies of cutthroat trout native to the Platte River drainage on the Eastern Slope of Colorado, while the Colorado River cutthroat trout is the subspecies native to Garfield and Eagle Counties and throughout the Western Slope of Colorado. Although the occurrence of greenbacks in Cache Creek and potentially elsewhere in the project area and WRNF areas is apparently the result of human intervention (e.g., sanctioned or ad-hoc transplantation of fish from the Eastern Slope), its status as threatened applies to Western Slope populations. However, because drainages within the project area do not support this species, it is not considered further.

Endangered Big-River Fishes. Four species of federally-listed big-river fishes occur within the Colorado River basin downstream from the project area. The main factor identified as potentially affecting these fishes is the consumptive use of water from the Colorado River or its tributaries, resulting in decreased flows and adverse modification of critical habitat. These ecologically similar species are discussed below:

- Colorado Pikeminnow (*Ptychocheilus lucius*). Federally-listed as endangered. The Colorado pikeminnow (formerly Colorado squawfish) was once abundant in the main stem of the Colorado River and most of its major tributaries in Colorado, Wyoming, Utah, New Mexico, Arizona, Nevada, California, and Mexico. Now, they exist primarily in the Green River below the confluence with the Yampa River, the lower Duchesne River in Utah, the Yampa River below Craig, Colorado; the White River from Taylor Draw Dam near Rangely downstream to the confluence with the Green River; the Gunnison River in Colorado; and the Colorado River from Palisade, Colorado, downstream to Lake Powell. Biologists believe that Colorado pikeminnow populations in the upper Colorado River basin are now relatively stable and in some areas may even be growing. Designated Critical Habitat for the Colorado pikeminnow

includes the Colorado River and its 100-year floodplain west (downstream) from the town of Rifle.

- Humpback Chub (*Gila cypha*). Federally-listed as endangered. The nearest known habitat for the humpback chub and bonytail is within the Colorado River approximately 70 miles downstream from the project area. Only one population of humpback chub, at Black Rocks west of Grand Junction, is known to exist in Colorado.
- Bonytail (*G. elegans*). Federally-listed as endangered. This large chub is a member of the minnow family. Their current distribution and habitat status are largely unknown due to its rapid decline prior to research into its natural history. Historically, bonytails were present in the Colorado River system, which includes the Yampa, Green, Colorado, and Gunnison rivers. The bonytail is extremely rare in Colorado, and no self-sustaining population is known to exist anywhere in the Colorado River basin. Only one individual bonytail has been captured in the state since 1980. Restoration stocking of bonytail in the wild to develop adult populations is the priority recovery action in Colorado.
- Razorback Sucker (*Xyrauchen texanus*). Federally-listed as endangered. The razorback sucker was once widespread throughout most of the Colorado River Basin from Wyoming to Mexico. In the Upper Colorado River Basin, they are now found only in the upper Green River in Utah, the lower Yampa River in Colorado and occasionally in the Colorado River near Grand Junction. Because so few of these fish remain in the wild, biologists have been actively raising them in hatcheries in Utah and Colorado and stocking them in the Colorado River. Designated critical habitat for the razorback sucker includes the Colorado River and its 100-year floodplain west (downstream) from the town of Rifle.

Abrams Creek does not contain greenback cutthroat trout. The Proposed Action does not directly affect the Colorado River and therefore will have little or no direct effect on the four endangered big-river fishes or their habitat. Due to the (a) absence of any known occurrences within the area, (b) lack of suitable habitat for any listed, proposed or candidate aquatic wildlife species within the area, and (c) negligible indirect and offsite negative impacts from the project, it is concluded that the proposed project will likely have “**No Effect**” on any of these species.

- *Are there wetlands or other surface waters inside the project boundaries that potentially fall under Clean Water Act (CWA) jurisdiction as “Waters of the United States?” If so, please describe and estimate any impacts the proposed project may have.*

The project area contains a riparian area along Abrams Creek. Vegetation is a deciduous woodland dominated by aspen with a few mature (tall) willow clumps. A 2002 Proper Functioning Condition (PFC) assessment of this reach of Abrams Creek rated it as proper functioning condition. Photos of the riparian area indicate that it is in good condition (late seral stage).

Minimal disturbance to the riparian area would occur from removal and installation of irrigation systems. Disturbance to the riparian area would also be expected to recover naturally within a short period of time (within 5 years) given the current condition of the riparian area. No long-term loss of riparian vegetation would occur.

The project would result in minor, short-term, impacts to the riparian area, which would not deteriorate or prevent the achievement of a functional riparian zone. No Action would result in no loss or disturbance to the riparian area; therefore, would not deteriorate or prevent the achievement of the functioning riparian systems.

- *When was the water delivery system constructed?*

1906

- *Will the proposed project result in any modification of or effects to individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.*

The project includes installation of a new diversion structure at Abrams Creek, in the same location originally constructed by Julius Olsen in 1906. The new structure will include piping and the installation of a fish screen. The new system is estimated to improve water-use efficiency by 40%.

There have been no previous extensive alterations to the current irrigation system. This is a pre-FLPMA ditch. Buckhorn will be applying for a Right of Way for some portions of the ditch that will not be within the current footprint of the ditch. Negotiations for this are in process.

- *Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.*

According to Heather Peterson, a National and State Register Historian, this property is not on the National Register of Historic Places nor is it eligible for listing.

- *Are there any known archeological sites in the proposed project area?*

There are no known archeological sites in the proposed project area.

- *Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?*

There will be no effects on low income or minority populations.

- *Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?*

The proposed project will not limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands as there are no known tribal sites or land in or near the project site.

- *Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?*

The project will not contribute to introduction, continued existence, or spread of noxious weeds or non-native invasive species. Preventative measures (such as having a sanitizing station for waders) will be in place to eliminate any threat to the stream by noxious or invasive aquatic species and there will be no introduction of noxious, non-native, or invasive plant species to the project area.

Funding Plan

The total cost of the project is estimated to be \$1,380,000.

Expenditures

BUDGET AND TIMELINE						
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Salaries and Wages

Brooke Ranney- Projects and Events Coordinator (Eagle River Watershed Council)

Eagle River Watershed Council will be the fiscal agent for purposes of the Bureau of Reclamation WaterSMART grant. Brooke Ranney will be the primary contact for purposes of administration of the grant and grant contract. She will also be engaged in public outreach to educate the community about the project and the value of the partnership behind it.

Amelia (Mely) Whiting - Project Coordinator (Trout Unlimited)

Mely has been with Trout Unlimited for over 10 years and is currently coordinating several cooperative projects in the Upper Colorado River basin that bring together diverse partners in an effort to improve stream conditions while enabling efficient use of irrigation and municipal water supplies. Mely will be responsible for coordinating all aspects of the project.

Brian Hodge – Fisheries Biologist (Trout Unlimited)

Brian has worked in the field of fisheries and aquatic resources for 12 years, and has been with Trout Unlimited for 6 years. He has extensive experience planning, implementing, and monitoring watershed restoration projects. Brian will provide technical support to the effort.

Kendall Bakich – Fisheries Biologist (Colorado Parks and Wildlife)

Kendall has been closely involved in the monitoring and evaluation of the cutthroat population in Abrams Creek, including the documentation of its aboriginal and genetic standing, habitat and water qualities, and evaluation of factors limiting and/or threatening the population. She championed the protection of Abrams' Creek cutthroat trout to Buckhorn, and was a member of the team negotiating the partnership agreement with Buckhorn. Kendall will provide monitoring and technical support, including monitoring the project's habitat and conservation species improvement outcomes.

David Graf – Hydrologist (Colorado Parks and Wildlife)

Also a member of the partnership agreement negotiating team, David conducted the analysis necessary to quantify the yield of the project for purposes of stream flow improvements and determine whether the benefits will in fact accrue to Abrams Creek. David will provide technical support for the project.

Tom Fresques – Fisheries Biologist (BLM)

In conjunction with Colorado Parks and Wildlife, Tom has been closely involved in the monitoring and evaluation of the Abrams Creek cutthroat population and its habitat, including evaluation of factors limiting and/or threatening the population. He also implemented a culvert replacement on the stream to enhance fish passage. Tom will provide monitoring and technical support for the project.

Roy Smith – Water Rights Specialist (BLM)

Roy has collected cross section data and formulated a recommendation for an increase of the instream flow water right on Abrams Creek that has been submitted to Colorado Water Conservation Board. Roy has familiarity with the JPO Ditch and expertise in water-related rights-of-way over BLM lands, so he will be part of the team that processes Buckhorn's application to BLM for a new right-of-way grant for the improved ditch. Roy will provide technical support in protecting improved flows in Abrams Creek and technical support for the right-of-way application process.

John Hill – Manager, Buckhorn District

John Hill will be overseeing the construction of the pipeline and related permitting activities. He will also be engaged in public outreach to educate the community about the project and the value of the partnership behind it.

Salaries and Wages

Organization	Personnel	\$/Unit	Quantity	Total Cost
Eagle River Watershed Council	Brooke Ranney		10% of time over 2 yrs	\$9,000
Trout Unlimited	Mely Whiting		20% of time over 2 yrs	\$44,616
Trout Unlimited	Brian Hodge		20% of time over 2 yrs	\$36,800
Colorado Parks and Wildlife	Kendall Bakich	\$38.62/HR	84 Hrs	\$3,244.08
Colorado Parks and Wildlife	Lab Techs (2)	\$16.93/HR x 2	48 Hrs	\$1,625.28
Colorado Parks and Wildlife	David Graf	\$50/HR	50 Hrs	\$2,500
BLM	Tom Fresques- NEPA review	\$39.19/HR	4 Hrs	\$157
BLM	Roy Smith- Right of way issues	\$58/HR	16 Hrs	\$928
BLM	Roy Smith- instream flow issues	\$58/HR	24 Hrs	\$1,392
Buckhorn District: in-kind future	Contract personnel: Jeff Bennet, John V. Hill, Patrick Mackeage	\$96/HR average rate based on projected project participation	491 Hrs	\$47,137.64
Buckhorn District: cash outlay included in project cost	Outsourced engineering design and construction services: cash outlay	\$110/HR average rate ; engineering techs and professional engineers	360 Hrs	\$39,600
TOTAL				\$187,000.00

Construction Materials and Supplies

Item No.	Description	Quantity	Units	Unit Price	Ext. Price
	MATERIALS				
	18-inch Fusible, DR 26 HDPE	21790	LF	\$ 17	\$ 375,878
	18"x18" Maintenance Access Tee	24	EA	\$ 425	\$ 10,200
	18-inch Expansion Fitting	261	EA	\$ 350	\$ 91,350
	18-inch 90-deg Bend	10	EA	\$ 224	\$ 2,240
	18-inch 45-deg Bend	25	EA	\$ 144	\$ 3,600
	18-inch 22.5-deg Bend	25	EA	\$ 137	\$ 3,425
	18-inch Reinforced Conc. End	6	EA	\$ 600	\$ 3,600
	Fiberglass Manhole (5' dia)	1	EA	\$ 2,500	\$ 2,500
	Fish Screen	2	EA	\$ 10,000	\$ 20,000
	Trash / Debris Guards	6	EA	\$ 250	\$ 1,500
	Carsonite Marker Post	26	EA	\$ 30	\$ 780
	Pipe Anchor	25	EA	\$ 400	\$ 10,000
	Watering Trough	2	EA	\$ 250	\$ 500
	Riprap	16	CY	\$ 50	\$ 800
	Hernage Creek Flume	1	EA	\$ 3,000	\$ 3,000
	Rock Check Dam	25	EA	\$ -	\$ -
	18-inch RCP Culvert	36	LF	\$ 54	\$ 1,944
Notes:				Sub-Total* =	\$ 531,317
Item No.	Description	Quantity	Units	Unit Price	Ext. Price
	CONSTRUCTION				
	18-inch Fusible, DR 26 HDPE	21790	LF	\$ 15	\$ 326,850
	18"x18" Maintenance Access Tee	24	EA	\$ 1,000	\$ 24,000
	18-inch Expansion Fitting	261	EA	\$ 250	\$ 65,250
	18-inch 90-deg Bend	10	EA	\$ 250	\$ 2,500
	18-inch 45-deg Bend	25	EA	\$ 250	\$ 6,250
	18-inch 22.5-deg Bend	25	EA	\$ 250	\$ 6,250
	18-inch Reinforced Conc. End	6	EA	\$ 250	\$ 1,500
	Fiberglass Manhole (5' dia)	1	EA	\$ 500	\$ 500
	Fish Screen	2	EA	\$ 5,000	\$ 10,000
	Trash / Debris Guards	6	EA	\$ 200	\$ 1,200
	Carsonite Marker Post	26	EA	\$ 25	\$ 650
	Pipe Anchor	25	EA	\$ 1,000	\$ 25,000
	Watering Trough	2	EA	\$ 1,000	\$ 2,000
	Riprap	16	CY	\$ 50	\$ 800
	Hernage Creek Flume	1	EA	\$ 8,000	\$ 8,000
	Rock Check Dam	25	EA	\$ 1,200	\$ 30,000
	18-inch RCP Culvert	36	LF	\$ 40	\$ 1,440
	Revegetation	10	AC	\$ 2,000	\$ 20,000
Notes:				10	\$ 20,000
				Sub-Total*	\$ 532,190

Contractual

The following consultants will be involved in the design, engineering and permitting of the Abrams Creek project: RG & Associates: Civil Engineers; Justin Yarnell, P.E.; and Doug Clements, P.E., Buckhorn's water resource engineer. Details on the activities and background of each contractor is available in the Project Implementation section.

Task 1- Permitting \$77,400

September 1, 2017 to June 1, 2018

Permitting: \$53,400

Administrative costs for Task 1: \$24,000

Task 2 - Final Design and Construction Plans \$97,400

September 1, 2017 to June 1, 2018

Engineering, design development, and final engineering: \$73,400

Administrative costs for Task 2: \$24,000

Task 3 – Construction of Project \$1,156,500

July 1, 2018 to July 1, 2019

See Materials, Supplies, and Construction Costs Table above

Materials and Supplies: \$1,063,500

Construction Labor: \$33,000

Administrative costs for Task 3: \$60,000

Task 4 – Monitoring \$48,700

September 1, 2017 to July 1, 2019

Monitoring: \$36,700

Administrative costs for Task 4: \$12,000

In-Kind Descriptions

- Trout Unlimited has donated in-kind legal and administrative costs in the amount of \$150,000.

- Buckhorn has provided \$350,000 in services to date. These services include:
 - Water resources legal, engineering, environmental consulting, surveying: \$100,000
 - Direct resources, including management and field staff, *pro bono* consultation: in excess of \$200,000
 - Project permitting and approvals: \$50,000

- Eagle River Watershed Council will provide \$1,500 in in-kind service:
 - 58 volunteers hours @ \$25.96/Hr

- Colorado Parks and Wildlife will provide \$21,999.97 of in-kind service in the form of staff time, equipment and materials toward (1) project monitoring; (2) assistance in project oversight and permitting; and (3) public outreach.

Environmental and Regulatory Compliance Costs

NEPA and other environmental and regulatory processes have been completed and no further Environmental and Regulatory Compliance costs are anticipated for the Abrams Creek project.

MICHAEL F. BENNET
COLORADO

COMMITTEES:
AGRICULTURE, NUTRITION, AND FORESTRY

FINANCE

HEALTH, EDUCATION, LABOR,
AND PENSIONS

United States Senate

WASHINGTON, DC 20510-0609

WASHINGTON, DC:
458 RUSSELL SENATE OFFICE BUILDING
WASHINGTON, DC 20510
(202) 224-5852

COLORADO:
1127 SHERMAN STREET
SUITE 150
DENVER, CO 80203-2388
(303) 455-7600

<http://www.bennet.senate.gov>

February 13, 2017

Irene Hoiby
Bureau of Reclamation
PO Box 25007 MC: 84-27852
Denver, CO 80225

Dear Ms. Hoiby:

I am pleased to support the Eagle River Watershed Council's application to the Bureau of Reclamation for a WaterSMART Cooperative Watershed Management Program - Phase II Grant. If awarded funds will be used for the Abrams Creek Cutthroat Trout Restoration Project that will improve the habitat for a Core Conservation population of Green-Lineage cutthroat trout population in Abrams Creek.

This application has strong regional support from area experts and organizations including, the Colorado Parks and Wildlife Department, Buckhorn Valley Water District, Eagle County Commissioners, Eagle Valley Land Trust, the Town of Gypsum and Trout Unlimited/Eagle County.

Supporters of this project have shared with me the importance of this habitat to the survival of the only known aboriginal cutthroat trout population in the Eagle River watershed and one of the few remaining indigenous populations left in the Upper Colorado River. Funding will assist in the implementation of an instream flow agreement reached with the owner of the JPO Ditch. Recovery of this cutthroat trout population is a good first step in protecting this species, and ensuring it will not need to be listed as an Endangered Species.

I encourage you to give the Eagle River Watershed Council's application every appropriate consideration consistent with all applicable laws and regulations.

Sincerely,



Michael F. Bennet
United States Senator

State Representative
DIANE MITSCH BUSH
Colorado State Capitol
200 East Colfax Avenue, Room 307
Denver, Colorado 80203
Office: 303-866-2923
diane.mitschbush.house@state.co.us



Chair:
Transportation & Energy
Committee
Vice Chair:
Agriculture, Livestock, &
Natural Resources Committee

COLORADO
HOUSE OF REPRESENTATIVES
State Capitol
Denver
80203

To Whom It May Concern,

I am writing you in my capacity as the Colorado State Representative for Eagle County to very strongly support funding for the Abrams Creek Cutthroat Trout project in Eagle County, Colorado.

This project will protect the Abrams Creek Cutthroat, the *only* known aboriginal cutthroat trout population in the Eagle River watershed. Additionally, it is one of only a few indigenous populations remaining in the Upper Colorado River system.

This project is a cooperative effort among several stakeholders in a key reach of the Eagle River. The Eagle River is a major tributary to the Colorado River. The confluence with the Colorado is near Dotsero, Colorado in Eagle County.

Currently, the single greatest limitation to this population is a significant diversion by a single irrigation ditch (JPO No 2). This very senior (1906) diversion takes away a significant portion of the habitat-supporting water supply, especially during lower flow periods. The project will pipe the JPO No. 2 ditch, improving water delivery/efficiency by 40%. In turn, Buckhorn District (owner of the diversion rights) will reduce diversions by 40% and Buckhorn will curtail all diversions if the flows are below 1.25 cfs.

Additional benefits will result from the project's periodic provision of flushing flows to Abrams Creek channel, thereby enhancing the Cutthroat habitat. As a perpetual agreement with Buckhorn, the benefits to the trout are *forever*.

By increasing efficiency and therefore flows, not only will the native cutthroat population be protected, but it is believed the population will expand - making it possible to reintroduce the population to additional streams in the watershed.

I urge your support of this long-term, joint effort of local and national nonprofit organizations, the ditch owner (Buckhorn), Colorado Parks & Wildlife and BLM. These stakeholders have worked closely on this and other key river restoration projects. They have a very successful record of completing projects to make the Eagle River whole for this and future generations. This is a critical project.

Yours for a just, equitable, sustainable, and prosperous Colorado for all,

A handwritten signature in black ink, appearing to read "Diane Mitsch Bush", written over a horizontal line.

Representative Diane Mitsch Bush, HD26-Eagle County and Routt County

Chair, House Transportation and Energy Committee
Vice-Chair, House Agriculture, Livestock, and Natural Resource Committee



COLORADO

Parks and Wildlife

Department of Natural Resources

Glenwood Springs Area Office
0088 Wildlife Way
Glenwood Springs, CO 81601
P 970.947.2920 | F 970.947.2936

February 15, 2017

To Whom It May Concern,

Colorado Parks and Wildlife (CPW) enthusiastically supports the Abrams Creek Cutthroat Trout project in Eagle County, Colorado.

The project is aimed at protecting and improving the resiliency of native cutthroat in Abrams Creek, the *only* known aboriginal cutthroat trout population in the Eagle River Watershed. As well, it is one of very few indigenous populations remaining in the Upper Colorado River watershed.

Abrams Creek cutthroat trout are distinct from other cutthroat populations. Their genetic “fingerprint”, a reflection of adaptation, is likely indicative of a unique tolerance toward warmer temperatures and drought conditions developed in their relatively low elevation habitat. These kinds of adaptations make this population particularly important for reintroduction efforts in the face of our changing climate.

The largest limitation to Abrams Creek is a significant diversion by an antiquated irrigation ditch (JPO No 2). This longstanding water right (1906) diverts a significant portion of the habitat-supporting water supply, especially during lower flow periods. Fish entrainment also occurs due to lack of permanent fish screen. The project will pipe the rudimentary ditch, improving water delivery/efficiency by 40% and install a self-maintaining fish screen. In turn, Buckhorn Irrigation District (owner of the diversion rights) will reduce diversions proportionally and curtail all diversions if the flows are below 1.25 cfs. Furthermore, an increased In-Stream Flow (ISF) water right will protect the additional water to benefit the cutthroat population.

Additionally, other enhancements are expected to support the cutthroat, including an agreement to support periodic flushing flows in Abrams Creek, increased habitat connectivity with more water available during lower flow periods, improved fish and macroinvertebrate (trout food) habitat, and eliminating the loss of individuals down the ditch. An agreement between Trout Unlimited and Buckhorn to improve flow in Abrams Creek due to diversion improvement has set a precedent of cooperation between resource users and trout advocates to benefit these trout *in perpetuity*.

These efforts to increase diversion efficiency and augment stream flows, ensures this native cutthroat population will be protected - making it possible to reintroduce and expand these fish to additional streams in the watershed and aid in the recovery of the species.



I respectfully encourage your support of this project, a joint effort of local and national nonprofit organizations, the ditch owner (Buckhorn), CPW, and the Bureau of Land Management (BLM). If you have any questions about the project, please contact Kendall Bakich, the CPW Aquatic Biologist intimately involved in the support and protection of the Abrams Creek cutthroat trout through management and conservation actions, public outreach, and fostering the relationships that have culminated in the project outlined above.

Thank you for your time and consideration.

Sincerely,

A handwritten signature in cursive script that reads "Ron D. Velarde". The signature is written in dark ink and is positioned above the typed name.

Ron D. Velarde
Northwest Regional Manager
Colorado Parks and Wildlife



United States Department of the Interior



BUREAU OF LAND MANAGEMENT
COLORADO RIVER VALLEY FIELD OFFICE
2300 River Frontage Road
Silt, CO 81652
www.blm.gov/co/st/en/fo/crvfo.html

In Reply Refer to:
7250 (CON040)

February 9, 2017

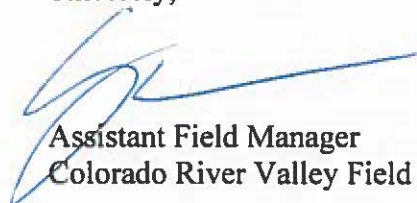
To Whom It May Concern:

The purpose of this letter is to express Bureau of Land Management (BLM) support for a proposed restoration project on Abrams Creek on lands managed by the BLM's Colorado River Valley Field Office. It is the BLM's understanding that the proposed project is designed to provide additional water for fish habitat in Abrams Creek. The additional water would be provided by piping portions of the JPO Ditch System, thereby reducing water lost to seepage, and allowing less water to be diverted from Abrams Creek into the ditch. BLM believes that the project could result in significantly more usable fish habitat below the headgate of the JPO Ditch. The BLM supports the objectives of the project because Abrams Creek provides important habitat for a conservation population of Colorado River cutthroat trout, a species that appears on the BLM's sensitive species list. The BLM believes that the collaborative effort envisioned by the project, which would include nonprofit entities, local government, state government agencies, and federal government agencies, would greatly increase the chances of success.

The BLM's support for the project is offered with the caveat that such support does not guarantee or imply approval of the proposed project on BLM-managed lands. The project proponent will be required to apply for a Federal Land Policy and Management Act Title V right-of-way for any reconstructed portions of the ditch that cross BLM-managed lands. The proposed project will be subject to review under the National Environmental Policy Act (NEPA) procedures, along with required review under other federal laws that are designed to protect cultural and archaeological resources. The formal review process could result in denial of the proposed project, or could result in a request by the BLM to significantly modify proposed construction features or project routing. However, the BLM is committed to working collaboratively with the project proponent to conduct a timely NEPA review and to carefully considering any mitigation or design features proposed by the project proponent to avoid and minimize impacts.

If you have questions, please contact Chad Mickschl, Hydrologist, at (970) 876-9071 or cmickschl@blm.gov.

Sincerely,



Assistant Field Manager
Colorado River Valley Field Office



Drew Peternell, Director, Colorado Water Project

February 15, 2017

To Whom It May Concern:

Trout Unlimited strongly supports the Abrams Creek cutthroat trout project. The Abrams Creek cutthroat trout is the only known aboriginal cutthroat trout population in the Eagle River watershed and one of the few indigenous populations left in the upper Colorado River basin. This lineage of trout possess a unique haplotype that is genetically more distinct than other populations, making a significant contribution to the genetic diversity of cutthroat trout species. Abrams Creek cutthroat are also distinctive in that they reside in a relatively low elevation drainage, giving them probable adaptations to warmer temperatures and drought conditions that may benefit reintroduction efforts in the face of climate change.

State and federal biologists have determined that low stream flows are a limiting factor for the Abrams Creek population. Water diversions from the JPO Ditch significantly reduce Abrams Creek flows, sometimes drying up portions of the creek within the cutthroat trout habitat. In light of the importance of the species, Trout Unlimited negotiated an agreement with Buckhorn Water District, the owner of the JPO Ditch, that would leave 40 percent of water physically available to the JPO Ditch in Abrams Creek and would preclude all diversions from Abrams Creek at the JPO Ditch if flows fall below 1.25 cfs.

This arrangement – which would exist in perpetuity – will be possible only if sufficient funds are obtained to pipe portions of the JPO Ditch so as to improve the water delivery efficiency of the ditch. We urge you to support this effort to not only improve the Abrams Creek cutthroat trout population, but also create the opportunity for re-introduction of the species in nearby watersheds.

Sincerely,

Drew Peternell

Greetings,

The Board of Directors of the Buckhorn Valley Metropolitan District is writing to express our complete support for the Abrams Creek Cutthroat Trout Project , and to respectfully request that your group lend all available support.

The genesis of this project dates back almost two decades, when the Colorado Parks and Wildlife field officers first identified the unique, aboriginal strain of trout found in Upper Abrams. At that time, the control of this Buckhorn's water rights was held by agricultural interests, and they had no interests in 'sharing' the water, which diversion right dates back to 1906.

Interest in the project was reinvigorated around 2010, when the current board was approached again by CPW. This board became interested, and now, all this time later, the team of CPW, Trout Unlimited (TU), and Buckhorn's staff, board, lawyers and engineers arrived at the solution to help the Trout that is before you.

Beyond the countless hours of meetings, telecoms, emails, the CPW+TU+Buckhorn team have expended well over \$100,000 and unmeasured more tens of thousands in staff and volunteer time. Recently, the Eagle River Watershed Council has become involved to assist with local awareness and project implementation

The proposed solution allows this Board to fulfill its duty to preserve the irrigation water needed in the Buckhorn, while leaving ample water in Abrams Creek to preserve, enhance and expand the cutthroat trout habitat.

Here are some of the reasons we invested in this project, and why we hope you will, too:

The Abrams Creek cutthroat is the *only* known aboriginal cutthroat trout population in the Eagle River watershed, and one of only a few indigenous populations remaining in the Upper Colorado River system.

To supply the irrigation needs in Buckhorn, the JPO diversion takes away a significant portion of the habitat-supporting water supply, especially during lower flow periods. But, if the miles of JPO ditch are piped, the leakage losses will be reduced significantly, perhaps as much as 40%. While the 40% is merely an estimate, the Buckhorn has agreed to permanently reduce diversions by the full 40%.

Perhaps, most significantly, Buckhorn will curtail all diversions if the flows are below 1.25 cfs. Thus, at critical low flow periods, Buckhorn will leave the *entire* flow for the Trout. This is particularly significant to the Buckhorn, because we have agreed to pump all the water for irrigation requirements during these curtailment periods, at substantial costs, running into thousands per month.

And, we have agreed to coordinate with CPW and TU for periodic provision of flushing flows to Abrams Creek channel, thereby enhancing the cutthroat habitat by refreshing the stream channel.

Very importantly, the Buckhorn has agreed to a perpetual contract , so the benefits to the trout are *forever*.

Sincerely,
Buckhorn Valley Metropolitan Buckhorn No. 1



John V. Hill, President



February 1, 2017

To whom it may concern,

I am writing this letter on behalf of Eagle Valley Trout Unlimited chapter #102 (EVTU), in support of the ongoing conservation efforts on Abrams Creek in Western Eagle County, Colorado.

Over the last few years the tiny Abrams Creek, flowing off of the fairly arid Hardscrabble Mountain, has generated quite a buzz among local native trout enthusiasts, Colorado Trout Unlimited, and National Trout Unlimited. Until recently it was thought Abrams was little more than a small tributary to the Brush Creek with no real unique characteristics, but we now know that Abrams is far from being just another place to pull irrigation water from. Abrams Creek is exceptional for one main reason, a natural fish barrier on the lower stretch of the stream that has kept non-native trout species from taking over. Because of this feature, Abrams holds the only population of Eagle River Green Lineage Cutthroat Trout known to still exist.

As the west was developed, streams such as Abrams played a critical role in providing water to homesteads for crop irrigation and other use. In the late 19th century, Abrams was diverted across Hardscrabble Mountain in an open air ditch toward Gypsum, a distance of around 7 miles. The trek across Hardscrabble in an open air ditch results in substantial water loss from seepage, evaporation, and consumption by vegetation. This loss requires that significantly more water be diverted at the head gate than is actually needed by the end-user. Water is diverted about ¼ of the way down Hardscrabble leaving the lower portion of Abrams mostly dry year round. Above the head gate there is just enough water to maintain this small population of fish. In order to grow and sustain the fragile population, habitat that can support fish year round must be created from the head gate downstream to the natural fish barrier. In short, more water must be left in the lower stretch of stream so fish can populate those areas.

Colorado Parks and Wildlife, several area non-profit groups, along with the owner of the water rights, have decided on a solution that would pipe the irrigation water from the head gate to the end user. Piping the ditch drastically reduces water loss in transit requiring less volume to be initially diverted. This will leave much more water in the creek and create good habitat. However, we must act fast as we are one minor catastrophe in the Abrams Creek drainage away from the loss of a species.

Please consider supporting this effort to save the last population of native Eagle River trout. It is not often that a conservation movement is able to identify and act on such a remarkable opportunity, the opportunity to right a historical blunder. Thank you for your consideration, and if you have any questions please do not hesitate to contact me directly at 970-306-9424.

Sincerely,

Brian Bloess
Eagle Valley Trout Unlimited

Eagle Valley Trout Unlimited
P.O. Box 6353
Vail, CO 81658

www.eaglevalley.tu.org

OFFICE OF THE
BOARD OF COMMISSIONERS
970-328-8605
FAX: 970-328-8629
eagleadmin@eaglecounty.us
www.eaglecounty.us



JILL H. RYAN
KATHY CHANDLER-HENRY
JEANNE MCQUEENEY

February 3, 2017

Re: Abrams Creek Cutthroat Trout Project

To Whom It May Concern:

The Eagle County Board of County Commissioners supports the Abrams Creek Cutthroat Trout Project. The Abrams Creek cutthroat is the only known aboriginal cutthroat trout population in the Eagle River watershed. In fact, it is one of only a few indigenous populations in the Upper Colorado River. Eagle County supports the preservation of this population and is encouraged by Colorado Parks and Wildlife's belief that, once protected in this stream, this rare population can be reintroduced into other streams within the watershed.

The protection of the Abrams Creek cutthroat would be achieved by improving the delivery of irrigation water diverted from Abrams Creek by 40%. This effort supports Eagle County's strategic goal to "protect surface and ground water quality and quantity." Protecting water resources will become a greater challenge due to increasing impacts from climate change and rising human populations. The cooperation and collaboration of the water rights holders, the State of Colorado and nonprofit organizations to bring this project to fruition will serve as a model to other communities.

We look forward to this project being completed, and the Abrams Creek Cutthroat protected.

If you have questions regarding our support of the project, please contact one of us at the above email address.

Sincerely,

Jill H. Ryan
Chair

Kathy Chandler-Henry
Commissioner

Jeanne McQueeney
Commissioner



United States
Department of
Agriculture

Forest
Service

White River
National
Forest

Eagle/Holy Cross Ranger District
24747 US Highway 24
P.O. Box 190
Minturn, CO 81645
OFFICE (970) 827-5715
FAX (970) 827-9343

File Code: 1580

Date: February 13, 2017

Bureau of Reclamation
Financial Assistance Operations Section
Attn: Ms. Irene Hoiby
Mail Code: 84-27852
P.O. Box 25007

To Whom It May Concern,

The Eagle/Holy Cross Ranger District of the White River National Forest (WRNF) strongly supports the efforts of the Eagle River Watershed Council (ERWC) to obtain grant funding for the Abrams Creek Cutthroat Trout project in Eagle County, Colorado.

The ERWC and the Eagle/Holy Cross Ranger District have had a long standing and successful partnership resulting in the completion of a number of restoration projects that have contributed to stream health and fish habitat improvements. The headwaters of Abrams Creek are located on USFS lands and the proposed project would improve the quality of habitat in Abrams Creek and ensure future flows needed to maintain the fragile cutthroat trout population. If successful, this project would increase the population of cutthroat trout in Abrams Creek which could then be replicated and introduced into other Forest Service streams increasing the occupied range of this species. Securing the viability of this fish population could guide restoration and recovery efforts for native cutthroat trout into the future.

The proposal submitted by the ERWC was developed in cooperation with Colorado Parks and Wildlife and is supported by the USFS East Zone Fisheries Biologist. With the support of joint effort of local and national nonprofit organizations, the ditch owner (Buckhorn), Colorado Parks & Wildlife and Bureau of Land Management we believe that the Abrams Creek Cutthroat Trout project can be successfully completed.

Sincerely,

AARON W. MAYVILLE
District Ranger



Porzak Browning & Bushong LLP
Attorneys • at • Law
2120 13th Street, Boulder, CO 80302

Glenn E. Porzak
Michael F. Browning
Steven J. Bushong
Kristin Howse Moseley
Kevin J. Kinnear
Karen L. Henderson
Cori A. Hach

303 443-6800 Tel.
303 443-6864 Fax.
www.pbblaw.com

February 6, 2017

Re: Abrams Creek Cutthroat Trout Restoration Project

To Whom It May Concern,

This letter is to express support for the Abrams Creek Cutthroat Trout Project. This Project is designed to increase flow in Abrams Creek, which is home to a unique subspecies of cutthroat trout. The Abrams Creek cutthroat is the only known aboriginal cutthroat trout population in the Eagle River watershed, and is one of the last remaining indigenous cutthroat populations in the Upper Colorado River basin. Currently, the single greatest limitation on this trout's available habitat is a lack of water.

The Buckhorn Valley Metropolitan District (the "District") owns the JPO Ditch No. 2, which diverts up to 3.0 cfs out of Abrams Creek for use within the District. These diversions are important for the District, but result in reducing the useable trout habitat by approximately one-half. The Abrams Creek Cutthroat Trout Project entails piping the JPO Ditch No. 2 to improve water delivery efficiency in return for an agreement by the District to leave 40% of the available water in Abrams Creek to support the trout. Further, if the 40% will result in less than 1.25 cfs being left in Abrams Creek, the District has agreed to further limit its diversions or stop them all together to achieve as close to 1.25 cfs as possible in the Creek. This ensures that the trout will be protected even in times of water shortage.

This project presents a unique opportunity for collaboration between the District (as the owner of the ditch and water rights), nonprofit organizations, Colorado Parks & Wildlife, and the BLM. This mutually beneficial project will help protect the native Abrams Creek Cutthroat and allow its population to expand, making it possible to reintroduce the population to additional streams in the watershed.

The District is not only contributing the water to the project, it has also provided legal and engineering services to help facilitate the project. We hope you will join us in supporting this important project to protect our native fish species.

Sincerely,

Porzak Browning & Bushong LLP



Steve Bushong
Water Counsel for Buckhorn Valley Metropolitan District

February 2, 2017

Greetings,

The Town of Gypsum strongly supports the Abrams Creek Cutthroat Trout project here in Eagle County, Colorado, and respectfully requests that your group lend all available support.

Why is this important?

- The Abrams Creek cutthroat is the *only* known aboriginal cutthroat trout population in the Eagle River watershed.
- This location is home to one of only a few indigenous cutthroat populations remaining in the Upper Colorado River system.

Risks to these cutthroat

- The single greatest risk to this cutthroat population is significant diversion by a single irrigation ditch called the JPO No 2. This 1906 senior water diversion takes away a significant portion of the habitat-supporting water supply, with substantial risks during lower flow periods.

Solution

- Pipe the JPO No. 2 ditch which will improve water delivery and efficiency by 40%. By increasing efficiency and water flows, not only will the native cutthroat population be protected, but it is believed the population will expand making it possible to reintroduce the population to additional streams in the watershed. Additional benefits will be periodic flushing flows to Abrams Creek channel which also enhances outthroat habitat.

Support from JPO Ditch Owner

- The owner of the JPO Ditch No. 2, Buckhorn Valley Metro District, will be supporting this improved habitat by reducing diversions by 40% and curtail all diversions if flows are below 1.25 cfs.

This is a perpetual agreement with Buckhorn, the benefits to the trout are *forever*.

ADMINISTRATION

Town Manager
Jeff Shroll

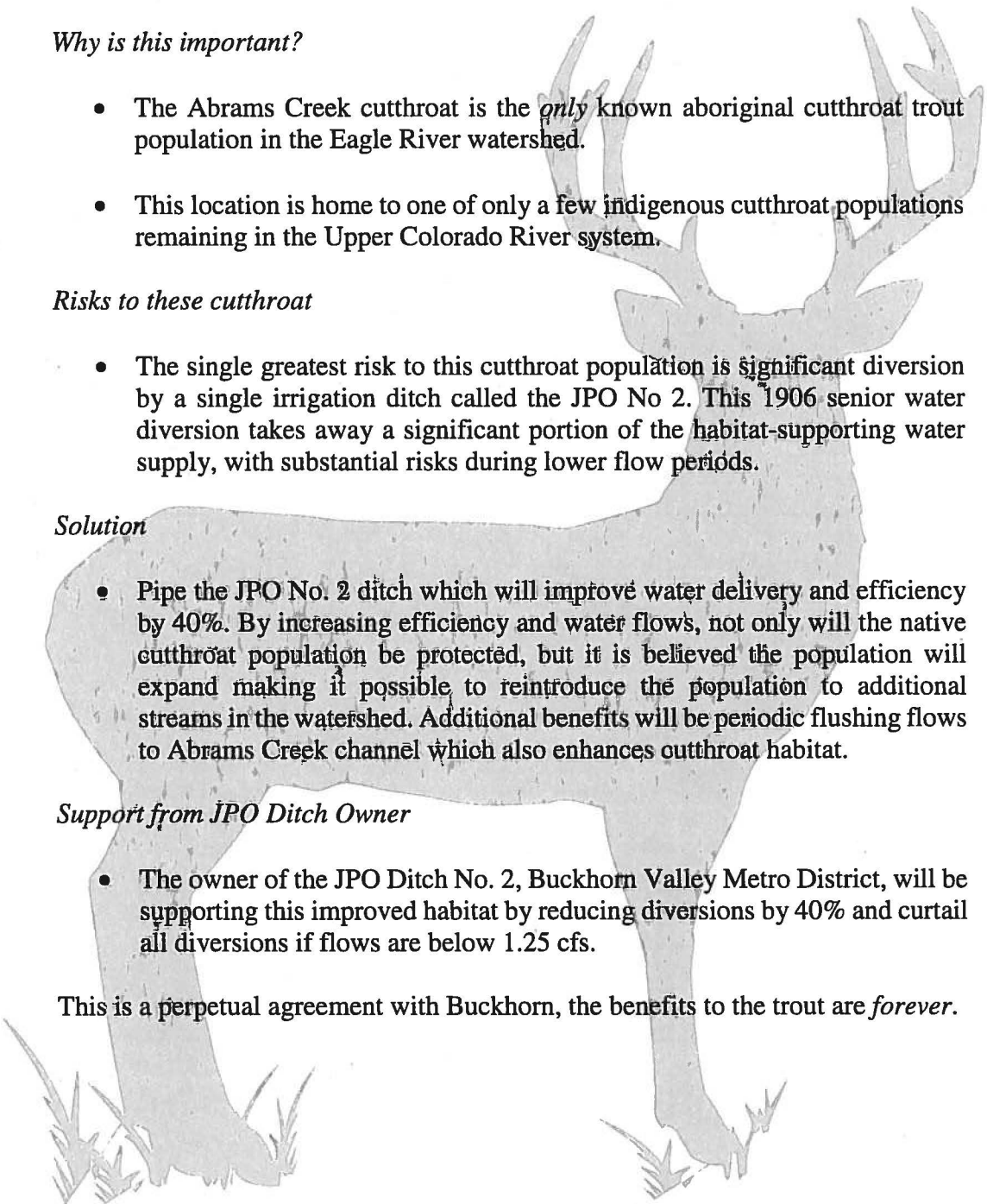
Asst. Town Manager
Frances Barela

Town Clerk
Danette Schlegel

Finance Officer
Mark Silverthorn

Sales Tax Auditor
Lynn Trudeau

Special Projects Coordinator
Krista DeHerrera



The Town of Gypsum asks for your support of this long-term, joint effort of local and national nonprofit organizations, the ditch owner (Buckhorn Valley Metro District), Colorado Parks & Wildlife, and BLM.

Very truly yours,

TOWN OF GYPSUM
A Home Rule Municipal Corporation

A handwritten signature in cursive script, appearing to read "Jeff Shroll".

Jeff Shroll, Town Manager



Board of Directors

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Jim Daus

Executive Director

jdaus@evlt.org

Jessica Foulis

**Stewardship and Outreach
Manager**

jfoulis@evlt.org

Nancy Glass

Office Manager

nglass@evlt.org

Mailing Address

**Post Office Box 3016
Edwards, CO 81632**

Physical Address

**(Wells Fargo Building, Edwards)
34215 Hwy. 6, Suite 205
Edwards, CO 81632**

970.748.7654

www.evlt.org



To Whom it May Concern,

Eagle Valley Land Trust strongly supports the Abrams Creek Cutthroat Trout project here in Eagle County, and respectfully requests that your group lends all available support.

These are some of the reasons we think this project is so important:

The Abrams Creek cutthroat is the *only* known aboriginal cutthroat trout population in the Eagle River watershed.

It is one of only a few indigenous populations remaining in the Upper Colorado River system.

Currently, the single greatest limitation to this population is significant diversion by a single irrigation ditch (JPO No 2). This very senior (1906) diversion takes away a significant portion of the habitat-supporting water supply, especially during lower flow periods

The project will pipe the JPO No. 2 ditch, improving water delivery/efficiency by 40%.

In turn, Buckhorn District (owner of the diversion rights) will reduce diversions by 40% and Buckhorn will curtail all diversions if the flows are below 1.25 cfs.

Additional benefits will result from the project's periodic provision of flushing flows to Abrams Creek channel, thereby enhancing the Cutthroat habitat.

This is a perpetual agreement with Buckhorn, the benefits to the trout are *forever*.

By increasing efficiency and therefore flows, not only will the native cutthroat population be protected, but it is believed the population will expand - making it possible to reintroduce the reintroduce the population to additional streams in the watershed.

As the holder of the Abrams Creek Conservation Easement in Eagle, CO, we support any efforts to protect and restore Abrams Creek and the native Cutthroat Trout population.

Eagle Valley Land Trust asks for your support of this long-term, joint effort of local and national nonprofit organizations, the ditch owner (Buckhorn), Colorado Parks & Wildlife and BLM.

Sincerely,

Jessica Foulis, Stewardship and Outreach Manager



February 13, 2017

To Whom It May Concern,

RE: Abrams Creek Cutthroat Trout Project Grant Request

American Rivers strongly supports the Abrams Creek Cutthroat Trout project in Eagle County, Colorado.

This project will protect the Abrams Creek cutthroat, the *only* known aboriginal cutthroat trout population in the Eagle River watershed. Additionally, it is one of only a few indigenous populations remaining in the Upper Colorado River system.

Currently, the greatest barrier to expanding and strengthening this population is a significant diversion by a single irrigation ditch (JPO No 2). This very senior (1906) diversion diverts a significant portion of the streams native water supply, especially during lower flow periods. That seriously limits the available habitat for these very rare fish.

This project will pipe the JPO No. 2 ditch, improving water delivery/efficiency by 40%. In turn, Buckhorn District (owner of the diversion rights) will reduce diversions by 40% and Buckhorn will curtail all diversions if the flows are below 1.25 cfs.

Additional benefits will result from the project's periodic provision of flushing flows to Abrams Creek channel, thereby enhancing the Cutthroat habitat. As a perpetual agreement with Buckhorn, the benefits to the trout are *forever*.

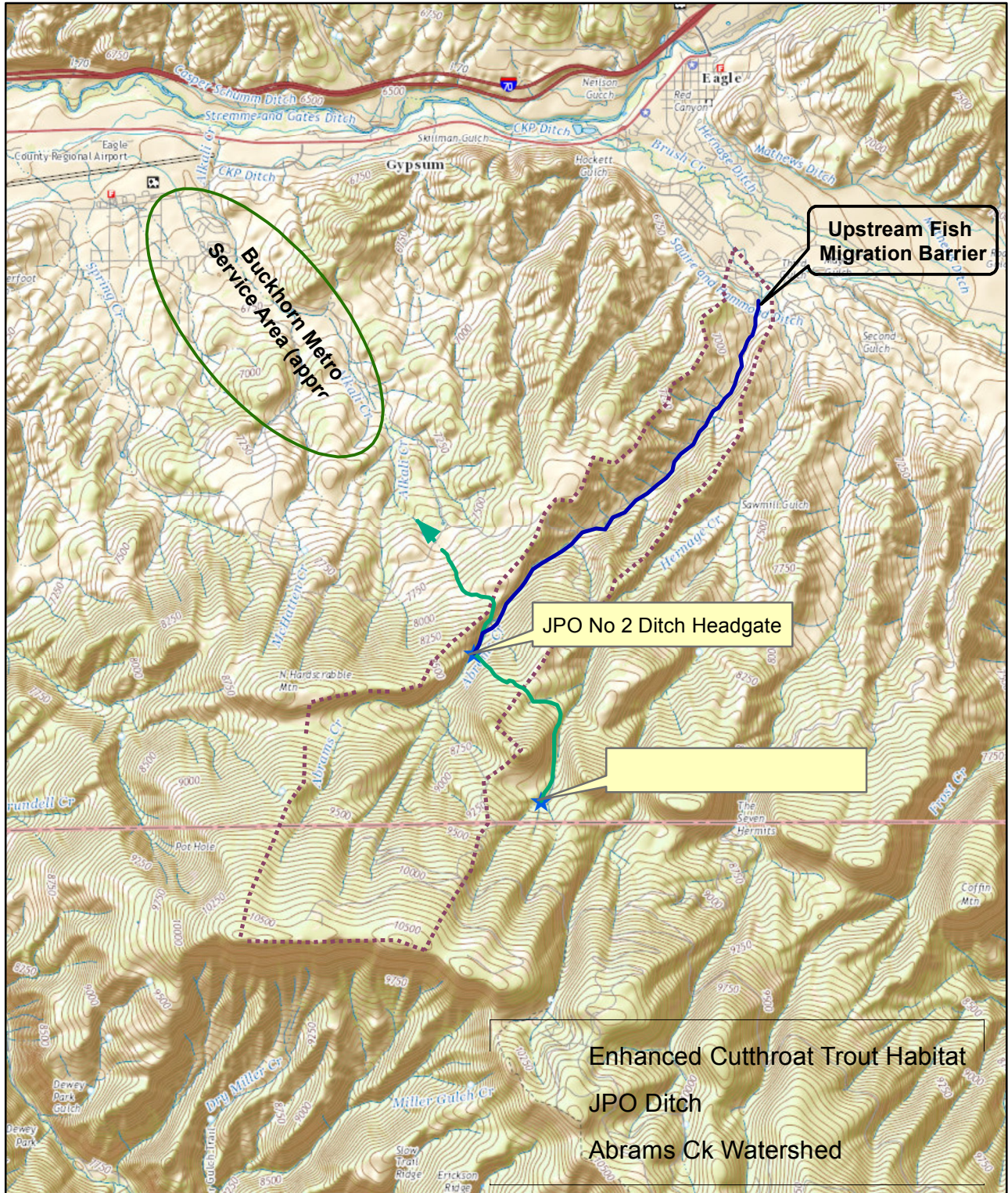
Increasing efficiency and flows will also make direct habitat restoration and expansion possible. Not only will the native cutthroat trout population be protected, but the population may grow - making it possible to reintroduce this unique population to other streams within the Eagle River watershed.

I strongly encourage your support of this long-term, joint effort of local and national nonprofit organizations, the ditch owner (Buckhorn), Colorado Parks & Wildlife and BLM.

Sincerely,
Ken Neubecker

Associate Director, Colorado River Basin Program
American Rivers
24 S. Meadow View Ct.
Glenwood Springs, CO 81601
(970) 230-9300

Abrams Creek Cutthroat Trout Project Overview Map



1:100,000

0 0.5 1 2 Miles



2-14-2017

DRAFT INSTREAM FLOW RECOMMENDATION – January 2015 Version

Ms. Linda Bassi
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Ms. Bassi:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its recommendation for an instream flow water right on Abrams Creek, located in Water Division 5. Colorado Parks and Wildlife and Trout Unlimited have also chosen to jointly make this recommendation with the BLM, and their recommendation letters will arrive under separate cover.

Location and Land Status. Abrams Creek originates on the northeastern flank of Hardscrabble Mountain approximately seven miles southwest of the City of Eagle. This recommendation covers a reach that starts at the headwaters and extends downstream to the confluence with Brush Creek. The confluence with Brush Creek is located within the Eagle city limits. This stream reach covers a distance of approximately 5.3 miles. The BLM and U.S. Forest Service manage the upper 3.5 miles of the creek, while the lower 1.8 miles are located on private lands and lands managed by the City of Eagle.

Existing Instream Flow Water Rights. In 1980, the Colorado Water Conservation Board appropriated an instream flow water right on Abrams Creek. The protected flow rate is 0.5 cfs from January 1 to December 31. The existing instream flow water right extends from the headwaters to a headgate diversion located in the SE ¼ SW ¼, Section 9, T5S R84W, Sixth P.M. The recommending entities believe that this location refers to the headgate of the Mrs. Paye Ditch.

Biological Summary. Abrams Creek is a cold-water, high gradient stream. It flows through a narrow valley with a valley floor of up to one-fourth mile in width. The stream is often confined by bedrock, and the horizontal extent of alluvium along the stream is typically less than 100 feet. The stream generally has large substrate, typically consisting of cobbles and small boulder mixed with gravels. The stream also exhibits a large amount of woody debris in the stream channel, which adds to stream stability and habitat complexity. While riffle habitat is sufficient, Abrams Creek generally lacks extensive pool habitat, which could be a limiting factor for the fish population.

Fisheries surveys have revealed a self-sustaining population of native cutthroat trout. The Abrams Creek population is considered a Core Conservation population of pure Green-Lineage Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*). This is the only known aboriginal cutthroat population in the Eagle River watershed and is important with respect to future reclamation planning within the watershed and overall conservation efforts for the species. The population is small and limited in part by reduced water flow – primarily during irrigation season. Intensive macro-invertebrate surveys have not been conducted, but spot samples have

increase of 0.2 cfs to the existing instream flow water right between July 16 and March 31, and an increase of 0.75 cfs to the existing instream flow right between April 1 and July 15. In addition, implementing this recommendation would require a new appropriation between the Mrs. Paye Ditch headgate and the confluence with Brush Creek, in the amounts and timing described in the two paragraphs above.

Water Availability. The recommending entities are aware of the following water rights on Abrams Creek:

J P O Ditch #2 – 1.0 cfs, 1908 Priority; 2.0 cfs, 1916 Priority
Mrs. Paye Ditch – 0.8 cfs, 1899 Priority; 2.2 cfs, 1923 Priority

The recommending agencies are not aware of any historic gage information on Abrams Creek. However, some historic diversion records are available for the Mrs. Paye Ditch, located in the lower part of the recommended reach, and for the JPO Ditch, located in the middle of the recommended reach. In addition, the most recent owners of the JPO Ditch have maintained measurement flumes on Abrams Creek and on the JPO Ditch. Those records can be made available for review by the CWCB staff.

Historically, diversions from the JPO Ditch severely limited the amount of water available below the headgate during the mid-July through October period. The JPO Ditch owners are actively exploring efficiency measures along the JPO Ditch that will result in a lower volume of diversions during the mid-July through October time period, making additional water available for instream flow protection.

Relationship to Fish Management Plans. Consistent with Colorado's Cutthroat Trout Conservation Strategy, the goal of this project is to protect and expand this precarious Core Conservation of Green-lineage cutthroat trout and increase the resiliency within the population. Specifically, protecting instream flows on Abrams Creek will:

- Increase physical/wetted habitat along approximately 3.5 miles of stream
- Improve in-stream habitat connectivity and quality
- Increase aquatic insect productivity, improving cutthroat food resources
- Develop increased pool depths
- Sustain/expand riparian canopy cover
- Maintain cooler water temperatures in lower Abrams Creek

Data sheets, R2Cross output, fishery survey information, and photographs of the cross section were included with our draft recommendation in January 2015. We thank the Colorado Water Conservation Board for its cooperation in this effort.

If you have any questions regarding our instream flow recommendation, please contact Roy Smith at 303-239-3940, Jay Skinner at 303-291-7260, or Mely Whiting at 720-470-4758.

Sincerely,

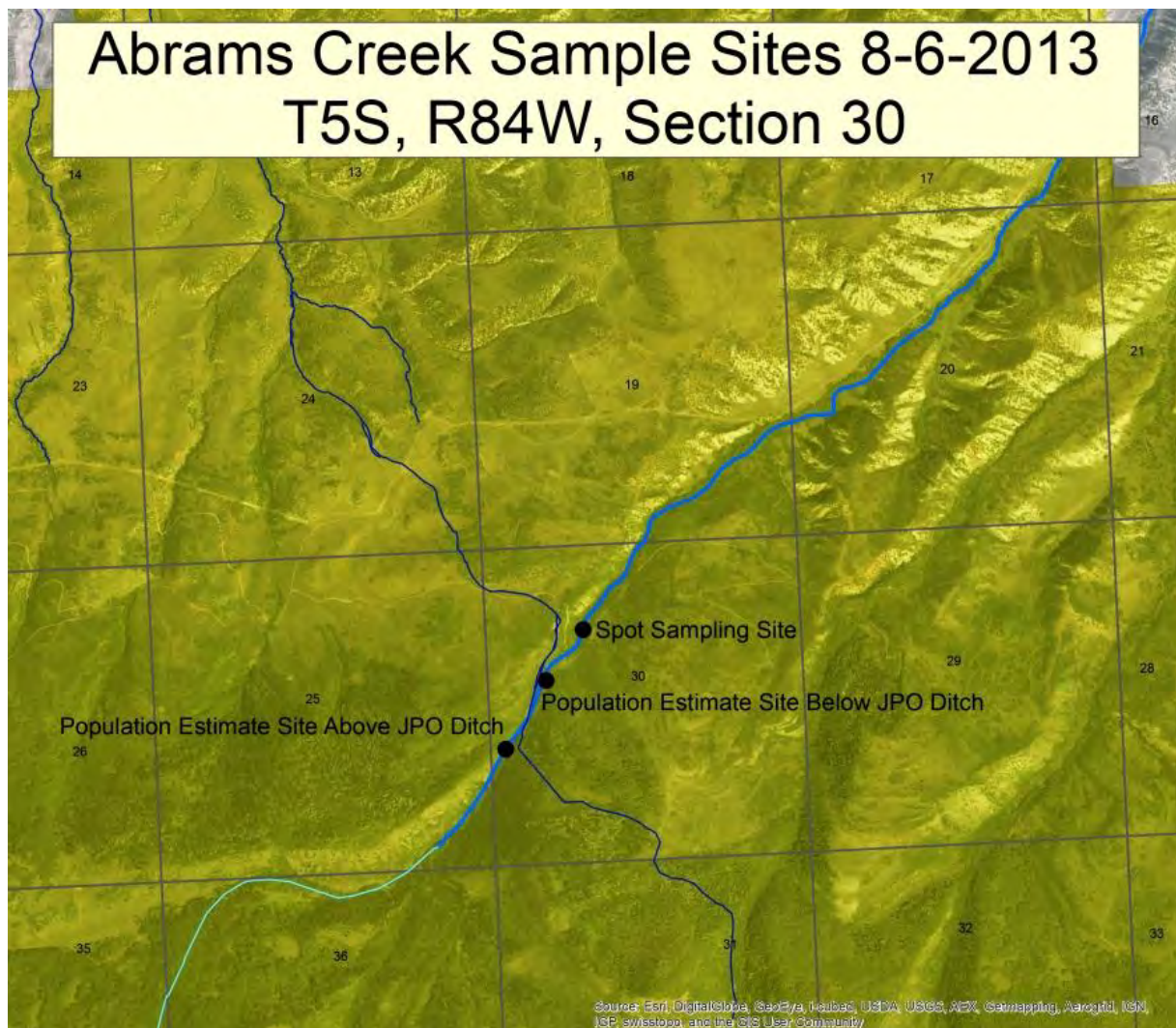
Brian St. George
Deputy State Director
Resources and Fire

Cc: Manager, Colorado River Valley FO
Pauline Adams, Colorado River Valley FO
Tom Fresques, Colorado River Valley FO

Colorado River Valley Field Office Stream Surveys August 2013

Abrams Creek - Water Code #23414

Abrams Creek, located on lands managed by the Colorado River Valley Field Office, was sampled on August 6, 2013. Two population estimates were completed, one above the JPO Diversion Ditch, and one below the JPO Diversion Ditch. Each population estimate was completed using one backpack electroshocker. Data was obtained to compare population densities above and below this significant water diversion feature. Additional presence/absence spot sampling was done below BLM road 8380 for approximately 400 feet. Personnel present were Tom Fresques, Gregor Dekleva, and Matt Ringer, BLM, and Kendall Bakich and crew, Colorado Parks and Wildlife.





Discussion:

General

Abrams Creek contains a genetically pure population of Colorado River Cutthroat Trout - Green Lineage. In addition, this population has unique haplotypes that distinguish it amongst other green lineage populations which makes this population more unique. It is the only pure population of its kind in the entire Eagle River watershed and appears to be an aboriginal population that has likely been in existence since the last ice age. The population is small but stable and is currently restricted to approximately one 1-1.5 miles of habitat.

Site 1 (Above JPO Diversion Ditch)

CPW has the data associated with the sampling of this site.

Site 2 (Below JPO Diversion Ditch)

The stream at this site is small with an average width of 3 feet and an estimated flow of approximately 1.5 cfs. Habitat consists of small drop pools and areas of undercut banks with small riffle and run areas. The stream is a Rosgen B channel type. Riparian vegetation is lush, dense, and diverse consisting of rocky mountain maple, alder, willow, chokecherry, horsetail, aspen, wildrose, sedge, spruce, fir, and nettle. The stream contains excellent streamside cover and shading. Noxious weeds including Canada thistle and houndstongue are also common along portions of the creek.

The site is slightly impacted by cattle that concentrate at a couple stream crossings in this reach. Generally, flows below the JPO Ditch are 0.50 - 0.75 cfs less than those above the ditch. At the time of sampling, it did not appear that the full allocation of water was being diverted. Based on our sampling, this site is representative of 156 adult cutthroat trout (>150 mm TL) + or - 6 fish, at the 95% confidence interval, per mile of stream.

Spot Sampling below the Road Crossing

Approximately 400 feet of stream was spot sampled below the road crossing to document presence of cutthroat trout and get some relative abundance information. Cutthroats were collected throughout the segment and nice sized adult fish as well as a few smaller fish were noted. Densities appear to be similar to slightly higher than the population estimate site above the road but below the JPO Diversion Ditch. All fish collected appeared healthy. Habitat was similar as the other sites with dense riparian vegetation and cover and excellent stream shading. Large, deep pools are lacking.

Recommendations:

- Resample the two population estimate sites again to get some more confidence as well as trend data
- Grazing permittees will complete the new allotment boundary fence to better manage cows and reduce trespass and stream crossing impacts
- Consider treating weeds including thistle and houndstongue

COLORADO WATER CONSERVATION BOARD
 INSTREAM FLOW / NATURAL LAKE LEVEL PROGRAM
 STREAM CROSS-SECTION AND FLOW ANALYSIS

LOCATION INFORMATION

STREAM NAME: Abrams Creek
 XS LOCATION: 750' downstream from JPO Ditch headgate
 XS NUMBER: 4

 DATE: 1-Jul-13
 OBSERVERS: R. Smith, P. Adams

 1/4 SEC: NW
 SECTION: 30
 TWP: 5S
 RANGE: 84W
 PM: Sixth

 COUNTY: Eagle
 WATERSHED: Eagle River
 DIVISION: 5
 DOW CODE: 23414

 USGS MAP: 0
 USFS MAP: 0

SUPPLEMENTAL DATA

*** NOTE ***
 Leave TAPE WT and TENSION
 at defaults for data collected
 with a survey level and rod

TAPE WT: 0.0106
 TENSION: 99999

CHANNEL PROFILE DATA

SLOPE: 0.71

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Abrams Creek
 XS LOCATION: 750' downstream from JPO Ditch headgate
 XS NUMBER: 4

DATA POINTS= 20

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	5.34		
1 G	0.50	6.14		
	1.20	6.22		
W	1.30	6.75	0.00	0.00
	1.60	6.95	0.20	0.04
	1.90	6.95	0.20	0.92
	2.20	7.05	0.30	1.07
	2.50	7.05	0.30	1.07
	2.80	6.95	0.20	1.60
	3.10	6.95	0.20	0.86
	3.40	6.95	0.20	1.39
	3.70	6.95	0.20	0.00
	4.00	6.95	0.20	0.34
	4.30	7.00	0.25	0.65
	4.60	6.95	0.20	0.57
	4.90	6.90	0.15	0.21
W	5.10	6.75	0.00	0.00
	5.20	6.30		
1 G	5.60	6.22		
LS	9.00	6.00		

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.36	0.20	0.06	0.00	0.4%
0.30	0.20	0.06	0.06	9.3%
0.32	0.30	0.09	0.10	16.3%
0.30	0.30	0.09	0.10	16.3%
0.32	0.20	0.06	0.10	16.2%
0.30	0.20	0.06	0.05	8.7%
0.30	0.20	0.06	0.08	14.1%
0.30	0.20	0.06	0.00	0.0%
0.30	0.20	0.06	0.02	3.4%
0.30	0.25	0.08	0.05	8.2%
0.30	0.20	0.06	0.03	5.8%
0.30	0.15	0.04	0.01	1.3%
0.25		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

3.96 0.3 0.77 0.59 100.0%
 (Max.)

Manning's n = 0.5496
 Hydraulic Radius= 0.19530139

STREAM NAME: Abrams Creek
 XS LOCATION: 750' downstream from JPO Ditch headgate
 XS NUMBER: 4

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.77	0.77	0.0%
6.50	0.77	1.74	124.6%
6.52	0.77	1.66	114.5%
6.54	0.77	1.58	104.5%
6.56	0.77	1.50	94.4%
6.58	0.77	1.42	84.4%
6.60	0.77	1.35	74.4%
6.62	0.77	1.27	64.4%
6.64	0.77	1.19	54.4%
6.66	0.77	1.12	44.5%
6.68	0.77	1.04	34.6%
6.70	0.77	0.96	24.7%
6.71	0.77	0.92	19.7%
6.72	0.77	0.89	14.8%
6.73	0.77	0.85	9.8%
6.74	0.77	0.81	4.9%
6.75	0.77	0.77	0.0%
6.76	0.77	0.73	-4.9%
6.77	0.77	0.70	-9.8%
6.78	0.77	0.66	-14.6%
6.79	0.77	0.62	-19.4%
6.80	0.77	0.59	-24.1%
6.82	0.77	0.51	-33.5%
6.84	0.77	0.44	-42.8%
6.86	0.77	0.37	-51.9%
6.88	0.77	0.30	-60.8%
6.90	0.77	0.23	-69.7%
6.92	0.77	0.17	-78.2%
6.94	0.77	0.11	-86.4%
6.96	0.77	0.06	-92.1%
6.98	0.77	0.04	-95.1%
7.00	0.77	0.02	-97.1%

WATERLINE AT ZERO

AREA ERROR = 6.750

STREAM NAME: Abrams Creek
 XS LOCATION: 750' downstream from JPO Ditch headgate
 XS NUMBER: 4

Constant Manning's n

GL = lowest Grassline elevation corrected for sag
 WL = Waterline corrected for variations in field measured water surface elevations and sag

STAGING TABLE

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.22	4.40	0.65	0.83	2.86	5.36	100.0%	0.53	4.28	1.50
	6.25	4.24	0.64	0.80	2.73	5.18	96.6%	0.53	4.06	1.49
	6.30	3.98	0.63	0.75	2.52	4.87	90.9%	0.52	3.71	1.47
	6.35	3.96	0.59	0.70	2.33	4.77	89.0%	0.49	3.28	1.41
	6.40	3.94	0.54	0.65	2.13	4.67	87.1%	0.46	2.87	1.35
	6.45	3.92	0.49	0.60	1.93	4.57	85.2%	0.42	2.48	1.28
	6.50	3.90	0.44	0.55	1.74	4.47	83.3%	0.39	2.11	1.21
	6.55	3.88	0.40	0.50	1.54	4.36	81.4%	0.35	1.75	1.14
	6.60	3.86	0.35	0.45	1.35	4.26	79.5%	0.32	1.42	1.06
	6.65	3.84	0.30	0.40	1.15	4.16	77.6%	0.28	1.12	0.97
	6.70	3.82	0.25	0.35	0.96	4.06	75.6%	0.24	0.84	0.87
WL	6.75	3.80	0.20	0.30	0.77	3.96	73.7%	0.20	0.59	0.77
	6.80	3.66	0.16	0.25	0.59	3.78	70.5%	0.15	0.39	0.66
	6.85	3.52	0.12	0.20	0.41	3.61	67.3%	0.11	0.22	0.53
	6.90	3.38	0.07	0.15	0.23	3.44	64.0%	0.07	0.09	0.38
	6.95	1.50	0.05	0.10	0.08	1.54	28.7%	0.05	0.02	0.30
	7.00	0.60	0.04	0.05	0.02	0.62	11.5%	0.04	0.01	0.25

STREAM NAME: Abrams Creek
 XS LOCATION: 750' downstream from JPO Ditch headgate
 XS NUMBER: 4 Jarrett Variable Manning's n Correction Applied

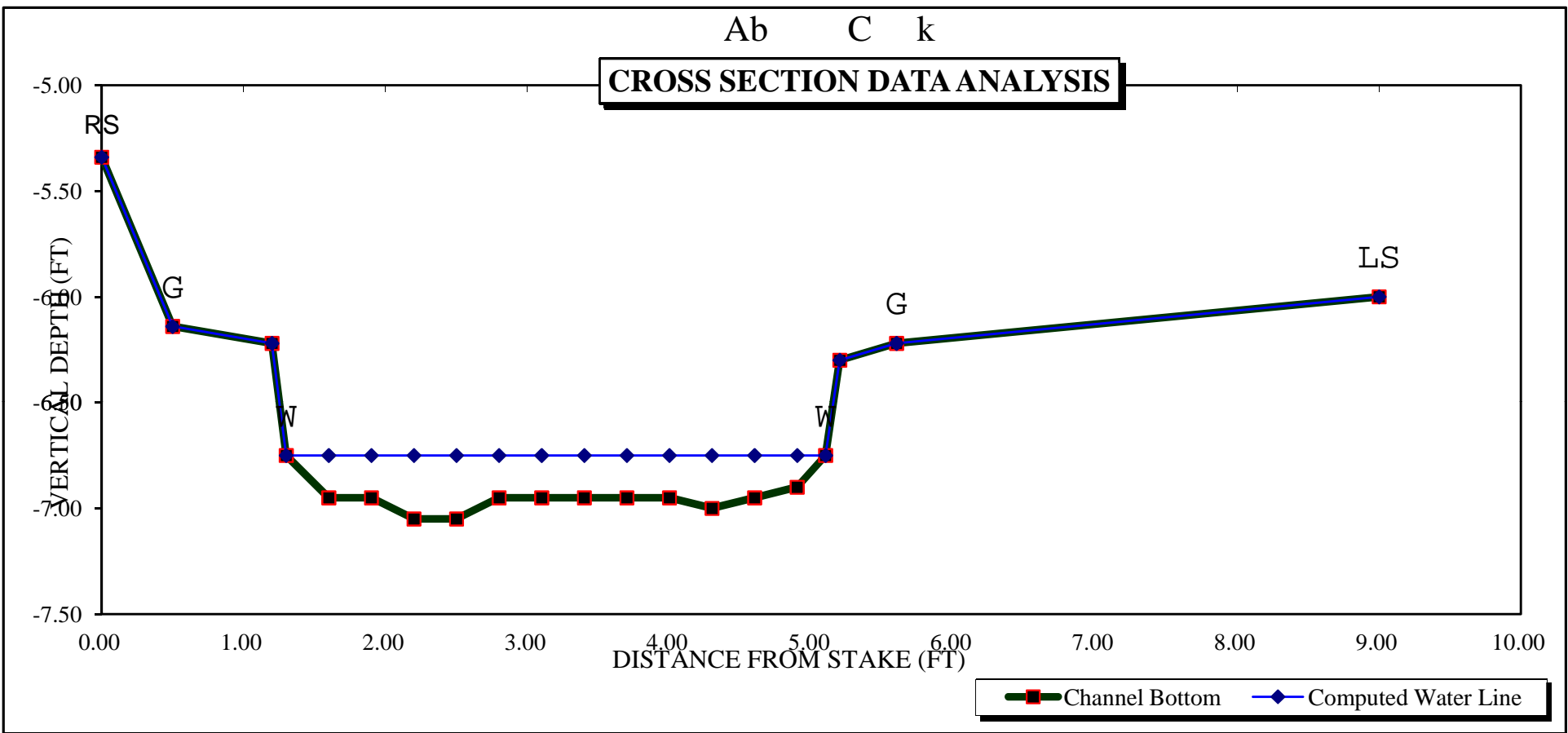
GL = lowest Grassline elevation corrected for sag

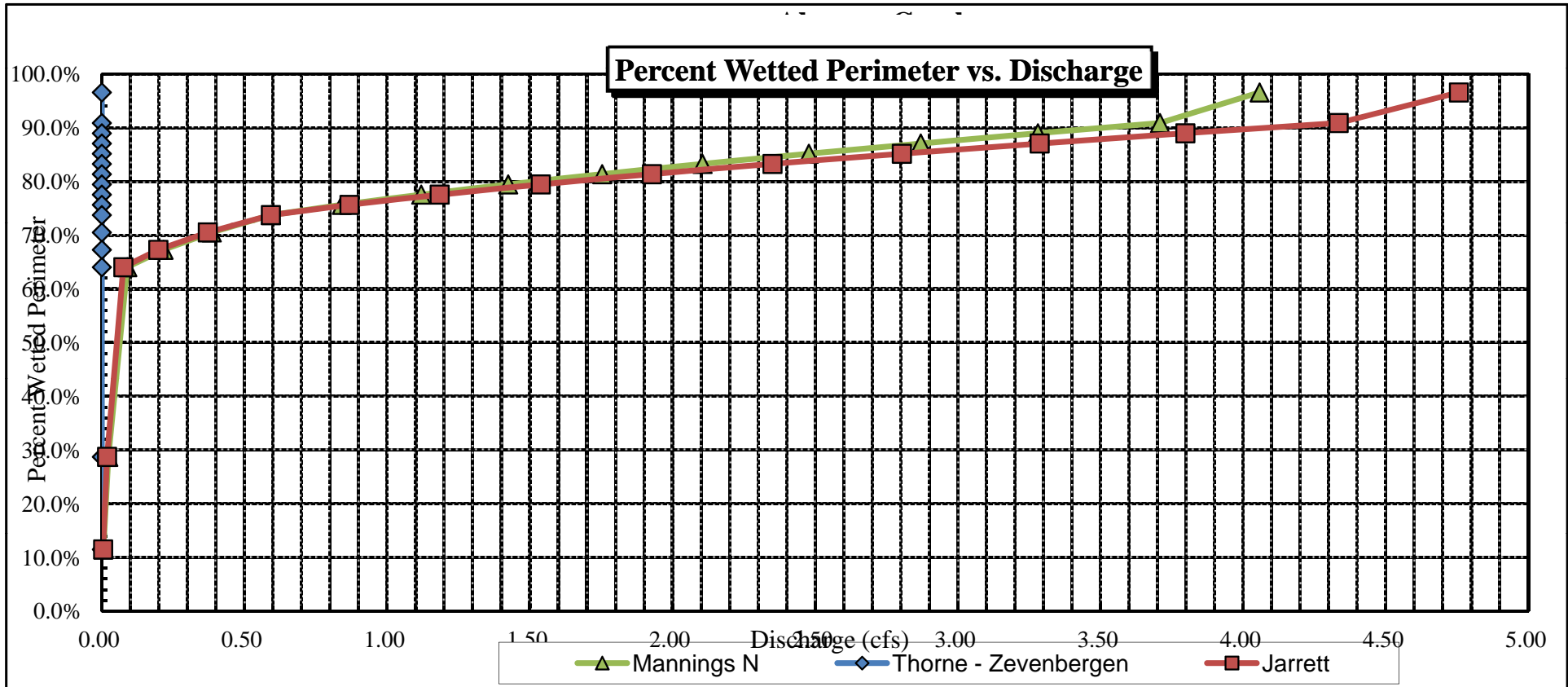
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.22	4.40	0.65	0.83	2.86	5.36	100.0%	0.53	5.03	1.76
	6.25	4.24	0.64	0.80	2.73	5.18	96.6%	0.53	4.76	1.74
	6.30	3.98	0.63	0.75	2.52	4.87	90.9%	0.52	4.33	1.72
	6.35	3.96	0.59	0.70	2.33	4.77	89.0%	0.49	3.80	1.63
	6.40	3.94	0.54	0.65	2.13	4.67	87.1%	0.46	3.29	1.54
	6.45	3.92	0.49	0.60	1.93	4.57	85.2%	0.42	2.80	1.45
	6.50	3.90	0.44	0.55	1.74	4.47	83.3%	0.39	2.35	1.35
	6.55	3.88	0.40	0.50	1.54	4.36	81.4%	0.35	1.93	1.25
	6.60	3.86	0.35	0.45	1.35	4.26	79.5%	0.32	1.54	1.14
	6.65	3.84	0.30	0.40	1.15	4.16	77.6%	0.28	1.18	1.03
	6.70	3.82	0.25	0.35	0.96	4.06	75.6%	0.24	0.87	0.90
WL	6.75	3.80	0.20	0.30	0.77	3.96	73.7%	0.20	0.59	0.77
	6.80	3.66	0.16	0.25	0.59	3.78	70.5%	0.15	0.37	0.63
	6.85	3.52	0.12	0.20	0.41	3.61	67.3%	0.11	0.20	0.49
	6.90	3.38	0.07	0.15	0.23	3.44	64.0%	0.07	0.08	0.32
	6.95	1.50	0.05	0.10	0.08	1.54	28.7%	0.05	0.02	0.24
	7.00	0.60	0.04	0.05	0.02	0.62	11.5%	0.04	0.00	0.19

Ab C k

CROSS SECTION DATA ANALYSIS





Velocity vs. Discharge

