

Project Implementation Plan

Project Title	Kerber Creek Restoration Project Phase 2
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1.0 Project Proposal Summary

Sponsor	
Organization Name	Trout Unlimited
E-mail address	erussell@tu.org
Mailing Address	523 Arbor Drive
City, State and Zip	Lafayette, CO 80026
Telephone Number	720-938-5438
Fax Number	
Federal Tax ID	38-1612715

Project Coordinator or Primary Contact	
Name	Elizabeth Russell
Title	Mine Restoration Project Manager
E-mail Address	Same as above
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City, State and Zip	“
Telephone Number	“
Fax Number	“

Project Funding
CO NPS Funds Requested \$413,000 + Match (cash/in-kind) \$339,000 = Total Project Cost \$752,000
Federal Funds - Federal Cooperator Contribution (Please do not include in the total.) \$10,000

Project Start Date	January 2013	Project End Date	June 2015
Geographic Coverage (check one)	Statewide	X Regional (Watershed)	Site Specific

Project Location	
River Basin	Rio Grande
Watershed(s)	Kerber Creek Watershed
Watershed size	64,325 acres
303(d) listed Stream	Yes x No Listed Segment: CORGCB09B
HUC(s) (8 digit USGS Hydrologic Unit Codes)	1301000302
County(ies)	Saguache
Position coordinates of project location in decimal form.	Latitude 38.21 N Longitude 106.07 W

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NPS Pollution Source categories to be addressed (Check all that apply)			
	Agriculture		Silviculture
	Habitat Modification (drainage/filling wetlands, stream bank destabilization)		Hydrologic Modification (changes to water flow as in reservoir, diversions, etc.)
	Urban runoff/Stormwater		Groundwater Loading
x	Mining		Natural Sources
	Construction		Other:

NPS Pollutants to be addressed (Check all that apply)			
	Excess Nitrogen		Pesticides
	Excess Phosphorus		Oil and grease
	Sedimentation		Temperature
	Pathogens/Bacteria	x	pH
x	Metals	x	Habitat impact
x	Low dissolved oxygen		Other:
Estimate Load Reduction, if checked for excess nitrogen, excess phosphorus and/or sedimentation			
# pounds of nitrogen reduced by project		Reference:	
# pounds of phosphorus reduced by project		Reference:	
# tons of sediment load reduced by project		Reference:	

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Project Description: The Kerber Creek Restoration Project is a joint partnership between Trout Unlimited, Bureau of Land Management (BLM), Colorado Nonpoint Source (NPS) Program, Colorado Division of Reclamation Mining and Safety (DRMS), Natural Resources Conservation Service (NRCS), AmeriCorps Office of Surface Mining (OSM)/VISTA, Colorado Water Conservation Board (CWCB), Colorado State Forest Service (CSFS), Bonanza Stakeholders' Group (BSG), U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), local landowners and other partners. Historic mine wastes and tailings have been transported and deposited downstream through Kerber Creek and are contributing metals and low pH to the waterway. The project involves in-situ treatment of mine tailings by demobilizing metals and revegetating tailing piles, and installation of fish habitat and stream bank stabilization structures. Over \$1.3 million in restoration work has been accomplished over the past three years and the success of that work has encouraged more private landowners to join the project. The additional money will allow for the start of the second phase of restoration work along Kerber Creek, which will identify and assess priority project areas identified in the Draft Kerber Creek Watershed Plan.

Project Goals: Several project goals have been established. These include: reducing metal mobilization to the creek; improving Kerber Creek water quality; stabilizing stream channel and improving natural sinuosity; improving fisheries and macroinvertebrate habitat; and improving upland and riparian vegetation cover.

2.0 Statement of Need

2.1 General Watershed Information

While the entire Kerber Creek watershed is mostly federal lands, the project area is mostly in private ownership (Appendix 2). Floodplain elevation ranges from 7,953 feet at Villa Grove to 9,465 feet at the town site of Bonanza.

Kerber Creek is part of the much larger Rio Grande Rift Zone, which extends from southern New Mexico northward through the San Luis and Arkansas Valleys to its northern termination near Leadville. The Kerber Creek watershed is bordered on the east by the Sangre de Cristo Mountains, the result of extensive block faulting during the Laramide Orogeny. This faulting resulted in the placement of Precambrian basement, Paleozoic sedimentary, and Tertiary intrusive rocks in contact with Tertiary valley fill deposits. Along the bases of the surrounding mountainsides, unconfined water is abundant in alluvial and colluvial deposits and is also in sedimentary, igneous, and metamorphic rocks (BLM, 1989).

The upper Kerber Creek watershed valley lies in the Seitz-Bushvalley-Rock outcrop consisting of deep and shallow, rolling to very steep, well drained, very stony and cobbly loamy soils and rock outcrop on mountainsides and ridges. Here the erosion and permeability are moderate. Surface runoff is high and water capacity is high. These soils fall in the Mountain Loam Ecological Range Site. The lower portion lies in the Big Blue-Gerrard deep nearly level gently sloping poorly drained loamy soils, on floodplains, low terraces, and fans. Here, permeability is slow to moderate, runoff is slow, and erosion hazard is supposed to be slight (USDA, 1984).

Historic mining activities resulting in the discharge and deposition of mine waste have degraded the Kerber Creek watershed. Despite the restoration activities completed as part of the original American Smelting and Refining Company (ASARCO) clean-up operation, water quality in Kerber Creek still exceeds water quality standards for cadmium in Segment 9a and for copper in Segment 9b according to the CDPHE 2008 303(d) list. Additionally, annual loads of lead, silver, low pH, and zinc from upstream tributaries would require significant reductions to meet current water quality standards (CDHPE, 2008). In addition, limits to natural vegetation persist in the lower watershed in areas where

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no restoration activity has taken place to date, preventing the reestablishment of channel stability. There are 26 permitted water diversion points along Kerber Creek, not all of which are necessarily functional.

2.2 Water Body Description

The Kerber Creek watershed is defined by the United States Geological Survey as a 5th level watershed with HUC 1301000302 and is part of the Rio Grande Closed Basin (KCRP, 2011a). Main tributaries to Kerber Creek include Slaughterhouse Creek, Brewery Creek, Skunk Creek, Rawley Gulch, Eagle Gulch, and Sand Gulch and other perennial and ephemeral drainages. Precipitation ranges from approximately 30 inches at higher elevations to 12 inches at lower elevations. One active gage station is located on Kerber Creek within the project area (Appendix 3). The two-year event at this location is approximately 95 cubic feet per second (cfs), and the 100-year event is about 434 cfs. A flow of 211 cfs was recorded in 2001, and highest flow on record is 407 cfs in 1941.

According to BLM's Kerber Creek Environmental Assessment (2006), B, E, and C stream types with medium to large cobble substrate are present on Kerber Creek. Lower in the drainage, gravel and fine sediments increase. Stream bankfull width varies from approximately 8 feet to 21 feet, with an average of about 14-16 feet. Bankfull depth on wider reaches is 1 foot or less, and increases as width decreases. Stream gradient is approximately 3%, with riffle bedform the most common. Restoration activities completed as a part of Phase 1 have improved stream channel stability considerably. Stabilization efforts as detailed in Phase 1 included the installation of root wads, willow fascines, and engineered rock weirs as well as the planting of sedge mats, willow, and cottonwood at prescribed sites. Measurements of stream sinuosity and percentage of vegetated banks over the completed course of Phase 1 have shown improvement in treated sites. Additionally, fishery density has shown an upward trend since 1980, as shown by the results of monitoring events at 3 sites upstream of Villa Grove in 2008, 2009, and 2010 though improvement in macroinvertebrate density has not been consistent (KCRP, 2011b).

Despite these efforts, tailings depositions persist in certain areas along the stream, such as at site KC16, resulting in loss of riparian vegetation, high width/depth ratios, and low sinuosity values. These characteristics result in an unstable stream channel that cannot support sufficient fishery or macroinvertebrate densities (KCRP, 2011a). Overall, past reclamation and remediation projects on Kerber Creek and at upstream mine sites have improved watershed health to some degree. Stream morphology and riparian health on Kerber Creek vary considerably, with some reaches stable with desirable physical attributes, and others that continue to be impacted by tailings deposits and unstable banks.

2.3 Type of Water Quality Problem including Sources

Lands within the watershed are owned and managed by BLM, USFS, and private citizens. Mine wastes, including tailings, were discharged into Kerber Creek by pre-1930s milling from several mills in the Bonanza Mining District and were transported and redeposited downstream. Prior to the start of Phase 1, voluntary cleanup actions were conducted in the watershed. Over \$10 million in response actions were undertaken by the BLM, ASARCO, CDPHE, and USFS. However, tailings were still present and degraded stream channel conditions persisted over a distance of 17 miles. Under a 2008 Nonpoint Source Program grant and related matching funds, project partners began addressing these concerns on private lands along Kerber Creek, using the restoration practices in this proposal. In Phase 1, project partners restored approximately 50 acres of tailings deposits, over 6.5 miles of stream, 13.2 miles of stream bank, and installed 171 in-stream structures. These methods have improved stream channel health, bank stability, and riparian vegetation on treated sections. The BSG and participating

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government agencies are committed to monitoring these parameters for the duration of Phase 1 (2015) and additional phases. In the lower watershed, a total of approximately 172 acres of mine wastes have been identified, and to date, about 50 acres have been restored. Therefore, there are about 122 acres yet to be restored.

Since 2008, new partnerships with landowners have been formed and X-Ray florescence (XRF) analyses were used to determine that along several stretches of the stream, low pH and high metal toxicity limit natural revegetation and stream bank stabilization. In these areas, stream banks are not agglomerating with clean soils and the stream channel is not capable of sustaining flows during low precipitation periods, or promoting protective vegetative recruitment and establishment. Conversely, high flows continue to scour stream banks, which restrict the natural colonization of riparian plant species, thus reducing channel stability.

CDPHE and project partners have collected and analyzed surface water samples since 1990 in this watershed. This data is available via CDPHE, through the WQX Data system (EPA, 2010). From 2005- 2010 BLM and partners collected and analyzed surface and subsurface tailing samples, using XRF to evaluate metal concentrations. In summary, all metals analyzed except selenium and mercury were detected above naturally occurring background levels. Several sites exceed the human Risk Management Criteria for soils including arsenic (46 mg/kg) and lead (1,000 mg/kg) (BLM, 2006).

2.4 Water Quality Priorities

This proposal presents a plan for the restoration of key areas impacted by historic mine tailings in the Kerber Creek watershed. Kerber Creek was on the 2006 State of Colorado Section 303(d) list for heavy metals resulting from mining operations conducted nearly a century ago. Colorado Department of Public Health and Environment (CDPHE) completed a Total Maximum Daily Load Assessment (TMDL) in 2008. The water quality goal for the 303(d) listed segments of Kerber Creek is attainment of the assigned use classifications for Segments 9a and 9b, specifically the assigned Water Supply Use classification for Segment 9a and the Aquatic Life Use classification for Segment 9b (segment where restoration project will occur). A primary endpoint of the project is that the water quality standards for metals are attained. The segment of the waterway that this proposal covers is listed for dissolved cadmium, copper, and zinc and is classified as Aquatic Life Cold 1, Recreation E, Water Supply, Agriculture / Use Protected in the TMDL (CDPHE, 2008).

Since 1993, stream and riparian restoration work has included phytostabilization of mine tailings, relocation of high metal concentration soils out of the floodplain, re-establishment of natural meandering channel patterns, channel stabilization with rock barbs, J-hooks, cross-vanes, vortex weirs, root wads, and willow/alder plantings, and lining of channels to preclude infiltration into mine workings. Because of this, Kerber Creek has already progressed from supporting virtually no aquatic life over a 17-mile long stretch to nearing water quality goals. Fish are now present in some stretches of Kerber Creek below its confluence with Brewery Creek, as well as in other areas within the watershed (KCRP, 2011a). However, a further reduction of metals loading is necessary to attain current water quality standards in the stream. Reduction of this load, which is the primary goal of Phase 2, combined with future reclamation of the Minnie Lynch mine site, would likely allow Kerber Creek to meet water quality standards.

All of the project work included in this proposal has been identified as high-priority work in the Draft Kerber Creek Watershed Plan (2011). Water quality is gradually improving in Kerber Creek, which is evidenced by several metals from Segments 9a and 9b attaining standards. Lead, silver, pH, cadmium, and zinc were all removed from the 303(d) list in 2008 (CDHPE, 2008). However, flow from upstream tributaries such as Squirrel Creek and Rawley Gulch retains the capacity to contribute such contaminants to the main channel. The annual load reduction needed to meet the TMDL for Segment 9b,

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would be 9% for cadmium, 18% for copper, and 8% for zinc (CDHPE, 2008). Cadmium in Segment 9a and copper in Segment 9b remain on the 303(d) list. Reducing metals loading in the lower watershed, as well as from source areas (e.g. Rawley Gulch/Minnie Lynch) would be needed to achieve those load reductions (Appendix 5). The engineering and design work will provide a basis for future implementation of remediation at Minnie Lynch. Therefore, the combination of planned work for Phase 2 and future remediation of Minnie Lynch source areas could result in the deletion of Kerber Creek from the 303d list.

2.5 Map of Watershed Location

Please see Appendix 1 for a watershed location map.

3.0 Project Description

3.1 Environmental and Programmatic Goals

Watershed Environmental Goals

- Reduce the amount of cadmium, copper, zinc and other metals entering Kerber Creek from mine tailings and source areas (e.g. Minnie Lynch/Rawley Gulch)
- Improve stream system through channel restoration, establishing vegetation along banks and improving natural meander patterns
- Improve Kerber Creek fishery and macroinvertebrate habitat

Programmatic Goals

- Demonstrate potential success of Good Samaritan mine restoration work
- Maintain good relationship with local stakeholders and include in all project decision-making.
- Improve Kerber Creek fishery and work towards reestablishment of native fisheries
- Complete project work prioritized in the Kerber Creek Watershed Plan

3.2 Objectives, Tasks, and, Products

Objective 1: Manage project

Task 1: Manage grant, oversee project, submit required semi-annual and final reports.

Products: Project reports to CDPHE for review and approval; completed restoration project.

Objective 2: Phytostabilize priority mine waste/tailing deposits along creek.

Task 2: Prepare sites for phytostabilization, purchase and incorporate 34 acres of soil amendments for phytostabilization, install sediment barriers, and revegetate sites.

Product: 34 acres of land phytostabilized.

Objective 3: Stabilize stream banks at 30 sites.

Task 3: Where prescribed, install root wads, willow fascines, and engineered rock structures. Plant sedge mats, willow, and cottonwood.

Product: Stable stream banks.

Objective 4: Install 100 fish habitat structures in stream.

Task 4: Place cross-vanes, J-hooks, barbs and low head dams where prescribed.

Products: Improved fish habitat and stream health.

Objective 5: Monitor stream bank morphology, riparian and upland vegetation, fisheries, water quality, and macroinvertebrate populations in accordance with approved SAPP

Task 5: As detailed in the SAPP: measure stream sinuosity on 5 stream reaches, install 3 semi-permanent cross section transects, and establish 3 photo points to monitor stream morphology

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changes. Establish and monitor 3 long-term vegetation transects/water quality/fishery/and macroinvertebrate points for quantifiable changes in water quality, structure and populations.

Products: Quantitatively and qualitatively document improvement over time by monitoring all stations in 2014 and 2016 as specified in the SAPP.

Objective 6: Engineering/Design at Source Areas (Minnie Lynch/Rawley Gulch).

Task 6: Based on characterization data (water quality/soils) collected over the past couple of years, develop engineering/design alternatives for reducing metals loading from Minnie Lynch/Rawley Gulch source areas.

Product: Implementation alternatives for future cleanup work that could result in a metals loading reduction of 30-60% in the main stem of Kerber Creek downstream of confluence with Rawley Gulch.

Objective 7: Continue to develop a strong and lasting BSG and share success of project.

Task 7: Hold 6 community meetings to report progress and share successes with BSG members to further develop and maintain an engaged and committed BSG with the capacity to address new watershed issues as they arise. Share project information at appropriate conferences and meetings; develop interpretive signage.

Products: Committed stakeholders and informed public; interpretive signage.

3.3 Environmental Permits

BLM obtained a Clean Water Act (CWA) Section 404 permit for the project, as well as a storm water permit¹. These permits cover work on both private and public land. Each landowner will agree to sign the required covenants for the project. If a landowner does not agree, his portion of the project will be dropped and the money will be spent elsewhere. Both permits were renewed in 2009 and are valid for the remainder of the project.

TU will work closely with EPA Region 8 to ensure that the organization is shielded from liability. For Phase 1, the Kerber Creek Restoration Project offered an excellent opportunity to utilize the EPA tools, and TU became the first in the country to initiate a Good Samaritan cleanup using the Good Samaritan Initiative. After extensive legal work by the EPA and TU, TU obtained Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) relief under an EPA Settlement Agreement. This agreement will be continued throughout the life of the project.

3.4 - Lead Project Sponsor Qualifications

TU has extensive experience managing grants and overseeing projects throughout the country. Over the past three years, TU has utilized federal grants from the National Fish and Wildlife Foundation, USFWS, NRCS, Office of Surface Mining, BLM, National Park Service, National and Oceanic Atmospheric Administration, and EPA totaling more than \$4.5 million to complete conservation projects across the nation. The continued support of these agencies speaks to TU's strong track record for completing its project-specific objectives to benefit coldwater resources and documenting the results of its projects in reports to these agencies. In Colorado, TU has successfully completed a \$449,000 project grant from the Colorado NPS for Phase 1 of the restoration work along Kerber Creek.

The Kerber Creek Restoration Project provides an excellent opportunity for on-the-ground restoration that meets TU's mission to conserve, protect, and restore North America's trout fisheries and their watersheds. As one of the lead partners in this effort to address pollution caused by legacy

¹ BLM Storm Water Permit – Notice of Intent Tracking Number: COR10CS8F can be downloaded at <http://www.epa.gov/npdes/stormwater>. COE – BLM Nationwide 404 Permit No. 27t – Action No. SPA-2008-00243-SCO.
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hardrock mining, TU has been successful in bringing in multiple partners and landowners to participate in this project as part of the BSG. The first phase of restoration work was completed in October 2008 by the BLM, and has continued since. The project received six prestigious awards since its inception: the BLM's *Hardrock Mineral Environmental Award*, the Colorado Riparian Association's *Excellence in Riparian Area Management Award*, the Rocky Mountain Region of the USFS's *Forest and Grassland Health Partner of the Year* and *Water Emphasis of the Year Honor*, the Public Lands Foundation's *Landscape Stewardship Award*, and the Western Division of the American Fisheries Society's *Riparian Challenge Award*. All of this was made possible through the great partnership of the BSG.

3.5 BMP Operation and Maintenance

BMPs will be followed by land owners and project managers. Remedial actions at the site will adhere to the programmatic Environmental Assessment for Watershed and Fisheries Conservation Treatments (USFS, 2005). This programmatic EA lists impacts to watersheds and riparian areas mitigation measures that implement BMPs. Additionally the Army Corps of Engineers (USACE) 404 permit and EPA's Construction General Permit Nationwide Storm Water Permit list additional BMPs that will be adhered to. A copy of the 404 permit will be provided upon request.

The EPA Storm Water Permit, the USACE 404, and the programmatic EA all include descriptions of BMPs (available upon request). All participating stakeholders have agreed to adhere to BMPs on their parcel, and every parcel will be reviewed yearly by a partner organization to ensure adherence. Partner agreements are with the current landowner only. If a landowner sells or abandons his or her land, the new land owner will be made aware of the project and the agreement into which the previous landowner entered. They will be encouraged to join the BSG. A checklist will be completed during each site visit. Partners will ensure BMP adherence throughout the life of the project.

4.0 Coordination Plan

4.1 Lead Project Sponsor and Cooperators (all by informal agreements, contracts with funders) with details in the appendix.

Cooperators	Responsibilities
TU (Lead Sponsor)	Fiscal administrator, project manager, field coordination, outreach
BLM/USFWS	Field coordination, technical assistance, monitoring oversight
NPS Program	Funding, technical assistance
AmeriCorps OSM/VISTA	Outreach, education, volunteer coordination
DRMS	Funding, technical support
Collegiate Peaks Anglers	Volunteer labor
NRCS	Technical support, landowner assistance
Landowners	Volunteer labor, equipment
BSG	Volunteers, outreach
USFS	Technical assistance
EPA	Legal assistance, monitoring support
CWCB	Funding
CSFS	Funding
Commission for Environmental Cooperation	Funding
Tiffany & Co. Foundation	Funding
XCEL Energy Foundation	Funding

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4.2 Local Support

The land owners located along Kerber Creek and its tributaries formed the BSG in 2007 and are actively involved in addressing the restoration needs of Kerber Creek. BSG is dedicated to providing coordination and assistance to this project and currently has over 20 private land owners, 11 state and federal agencies, and 2 nonprofit organizations as group members. BSG and other local land owners will be contributing over \$100,000 of in-kind match to the restoration project. The Collegiate Peaks Chapter of TU, based in Salida, and Adams State College in Alamosa have a history of working on river restoration projects in the San Luis Valley. One or both of these partners will be contributing volunteer labor for restoration and revegetation. The project also enjoys the support of Saguache County Sustainable Environmental and Economic Development (ScSEED), a local economic development organization and the Northern San Luis Valley Conservation Roundtable, an association of local conservation groups and landowners. Educational tours of the project's work are done on an individual basis with community members including local school groups, volunteers, and any other interested parties, such as watershed groups and history-based organizations. We conduct an average of six per year.

The project also has the support and strong partnership with the USFWS in the Saguache Field Office. USFWS is now the staff for the project on behalf of BLM, the lead agency. During Phase 2, we will also partner with NRCS once again, but the details of the agency's involvement are still being worked out.

4.3 - Coordination with Other Projects and Organizations

To better address the need for coordination with other projects and organizations, the sponsors applied for and were granted an AmeriCorps OSM/VISTA member. The project has had one full three-year term of OSM/VISTA members serve so far, and began a second three-year term in August 2012. According to lead sponsors, the member is tasked with the following responsibilities, all of which involve improvement of relationships between the main project and associated organizations and the building of additional relationships:

- Submit grant proposals to secure future funding
- Maintain organizational website
- Coordinate and network with local watershed organizations
- Support and develop, where possible, historic mining-related projects
- Present watershed organization via appropriate channels
- Assist in developing and facilitating outdoor educational events
- Present Kerber project work at least one professional conference during each project year
- Assist with water quality sampling, soil analysis, and riparian habitat assessments

Current and future OSM/VISTAs will work on furthering community outreach efforts and engaging local residents in volunteer projects and educational events.

4.4 Similar Watershed Activities

Other restoration activities in the watershed include USFS closure of 15 miles of non-authorized user created routes, continued revegetation efforts at the Rawley 12, salvage of beetle killed timber on 400 acres of forested land, and continued grazing management improvement on public and private lands.

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5.0 Evaluation and Monitoring Plan

5.1 - SAPP Development

Phase 2 of the Kerber Creek Restoration Project will adhere to all requirements in the existing SAPP that was developed by the BLM and approved by EPA and CDPHE for Phase 1 of the project. USFWS will complete any needed updates and additions to existing SAPP.

5.2 Watershed Monitoring Strategy

Overall watershed monitoring strategy is to document improvement of water quality, channel morphology, macroinvertebrate and fish density, upland vegetation and riparian corridor, and riparian proper functioning condition. The table in Appendix 4 describes these particular monitoring and target results, including methods and measures of success. In addition to Phase 1 monitoring sites, new monitoring sites will be added for vegetation, channel morphology, and fishery/macroinvertebrate density within the area of proposed work (KC16, Appendix 7). All data collection will be conducted according to the updated Phase 1 SAPP ensuring continuity of procedures and comparability of data. Monitoring may result in proposed amendments for inadequate or failed treatment sites as appropriate.

Programmatic goals include the demonstration of the potential success of Good Samaritan mine restoration work, the maintenance of a good relationship with local stakeholders, the improvement of the Kerber Creek fishery, and the completion of work prioritized in the Watershed Management Plan. Quarterly meetings of the Bonanza Stakeholders Group will be held in order to ensure continued involvement of local landowners, and meetings will be monitored for attendance and satisfaction of landowners with the direction and leadership of the project. In addition, the effectiveness of community outreach and education programs will be evaluated based on the number of community meetings held and the participation of local youth in project activities. Relationships developed from presence at relevant conferences and production of professional papers also indicate the effectiveness of outreach efforts.

The evaluation table summarizes project objectives and tasks.

Environmental (E) Goal: Reduce metals loading to Kerber Creek; Improve stream system; Improve Kerber Creek fishery and macroinvertebrate habitat				
Programmatic (P) Goal: Demonstrate potential success of Good Samaritan mine restoration work; Maintain good relationship with local stakeholders; Work towards reestablishment of native fisheries; Complete project work prioritized in Watershed Management Plan				
	Responsible Party	Outputs or Outcomes	Evaluation Methods	Measure of Success
Objective 1: Manage project				
Task 1: Manage grant, submit required reports, oversee project	TU; BLM	Semi-annual and final reports to CDHPE for review and approval; Completed restoration project	Writing, reviewing, and submitting required reports; Monitoring all partners' involvement and ensuring that all work is completed as prioritized in Watershed Management Plan	Timely submission and approval of required reports; Standards met for all impaired environmental variables
Objective 2: Phytostabilize priority sites with mine tailings along creek				

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Task 2: Prepare for and complete phytostabilization for 34 acres	BLM; BSG	34 acres of land phytostabilized	Purchasing and incorporation of soil amendments (lime, limestone, compost) followed by revegetation	Completion of phytostabilization plans with degree of success equal to that of previous projects
Objective 3: Stabilize stream banks at 30 sites				
Task 3: Where prescribed, install root wads, willow fascines, and engineered rock structures; Plant sedge mats, willow, and cottonwood	BLM; BSG; NRCS	Stable stream banks	Vegetation of stream bank; installation of engineered rock structures	50% increase in stream bank vegetation cover; successful installation of engineered structures
Objective 4: Install 100 fish habitat structures in stream				
Task 4: Place cross-vanes, J-hooks, barbs, and low head dams where prescribed	BLM; BSG; NRCS	Improved fish habitat and stream health	Installation of rock structures in identified sites	Increase in fish density and biomass; decreased width/depth ratio
Objective 5: Continued use of approved SAPP				
Task 5: Monitor stream bank morphology, riparian and upland projects, fisheries, water quality, and macroinvertebrate populations using existing SAPP	BLM; TU	Quantitative and qualitative documentation of improvement over time; Utilization of SAPP	Monitoring of all stations in 2014 and 2016, including reaches for stream sinuosity, photo points, and transects utilizing existing SAPP to ensure continuity of measurements	Improvement of all watershed variables based on comparable measurements as specified in SAPP
Objective 6: Engineering/Design at Source Areas (Minnie Lynch/Rawley Gulch)				
Task 6: Reduce metals loading from Minnie Lynch/Rawley Gulch source areas	TU; USFS; USFWS	Implementation alternatives for future cleanup work	Use of characterization data (water quality/soils) to develop engineering/design alternatives to reduce metals loading	Progress towards a metals loading reduction of 30-60% in mainstem downstream of confluence with Rawley Gulch
Objective 7: Foster a strong and lasting BSG and share success of project				
Task 7: Further develop and maintain an engaged and committed BSG with the capacity to address new watershed issues as they arise. Share project information at appropriate conferences and meetings; develop interpretive signage.	BLM; AmeriCorps OSM/VISTA	Committed stakeholders; Informed, interested public; Greater support for and knowledge of project	Continue to hold quarterly BSG meetings; Hold 6 community meetings to inform and educate public and garner support; share project success via professional conference presentations and papers	Increased capacity to address new watershed issues; Increased attendance at BSG and community meetings; Increased participation in meetings and volunteer activities from different sectors of the community; Presence at conferences

5.3 - Data Management and Evaluation Reporting

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Colorado Data Sharing Network Microsoft Excel data tables have been designed and will be provided for each parameter included in the WQX database. All data entry will be reviewed to ensure there are no data entry errors; one hundred percent data accuracy will be the minimum accepted. Spatial data with unique attributes linked with the Kerber Creek project geo-database will be archived on the Monte Vista BLM server. Data will be updated as it is collected. Results from the data analysis will be used to evaluate progress, determine if changes in project/monitoring design need to be considered, and assess the overall final project success. The BLM is the responsible partner for project evaluation. Information from the project will be presented at a minimum of two restoration-related annual conferences such as the Colorado Watershed Assembly/Colorado Riparian Association or Society for Ecological Restoration conferences during the grant period. The project's OSM/VISTA member will also help produce educational materials exemplifying lessons learned.

5.4 Describe any models used.

No models will be used for this restoration project.

5.5 Project Evaluation

Environmental goals will be evaluated based on timely attainment of goals specific to each parameter as detailed in the Watershed Monitoring Strategy table in Appendix 4. Data will be collected and analyzed as detailed in the SAPP, and evaluation will be based on the extent to which progress is made on meeting water quality requirements and that to which stream channel health and revegetation goals for Phase 2 are achieved by the time of submission of the final report, though monitoring will likely continue beyond that date. Evaluation of programmatic goals will be based on stakeholders' meetings attendance and the extent to which local landowners are interested and involved in restoration efforts within the time frame of Phase 2. Upon project conclusion, project goals will be considered met if each landowner or land management agency is able to sustain the improved environmental quality without the assistance of an organized coalition.

6.0 Budget (Budget Table is attached as a separate file)

7.0 Public Involvement

7.1 Process for Public Involvement

As with Phase 1, public involvement will be a high priority for the project. This coordinated effort already has the support of the BSG, the association of local project stakeholders, which will continue to meet quarterly throughout the restoration project. Regular updates will be provided by TU and BLM/USFWS. Numerous volunteer work days for stream restoration and revegetation work will be coordinated with the Collegiate Peaks Chapter of TU, volunteers, stakeholder members and other land owners. These organizations and participants have committed to assisting with labor for all work days. Six community meetings in Villa Grove and Saguache will be planned over the span of the project to provide project updates and a draft of the watershed plan to interested community members. The Northern San Luis Valley Conservation Round Table has begun outreach to other interested conservation groups within the San Luis Valley. The Round Table provides information about accomplishments on Kerber Creek and shares best practices. A website is currently maintained (www.kerbercreek.org) that keeps interested parties up-to-date on activities and featured project highlights. We also plan to celebrate and share our successes with an annual potluck barbeque at a local

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landowner's ranch. Additionally, both TU and the BLM will update Kerber Creek restoration information on their respective websites.

References Cited:

- [BLM] Bureau of Land Management, Saguache Field Office. 2006. Environmental Assessment No. CO-500-07-014EA. Kerber Creek Restoration Projects.
- [BLM] Bureau of Land Management 1989. San Luis Valley Resource Management Plan and Environmental Impact Statement.
- [CDPHE] Colorado Department of Public Health and Environment. 2008. Total Maximum Daily Load Assessment (TMDL). Kerber Creek, Saguache County, Colorado, Colorado Water Quality Control Division.
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- [USFS] U.S. Forest Service. 2005. Environmental Assessment for Watershed and Fisheries Conservation Treatments. San Luis Valey Public Lands Center, Saguache, CO.

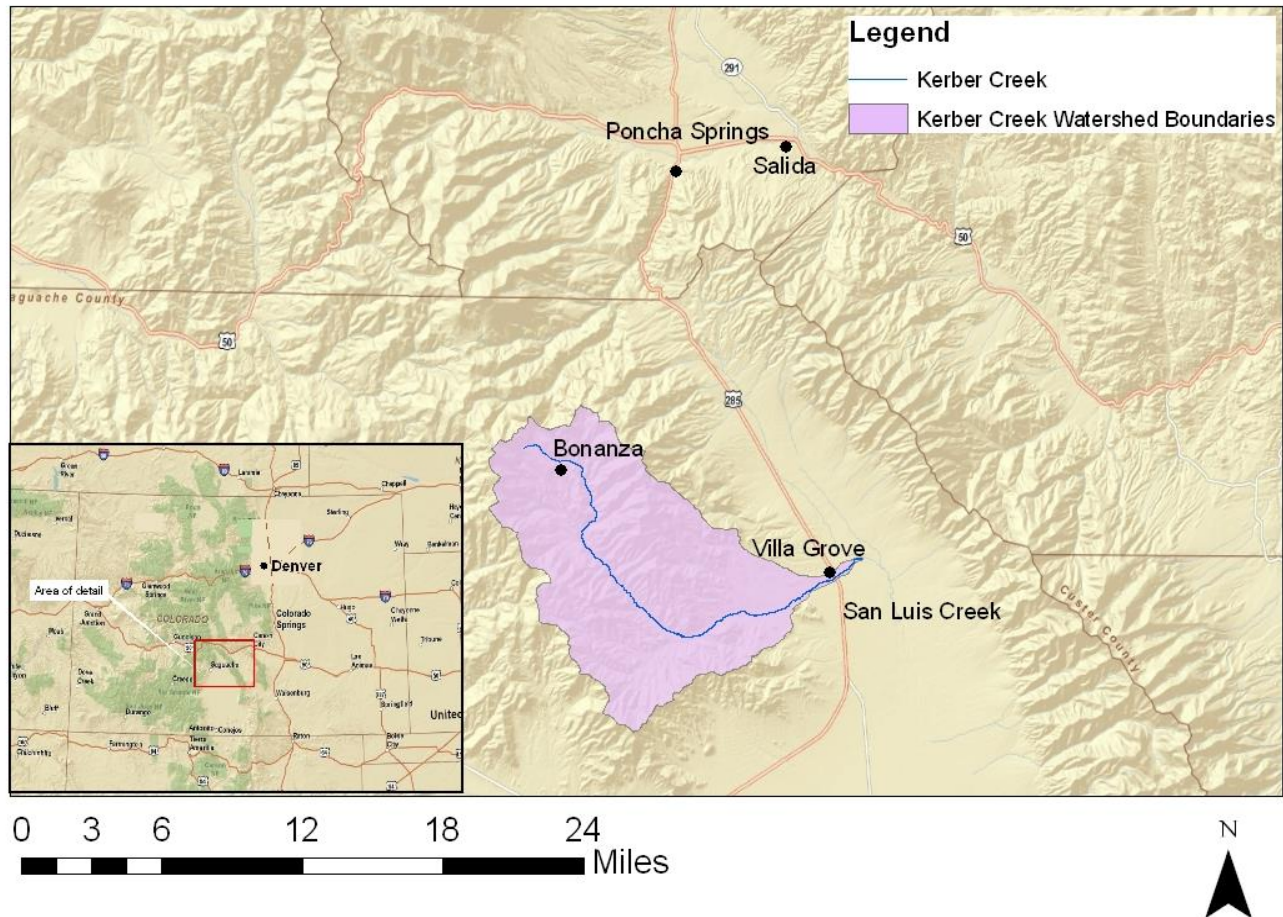
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Project Implementation Plan

Appendix 1. Kerber Creek Restoration Project location map.



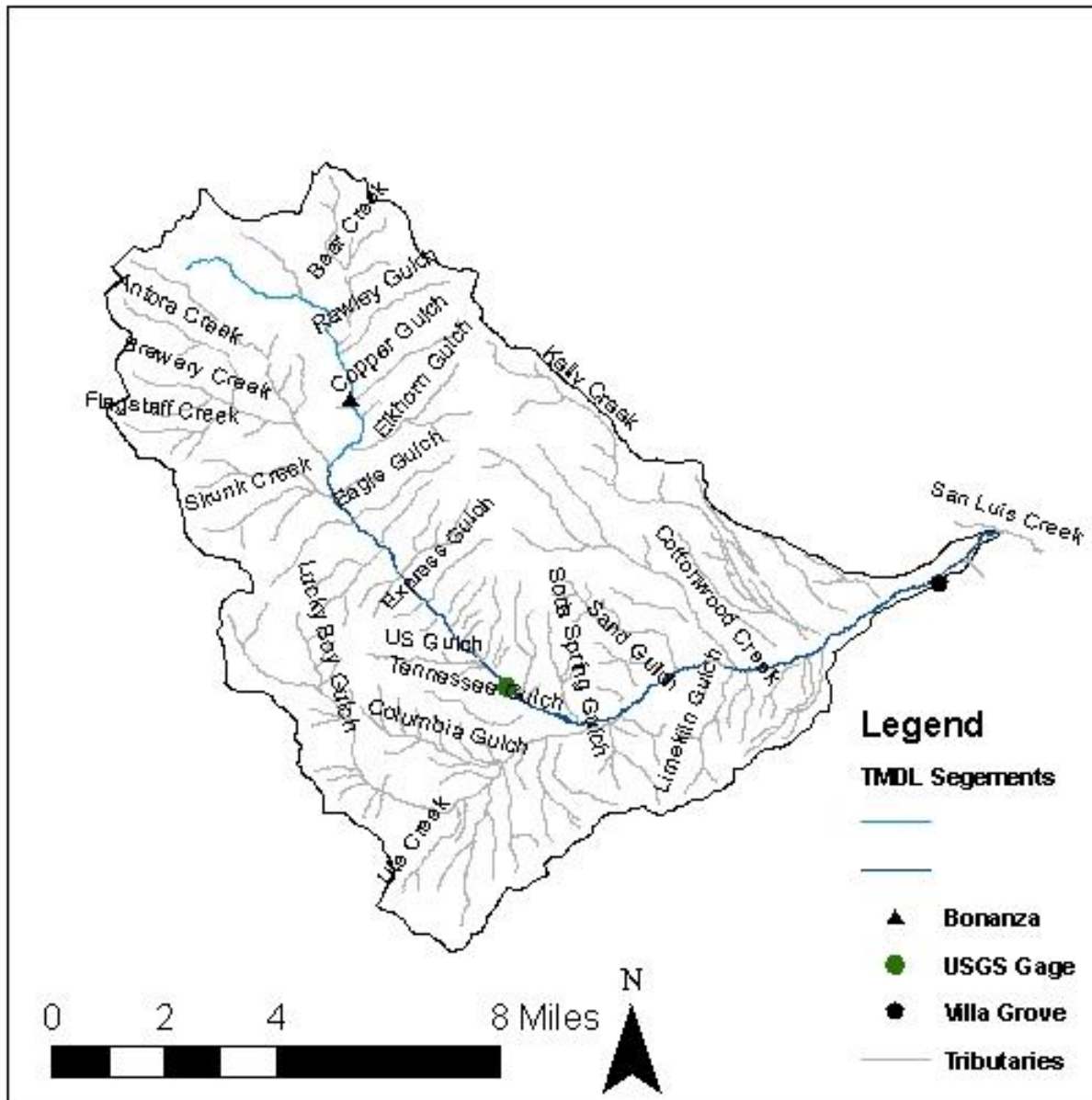
Created by the Saguache Ranger District/Field Office 2010

Appendix 2. Land ownership within Kerber Creek Watershed by land type.

Land Type	Total	BLM %	Private %	USFS %
Watershed	64325 acres	13 (8276 acres)	21 (13583 acres)	66 (42466 acres)
Floodplain	3630 acres	1 (37 acres)	99 (3589 acres)	.01 (5 acres)
Stream bank	17 miles	6 (1 mile)	94 (16 miles)	0

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Appendix 3. Kerber Creek watershed including perennial and ephemeral tributaries.



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Appendix 4. Watershed monitoring strategy: Methods, objectives, and desired results for all variables used to monitor the Kerber Creek watershed.

Water Quality/ Environmental Goals	Objective	Environmental Data Collection / Tasks	Frequency	Measurable Results
Reduce metal mobility in soil	Reduce metal concentrations in Kerber Creek	Using CDPHE water quality data and monitoring sites already established (CDPHE, 2008).	Prior to project initiation (2008) and then again in 2011 and 2015 (Phase 1); first in 2014 and then in 2016 (Phase 2)	Within 5 period, meet site-specific chronic water quality standards for zinc, cadmium, and copper in segment 9b (best case scenario)
Increased sinuosity	Improve floodplain recharge, and reduce shear stress	Using past, current, and future satellite imagery, measure stream length and divide by valley length (Rosgen and Silvey 1998) Measure on the ground, in three 250 meter long reaches.	Prior to project initiation (2008) and then again in 2011 and 2015 (Phase 1); first in 2014 and then in 2016 (Phase 2)	2-5% Increased Sinuosity in a 1 mile reach
Reduced channel width	Stabilize banks and facilitate sustainable fate and transport of sediment	Install three semi-permanent cross sections and measure width depth from floodplain to floodplain (Rosgen and Silvey 1998).	Prior to project initiation (2008) and then again in 2011 and 2015 (Phase 1); first in 2014 and then in 2016 (Phase 2)	Reduce channel width 10%
Increased depth	Increase depth of stream for habitat improvement and floodplain recharge	See above	Prior to project initiation (2008) and then again in 2011 and 2015 (Phase 1); first in 2014 and then in 2016 (Phase 2)	Increase depth 10%
Increased macro-invertebrate density	Improve macro-invertebrate density to assimilate nearest similar potential natural community stream	Sample and analyze macro-invertebrates at 3 sites focusing on EPT ratios. Samples will be collected at a minimum of three sites in the Kerber watershed and 3 sites in Sheep Creek watershed. (Utah St. Bug Lab protocols)	Prior to project initiation (2008) and then again in 2011 and 2015 (Phase 1); first in 2014 and then in 2016 (Phase 2)	Overall increase of 10% macro invertebrate density
Increased fishery density	Improve fisheries	Partner with CPW and FWS to shock and determine fishery density at 3 sites (CDOW Jake-o-matic)	Prior to project initiation (2008) and then again in 2011 and 2015 (Phase 1); first in 2014 and then in 2016 (Phase 2)	Overall increase in fish density 10%
Increased upland vegetation cover	Decrease overland flow, reduce metals loading, and slow infiltration of rainfall and snowmelt	Install 3 semi-permanent Daubenmire transects and record vegetation frequency and cover (Daubenmire 1967)	Prior to project initiation (2008) and then again in 2011 and 2015 (Phase 1); first in 2014 and then in 2016 (Phase 2)	Increase vegetation cover 50%
Display change	Demonstrate change overtime with photography	Establish at least 3 additional semi-permanent photo points (BLM TR 1734-4, 1999)	Prior to project initiation (2008) and then again in 2011 and 2015 (Phase 1); first in 2014 and then in 2016 (Phase 2)	Monitor long-term trends in riparian and upland habitats

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Appendix 5. Lead Project Sponsor and Cooperating Organizations.

Lead Sponsor			
Agency Name	Trout Unlimited		
Agency Address	523 Arbor Drive, Lafayette, CO 80026		
Role/contribution	Grant administration and project management		
Contact Person	Elizabeth Russell	Telephone	720-938-5438
E-mail address	erussell@tu.org		

Cooperators			
Agency Name	BLM / USFS/USFWS		
Agency Address	San Luis Valley Field Office / Saguache Ranger District / Colorado Field Office		
Role/contribution	Technical assistance, matching contributions, monitoring		
Contact Person	Laura Archuleta	Telephone	719-655-6121
E-mail address	laura_archuleta@fws.gov		

Cooperators			
Agency Name	Western Hardrock Watershed Team/AmeriCorps VISTA		
Agency Address	San Luis Valley Field Office		
Role/contribution	Working with landowners, stakeholder development, outreach and education		
Contact Person	Trevor Klein	Telephone	719-655-6107
E-mail address	coordinator@kerbercreek.org		

Cooperators			
Agency Name	Division of Reclamation Mining and Safety		
Agency Address	1313 Sherman Street, Room 215, Denver, CO 80203		
Role/contribution	Cash match		
Contact Person	Julie Annear	Telephone	303-866-3567 ext 8104
E-mail address	julie.annear@state.co.us		

Cooperators			
Agency Name	Colorado Water Conservation Board		
Agency Address	1313 Sherman Street, Room 721, Denver CO 80203		
Role/contribution	Cash match		
Contact Person	Chris Sturm	Telephone	303-866-3441 ext 3236
E-mail address	chris.sturm@co.state.us		

Cooperators			
Agency Name	Collegiate Peaks Anglers Chapter of Trout Unlimited		
Agency Address	c/o Fred Rasmussen, 11620 CR 251, Salida, CO 81201		
Role/contribution	In-kind match for volunteer hours		
Contact Person	Fred Rasmussen	Telephone	719-539-2595
E-mail address	salmo@ridgeviewtel.us		

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Cooperators			
Agency Name	Saguache County Sustainable Environmental and Economic Development		
Agency Address	PO Box 102, Villa Grove, CO 81155		
Role/contribution	Outreach, local support and community engagement		
Contact Person	Kim Smoyer	Telephone	719-655-0104
E-mail address	development@scseed.org		

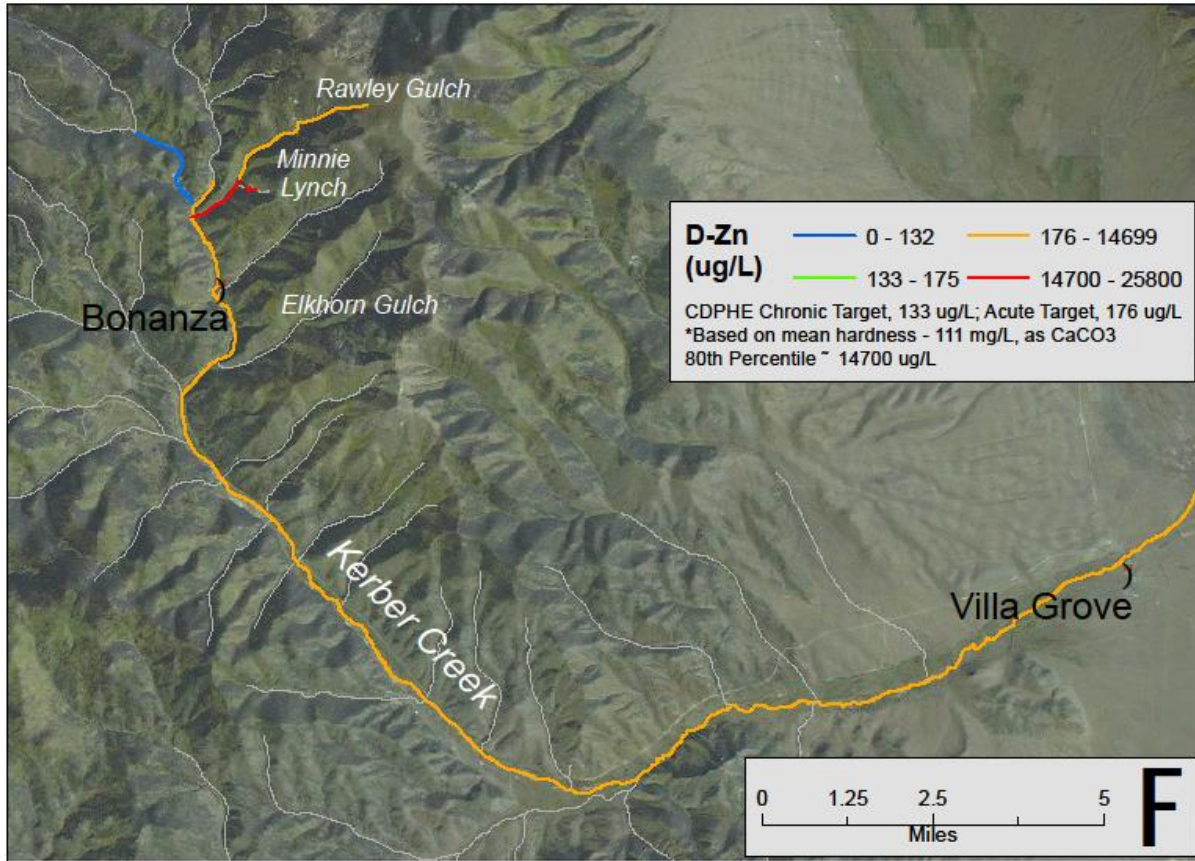
Cooperators			
Agency Name	Northern San Luis Valley Conservation Roundtable		
Agency Address	c/o Barbara Tidd, 28922 County Rd 65, Moffat, CO 81143		
Role/contribution	Outreach, local support and community engagement		
Contact Person	Barbara Tidd	Telephone	719-256-5436
E-mail address	barb@olt.org		

Cooperators			
Agency Name	Bonanza Stakeholders Group Landowners		
Agency Address	10315 Baneberry Place, Highlands Ranch, CO 80129		
Role/contribution	Access agreements, partner recruitment, in-kind and cash match		
Contact Person	Jeff Dragos	Telephone	303-791-3043
E-mail address	jeff@kerbercreek.com		

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Appendix 6. Dissolved zinc ribbon map for Kerber Creek main channel and source areas.

Kerber Creek, May 2010



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Appendix 7. KC16 property where most proposed work will take place.

