COLORADO WATER CONSERVATION BOARD

WATER SUPPLY RESERVE ACCOUNT
2007-2008 GRANT APPLICATION FORM

Lower Willow Creek Restoration Project	**Rio Grande Basin**

Amount of Funds Requested	Please Check Applicable Box		Approval Letter Signed By Roundtable Chair and Description of Results of Evaluation and Approval Process	
$50,000 - Basin **$200,000 - Statewide**	X	Basin Account	X	Yes
	X	Statewide Account		No

<u>* For the Basin Account, the Application Deadline is 60 Days Prior to the Bimonthly CWCB meeting. The CWCB meetings are posted at www.cwcb.state.co.us and are generally the third week of the month.</u>

<u>* For the Statewide Account, the Application Deadline is 60 Days Prior to the March and September CWCB Board Meetings.</u>

* In completing the application you may attach additional sheets if the form does not provide adequate space. If additional sheets are attached please be sure to reference the section number of the application that you are addressing (i.e., A.1. etc.).

<u>Instructions</u>: This application form must be submitted in electronic format (Microsoft Word or Original PDF are preferred). The application can be emailed or a disc can be mailed to the address at the end of the application form. The Water Supply Reserve Account Criteria and Guidelines can be found at http://cwcb.state.co.us/IWMD/. **The criteria and guidelines should be reviewed and followed when completing this application**. You may attach additional sheets as necessary to fully answer any question, or to provide additional information that you feel would be helpful in evaluating this application. Include with your application a cover letter summarizing your request for a grant. If you have difficulty with any part of the application, contact Rick Brown of the Intrastate Water Management and Development (Colorado Water Conservation Board) for assistance, at (303) 866-3514 or email Rick at rick.brown@state.co.us.

Generally, the applicant is also the prospective owner and sponsor of the proposed water activity. If this is not the case, contact the Rick Brown before completing this application.

Part A. - Description of the Applicant (Project Sponsor or Owner);

1. Applicant Name(s): San Luis Valley Resource Conservation & Development Council

Mailing address: 101 S. Craft Drive,
Alamosa, CO 81101

Taxpayer ID#: 74-2477074 Email address: james.mietz@co.usda.gov

Phone Numbers: Business: 719-589-3907 x124

Home:

Fax: 719-589-0613

2. Person to contact regarding this application if different from above:

Name: Carishma Gokhale-Welch

Position/Title Director, Willow Creek Reclamation Committee

3. Provide a brief description of your organization below: see "Description of Applicant" in Part 2 of Criteria and Guidance for required information.

The San Luis Valley Resource Conservation & Development Council (SLV RC&D) has sponsored the **Willow Creek Reclamation Committee** on several projects since 1999, and will be the fiscal agent sponsoring the Lower Willow Creek Restoration Project in Mineral County, Creede, Colorado. The WCRC will be the project lead, and will assume all duties for grant administration, project coordination, and report production.

Historic mining practices over the last century have heavily impacted the lower Willow Creek watershed, Creede, CO in terms of impaired water and habitat quality. This is mainly the result of metal-contaminated water flowing from mine adits, waste rock piles, and groundwater seeps. In addition, many years of deposition in the floodplain have impacted native and riparian habitat in the watershed.

In response to these environmental problems, the **Willow Creek Reclamation Committee (WCRC)** was formed in late 1997 as a community-based initiative dedicated to integrated watershed management. The Committee grew out of the determination of a group of local citizens in Creede not to have the town placed on the National Priorities List for Superfund designation. It is a grassroots non-profit organization committed to improving water quality and habitat, reducing flood risks, reclaiming areas impacted by mining, and preserving historic structures in the Willow Creek watershed in ways that are practical, cost-effective, and beneficial to the economic sustainability of the Creede community.

The WCRC is chaired by Zeke Ward, Mineral County commissioner; committee members include representatives from many of the partner agencies listed below. The WCRC has acquired approximately $1.2 million in funding from the agencies and organizations listed below:

Key Partners and Funding Sources:

Committee Members, Groups and Agencies	**Current and Past Funding Sources**
• US Environmental Protection Agency • US Forest Service • US Natural Resources Conservation Service* • US Fish and Wildlife Service* • US Geological Survey • CO Dept. Public Health and Environment* • CO Div. of Reclamation, Mining & Safety* • CO Div. of Wildlife/ River Watch • CO State Historical Society • CSU Cooperative Extension • Rio Grande Roundtable • San Luis Valley Resource Conservation and Development, Inc. • Mineral County* • Mineral County Fairgrounds Association* • City of Creede* • Citizens of the Creede Area (including retired professionals and miners)	• EPA/ CDPHE 319 Non-point Source Grants • EPA 104(b)(3), RGI, NPDES • Colorado State Historical Fund • **Colorado Water Conservation Board** • Colorado Watershed Protection Fund • Colorado Department of Local Affairs • Colorado Division of Reclamation, Mining and Safety • EPA/CDPHE Brownfields • US Army Corps of Engineers • US Forest Service • Federal Emergency Management Agency • Rio Grande Water Conservation District* • El Pomar Foundation • Virginia Christensen Trust • Hitchcock Foundation • State and Local In-Kind • Creede businesses • Creede Resources, Inc.* • Private Donations

*Letters of support attached

A key to the WCRC's success has been its active collaboration with the community's water districts, agencies, organizations (listed above) and most recently, the Rio Grande Basin Round Table, in support of the Rio Grande Basin's efforts to achieve water sustainability. Since 1997, the WCRC has worked determinedly to restore the Willow Creek watershed, whose health ultimately impacts the historic water users in the agricultural San Luis Valley and the downstream states of New Mexico and Texas.

Part B. - Description of the Water Activity – Please Refer to Criteria and Guidance Document for Eligibly Requirements

1. Name of water activity/project:

Lower Willow Creek Restoration Project

What is the purpose of this grant application?

[ ] Environmental compliance and feasibility study

[ ] Technical Assistance regarding permitting, feasibility studies, and environmental compliance

[ ] Studies or analysis of structural, nonstructural, consumptive, nonconsumptive water needs, projects

Study or Analysis of:

- [ ] Structural project or activity
- [ ] Nonstructural project or activity
- [ ] Consumptive project or activity
- [ ] Nonconsumptive project or activity

[X] Structural and/ or nonstructural water project or activity

Project Overview (inserted for contextual orientation and clarity of the proposal):

- The Willow Creek Reclamation Committee (with the San Luis Valley Resource Conservation & Development Council as its fiscal agent) is seeking a total of $250,000 in funds from the Colorado Water Conservation Board towards restoring and stabilizing 3,700 linear feet of Lower Willow Creek.

- The scope of the work for WSRA funding includes finalizing the restoration design and re-constructing 3,700 linear feet of Lower Willow Creek. Approximately 52 acres of floodplain area will benefit from these WSRA funds.

- WSRA funding will serve as match money to leverage the recently approved $398,770 Section 319 grant. These funds will combine with other sources in a $1.56 million project to restore the function of Lower Willow Creek as a natural flowing stream.

- The $1.56 million budget for the Lower Willow Creek Restoration project will involve re-constructing the entire Lower Willow Creek upto the downstream limit of the Mineral County Fairgrounds property (please see map) with a stable meandering single-thread stream channel (approximately 8,230 linear feet). Goals include stabilizing the channel with rock structures and vegetation, directing stream channel layout away from identified contaminated areas, relocation of highly contaminated soil above the watertable, construction of wetlands, revegetation of the riparian corridor, and landscaping to improve recreational and education opportunities.

2. Describe how the water activity meets these **Threshold Criteria.**

1. The water activity meets the eligibility requirements outlined in Part 2 of the Criteria and Guidelines.

   The SLV RC&D is an eligible non-governmental organization classified under the U.S. tax code under section 501(c)(3), and is the fiscal agent for the WCRC for this project.

   The Lower Willow Creek Restoration Project is an eligible non-structural water activity, which benefits *both* consumptive and non-consumptive water needs in the Rio Grande Basin.

2. The water activity is consistent with Section 37-75-102 Colorado Revised Statutes. The requirements/language from the statute is provided in Part 3 of the Criteria and Guidelines.

   This Project is consistent with the above referenced statute, and will not restrict the ability of the holder of a water right to use or to dispose of that water right in any manner permitted under Colorado law.

3. The water activity underwent an evaluation and approval process and was approved by the Basin Roundtable (BRT) and the application includes a description of the results of the BRTs evaluation and approval of the activity. At a minimum, the description must include the level of agreement reached by the roundtable, including any minority opinion(s) if there was not general agreement for the activity. The description must also include reasons why general agreement was not reached (if it was not), including who opposed the activity and why they opposed it. Note- If this information is included in the letter from the roundtable chair simply reference that letter.

   This information is included in the letter from the Rio Grande Interbasin Roundtable.

4. The water activity meets the provisions of Section 37-75-104(2), Colorado Revised Statutes. The requirements/language from the statute is provided in Part 3 of the Criteria and Guidelines.

   The Rio Grande Basin is currently in the process of developing both the consumptive and non-consumptive needs assessment. The June 2006 *SWSI Water Supply and Needs Report for the Rio Grande Basin* addressed both these aspects. Following is an analysis of how the Lower Willow Creek Restoration project will address SWSI findings:

   - Section 5 addresses the Consumptive Water Needs in the Rio Grande Basin. The Lower Willow Creek Restoration project will restore natural stream process to improve sediment transport, reduce erosion, improve water quality and create better-functioning in-stream and riparian corridor habitat. In addition, it will increase water supply to the Rio Grande by reducing evaporative loss by constructing a single-thread meandering stream in place of the currently braided Willow Creek, thereby supporting downstream agricultural water rights and addressing consumptive water needs in the Rio Grande Basin.

   - Section 6 addresses the Non-Consumptive Water Supply Needs in the Rio Grande Basin. The Lower Willow Creek Restoration project will directly implement the "Conserve, Protect, and Restore" strategy mentioned in the June 2006 SWSI Report. In addition, the

restoration of the natural function of Lower Willow Creek will improve riparian and fish habitat, enhance recreational and educational opportunities. Being at the headwaters of the Rio Grande, the project will also support the Gold Medal fisheries downstream in the Rio Grande and the riparian communities downstream on the Rio Grande that have been identified as actual and potential habitat for three bird species that are either protected under the federal Endangered Species Act or the Colorado State Threatened, Endangered and Species of Special Concern list.

5. For Applications that include a request for funds from the Statewide Account, describe how the water activity meets the **Evaluation Criteria**. See Part 3 of Criteria and Guidelines.

Promoting Collaboration and Cooperation

a. Addresses multiple needs or issues, including consumptive and/or non-consumptive needs:

The Lower Willow Creek Restoration Project's goals address *both* consumptive and non-consumptive needs, and benefits multiple needs and entities in the Rio Grande Basin, including environmental and wildlife habitat benefits, increasing water supply through reduction in evaporative loss, agricultural use, recreational benefits, public health benefits, public education, economic/tourism.

- Restore Lower Willow Creek from its current braided form within its bare and contaminated floodplain to improve water quality of Lower Willow Creek and the Rio Grande, and reduce sediment loading to the Rio Grande.

- Increase water supply to the Rio Grande by reducing evaporative loss by constructing a single-thread meandering stream in place of the currently braided Willow Creek, thereby supporting downstream agricultural water rights.

- Improve riparian habitat to provide critical habitat for the area's wildlife by improving water quality, creating wetland areas, improving soil conditions for re-vegetation. This will support several non-consumptive uses.

- Preserve open space, and create trails to improve recreational opportunities for the largely tourism based economy of Creede.

- Reduce public health risk associated with direct contact with contamination by removing and capping contaminated soils.

- Restore and stabilize Lower Willow Creek to improve aesthetic conditions and promote public education through landscaping, trails and interpretive signs.

b. Meets intrabasin needs:

- Aid in the state of Colorado's water supply to New Mexico, Texas, and Mexico under the Rio Grande Compact by reducing evaporative losses due to a multi-threaded channel with many areas of standing water and saturated soils.

- The WCRC has garnered support from both traditional consumptive water interests (including support from the Rio Grande Water Conservation District, Rio Grande Headwaters Restoration Project, and the Rio

Grande Roundtable), and non-consumptive interests (such as USDA NRCS, USFS, USFWS, BLM, and others). Please see letters of support.

- Benefits wildlife and improves riparian habitat.

- Contributes to sustainability of water system by reducing evaporative loss and returning healthy eco-system to Lower Willow Creek floodplain.

- During the formation of the WCRC in 1997, local public consensus established goal to "reclaim the Willow Creek floodplain below Creede to improve the physical, chemical, biological, and aesthetic qualities of the creek as an integral part of the local community."

Facilitating Water Activity Implementation

c. How funding will reduce uncertainty that water activity will be implemented:

- WSRA funding will fulfill a required match for the $398,770 Section 319 grant awarded to the WCRC in 2008 for the $1.56 million project. The current request will help to leverage these funds to the maximum extent possible. Full funding is critical for timely and efficient implementation.

- WSRA funds will be applied specifically towards finalizing the restoration design and channel restoration and stabilization.

d. Urgency of Need

- During the formation of the WCRC in 1997, the fifth adopted goal determined by public consensus was to "reclaim the Willow Creek floodplain below Creede to improve the physical, chemical, biological, and aesthetic qualities of the creek as an integral part of the local community".

- "Window of opportunity" to match the $398,770 Section 319 grant received is now.

- As the second largest contributor of contaminants in the watershed, the floodplain is ranked as a high priority for cleanup and restoration in the draft Willow Creek Management Plan.

- Since its inception, the WCRC has undertaken extensive characterization efforts and has identified top priority remediation projects in the watershed. Of the sites prioritized by the WCRC, all major upstream projects have been completed except for the Nelson Tunnel/Commodore pile. The USEPA placed the Nelson Tunnel on the National Priorities List in September 2008, and is currently carrying out an Emergency Removal Action at the Commodore Pile.

- Below is a brief timeline of reclamation work carried out by the WCRC in the Willow Creek watershed since 1999.

  1999-2002: Characterization of the Willow Creek watershed in collaboration with WCRC's federal, state and local partners including the creation of a Sampling Analysis Plan; water sampling throughout the watershed for heavy metals and pH; biological assessment of East Willow, West Willow, and Willow Creek, identification and prioritization of contaminant sources in the watershed.

  2003: Implementation of Best Management Practices at five of the prioritized mine sites in the

watershed, including remediation, reclamation and re-vegetation with technical assistance and funding from the USFS, Section 319 funding through CDPHE, CDRMS, and local volunteers. In addition, the WCRC focused on outreach and education within the local community.

2004: Creation of a Watershed Management Plan with assistance from USEPA and Section 319 funds. The draft plan will be finalized by 2008.

2005-2008: Remediation and reclamation of the remaining prioritized mine sites (including the Amethyst and Last Chance mine dumps), implementing flood control structures (including Windy Gulch), and a pilot dewatering study of the Nelson Tunnel. In addition, the Committee focused on re-vegetation of the reclaimed sites, clean up of the floodplain by removing depositions from upstream, education and outreach efforts within the community.

- Of the sites prioritized by the WCRC, the Lower Willow Creek floodplain downstream of Creede is the only major site remaining to be restored.

e. Length of time needed to implement the water activity

- WSRA funds will be delegated to finalizing the restoration design and construction supervision, which will be completed in 2009. Re-construction of 3,700 feet of Lower Willow Creek using WSRA funds will be completed within the summer and fall months of 2010. Please see milestone table for details, Appendix C.

- The overall $1.56 million project will be completed within three years.

f. Expertise and ability of applicant to implement the proposed activity

- The WCRC has been working successfully in the Willow Creek watershed with an excellent track record in implementing BMPs for over 10 years.

- The Lower Willow Creek Restoration project will continue to incorporate BMPs with demonstrable success in previous projects.

- The WCRC has worked closely with the USDA NRCS to characterize the Willow Creek floodplain. The NRCS plan, *Willow Creek Stream, Restoration: Planning Study* (April 2007) evaluated floodplain conditions, estimated morphological parameters, and developed a preliminary design and cost estimates for the restoration of Willow Creek. The final restoration design will be based on the NRCS conceptual design.

g. Matching Funds

- WSRA funding will be fully matched by the approved **Section 319 grant of $398,770**.

- Additional matching funds will be obtained from various federal, state and local sources. Anticipated cooperating agencies are:

  - **City of Creede**: Office and meeting space; sponsorship for EPA Brownfields application and Great Outdoors Colorado grant
  - **Mineral County**: Heavy equipment

- **Mineral County Fairgrounds Association**: Assistance with stream restoration and planning
- **Creede Resources / Hecla**: Land donation, additional funding and technical support
- **US EPA Brownfields program**: **$200,000** Funding will be sought for capping and re-vegetation
- **CDPHE-Hazardous Materials and Waste Management Division**: **$50,000** Voluntary clean-up program and technical expertise; funding will be sought for capping and re-vegetation match
- **Great Outdoors Colorado**: **$375,000** Funding will be sought for trails and landscaping
- **Colorado Division of Mining Reclamation and Safety**: **$35,000** Technical expertise relative to BMP implementation and source of funding.
- **USDA NRCS**: Technical expertise relative to restoration design; potential funding through Wetland Reserve Program, Environmental Quality Incentives Program or other programs

The total funding for the entire project is expected to be about **$1.56 million** and the total in-kind contribution is expected to be approximately **$256,000**. Please see budget for additional information, Appendix D.

h. Demonstrated Need

- This project will not be implemented sucessfully if this proposal is not fully funded. Significant funding is required to carry out the Lower Willow Creek Restoration Project in a timely and effective manner, and raising such resources is a challenge for any organization, particularly in the rural San Luis Valley.

- Contamination in the floodplain is a risk to water quality, public health, and wildlife. In addition, improving the delivery of water to the Rio Grande through a reduction in evaporative loss in the Lower Willow Creek floodplain will improve efficiency of water delivery to the Rio Grande, and to the consumptive users downstream.

<u>Meeting Water Management Goals and Objectives and Identified Water Needs</u>

i. The water activity helps complete a needs assessment, including consumptive and/or non-consumptive needs, that was not fully funded from other sources.

- Willow Creek flows directly into the Rio Grande, an important Colorado river. Enhancing the water quality, improving riparian habitat, and increasing the long-term stream stability of Willow Creek will have impact on the health of the Rio Grande and sustainability of the intrabasin water supply.

- The Willow Creek watershed was identified in the 1990 Colorado NPS Assessment Report and Management Plan and the 1991 Colorado Water Quality Control Division Report as a high priority area requiring control of non-point sources of metals from historic mining activities.

- Cleanup and reclamation of the floodplain was ranked as a high priority in the draft Willow Creek Watershed Management Plan. The Rio Grande below Willow Creek (Rio Grande Segment 4) was placed on the 2006 303(d) list of water-quality-limited segments for Colorado for high levels of zinc (from Willow Creek to Del Norte) and cadmium (from Willow Creek to Wagon Wheel Gap).

j. The water activity meets one or more of the water management objectives identified in the Statewide Water Supply Initiative, helps implement projects and processes identified as helping meet Colorado's future water needs, and/or addresses the gap areas between available water supply and

future need as identified in the Statewide Water Supply Initiative or a roundtable's basin-wide water needs assessment done in accordance with the Colorado Water for the 21 Century Act.

The project meets the following water management objectives identified in the Statewide Water Supply Initiative:

- Sustainably meet agricultural demands by enhancing water quality, improving riparian habitat, and improving long-term management of stream energy and sediment transport
- Optimizes existing and future water supplies by reducing evaporative loss due to a multi-threaded channel with many areas of standing water and saturated soils.
- Enhances recreational opportunities by reducing contact with contaminated soils and with landscaping and trails
- Provides for environmental enhancements by improving water quality, soil conditions, and riparian habitat.
- Protects cultural values by supporting this rural area's historic and current agricultural lifestyle.
- Complies with all applicable laws, regulations, and water rights

k. Promotes water conservation and efficiency.

- Improves the efficiency of water delivery to the Rio Grande and to the consumptive users down stream by reducing evaporative water loss, and by restoring natural meanders to the heavily braided creek.
- Improves long-term management of stream energy and sediment transport through reestablishment of a meandering steam with proper dimension, pattern and profile.

- Located at the headwaters of the Rio Grande, the project increases the sustainability of the Rio Grande Basin.

l. The applicant has an existing water conservation plan.
Not applicable.

m. The water activity will make new water available for use.

- The establishment of a single-thread meandering stream will substantially reduce the extent of surface saturated floodplain, and would result in **water savings to the amount of approximately 36 acre-feet per year**. The current braided form has an extensive evapo-transipiration component, since the over-widened channel provides a great deal of surface area exposure (NRCS 2007). Please see map in Appendix A, page A6.

n. The water activity involves reoperation, enlargement, or rehabilitation of existing facilities.
Not applicable.

<u>The Water Activity Addresses Issues of Statewide Value</u>
o. Water activity helps sustain agriculture, and open space, or meets environmental or recreational needs.

- Improves water quality of Lower Willow Creek and the Rio Grande, thereby helping to sustain consumptive and non-consumptive uses of the Rio Grande. This includes supporting agricultural water rights, recreation, and wildlife habitat.

- Increases delivery of water to the Rio Grande by restoring lower Willow Creek from its current braided form to a single-thread meandering stream, thereby reducing evaporative loss to the extent of approximately 36 acre-feet per year.

- Creates and maintains open space, recreational opportunities, and enhances environmental needs by improving riparian habitat, soil conditions for re-vegetation, and the stability of the stream bank.

- Enhances the Gold Medal fisheries downstream in the Rio Grande.

p. Assists in the administration of compact-entitled waters or addresses problems related to compact entitled waters and compact compliance and the degree to which the activity promotes maximum utilization of state waters.

- Increases efficiency and delivery of water to the Rio Grande by reducing evaporative loss through the floodplain, thereby increasing water supply and the State of Colorado's allocation under the Rio Grande Compact.

q. Assists in the recovery of threatened and endangered wildlife species or Colorado state species of concern:

- The project will specifically improve water and soil quality, and improve riparian habitat along Lower Willow Creek, which will assist in sustaining riparian communities downstream on the Rio Grande that have been identified as actual and potential habitat for three bird species that are either protected under the federal Endangered Species Act or the Colorado State Threatened, Endangered and Species of Special Concern list. The Southwestern Willow Flycatcher is federally endangered, the Yellow-billed cuckoo is a federal candidate species, and the bald eagle is a Colorado State Threatened Species.

r. Provides a high level of benefit to Colorado in relationship to the amount of funds requested:

- The WSRA funds requested in this proposal constitute matching funds to the Section 319 funds approved in 2008. Other matching funds from various sources including the EPA Brownfields program, CDPHE – Hazardous Waste and Materials, Great Outdoors Colorado, NRCS, CDRMS, are anticipated, and will result in leveraging WSRA funds at a ratio greater than 1:1.

- In regards to the amount of funds requested, the proposed Project provides a high level of benefit to the state of Colorado. The importance of the stabilizing Lower Willow Creek and improving water quality in Willow Creek and the Rio Grande directly correlates to a healthier Rio Grande, benefiting the State of Colorado.

s. Complimentary to or assists in the implementation of other CWCB programs:

- This project complements CWCB's flood mitigation programs and CWCB's continued support for water and flood protection initiatives in the Willow Creek watershed. CWCB funded the Upper Willow Creek Flood Control and Stream Stability Study through the WCRC, which supported investigations of the Willow Creek flume through Creede.

- This project also complements the CWCB funded Windy Gulch Flood Protection Project (also through the WCRC) which improved flood protections for Creede at the confluence of Willow Creek and Windy Gulch. The Lower Willow Creek Restoration project also complements the CWCB's instream flow program by maintaining flows and flow depths through the Willow Creek

floodplain during low flow periods.

t. Helps support the State's economic vitality and competitiveness in national and international markets.

- Enhances the tourism industry in Mineral County, and the City of Creede by improving water and soil quality, and healthy, natural function to the Willow Creek floodplain. It will also establish recreational opportunities through landscaping and interpretive trails on the remediated open space. Tourism accounts for a significant portion of the base income of Mineral County and the City of Creede.

- Riparian stabilization and restoration measures will have a positive influence on both consumptive and non-consumptive uses in the Rio Grande Basin, supporting the San Luis Valley's economic vitality.

4. Please provide an overview of the water project or activity to be funded including – type of activity, statement of what the activity is intended to accomplish, the need for the activity, the problems and opportunities to be addressed, expectations of the participants, why the activity is important, the service area or geographic location, and any relevant issues etc. Please include any relevant TABOR issues that may affect the Contracting Entity. Please refer to Part 2 of Criteria and Guidance document for additional detail on information to include.

Overview/Background

- The Willow Creek Reclamation Committee (with the San Luis Valley Resource Conservation & Development Council as its fiscal agent) is seeking a total of $250,000 in funds from the Colorado Water Conservation Board towards restoring and stabilizing 3,700 linear feet of Lower Willow Creek.

- The scope of the work for WSRA funding includes finalizing the restoration design and re-constructing 3,700 linear feet of Lower Willow Creek. Approximately 52 acres of floodplain area will benefit from these WSRA funds.

- WSRA funding will serve as match money to leverage the recently approved $398,770 Section 319 grant. These funds will combine with other sources in a $1.56 million project to restore the function of Lower Willow Creek as a natural flowing stream.

- The current proposed $1.56 million budget for the Lower Willow Creek Restoration project will involve re-constructing the entire Lower Willow Creek up to the downstream limit of the Mineral County Fairgrounds property with a stable meandering single-thread stream channel (approximately 8,230 linear feet). Goals include stabilizing the channel with rock structures and vegetation, directing stream channel layout away from identified contaminated areas, relocation of highly contaminated soil above the watertable, construction of wetlands, revegetation of the riparian corridor, and landscaping to improve recreational and education opportunities.

- The WCRC has undertaken extensive characterization efforts (please see response to # 7 for previous efforts and studies) and has identified top priority remediation projects in the watershed. Of the sites prioritized, all major upstream projects have been completed with the exception of the floodplain downstream of Creede, and the Nelson Tunnel/Commodore pile, which the USEPA is currently addressing in and emergency removal action. The proposed Lower Willow Creek Restoration Project fulfills the WCRC's officially adopted goals and is timely as a logical next step

for cleanup in the Willow Creek watershed.

- The NRCS Willow Creek Stream Restoration Planning Study (NRCS 2007) produced by Steve Yochum and others evaluated floodplain conditions, estimated morphological parameters, and developed a preliminary design, and cost estimates. Attached in Appendix A, page A4 is a preliminary layout design from the planning study. Since the conceptual design is preliminary, certain issues of the design layout need to be considered prior to final design.

- The SLV RC&D will be the fiscal agency sponsoring the WCRC. The WCRC will be the project lead, and will assume all duties for grant administration, project coordination, and report production. A Section 319 grant of $398,770 has been awarded to carry out the project in 2008. Additional funding will be sought from private contributions, the US EPA Brownfields program, CDPHE-Hazardous Waste and Materials, Colorado Divison of Reclamation, Mining and Safety, Great Outdoors Colorado, and potentially from the Wetland Reserve Program or other programs of the US Natural Resources Conservation Service (NRCS). Please see letters of support for the Lower Willow Creek Restoration project.

Watershed Description/Geographic Location

- Willow Creek is a tributary of the upper Rio Grande in southwestern Colorado. It is located in Mineral County at the northwest end of the San Luis Valley, and flows through the historic mining town of Creede (population 412, in 2005). Tourism is the primary industry for Creede, which boasts a nationally acclaimed theatre company, historic downtown, and a spectacular natural setting. As a tributary to the headwaters of the Rio Grande, Willow Creek supports the agriculture (largely hay, alfalfa) in the upper reaches of the San Luis Valley. Willow Creek Watershed (HUC 13010001) encompasses approximately thirty-five square miles, and includes two prominent tributaries, East and West Willow, which flow through narrow and steeply eroded canyons. Willow Creek flows through Creede in a mortar and rock flume constructed by the Army Corps of Engineers in 1952 for flood control. The floodplain below town is approximately 8,700’ long, and ranges from 300’ to 1,000’ in width, and is located between the end of the concrete flume below Creede and the Rio Grande, and is roughly bounded by Highway 149.

- Historic mining practices over the last century have heavily impacted lower Willow Creek in terms of impaired water and habitat quality. Metal-contaminated water flowing from mine adits, waste rock piles, groundwater seeps, and years of deposition in the floodplain have damaged water quality and native riparian habitat of the lower watershed. At some point, the stream corridor was disturbed from its natural (and likely stable) condition; a braided stream resulted and has since existed. Potential causes of this braiding include vegetation removal during settlement and heavy sediment loading during mining operations. The lack of braiding in local reference streams, as identified by similar geomorphology, indicates that this stream pattern is not due to natural processes.

- The floodplain area of Lower Willow Creek is currently owned by four parties: Creede Resources (a subsidiary of the Hecla Mining Company), Mineral County Fairgrounds Association (MCFA), Wason Ranch, and Zimmerman (please see map). The area that is of concern for this project is the Creede Resources property (please see map). Creede Resources in currently in the process of donating their portion of the floodplain to a non-profit land conservation organization that would then transfer the property to the City of Creede following cleanup. The proposed plan is to restore Lower Willow Creek through this property, and maintain it as open space for the public. The

WCRC is currently assisting the MCFA in carrying out a Voluntary Clean Up Plan, primarily for the uplands portion of the MCFA property.

Description of Need/Importance of Project

The Rio Grande below Willow Creek (Rio Grande Segment 4) was placed on the 2006 303(d) list of water-quality-limited segments for Colorado for high levels of zinc (from Willow Creek to Del Norte) and cadmium (from Willow Creek to Wagon Wheel Gap). Classifications for Segment 4 include Recreation 1a, Aquatic Life Cold 1, Water Supply, and Agriculture. Willow Creek (Rio Grande Segment 7) has also been placed on the 2006 303(d) list from the confluence of East and West Willow Creeks to the Rio Grande for pH. The floodplain area is also the second largest contributor of contamination in the watershed. For this reason, cleanup and reclamation of the floodplain was ranked as a high priority in the draft Willow Creek Watershed Management Plan.

The Willow Creek Watershed was identified in the State NPS Assessment Report and Management Plan in 1990 and the Colorado Water Quality Control Division report in 1991 as a high priority area requiring control of non-point sources of metals from historical mining activities. At least sixteen mine/mill areas in the Willow Creek watershed have associated waste rock and/or tailings piles that have contributed to water contamination and habitat degradation through acidic, heavy metals or sediment-laden runoff. Fish and invertebrate communities are minimal or non-existent in the lower reaches of Willow Creek. Surface water quality is affected for more than seven miles of Willow Creek and its tributaries, with nearly five miles exceeding state water quality standards for metals and pH.

The successful and efficient implementation of the Lower Willow Creek Restoration Project will:

- Restore stream functions in Lower Willow Creek that would be more similar to natural stream functions prior to mining and settlement activities and improve long-term management of stream energy and sediment transport
- Improve water quality of Lower Willow Creek and Rio Grande Segment 4 by reducing loading of metals and sediment contaminants from the floodplain area sources through reduced erosion of and water contact with contaminated soils
- Improve efficiency of delivery of water to downstream users of the Rio Grande, and reduce evaporative loss
- Reduce public health risk associated with direct contact with contaminated soils and improve soil conditions for re-vegetation
- Improve riparian habitat, long-term stream stability, and aesthetic conditions with appropriate vegetation for riparian and upland areas
- Improve aesthetic conditions, recreational values, and educational opportunities with landscaping and trails

The benefits of the project are integral to the well-being of Willow Creek and the Rio Grande, and the population, agriculture, and natural habitat of the area. As mentioned in the proposal above, the project meets several SWSI findings and recommendations, and is thus important to Rio Grande and its downstream users. The section of the floodplain to be restored using WSRA funding will contribute substantially to these overall goals, and directly benefit the state of Colorado.

Problems

***Water Quality*:** Surface water quality in Lower Willow Creek is impaired by interaction with contaminated soil, metal precipitates, contaminated groundwater, and erosion of sediments. Soils in this area have been contaminated by conveyance and storage of mill waste in the floodplain or deposition of contaminated soils

from nearly one hundred years of upstream mining and milling operations.

The WCRC has characterized water quality and identified contaminant sources in the Willow Creek watershed, by taking water quality samples since 1999. Characterization efforts in the watershed have been summarized in a complete assessment document (EPA 2005), and have been incorporated into the draft watershed management plan. The characterization efforts have concluded that primary metals of concern are zinc and cadmium, with the largest contributor of these metals as the Nelson Tunnel discharge. On average, the Nelson Tunnel contributes over 200 pounds per day of zinc and about 0.5 pounds per day of cadmium. Currently, the EPA is carrying out an emergency response action on the Commodore pile and Nelson Tunnel area.

The floodplain area of Lower Willow Creek is the second largest contributor of contamination in the watershed. On record, Willow Creek has experienced contaminant releases from failed tailings impoundments (twice) and from a collapsed tailing transport tube (once). These releases resulted in zinc contamination of the Rio Grande producing fish kills as far as 30 miles downstream in August 1963 and September 1971 according to CDWO documentation. These releases resulted in zinc contamination of the Rio Grande producing fish kills as far as 30 miles downstream. WCRC 1999 fish and aquatic invertebrate sampling showed that little biological activity, including riparian vegetation, exists in the 3.5 miles of mainstem Willow Creek. Segment 4 of the Rio Grande is on the 2006 303(d) list for zinc and cadmium due to contamination from Willow Creek.

Surface water quality data collected by the WCRC in Lower Willow Creek , as well as site location and descriptions are attached in Appendix B. **On average, the total load to the Rio Grande of dissolved and total zinc (Zn_D, Zn_T) and cadmium (Cd_D, Cd_T) is increased by 85 and 108, and 0.39 and 0.45, pounds per day, as Willow Creek passes through the floodplain area.** This increase in zinc and cadmium load through the floodplain is significant; about 43% of the load attributed to the Nelson Tunnel. For this reason, restoration of the stream and cleanup of the floodplain was ranked as a high priority in the draft Willow Creek Watershed Management Plan.

***Poor Ecosystem Function*:** At least sixteen mine/mill areas in the Willow Creek watershed have associated waste rock and/or tailings piles that have contributed to water contamination and habitat degradation through acidic, heavy metals or sediment-laden runoff. Fish and invertebrate communities are minimal or non-existent in the lower reaches of Willow Creek. Lower Willow Creek is currently in a highly braided form, and a combination of water and soil contamination has led to poor ecosystem function.These substantial impariments prevent significant invertebrate and fish populations. Additional problems in this floodplain include the presence of poor grass and willow populations due to physical disturbance from braiding, mechanized manaipulations, and contaminated soils (NRCS 2007). A large quantity of waste rock from mining activites has been dumped throughout the floodplain, preventing substaintial vegetation growth over most of the floodplain area (NRCS 2007).

The establishment of a single-thread stream on the west side of the floodplain would not only restore the natural stream functions of Willow Creek, but would also improve the long-term mamangement of stream energy and sediment transport. In addition, this would enable a reduction in metal loading and sediment contaminants through reducing the erosion and water contact of contaminated soils, thereby reducing loading of metals and sediment contaminants from floodplain area sources. This will improve the health of the water system, and support the downstream gold-medal fisheries and agriculture users of the Rio Grande.

The establishment of a single-thread meandering stream would also substantially reduce the extent of surface saturated floodplain, and would result in water savings. The current braided form has an extensive evapo-transipiration component, since the over-widened channel provides a great deal of surface area exposure

(NRCS 2007). According to the NRCS 2007 preliminary morphological design, the restored stream will require approximately 5.3 acres of wetted aerial extent within the Creede Resources and MCFA properties. The current surface-saturated area within these two properties is approximately 26.7 acres (please see map in Appendix A, page A6). After accounting for 2 acres of wetlands, and approximately 7.3 acres of willow, the project would reduce approximately 12.1 acres of surface-saturated area. Assuming evaporation loss to be about 3 ft/acre/year, **water savings would amount to approximately 36.3 acre-feet per year.**

5. Please summarize the proposed scope of work. Please refer to Part 2 of the Criteria and Guidance document for detailed requirements. On the following page there is an example format for the Scope of Work. You can use the example format or your own format, provided that comparable information is included.

> **The scope of work should outline by task how the water activity will be accomplished. It is important that the scope of work detail the specific steps, activities/procedures that will be followed to accomplish the water activity and the specific products/deliverables that will be accomplished. The scope of work should include but not be limited to: task description, key personnel, budget, schedule and deliverables and the final report/project documentation upon completion of the water activity.**

Overall Watershed Goal and Methodology:
Reclaim the Willow Creek floodplain below Creede to improve the physical, chemical, biological, and aesthetic qualities of the creek as an integral part of the local community (officially adopted goal #5 of the WCRC). This will be accomplished using widely accepted BMPs and creative management of the creek, with no active treatment plant. In addition, after considering the effectiveness of the functioning of the stream as a geo-morphological unit, the installation of a liner and the economics involved, the WCRC considers that a liner is not a feasible alternative.

The overall project will cost about $1.56 million and will restore approximately 8,230 linear feet of stream. The $250,000 WSRA funds requested in this application will specifically restore 3,700 linear feet of Lower Willow Creek.

I. Objectives, Tasks and Costs

The responsible party for all tasks will be the WCRC. For task time requirements and a detailed budget, see attached milestone and budget tables.

Objective 1: Manage and administer the stream and floodplain restoration

Task 1: Manage and administer the design, bidding, construction, execution, and follow up review of project. Administer all aspects of the grants and required reporting. Develop bid documents and solicit and select contractor or contractor team.
Output: Project management and grant reporting, bid documents and contractor selected.
Cost to CWCB: $400; balance will be carried out using matching funds; please see budget for details.

Task 2: San Luis Valley RC&D (fiscal agent) provide oversight, and insurance coverage
Output: Administration of grant documents and funds
Cost to CWCB: $5,000; one-time flat fee for fiscal agent; please see budget for details.

Task 3: Transfer Creede Resources Property so that land is held by non-profit land conservation group and can be transferred to City of Creede following cleanup.
Output: Creede Resources property donated

Cost to CWCB: No cost to CWCB; $250,000 donation value, in-kind match; please see budget

Objective 2: Develop final design, channel reconstruction, install landscaping and trails.

Task 4: Evaluate floodplain contamination and develop final design and construction supervision to enable successful and economical restoration project: take surface and depth soil samples and analyze for metal concentration using XRF; evaluate areas of contamination, ease of construction, cleanup goals, and elevation profiles and integrate with preliminary design to develop final restoration design and construction supervision.

Output: GIS maps of metal concentrations at surface and near water table; final stream floodplain restoration design and construction supervision

Cost to CWCB: $30,095; balance will be carried out using matching funds; please see budget for details.

Task 5: Re-construct stable meandering single-thread stream channel away from contaminants: cut and fill areas and grade floodplain area level; excavate meandering single-thread stream channel; stabilize ditch diversion structures in new locations with rock cross-vanes; install J-hook and cross-vane rock structures; plant lines of willow on banks of outside bends; relocate areas of highly contaminated soil above the normal water level within the floodplain; construct wetland areas with willow and/or hydrophytes

Output: Floodplain prepared for channel excavation; channel excavated with proper form and profile; stable ditch diversions installed; stable rock structures installed with correct elevations and profiles; willow planted to provide long-term bank stability; areas of contaminated soil relocated above water table; areas of willow and/or hydrophytes wetlands constructed

Cost to CWCB: $214,505; balance will be carried out using matching funds; please see budget for details.

Task 6: Apply soil cap to floodplain areas to isolate contaminated soils from direct contact and improve soil conditions for re-vegetation and re-vegetate with regionally appropriate herbaceous and woody vegetation: apply a soil cap with a depth of 12" (preliminary) over soils with high levels of lead and a depth of 3" (preliminary) over other floodplain areas lacking in appropriate soil for re-vegetation; re-vegetate riparian and upland areas with appropriate willow, grass, and shrub species

Output: Appropriate soil cap over areas over floodplain areas to meet cleanup and environmental goals; bare floodplain areas re-vegetated with appropriate percent cover

Cost to CWCB: No cost to CWCB; this task will be carried out using matching funds; please see budget for details.

Task 7: Improve aesthetic conditions, recreational values, and educational opportunities through installation of appropriate landscaping and trails: develop final landscaping and recreational design; install landscaping and trails.

Output: Final landscaping and recreational design relying on community input; appropriate trails and landscaping installed.

Cost to CWCB: No cost to CWCB; this task will be carried out using matching funds; please see budget for details.

Objective 3: Monitor physical stability, re-vegetation success, and water quality improvements

Task 8: Measure and document channel morphology and stability at a minimum of 10 photo-point locations and 3 cross-section measurement locations; take water samples at least annually upstream and downstream of site (W-C, W-I, W-J); annually evaluate re-vegetation success using photo-points and an estimation of percent vegetative cover

Output: Qualitative and quantitative evaluation of channel stability; water quality monitoring data; qualitative and quantitative evaluation of re-vegetation success.

Cost to CWCB: No cost to CWCB; this task will be carried out using matching funds; please see budget for details.

II. Personnel

Provide a list of key water activity/project participants and their qualifications to accomplish the water activity/project. If specific individuals or firms have not yet been identified indicate the types of expertise that will be sought (i.e. professional engineering firm, registered land surveyor, aquatic biologist etc.).

Technical Assistance:	**Willow Creek Reclamation Committee's Technical Advisory Committee,** includes experts in the field from the USDA NRCS, CDRMS, EPA, CDPHE, and retired chemists, mining engineers, hydrologists, geologists, and other professionals. P.O. Box 518 Creede, CO 81130 **Agro Engineering** 0210 Road 2 South Alamosa, CO 81101 Agro Engineering completed the Willow Creek Flood Control and Stream Stability Study for the CWCB and the WCRC, served as contractor on the CWCB's Rio Grande Headwaters Restoration Project, and the CWCB's Alamosa River Watershed Restoration Master Plan and Environmental Assessment, and has professional engineering staff with experience in stream restoration design, land reclamation, and hydraulic modeling.
Project Coordinator:	Carishma Gokhale-Welch, Director, Willow Creek Reclamation Committee Carishma has a Master of Environmental Management from Yale University, and has been working as Director, WCRC for 20 months.
Fiscal Agent:	San Luis Valley Resource Conservation & Development Council
Contractors:	Not yet selected.

III. Budget

Please see Budget Tables in Appendix D.

IV. Schedule

Please see Milestone Table in Appendix C.

6. Water Availability and Sustainability – this information is needed to assess the viability and effectiveness of the water project or activity. Please provide a description of each water supply source to be utilized for, or the water body to be affected by, the water activity. For water supply sources being utilized, describe its location, yield, extent of development, and water right status. For water bodies being affected, describe its location, extent of development, and the expected effect of the water activity on the water body, in either case, the analysis should take into consideration a reasonable range of hydrologic variation.

- Willow Creek is a tributary of the upper Rio Grande in southwestern Colorado, and is located in Mineral County just north-west of the San Luis Valley, and flows through the historic mining town of Creede. Willow Creek watershed (HUC 13010001) encompasses approximately thirty-five square miles, and includes two prominent tributaries, East and West Willow, which flow through narrow and steeply eroded canyons. Willow Creek flows through Creede in a mortar and rock flume constructed by the Army Corps of Engineers in 1952 for flood control. The floodplain below town is approximately 8,700' long, and ranges from 300' to 1,000' in width. The floodplain area of Lower Willow Creek is located between the end of the concrete flume below Creede and the Rio Grande, and is roughly bounded by Highway 149. Please see Appendix A for the location of the Willow Creek watershed, Lower Willow Creek and the specific reach of the stream proposed for restoration.

- Historic mining practices over the last century have heavily impacted lower Willow Creek in terms of impaired water and habitat quality. At some point, the stream corridor was disturbed from its natural (and likely stable) condition; a braided stream resulted and has since existed. Potential causes of this braiding include vegetation removal during settlement and heavy sediment loading during mining operations. The lack of braiding in local reference streams, as identified by similar geomorphology, indicates that this stream pattern is not due to natural processes.

- On record, Willow Creek watershed has experienced contaminant releases from failed tailings impoundments (twice) and from a collapsed tailings transport tube (once). These releases resulted in zinc contamination of the Rio Grande producing fish kills as far as 30 miles downstream in August 1963 and September 1971. WCRC 1999 fish and aquatic invertebrate sampling showed that little biological activity, including riparian vegetation, exists in the 3.5 miles of mainstem Willow Creek. Segment 4 of the Rio Grande is on the 2006 303(d) list for zinc and cadmium due to contamination from Willow Creek. The floodplain area of Lower Willow Creek is the second largest source of zinc and cadmium in the Willow Creek watershed.

- The water supply source is Willow Creek; the water body to be directly affected by the proposed project is Willow Creek, and consequently the Rio Grande.

- No water rights will be changed, or their allocation affected by the proposed project.

- The major goals of this project that would be supported primarily by WSRA funds are to restore stream function in Lower Willow Creek and improve the water quality of Lower Willow Creek and the Rio Grande through reducing erosion of and water contact with contaminated soils. The project will also increase the supply of water by reducing evaporative loss by reconstructing a single-thread meandering creek. Additional goals are to reduce public health risks associated with direct contact with contaminated soils; improve soil conditions for re-vegetation; improve riparian habitat, long-term stream stability, and aesthetic conditions with appropriate vegetation; and improve aesthetic conditions, recreational values, and educational opportunities with landscaping

and trails.

7. Please provide a brief narrative of any related or relevant previous studies.

The Willow Creek watershed was identified in the Colorado NPS Assessment Report and Management Plan in 1990 and the Colorado Water Quality Control Division Report in 1991 as a high priority area requiring control of non-point sources of metals from historic mining activities. Metal-contaminated water flowing from mine adits, waste rock piles, groundwater seeps, and years of deposition in the floodplain have damaged the water quality and native riparian habitat of the lower watershed.

The resources and data presented in recent studies of the Willow Creek watershed will inform the final stream restoration design for the Lower Willow Creek Restoration Project. Recent studies performed by WCRC since 1999 include water sampling in fall 1999, each spring 2000-2008, fall 2007, a USGS tracer study, fish and macroinvertebrate sampling (1999, 2008), groundwater and waste rock sampling.

All characterization work completed by WCRC from 1999 to 2003 has been summarized in twenty-four formal reports, four of which summarize the groundwater, surface water, biology, and waste rock sampling efforts. All procedures for sample collection, analysis, and QA/QC followed the *Sampling and Analysis Plan for Site Reclamation and Surface Water, Groundwater, Biological, and Waste Rock Sampling* (WCRC, rev. May 2003). These data meet the requirements for accuracy and precision indicated in the SAP, and therefore, provide a thorough assessment of watershed condition.

In addition, in 2005 the EPA finished a thorough assessment of the watershed that encompasses aquatic resource values, characterization, and condition of the complete watershed. The assessment report also compiles other pertinent information regarding soils, geology, climate, and land cover, as well as anthropogenic influences in the watershed such as land use, economics of the area, population distribution, and cultural/historical features.

All data collected since 1999 have been incorporated into the draft Willow Creek Watershed Management Plan, and will be used to inform the final design for the Lower Willow Creek Stream Restoration project.

8. Additional Information – If you feel you would like to add any additional pertinent information please feel free to do so here.

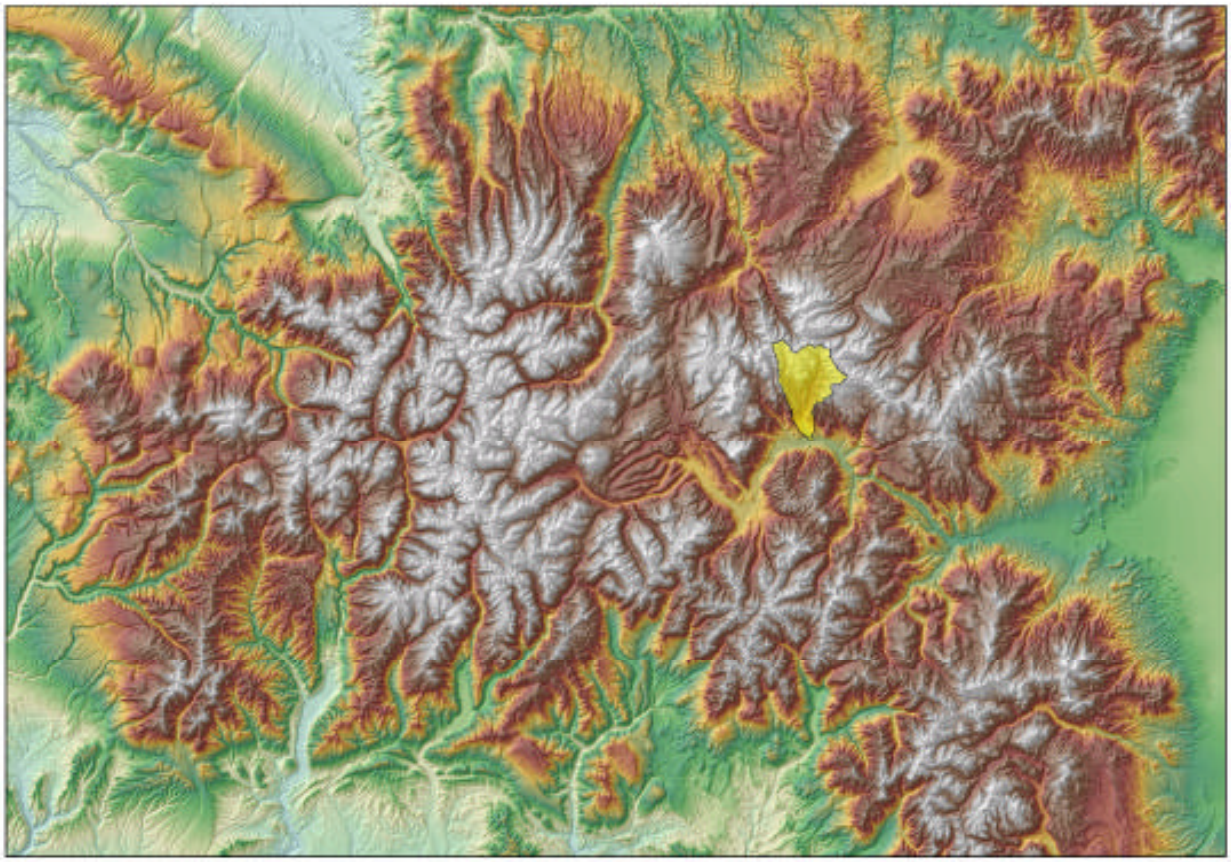
The above statements are true to the best of my knowledge:

Signature of Applicant:

Print Applicant's Name: James Mietz, San Luis Valley Resource Conservation and Development Council

Project Title: Lower Willow Creek Restoration Project

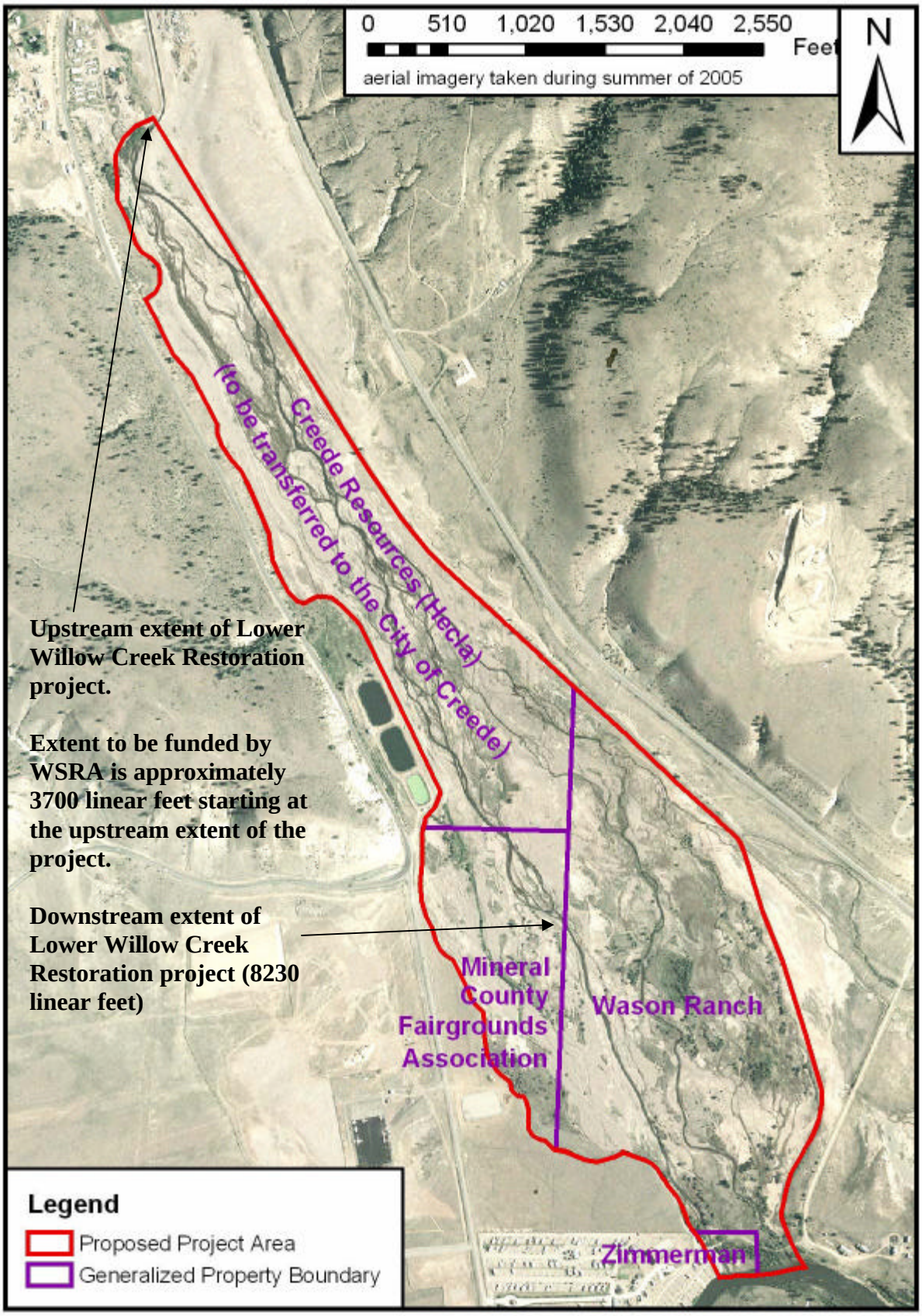
APPENDIX A
MAPS AND PHOTOS



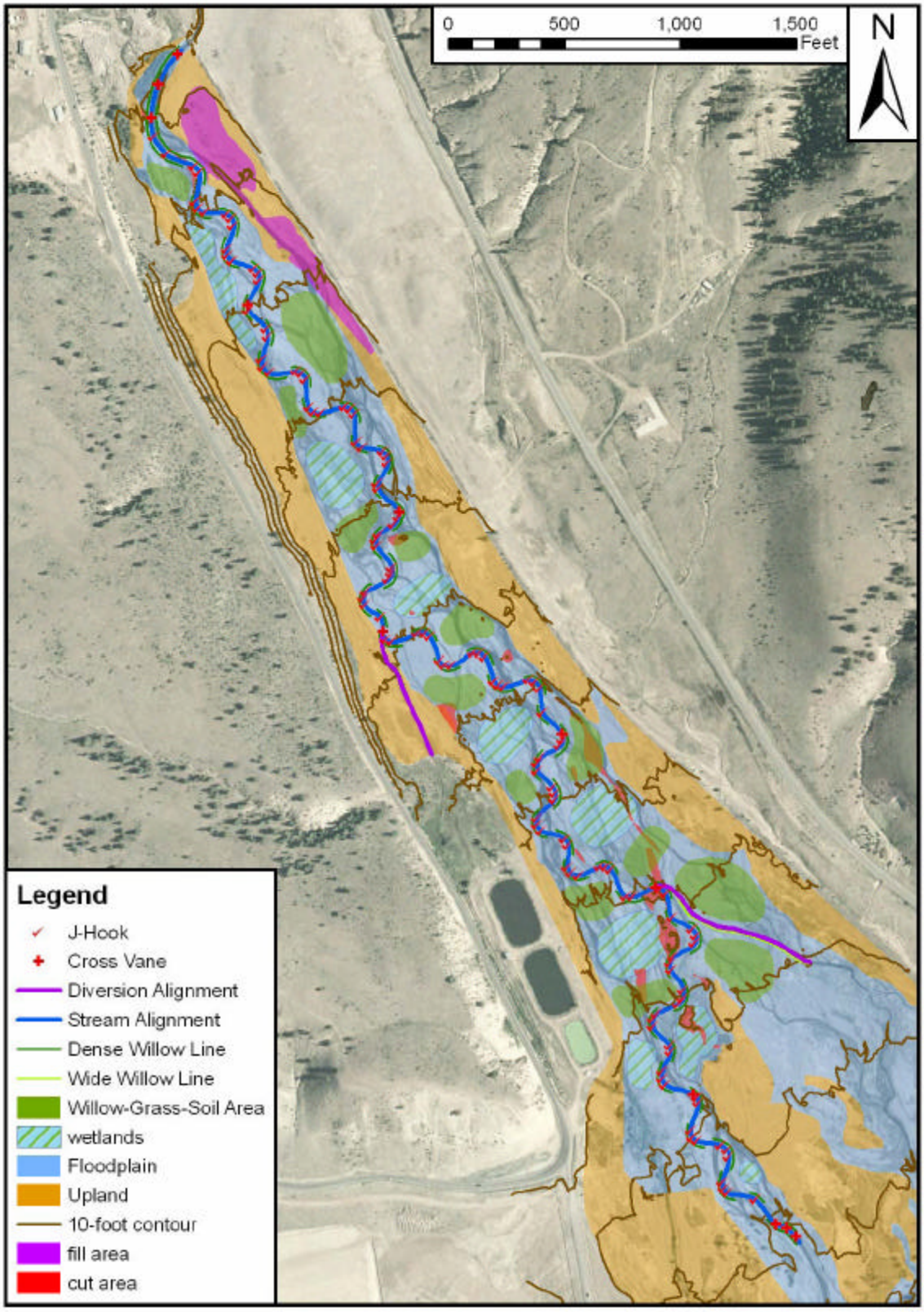
Location of Willow Creek watershed within San Juan Mountains and Upper Rio Grande Basin (EPA 2005)

Willow Creek Floodplain Area Circa 1888-90 (Colorado Historical Society)

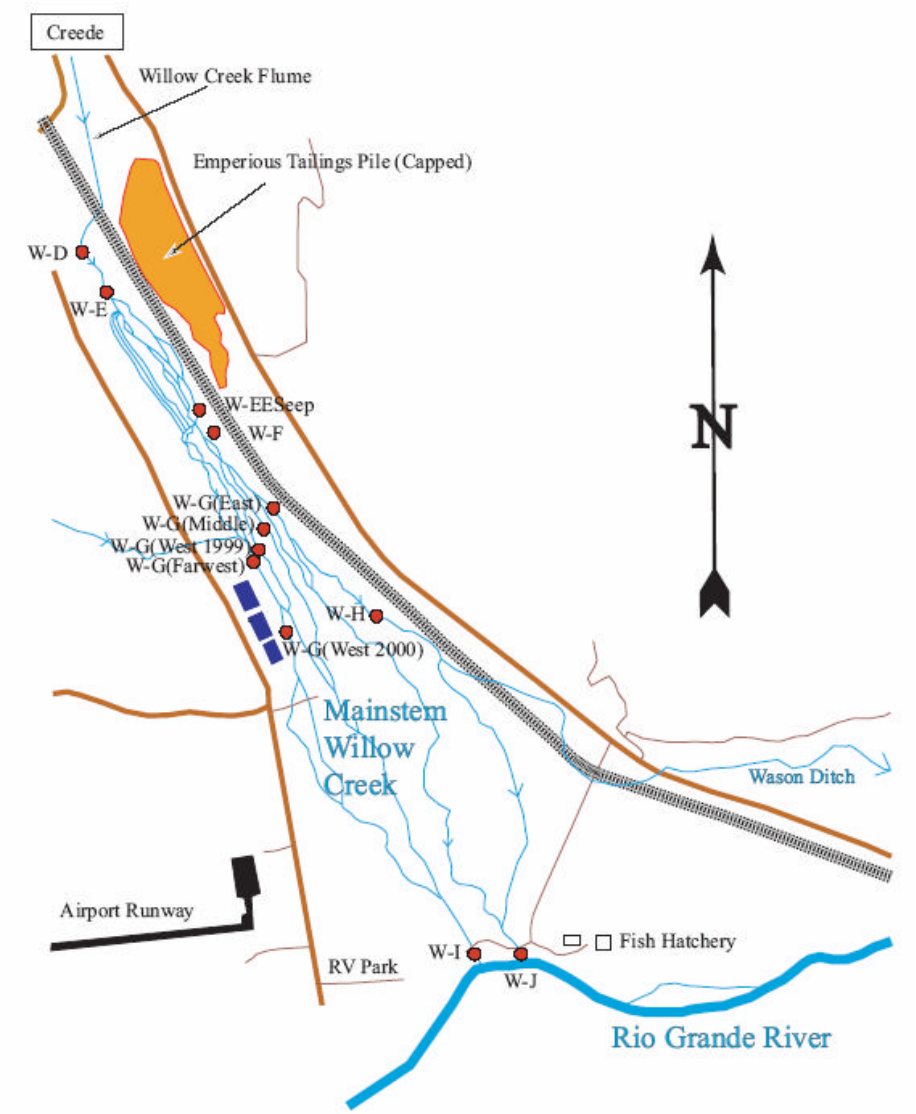
Current conditions of Willow Creek floodplain (adapted from NRCS 2007)
Willow Creek Floodplain and Property Boundaries (adapted from NRCS 2007)



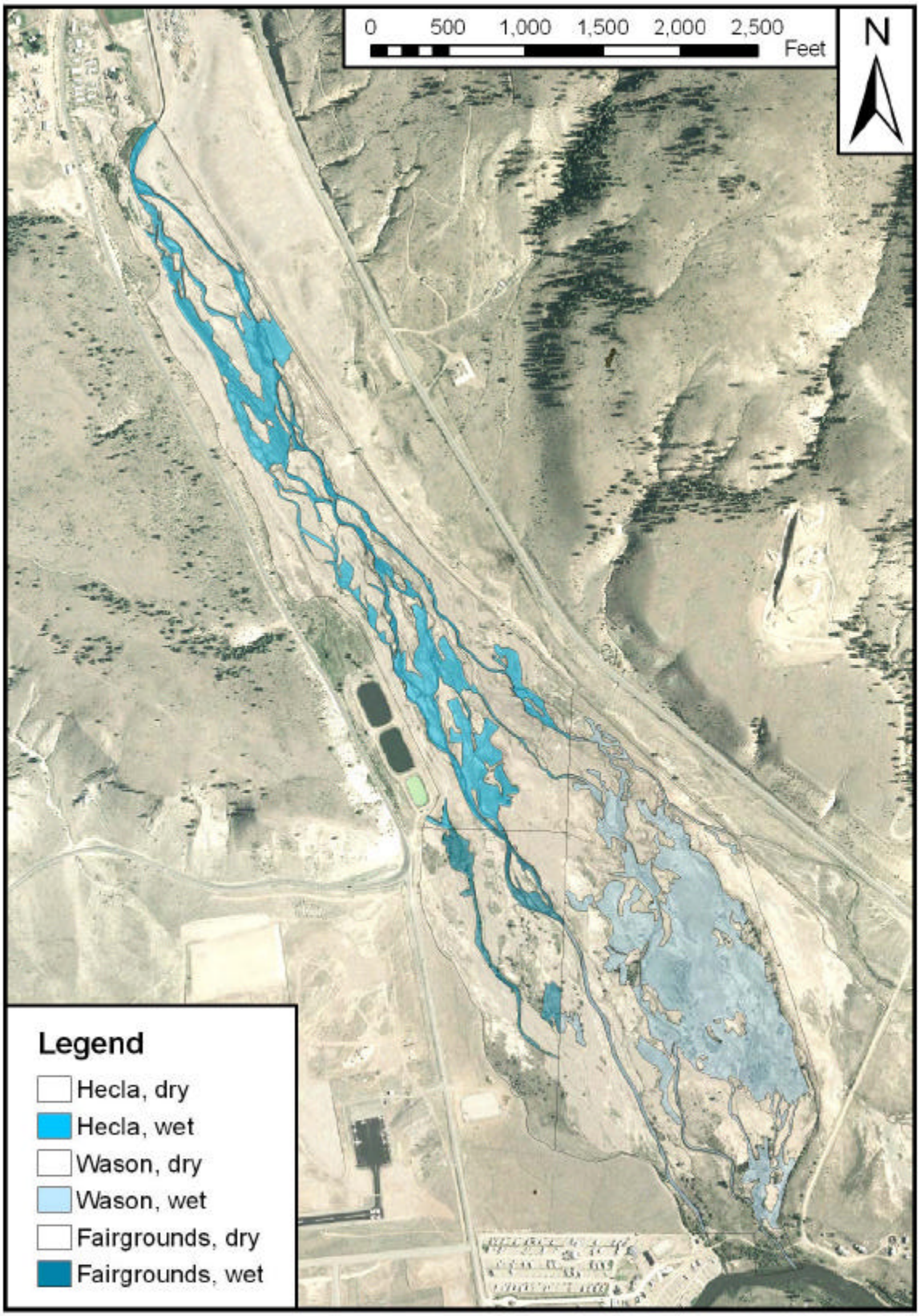
Willow Creek Floodplain and Property Boundaries (adapted from NRCS 2007)



Preliminary Design of Stream Restoration from Planning Study (NRCS 2007)



WCRC Water Quality Sampling Sites in Floodplain Area (WCRC 2004a)



Approximate surface saturated floodplain, August 19, 2005 (NRCS 2007)

APPENDIX B
WATER QUALITY DATA

Locations of water quality sites:

Site W-C is located near a former stream gauge at the entrance to the concrete flume that conveys Willow Creek through Creede to the Willow Creek floodplain. This site is ideal for flow measurement as the majority of the flow of Willow Creek is thought to enter the flume. Site W-D is located below the flume exit. Sites W-I and W-J are located in the West and East channels, respectively, of Lower Willow Creek just above the Rio Grande. A significant flow of groundwater may flow under the channels and into the Rio Grande from the Willow Creek floodplain. Therefore, the combined flow of sites W-I and W-J is often less than the flow at W-C. As no surface water inflows are noted to Willow Creek below W-C, the combined flows of W-I and W-J can be adjusted to equal flow at W-C to estimate overall loads to the Rio Grande.

Comparisons of concentrations and loads are attached in Appendix B for sites W-C, W-I, and W-J. Total downstream flow was adjusted to equal the flow at W-C, and flow in the east and west channels were weighted by the median proportions. Table 3 in Appendix B summarizes changes in concentrations and loads between W-C (upstream of the floodplain) to W-I/W-J (downstream of the floodplain) for all data measured by the WCRC.

Table 1: WCRC Water Quality Data from Lower Willow Creek

SiteID	Date	Flow (cfs)	Zn_D (ug/L)	Zn_T (ug/L)	Cd_D (ug/L)	Cd_T (ug/L)
W-C	5/18/00	47.19	1874	1911.9	8.46	8.64
W-I	5/18/00	34.57	2097.9	2174.1	10.04	9.92
W-J	5/18/00	9.31	2495.9	2603.1	12.06	12.19
W-D*	8/23/00	35.98	2602	2839	9	11
W-I	8/23/00	22.08	3378	3536	10	13
W-J	8/23/00	17.44	4000	4099	11	16
W-C	4/3/01	11.60		6340		19.6
W-I	4/3/01	7.45		7862		25.7
W-J	4/3/01	7.00		9448		30.5
W-C	5/23/01	159.61	709.6	761.5	5.71	6.14
W-I	5/23/01	134.32	1113	1180.9	6.89	7.19
W-J	5/23/01	25.29	1319.7	1485.1	7.79	8.37
W-C	5/2/02	14.09	4296.1	4370.5	14.8	15.13
W-I	5/2/02	11.33	4841.7	4918.4	19.15	19.22
W-J	5/2/02	3.16	5237.8	5360.4	19.35	19.73
W-C	5/8/03	11.34	4008.8	4165.4	13.13	13.37
W-I	5/8/03	2.62	5071.8	5071.5	19.56	19.65
W-J	5/8/03	4.56	6426.2	6669.2	23.75	24.14
W-C	5/6/04	67.13	1271.4	1251.8	7.08	7.18
W-I	5/6/04	21.82	1763.8	1977.5	9.32	10.3
W-J	5/6/04	29.232	1641.6	1864.6	8.43	9.32
W-C	5/3/05	21.7	2170.65	2265.637	8.1052	8.3918
W-I	5/3/05	6.75	2801.96	2995.932	11.4066	11.7995
W-J	5/3/05	10.44	2527.93	2837.428	10.3941	10.8211
W-C	11/29/05	9.2	4260		23	
W-I	11/29/05	5.56	5880		29	
W-J	11/29/05	2.57	5650		28	
W-C	5/8/06	38.66	1275	1294	1.9	2.7
W-I	5/8/06	18.6	1574	1618	3.9	3.8
W-J	5/8/06	12.33	1713.5	1861	3.4	3.9

** for 8/23/00, site W-D considered for analysis as no data from W-C*

Table 2: Median Flow Calculation

Description	Flow cfs	percent of total
W-C Median Flow	28.84	
W-I Median Flow	14.97	60%
W-J Median Flow	9.88	40%

Table 3: Change in Concentration and Load through Willow Creek Floodplain

Description	Zn_D	Zn_T	Cd_D	Cd_T
W-C Median Concentration (ug/l)	2171	2266	8.46	8.64
W-I/W-J Median Concentration (ug/l)*	2692	2933	10.85	11.41
W-C Median Load (lbs/day)	352	367	1.37	1.40
W-I/W-J Median Load (lbs/day)*	437	476	1.76	1.85
Median Concentration Increase (ug/l)	522	667	2.39	2.77
Median Load Increase (lbs/day)	85	108	0.39	0.45
Percent Increase (%)	24%	29%	28%	32%

**weighted 60% W-I and 40% W-J with total median flow equal to W-C (28.84 cfs)*

APPENDIX C
MILESTONE TABLE

Milestone Table

Objective		Task	Output	Fiscal 2009 (7/08-6/09)												Fiscal 2010 (7/09-6/10)												Fiscal 2011 (7/10-6/11)											
				J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Objective 1: Project management and administration	1.	Project Management and administration	Project management and reports; bid documents & contractor selection																																				
	2.	SLV RC&D administration	Grant administration																																				
	3.	Transfer land to nonprofit	Creede Resources property donated																																				
Objective 2: Develop final design, channel reconstruction, install landscaping and trails	4.	Final restoration design, construction supervision	GIS maps of contamination, final restoration design																																				
	5.	Re-construct stream channel, plant bank willow, construct wetland areas	Floodplain prepared, channel excavated, ditch diversions installed, rock structures installed, bank willow planted																																				
	6.	Apply soil cap and re-vegetation	Soil cap over floodplain, floodplain re-vegetated																																				
	7.	Final landscaping and trails design and installation	Final landscaping and trail design; trails and landscaping installed																																				
Objective 6: Monitoring and Evaluation	8.	Monitor channel stability, water quality, and re-vegetation	Evaluation of channel stability, water quality data, evaluation of re-vegetation																																				

APPENDIX D
BUDGET TABLES

Budget Table Part 1

Funding Sources	Fiscal 2009 (7/08-6/09)	Fiscal 2010 (7/09-6/10)	Fiscal 2011 (7/10-6/11)	TOTAL
WSRA Funds				
1) FY08 Funds	$15,095	$234,905	$0	$250,000
EPA Section 319				
1) FY08 Funds	$29,000	$367,120	$2,250	$398,370
Other Federal Funds				
1) EPA Brownfields	$0	$200,000	$0	$200,000
State/Local Match				
1) CDRMS[1]	$35,000	$0	$0	$35,000
2) Great Outdoors Colorado	$0	$135,000	$240,000	$375,000
3) CDPHE HWM[2]	$0	$50,000	$0	$50,000
4) Creede Resources/Hecla[3]	$250,000	$0	$0	$250,000
5) WCRC in-kind	$2,800	$50	$50	$2,900
6) City of Creede	$1,545	$1,545	$515	$3,605
Subtotals	*$289,345*	*$186,595*	*$240,565*	*$716,505*
TOTAL BUDGET	**$333,440**	**$988,620**	**$242,815**	**$1,564,875**

[1] *Colorado Division of Reclamation, Mining, and Safety*

[2] *Colorado Dept of Public Health and Environment Hazardous Waste Management Division CDPHE HWM used as match for EPA Brownfields Grant*

[3] *Donation of land to non-profit land conservation organization*

Budget Table Part 2

Objective	Task		WSRA Funds	319	Other Non-Fed Cash	Non-Fed In-Kind	Other Federal	Total Costs
Objective 1: Project management & administration	1.	Project Management and administration	$400	$12,500	$0	$3,105	$0	$16,005
	2.	SLV RC&D administration	$5,000	$5,000	$0	$0	$0	$10,000
	3.	Transfer land to nonprofit	$0	$0	$0	$250,000	$0	$250,000
Objective 2: Develop final design, channel reconstruction, install landscaping and trails	4.	Final restoration design, construction supervision	$30,095	$17,500	$35,000	$2,500	$0	$85,095
	5.	Re-construct stream channel, plant bank willow, construct wetland areas	$214,505	$362,170	$0	$0	$0	$576,675
	6.	Apply soil cap and re-vegatation	$0	$0	$200,000	$0	$200,000	$400,000
	7.	Final landscaping & trails design and installation	$0	$0	$225,000	$0	$0	$225,000
Objective 3: Monitoring and Evaluation	8.	Monitor channel stability, water quality, re-vegetation	$0	$1,600	$0	$500	$0	$2,100
TOTAL PROJECT			**$250,000**	**$398,770**	**$460,000**	**$256,105**	**$200,000**	**$1,564,875**

Budget Table Part 3

Objective	Task	WSRA Funds	Detailed explanation of costs
Objective 1: Project management & administration	1. Project Management and administration	$400	Telephone and internet: 4 months @ $100/month
	2. SLV RC&D administration	$5,000	One-time flat fee for fiscal agent tasks
	3. Transfer land to nonprofit	$0	No expense to CWCB -will be carried out using other matching funds
Objective 2: Develop final design, channel reconstruction, install landscaping and trails	4. Final restoration design, construction supervision	$30,095	Final restoration design and construction supervision: 316 hours @ $95/hour
	5. Re-construct stream channel, plant bank willow, construct wetland areas	$214,505	Work Description / No. / Qty. / Unit Cost / Total
			Soil cut/fill — 5321 — yd3 — $4.25 — $22,614
			Floodplain grading — 58.3 — ac — $240.00 — $13,992
			Stream Excavation (8230'x20'x1 — 10973 — yd3 — $4.25 — $46,637
			Ditch Excavation (910'x10'x3') — 1011 — yd3 — $4.25 — $4,297
			Diversion structure work — 2 — ea — $2,500.00 — $5,000
			J-hooks — 120 — ea — $2,200.00 — $264,000
			Cross-vanes — 11 — ea — $3,300.00 — $36,300
			Bank willow line (6' wide) — 8036 — ft — $1.90 — $15,268
			Excavate contaminated soil (5ac — 16133 — yd3 — $4.25 — $68,567
			TOTAL cost of stream re-construction for entire project (8,230 linear feet) — $476,675
			COST of stream re-construction for 3,700 linear feet (WSRA portion): 45% of total — **$214,505**
	6. Apply soil cap and re-vegatation	$0	No expense to CWCB -will be carried out using other matching funds
	7. Final landscaping & trails design and installation	$0	No expense to CWCB -will be carried out using other matching funds
Objective 3: Monitoring and Evaluation	8. Monitor channel stability, water quality, re-vegetation	$0	No expense to CWCB -will be carried out using other matching funds
TOTAL WSRA FUNDS		**$250,000**	

APPENDIX E
EVALUATION MATRIX

Evaluation and Monitoring Matrix

Objective	Task		Evaluation Criteria
Objective 1: Project management and administration	1.	Project Management and administration	? The reports and accounting for the grant will be be accurate, well-documented, and on-time. Reports will include all recent data and evaluations. ? Bid documents, site showing, contractor negotiations, and hiring will be conducted in a timely manner.
	2.	SLV RC&D administration	? Provision of effective oversight as fiscal agent and insurance coverage.
	3.	Transfer land to nonprofit	? Effective transfer of Creede Resources Property so that land is held by non-profit land conservation group and can be transferred to City of Creede following cleanup.
Objective 2: Develop final desgin, channel reconstruction, install landscaping and trails	4.	Final restoration design, construction supervision	? Surface and depth soil samples will be analyzed for lead concentration using XRF, and GIS maps of lead concentrations at surface and near water table will be produced. ? A final stream floodplain restoration design will be produced that will enable successful and economical restoration on evaluating contamination, ease of construction, cleanup goals, and elevation profiles. It will be in line with the preliminary, conceptual design developed by the USDA NRCS.
	5.	Re-construct stream channel, plant bank willow, construct wetland areas	? Floodplain is ready for channel excavation will be evaluated visually based on the final restoration design. ? A meandering single-thread stream channel will be excavated with proper form and profile based on the final restoration design and will be evaluated by on-site field supervisor. ? Ditch diversion structures will be stablized in new locations with rock cross-vanes and monitored by field supervisor. ? The installation of stable rock structures, including J-hook and cross-vane structures will be monitored by field supervisor. ? Areas of highly contaminated soil will be relocated above the normal water level within the floodplain and will be monitored by the field supervisor and documented with photographs. ? Willow will be planted to provide long-term bank stability. The success of this re-vegetation will be evaluated visually and documented with photographs. ? Wetland areas will be constructed with willow and/or hydrophytes based on the final restoration design, and monitored by the field supervisor
	6.	Apply soil cap and re-vegatation	? Appropriate soil cap will be applied to floodplain areas to meet cleanup and environmental goals. This will be ensured by the site supervisor. ? Bare floodplain areas will be re-vegetated with appropriate percent cover with willow, grass and shrub species. Re-vegetation success will be monitored and documented with a minimum of ten photo-point locations, along with a visual estimate of vegetative cover.
	7.	Final landscaping & trails design and installation	? Final landscaping and recreational design to improve aesthetic conditions, recreational values, and educational opportunities will be ensured relying on community input. ? Appropriate landscaping and trails will be installed based on the final design, and will be evaluated by the on-site supervisor and documented and monitored with photographs.
Objective 3: Monitoring and Evaluation	8.	Monitor channel stability, water quality, re-vegetation	? A minimum of 10 photo-point locations will be established before construction and annual photos taken after subsequent spring flows to provide qualitative evaluations of channel changes. Following construction, bank pins will be installed in at least three locations, which will be measured once a year. Detailed cross-section measurements will also be taken at these bank pins to provide a quantative evaluation of channel morphology and stablity. ? Water samples will be taken upstream and downstream of the site at WCRC sites W-C, W-I, and W-J. Water quality improvements will be documented based on these samples. ? Vegetation will be evaluated and monitored annually for the first five years after establishment; then once every other year or two. A minimum of 10 photo-point locations will be established to monitor vegetation success, and dectection of erosion of soil cap. A visual estimate of percent vegetative cover after the summer season will also be made.

APPENDIX F
REFERENCES

References

EPA 2005 *Aquatic Resources Assessment of the Willow Creek Watershed* U.S. Environmental Protection Agency, Region 8; Denver, Colorado.

McCulley, Frick & Gilman, Inc. 1999 *Preliminary Characterization of the Willow Creek Watershed: Existing Conditions and Recommended Actions*, Boulder, Colorado

NRCS 2007 *Willow Creek Stream Restoration Planning Study* USDA Natural Resources Conservation Service Rocky Mountain Engineering Team; Denver, Colorado.

Steven, T.A., Ratte, J.C.,1965 *Geology and Structural Control of Ore Deposition in the Creede District, San Juan Mountains, Colorado: US Geological Survey Professional Paper 487*

Willow Creek Reclamation Committee 2004a *Report on Surface and Mine Water Sampling and Monitoring in Willow Creek Watershed, Mineral County, CO (1999-2002)*; Creede, Colorado.

Willow Creek Reclamation Committee 2004b *Report on Characterization of Groundwater in the Alluvial Deposits Beneath the Floodplain of Willow Creek Below Creede*; Creede, Colorado.

Willow Creek Reclamation Committee 2004c *Final Report on Characterization of Fish and Aquatic Macroinvertebrates in Willow Creek*; Creede, Colorado.

APPENDIX G
LETTERS OF SUPPORT