McCormick Ditch Restoration Project Final Report

Prepared For:
WSRA Grant – Gunnison River Basin
Attn: Chris Sturm, Craig Godbout and Dori Vigil
Colorado Water Conservation Board

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Project Summary

In 2013, the Board of Directors for the Coal Creek Watershed Coalition (CCWC) initiated a project to improve and restore the McCormick Ditch on Coal Creek within the town limits of Crested Butte. The CCWC partnered with High Country Conservation Advocates (HCCA) and the Town of Crested Butte (Town) to design and complete this project.

The McCormick Ditch serves the Town of Crested Butte and the Verzuh Ranch with municipal parks and agricultural irrigation water drawn from Coal Creek. The water rights associated with the Ditch date to 1906 and 1961 adjudications.

The former diversion structure for the McCormick Ditch was a gravel push-up dam which dominates Coal Creek at 4th and Teocalli Avenue in the Town of Crested Butte. High spring flows necessitate frequent maintenance on the dam which involves heavy equipment in the stream bed, dredging up sediment and damaging the riparian corridor just upstream of the Butte Avenue Bridge and Coal Creek's confluence with the Slate River.

The Project sought to replace the existing push-up dam with a permanent diversion structure which will be more efficient, not require yearly maintenance and will better conform to the natural contours of Coal Creek.

This project sought the following outcomes:

- Cost savings from elimination of need for yearly maintenance.
- Efficient capture of water for diversion and delivery into McCormick Ditch.
- Reduction in sediment mobilization and disturbance to the Creek bed.
- Visual advantages of a natural looking structure within Town limits.
- Aquatic connectivity for the lower segment of Coal Creek to its confluence with the Slate River.
- Creation of improved riparian and fish habitat.

The CCWC hired Jeff Crane, of Crane Associates, to design and oversee construction of the restored diversion structure. Crane Associates had been hired in the past by the CCWC in two other diversion restoration projects in the years prior, the Town's Drinking Water Diversion and the Halazon Ditch restoration. A generous portion of construction personnel and heavy machinery was donated by the Town of Crested Butte public works department and by Lacy Construction. Following project construction, the CCWC in partnership with HCCA, would host a bio-engineering field day to plant willows and reclaim areas of the site where heavy machinery was used.

Project Approach and Implementation

Following project approval, the Board of Directors requested Zach Vaughter, CCWC Executive Director, and former HCCA Water Director, Jennifer Bock, to begin seeking funding for project implementation. Jennifer Bock was the primary contact for developing and presenting grant proposals to various funding entities. It was agreed that HCCA's role in the project would be

primarily fundraising, while the CCWC would be responsible for administering the grant and overseeing project completion.

Through effective grant writing, HCCA and Jennifer Bock successfully procured funding from the following entities in 2014:

- Upper Gunnison River Water Conservancy District - $23,345.00
- Colorado Water Conservation Board WSRA – Gunnison Basin Roundtable - $21,346.00
- Town of Crested Butte - $16,150.00 (In-Kind)
- Bill Lacy: Lacy Construction - $1,000.00 (In-Kind)
- **TOTAL Project Budget- $63,841.00**

With funding secured, the CCWC oversaw project coordination, stakeholder development, materials mobilization to the site, and public outreach/awareness surrounding project implementation. Jeff Crane of Crane and Associates oversaw the implementation and construction of the design and the Town provided staff, staff time, and equipment.

Original Project Budget

			UNIT	EST	SUB TOT	
ITEM DESCRIPTION	UNIT	QTY	COST	COST	COST	
Mobilization/Demobilization						
Equipment Transport (12)	LS	1	$1,000	$1,000		
					$1,000	
Diversion Structure						
Demo and remove ex structure	CY	150	$5	$750		
Excavation w/rock hammer	CY	200	$15	$3,000		
3" boulders delivered & placed	CY	170	$100	$17,000		
1 1/2" gravel rock bed installed	CY	60	$20	$1,200		
Toe logs installed	LF	200	$20	$4,000		
Grout boulders	CY	20	$250	$5,000		
Willows cut and planted	LF	200	$10	$2,000		
Water control	LS	1	$2,000	$2,000		
					$34,050	
Labor Tasks (In Kind Contributions)						**Operator**
Best Management Practices- repair and staging				$500		Town of CB
Demolish and Remove Existing Structure				$750		Town of CB
3" Boulder Placement				$8,500		Town of CB
1 1/2" Gravel Rock Installation				$600		Town of CB
Toe Logs Installation				$2,000		Town of CB
Water Control				$2,000		Town of CB
Best Management Practices- willows cut and planted				$1,800		Coal Creek Watershed Coalition (CCWC)
To Be Determined				$1,000		Bill Lacy
SUBTOTAL LABOR					$17,150	
SUBTOTAL MATERIAL COSTS					$35,950	
CONTINGENCY (15%)					$5,393	
CONSTRUCTION SUBTOTAL (not incl. in kind labor)					$41,343	
Project administration (13%)					$5,348	($4,192 to Crane Associates for construction oversight, $1,183 to CCWC for project management)
TOTALMATERIAL COST + Administration					$46,691	($23,345 granted by the UGRWCD)
In Kind Contributions					$17,150	
TOTAL PROJECT COST					$63,841	

Construction Implementation and Deliverables

To satisfy the requirements of the Colorado Water Conservation Board: WSRA Grant and the grant from the Upper Gunnison River Water Conservancy District, as well as the desires of all stakeholders concerned, the instream re-engineering of the diversion ditch and structure was designed and implemented to withstand naturally occurring seasonal flows.

The conceptual design called for 75 cubic yards of 3' diameter round rock/boulders and 25 cubic yards of 2' diameter round rock/boulders. The site did not have an immediate rock source and therefore an off-site rock source was identified prior to implementation, and delivered the Friday prior to excavation. In addition to in-kind construction services from the Town, Rodney Due-director of Public Works, coordinated all heavy machinery rentals and machine mobilization to the site.

After material mobilization to the site, an excavator was utilized to decommission the existing diversion structure. The previous diversion structure was created by erecting a large silt dam upstream of the McCormick diversion ditch in the center of Coal Creek, and allowing woody debris and large rocks deposited at high flow to accumulate. This structure was susceptible to high stress during times of high flows and had a history of washing out, contributing to large sediment deposition, and creating an extensive braided channel. Following decommission of the existing diversion structure, the accumulated sediment present in the diversion ditch was excavated and stored on site to be used as native bedload material.

Following decommission of the existing diversion structure and excavation of accumulated sediment from the diversion ditch, Jeff Crane of Crane and Associates and Zach Vaughter of the CCWC, oversaw implementation of the conceptual design and supervised construction of the new diversion structure. The previous diversion structure was replaced with a boulder structure with a constant top grade of 9245 feet, which was a similar elevation of the previous diversion structure and delivers the same head at the intake.

The excavated diversion ditch was lined and reinforced with 3' boulders, additionally a boulder J-hook was constructed extending upstream from the existing diversion ditch approximately five feet into the main stem of Coal Creek. This provided a more gradual diversion of water to the right side of the existing intake ditch. Rocks and toe logs utilized in the J-hook were anchored with cables to maintain design integrity during seasonal high flows. The diagonal alignment of the new structure provided a constant slope of 0.75% and reduced sediment deposition before the structure and ditch. This alignment provided improved stability and allows for fish migration past the diversion. Additionally, the new diversion structure reduces erosion on the right bank before entering into the diversion ditch and on the left bank during peak seasonal flows.

Following project construction and diversion structure implementation; above and below the project site, creek conditions were near optimal. Construction at each end of the project was carefully blended into the two end points so as to eliminate any visual discontinuities.

The McCormick Ditch Reconstruction design implementation achieved the desired deliverables as outlined in the scope of work:

- Reduced need for frequent maintenance of the existing structure.
- Constructed a more reliable diversion structure to withstand changing flows and improve water quality, instream habitat, and adjacent riparian habitat;
- Constructed a certified no-rise diversion structure using HEC-RAS modeling, and
- Improved longitudinal connectivity of Coal Creek.

The final phase of the project was to coordinate and facilitate a bio-engineering workshop offered to the public; this effort was outlined in the WSRA grant (task 4) to foster environmental stewardship on a community level and educate the public about the benefits of natural means of site reclamation. Willow cuttings and other native riparian vegetation were planted throughout the newly created floodplain and along areas where heavy machinery had been used in an effort to repair all staging areas. This bio-engineering workshop was well attended by HCCA staff, CCWC staff and volunteer members from the community; participants were able to plant approximately 400 willow cuttings that had been harvested from adjacent native species.

Conclusion

The McCormick Ditch Restoration Project can be described as a monumental success for the CCWC, HCCA, the community of Crested Butte, and the environmental integrity of Coal Creek. Project implementation resulted in a major improvement from the previous diversion structure and ditch. The final cost of the project came in well under budget by approximately $48,000.00; the final cost of the project was $15,648.33 compared to the original estimate of $63,841.00. Funding entities were billed for the following amounts based on deliverables outlined within each respective grant proposal:

- CWCB: WSRA - $5,848.33
- Upper Gunnison River Water Conservancy District - $9,800.00

This can be largely attributed to donations from the Town in the form of in-kind donation/match, as well as an in-kind donation from Lacy Construction.

Additionally, the McCormick Ditch Restoration Project implementation achieved the desired deliverables on Coal Creek as outlined in the scope of work provided to the Colorado Water Conservation Board: Gunnison Basin Roundtable, in that this project achieved:

- Cost savings from elimination of need for yearly maintenance.
- Efficient capture of water for diversion and delivery into McCormick Ditch.
- Reduction in sediment mobilization and disturbance to the Creek bed.
- Visual advantages of a natural looking structure within Town limits.
- Aquatic connectivity for the lower segment of Coal Creek to its confluence with the Slate River.

- Creation of improved riparian and fish habitat.

The CCWC would like to thank the Colorado Water Conservation Board for its support of this restoration project. The positive impacts associated with the project will have lasting impacts on the environmental integrity of Coal Creek and effectiveness of water delivery into the McCormick Ditch for years to come. If the CCWC can provide any further documentation or support please feel free to contact us. Thank you.

Appendix

The following are representative pictures showing before, during and after implementation of the project.

Before

During Implementation


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CAT

After