Scope of Work
Mancos River Diversion Project, Phase 1

Project Sponsor: Mancos Conservation District, PO Box 308, 604 Bauer Ave., Mancos, CO 81328;
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Project Director: Until April 15th, 2010: Felicity Broennan**;** 970-533-0241**;** felicitytoys@gmail.com
Project Director: After April 15th, 2010: Chester Anderson; 970-764-7851;
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Project Location: Our project is in the Mancos River Watershed. Specifically, we will be evaluating and designing new diversion structures along the Mancos River beginning with the Willis Ditch that lies in the Town of Mancos and continuing down to the Bolen Ditch. Other aspects of the project include mapping all of the diversions along the Mancos River and working with Colorado Water Trust to evaluate the potential of a water leasing program for increasing in stream flow.
Grant Category: Flood Mitigation and Watershed Stream Restoration and Protection
Grant Amount: $24,753

March 3rd, 2010

Overview:
Some pieces of critical importance have emerged over the past three years of our studying the Mancos River Watershed**.** First and foremost, a need to continue upgrading our aging, 19th century-vintage irrigation infrastructure that is taking its toll on the Mancos River in many ways: degradation of the river channel, inefficient and poorly measured water delivery, and frustrated irrigators unable to afford ongoing maintenance. A major portion of this degradation occurs at ditch diversion sites.

Second, there is a need for greater instream flows throughout the summer months when irrigators tend to dewater the river. This scope of work will allow for our partnership with Colorado Water Trust to begin analysis on the potential of developing instream flow rights in the Mancos River.

Our long-term goals for our watershed management and protection plan are to work with irrigators/irrigation companies and landowners along the Mancos River to restore the capacities of the river system. We can do this by taking a holistic approach to the above described situations. Funding from the Southwest Basin Roundtable will support the planning and design process necessary to reach these goals. We have examined the aging diversion structures with a team of experts (engineers, water commissioner, ditch owners, and an ecologist) working together to consider all possibilities of reform/restoration/irrigation efficiency improvement.

Specifically, this scope of work identifies the tasks necessary to reconstruct the most infirm and inefficient in-stream diversion structures. Five ditch companies have agreed that their diversions are in need of this work. Paired with the beginning of a legal analysis keyed to non-consumptive uses, this scope helps us estimate the costs necessary to reconstruct the diversion structures and file for instream flow rights.

Project Objectives:
1. Stabilize river bed at ditch company points of diversion:
    a. Place structure in riverbed to preserve present elevation and eliminate need for temporary dams to divert water into inlet channel.

b. Help river to remain in the present channel and preserve adequate water depth at inlet channel.
c. Armor riverbanks above and below inlet channel to survive100-year flood events.
d. Reduce maintenance of the diversion structure and increase stream flows.

2. Develop flood plain capacity to pass floodwaters with minimal scouring of vegetation and soils.

3. Install gate structure where necessary to control water entering inlet channel.

4. Discourage braiding of river channel above and below point of diversions.

5. Encourage healthy riparian habitat in the vicinity of the point of diversion.

6. Contribute, if possible, to restoration of sustainable fishery in river below the town of Mancos.

7. Seek funding from other stakeholders and beneficiaries of the proposed work.

8. Integrate project into flood control planning with Mancos Conservation District and river bottom landowners.

9. Map all of the diversion structures using a GPS.

10. Begin conducting analyses necessary to propose new instream flow appropriations on critical stream reaches in the study area. Analysis requires identification of the stream reaches proposed and the upper and lower termini of the proposed reaches, documentation of the existence of a "natural environment," quantification of the amount of water required to preserve the natural environment to a reasonable degree, hydrologic analyses which indicate that water is available for appropriation on the proposed stream reaches, and specific information as to why the stream reaches should be afforded protection under the Instream Flow Program. Document information in a report. Print and deliver copies to Mancos Conservation District, USBR, and Colorado Water Trust.
11.

Diversion descriptions:

1. Henry Bolen Ditch Company. The Bolen pipeline intake structure is on Chicken Creek just below a transfer ditch that delivers water from the point of diversion on the River to Chicken Creek, a distance of approximately 400'. The existing diversion structure consists of a log jam and excelsior rolls. There has been substantial streambank erosion upstream of the structure and channel braiding downstream. A permanent structure needs to be constructed and streambank enhancements established. There is no measuring device at the point of diversion. The mainline flow meter is located approximately 3000 feet from the intake structure at the first County Road crossing and is installed in a 48" pit on 24" diameter PVC pipe. There is no means at the structure to accurately measure the amount of water flowing into the pipeline. Therefore, the water users and the Water Commissioners rely on the flow meter. A Parshall flume should be installed at the point of diversion as part of the permanent diversion structure for the Bolen Ditch Company. There is a new head gate at this irrigation ditch that connects to the new pipeline. The head gate and pipeline were developed with a loan from the CWCB.

2. Mancos Valley Beaver Ditch Company- The intake structure for this ditch has recently been reconstructed by the NRCS but no in-stream diversion structure was ever completed. A large pile of boulders and cobble have been dumped into the channel but cut the river off from the floodplain. The diversion should be rebuilt to divert the required amount of water at low flows but still allow the river ample room to flood during high flow events. The Beaver Ditch Company has added a weir and staff

gauge at the intake structure as an alternate measurement point, reducing dependence upon a flow meter. There is a new head gate at this irrigation ditch that connects to the new pipeline. The head gate and pipeline were developed with a loan from the CWCB.

3. The Sheek Ditch Company pipeline diverts water from Chicken Creek although the approved point of diversion is on the Mancos River; approximately ½ mile away. Historically, water was diverted at the River into a ditch that crossed Chicken Creek in a flume. When the River heading washed out in the 70's the Ditch Company reconfigured the ditch at Chicken Creek and began a temporary diversion from Chicken Creek as an expedient to get through the season. Temporary has become permanent over the years for lack of a functional heading at the River. The Sheek Ditch Company needs to extend a new pipeline from Chicken Creek over to the River and install a proper heading to divert water at the River and abandon the Chicken Creek diversion. There is a new head gate at the Chicken Creek diversion point that is not properly measuring water; The head gate was funded by a loan from CWCB. **NOTE: this diversion point is caught in a controversy as to the validity of its current point of diversion and the Mancos Conservation District Board of Directors feels it best to let the ditch company settle with the Water Division before attempting a project. We would like to amend our proposal to eliminate this diversion.**

4. Number Six Ditch Company- The Company is a combination of water users from the Number Six Ditch, The Viets Ditch and the Boss Ditch which formed a joint Company to install a pipeline to serve all of the water users. The ditch diversion is located behind the excelsior plant and uses an annual gravel diversion to move water into the ditch. A permanent low-head diversion structure with a concrete headgate at the point of diversion would allow for natural re-vegetation of the floodplain and protect the current intake structure. There is a new head gate at this irrigation ditch that connects to the new pipeline. The head gate and pipeline were developed with a loan from the CWCB.

5. Carpenter and Mitchell Ditch Company- The pipeline, intake structure and in-stream weir to set the stream level was constructed in 2007. Metering is accomplished with a measuring weir built into the front-end of the intake structure. The Water Commissioner arranged for the design of the weir plate and staff gage that was installed in spring 2009. This intake structure and in-stream weir that sets the water level in the creek is not wide enough to pass high flows in the creek. A reinforced spillway is needed to carry flood water around the in-stream weir to protect it from damage. There is a new head gate at this irrigation ditch that connects to the new pipeline. The head gate and pipeline were developed with a loan from the CWCB.

6. Willis Ditch – This ditch is suffering the classic affects of years of make-shift diversion tactics and now the river armoring has disappeared, dropping the water level and increasing channelization. The ditch company is worried they won't be able to divert their full allotment of water because the situation has become so severe. The diversion is behind the Mancos School and could possibly be used as a model structure once it is stabilized, as it has easy access from downtown Mancos.

Task 1-Collect field data

Deliverable-Horizontal and vertical field data of 5 diversion structures

Contractor will survey each of the six diversion points including horizontal and vertical data points, stream cross sections up and downstream of the diversion, descriptions of physical characteristics and photo points. Download data into an AutoCad file and prepare base maps.

Completion Date: May 30, 2010

Cost: $4,000

Task 2-Prepare design drawings

Deliverable-Design drawings for review and approval

Contractor will develop and print design drawings of the 6 diversion structures and present to the steering committee, ditch companies as well as the full conservation district board. Revisions as required by district board and ditch companies.

Completion Date: June 30, 2010

Cost: $8,000

Task 3-Prepare Opinion of Costs

Deliverable-Cost estimate and project timeline for construction

Contractors will research materials, contractors and costs and prepare an opinion of costs and timeline for construction. Attend stakeholder meetings in Mancos.

Completion Date: July 30, 2010

Cost: $6,000

Task 4 – Map the diversions on the Mancos

Deliverable- 3 ring binder of photos and arc-view mapping of every diversion structure

Contractor will work with state water commissioner's local office, landowners, and ditch companies; will physically go to each of the 34 diversion points on all forks of the river, photograph the structures, gps the points and download all data into arcview. Maps will be produced and a three ring binder with each set of diversion data will be compiled and placed at the Conservation District office.

Completion Date: March 30, 2010

Cost: $13,000

Task 5 – Begin decree analysis

Deliverable – a document making recommendations about how the Mancos Conservation District may move forward on ISFs. To the extent possible, CWT will begin fact and data gathering to assist with the process for recommending new ISF appropriation options, including all manners of leases in addition to purchases.

The Colorado Water Trust staff will make 2 trips to the area to begin investigations on ISF opportunities in the Mancos watershed. These trips will include tours of areas of importance in the watershed and discussion with water commissioners.

Completion Date: September 30th, 2010

Completion Date: June 1, 2010

Cost: $12,000

Task 6 – Project Management

Deliverable – Ongoing coordination of all elements of tasks 1-5 start to finish plus final report.

Project manager will arrange meetings between supervisors, contractors, ditch company representatives and water commissioner as necessary throughout the project. PM is responsible for working with each of the four contractors on each element of the project, creating a cohesive timeline, supervising contractors as necessary, acting as liaison with funding agency, track billing and progress, and reports regularly to Mancos Conservation District Board. Manager is responsible for hiring contractors, negotiating and writing contracts; overseeing and supporting decree analysis partners with field trips, maps, contacts, meetings. PM will arrange for and run informational water trust meeting for the public, featuring Amy Beatie. PM will also attend each of 6 ditch company meetings to explain project and secure matching funds. PM will write the final report for the CWCB upon project completion.

Completion Date: December 30, 2010

Cost: $14,000 P.M. time; $2,000 materials & Supplies: Camera & accessories, GPS unit; large scale maps; community center rental & beverages/desserts for public meeting;

Name of Project: Mancos River Diversion

3/10/2010

Objective or Task	Description of Work to be Done	Direct CWCB Cost	Match In-kind MCD	Match Matching Round Table	Planned Task Cost
Task 1.	Collect Field Data			$6,000	$6,000
Task 2.	Prepare Design Drawings	$3,000	$1,247	$3,753	$8,000
Task 3.	Prepare Opinion of Costs	$4,000		$2,000	$6,000
Task 4.	GPS Map all diversion structures on river	$11,500	$1,500		$13,000
Task 5.	Begin decree analysis	$6,000		$6,000	$12,000
Task 6.	Project Management/materials/supplies	$6,000	$3,000	$7,000	$16,000
	Clerical		$740		$740

Total	**$ 30,500**	**$6,487**	**$24,753**	**$ 61,740**

Milestone Table for Mancos River

Task	Description of Work to be Done	Completed By		
		Jan. 30	June 30	Sept. 30
Task 1.	Collect Field Data		■	
Task 2.	Prepare Design Drawings			■
Task 3.	Prepare Opinion of Costs			■
Task 4.	Map Diversions	■		
Task 5.	Decree Analysis			■
Task 6.	Project Management - Ongoing	■	■	■

Personnel

The project, including data collection, preparation of design plans and opinion of costs will be done by Mark Oliver. Mr. Oliver has 27 years of surface water hydrology experience in the private sector. He started Basin Hydrology, Inc. in 1994 to offer specialized surface water hydrology services in fluvial geomorphology, wetlands, and watershed-scale drainage and erosion issues. He employs an applied, hands-on approach to projects. Mark performs surveys, detailed hydrologic and hydraulic analyzes, prepares construction plans, secures permits and provides construction oversight.

He has designed and constructed ~ 9 miles of river restoration projects in Colorado, Utah and New Mexico. These projects have included bank stabilization, fisheries and riparian enhancement, and complete channel-flood plain-riparian area reconstruction. Related activities include FEMA flood plain and floodway analyses and mapping. A certified engineer will stamp the plans before submission to entities for implementation.

Amy Beatie, of Colorado Water Trust, is working on the decree analysis. She and her staff will perform all duties in association with Task 5.

Jesse Lanci, a contractor for the Mancos Conservation District will do all GIS work in association with mapping the Mancos River. He will be assisted by Doug Ramsey of San Juan RC&D.

Felicity Broennan, M.S. is the outgoing director of the Mancos Watershed Project, and has been the point person for all coordinating, reporting, contracting elements of this project. As of April 15th, she will hand over all duties to Chester Anderson (See below).

Chester Anderson will step in as the new Mancos Watershed Project Director as of April 15th, 2010. Mr. Anderson is the owner of B.U.G.S Consulting, a small independent environmental research and monitoring firm located in Southwest Colorado. B.U.G.S. Consulting contracts with watershed groups and state and tribal entities. B.U.G.S. has an excellent track record applying for and receiving grants, developing Quality

Assurance Project Plans (QAPP), developing nutrient criteria, and coordinating and managing efforts among a variety of governmental agencies that result in watershed-wide research and monitoring programs. Our lab has the capability of processing macroinvertebrate, phytoplankton and periphyton samples for bioassessment studies as well as experience in processing water chemistry samples, analyzing data, developing GIS database systems and Watershed Management Plans.

Lea Cody is the district manager for the Mancos Conservation District, and will be responsible for the bookkeeping and grant administration.

MCD in-kind; The Diversion Project Phase I is overseen by the Mancos Conservation District Board and an advisory board whose members include: Dr. Dick White, Vice-President of the MCD Board, Dr. Jack Burk, President Emeritus of the MCD Board, Raymond Keith, Former Project Manager for the Salinity Project, and Eldon Simmons, President of the MCD Board.

Payment

Invoicing for this project will done based on the completion of the major project tasks. The request for payment shall include: a description of the work accomplished; an estimate of the percent completion for individual tasks and for the entire project in relation to the percentage of budget spent.

The last 5 percent of the project budget will be withheld until final project documentation is complete. All products, data and information developed as a result of this contract must be provided to the Mancos Conservation District and the CWCB in hard copy and electronic format as part of the project documentation.