

**Restoring Cebolla Canyon**  
**River Ecosystem Restoration Initiative RFP #: FY08-SWQB RERI**

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**1. Project Title: “Restoring Cebolla Canyon”**

The Rio Puerco Alliance requests \$159,111 to restore Cebolla Canyon, degraded by agricultural practices. Partners include Bureau of Land Management, Albuquerque Wildlife Federation, and New Mexico Wilderness Alliance. Workshops will be conducted on restoration methods, and a Summer Academy for high school students and teachers will be held near Grants.

**5. Problem Statement**

Historic irrigation diversions have dried out the wetlands along Cebolla Creek and caused headcutting and incision in the main channel. Our project will restore water to the wetlands and begin to stabilize the stream banks through implementation of select BMPs.

Cebolla Canyon is primarily within and protected by a congressionally designated Wilderness Area (Cebolla Wilderness) within the congressionally designated El Malpais National Conservation Area (EMNCA) near Grants, New Mexico (Map 1). The project area has multiple designations including Wilderness Area, and National Conservation area. However, all of the project area is Bureau of Land Management Public Lands. Within the project area, Cebolla Spring and Cebollita Spring emerge from the ground and provide habitat and/or water to a variety of wildlife species including Bald Eagle (*Haliaeetus leucocephalus*), Mule Deer (*Odocoileus hemionus*), Elk (*Cervus canadensis*), Mountain lion (*Felis concolor*), Bobcat (*Lynx rufus*), Abert's Squirrel (*Sciurus aberti*), two species of Wild Turkey (*Meleagris gallopavo intermedia*, *Meleagris gallopavo Merriami*) and reptiles such as the side-blotched lizard (*Uta stansburiana*). The next nearest constant water source for wildlife is the Rio San Jose, approximately 40 miles away. In addition, several ephemeral playas hold seasonal water but the nearest playa is about seven miles away.

The valley was homesteaded in the early 1900s. Today only ruins of the stone houses and hydrological modifications established by early settlers remain. The historic wetland of Cebolla Creek has been drained and earthen dams constructed to retain water for agricultural use. These changes to the area's hydrology coupled with cattle grazing have reduced the historic wetland to a fraction of its original size and inadvertently created a massive down-cut, incising the stream banks in some areas as deep as 50 feet.

Previously, water from the springs was impounded and used for irrigation almost exclusively. Former wetlands were drained and dams, irrigation ditches, and impoundments were constructed along Cebolla Creek to support agriculture. The irrigation systems and impoundments are no longer functional, but Cebolla Creek is displaced from its natural drainage, headcutting is occurring in the valley bottom, and the wetlands have not recovered. In one area, an abandoned diversion channel led from Cebolla Spring to a storage reservoir. We need to block that channel to re-connect groundwater flow from the Spring to the former wetland. In other areas, grade control structures need to be built to raise the bed of the Spring where it was deliberately ditched and drained.

Due to the draining of the valley, the plant community composition has deteriorated to a monoculture of blue grama grass (*Bouteloua gracilis*) with rabbit brush (*Chrysothamnus nauseosus*) increasing in the valley bottom. This coupled with increasing encroachment of Piñon (*Pinus edulis*) and Juniper (*Juniperus scopulorum*) from the uplands has converted the vegetative composition of the valley to that of a warm season upland plant community instead of a wetland. Re-vegetation with wetland species is needed to jump start recovery in the areas we treat under this project.

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In 1994, a seven-acre enclosure was constructed by BLM to reduce livestock use of the Cebolla Spring. In one growing season, the spring turned from a mud bog to standing water. The water promoted vegetative growth, which increased ground cover and shade, reducing loss of water to evaporation. As a result, a permanent saturated zone developed, providing the conditions for a nascent wetland. Since the fall of 2000 the Albuquerque Wildlife Federation has been organizing volunteer groups to help with restoration efforts in Cebolla Canyon. The groups have worked to construct restoration best management practice structures to spread water over the valley. These structures are re-wetting the meadow, widening the stream banks, and building up the channel bottom to return this portion of the wilderness area to its natural condition of a perennial stream and a properly functioning wetland. The result has been two-fold: the creek gradient is flattened and water infiltration into the banks has increased, promoting an increase in emergent wetland plant species, which add to bank stability. The saturated zone associated with the spring has expanded downstream along the first terrace adjacent to the creek. The saturated zone currently is over 40 acres. The wetlands area associated with the spring has the potential to double in size to over 80 acres. A long-term landscape-based approach to improving the ecological health of Cebolla Canyon and its associated wetlands is needed.

This project is based on the previous work done in the area. It will demonstrate and monitor innovative techniques to return land altered for agricultural use to its natural condition. This could provide the basis for other projects using similar techniques to return many acres of land hydrological modified for agricultural use to their original condition in New Mexico, which would have enormous benefits to the watersheds. This would provide habitat for diverse plant and animal species which are currently finding fewer hospitable locations; it would increase the amount of recharge into aquifers; it would stop erosion and improve water quality in area streams. Ultimately, this project and others like it would be sustainable, because they would return the land to its natural condition and would require no further modifications.

## **7. Proposal Description**

Historic irrigation diversions have dried out the wetlands along Cebolla Creek and caused headcutting and incision in the main channel. Our project will restore water to the wetlands and begin to stabilize the stream banks through implementation of select BMPs.

Under this project, we will conduct a structures and materials inventory of the Cebolla Creek subwatershed in the project area to assess the appropriate location of restoration structures. We will map those locations. We will attempt to return Reaches 1, 3, 4, 6, and 7 of Cebolla Creek to their natural condition and to re-establish 40-80 acres of wetland and wet meadow. We will use volunteers from AWF, RPMC, and NMWA to install fencing around 40 acres to wetland to protect it from grazing, and to install induced meanders, wicker weirs, one-rock dams, and other grade control structures to raise the grade of the channel and re-establish floodplain access in the riparian pasture.

In addition, we will use heavy equipment to remove abandoned irrigation berms to re-direct runoff to the old natural channel. We will also raise the road crossing, drain and reshape the road to reduce sediment yield to the wetland.

We will hold workshops, field trips, and a summer academy to disseminate information about the methods we are using. In addition, we will conduct extensive monitoring to determine the effectiveness of our work.

## **8. Implementation Plan and Schedule**

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**Task 1: Project Administration.** This includes developing and overseeing contracts, reimbursement requests, obtaining information for reports, writing semi-annual reports, one final report, and establishing a Steering Committee to provide technical assistance into the project design and implementation. The Steering Committee will meet quarterly over three years and will include representatives from AWF, RPA, NMED-SWQB, RPMC, New Mexico Wilderness Society, BLM, among others.

**Task 2: Restoration Reconnaissance.** We will conduct a structures and materials inventory of the Cebolla Creek sub-watershed from Reach 0 to Reach 7 in order to assess the appropriate location of restoration structure placement for this project and for the Cebolla Creek Wetlands Action Plan. Specific locations for installing best management practices will be identified and mapped.

**Task 3: Compliance.** BLM staff will perform National Environmental Policy Act (NEPA) compliance. (Clean Water Act sections 404/401 permits will not be necessary as this is a closed basin.) A Wilderness Exception will be included in the NEPA authorizing work adjacent to the Cebolla Canyon Wilderness Area.

**Task 4: Wetland Restoration Design.** Under this task, restoration work to return Reaches 1, 3, 4, 6, and 7 of Cebolla Creek to their natural condition will be designed by a surveyor and a stream restorationist who have experience in the area.

**Task 5: Install Fencing.** Approximately 15 volunteers (over six 10-hour volunteer days) will install fence around the Cebolla Spring area of approximately 40 acres of wetland to protect it from grazing. It is expected that at least 40 more acres of wetland will be created this way.

**Task 6: Reach 1 Restoration.** It is expected that we will use a dozer to move existing dam material from an abandoned irrigation berm to fill the incision in Reach 1 for approximately 50 feet. This will redirect runoff to rewet the old natural channel. Rock, riprap, seed, and mulching materials will be used to stabilize the disturbed banks.

**Task 7: Reach 3 Implementation.** Coarse deposition caught by the wetland below has caused a grade change in this reach. The stream bottom is building up and holding water longer. Approximately 6-7 feet of sediment has been captured thus far. Gullies along the road need rock fords made of permeable fill to hold more water up drainage. We expect to haul rock by front-loader to create fords (permeable fill structures). We will hold six 10-hour workdays (of approx. 15 volunteers each) over two years to install the restoration structures and re-vegetate with wetland species. Participants will learn about wetland restoration hands-on.

**Task 8: Reach 4 Implementation.** The lower end of Reach 4 was deliberately ditched and drained when it was cultivated. We need to build a grade control structure (either a cross-vane or filter dam) to raise the bed approximately two feet. We will need rock hauled by front-loader to build the grade control structure (using a backhoe or excavator). A huge slope wetland and cienega has been created from Cebolla Spring due to previous restoration work by AWF. We

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may need to install a low wicker structure at the existing channel by the fence line or we may need a log dam to keep water on flood plain. This is a Key Spot in Reach 4. We will hold six 10-hour workdays (of approx. 15 volunteers each) over two years to install 12 moist soil wicker weirs in the old channel to move flood flows to river right and to rewet wetland right and about 12 short berms to plug rills that are draining the wetland terrace. We need to block the abandoned diversion channel leading from Cebolla Spring to the storage reservoir valley right and re-connect groundwater flow from the spring to the abandoned wetland valley right.

**Task 9: Reach 6 Implementation.** AWF installed a small “worm ditch” here to starve the headcut. A new ditch of greater capacity (approximately 400 cfs) is needed. The new worm ditch (to be built with a bulldozer) should be about 20 feet wide. Excess soil from this process will be used to form a berm on river left (downstream side). Grade control structures will need to be installed in the worm ditch, using a backhoe or excavator. Weirs will be needed in the lower gully and more meandering should be created. Starting at the top, about 1,000 feet of berm should be created to divert flows around the headcut at the main channel gully. At the upper channel above the worm ditch we will need to add numerous one-rock dams to raise the grade and establish floodplain access in the riparian pasture. We will pick up rocks from the road with a front-loader to build the dams and stockpile them in. We will hold six 10-hour workdays (of approx. 15 volunteers each) over two years to do the work.

**Task 10: Reach 7 Implementation.** We need to raise the road crossing to form grade control. Approximately ½ mile of induced meanders will be installed by volunteers (two 10-hour workdays of approx. 15 volunteers each). The road will also need to be drained and reshaped to reduce sediment yield to the wetland. Rock will need to be hauled to raise the bed of the low water crossing and provide materials for volunteer workdays.

**Task 11: Outreach and Education.** We will conduct a workshop on the methods being used during one of the volunteer workdays, we will conduct field trips to the project area, and we will draft articles for the RPA, NMED-SWQB Clearing the Waters and AWF newsletters to disseminate information about this project and its effects. We will also participate in a week-long Summer Academy with wetlands as the theme. The Summer Academy will target high school students and science teachers from the Grants area and will focus on local and tribal school participation. Information on the project will also be made available at the BLM visitor’s center (in project vicinity). We will transfer project results and methods to other government entities and the public through:

- Community meetings in the area and field trips to project sites.
- Presentations at meetings of the Rio Puerco Management Committee.
- Meetings with elected officials, government agency staff, and other professional and decision makers in the area.
- Statewide presentations for other watershed organizations, Soil & Water Conservation Districts, etc. Displays at the El Malpais Visitors Center.
- Publication of project accomplishments and lessons learned in regional media, on NMED-SWQB website, in conference proceedings, in newsletters of the Rio Puerco Alliance and Albuquerque Wildlife Federation, etc.
- The Summer Academy and other workshops to train volunteers.

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**Task 12: Monitoring.** Monitoring will continue throughout this project and for three years post-installation. Baseline data collection will begin with wetlands delineation and photo points. A contractor will install transects for vegetation monitoring. RPA will supervise this task and develop a Monitoring Plan. Other monitoring will include the installation of piezometers, to determine whether the wetland areas are expanding with the restoration work. Other measurements will include temperature, turbidity, Rosgen Geomorphologic Assessment Methodology (Level 2). Volunteers under the supervision of the RPA and the monitoring contractor will collect some data (six 10-hour workdays of approx. 10 volunteers each over 3 years).

**Baseline for Measurement.** We will collect water chemistry, geomorphology, wetland delineation, and vegetation data to establish a baseline for the project area. Additionally, we will install piezometers to collect information about the hyporheic zone associated with Cebolla Creek. Previously, the AWF was the only group involved in wetland restoration. This project will increase volunteer involvement, as well as let more people in the area know about the potential for restoring agricultural land. We will monitor throughout the life of the project and obtain three years of post-installation data.

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