

**Restoring Cebolla Canyon**  
**River Ecosystem Restoration Initiative**  
**PSC #096-667-5000-0015; 2009**  
**Final Report**  
May 4, 2009-June 30, 2012

**What Was Accomplished**

**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, and BLM, among others.*

**Steering Committee.** We constituted the Steering Committee and held our first meeting on April 20, 2009. It was a field trip to the Cebolla Canyon site. Members introduced themselves to each other and discussed project goals, workplan tasks, timelines, and deliverables in detail. Various work elements were assigned. Other discussion topics included previous results of restoration projects, roadwork issues, fence inventory, archeological considerations, and wildlife habitat. The **Steering Committee Members** over the three years of meetings were:

Barbara Johnson, RPA Executive Director

Matt Schultz, NMED Wetlands Grant Project Officer

Maryann McGraw, NMED Wetlands Program Coordinator

Steve Fischer, BLM Rio Puerco Watershed Coordinator; RPMC

Dave Mattern, BLM Hydrologist

Ken Jones, El Malpais National Conservation Area Supervisory Park Ranger

Gene Tatum, AWF, retired BLM

Bill Zeedyk, ZEC environmental consultant

Dale Hall, NMDGF Habitat Stamp Program Coordinator

Andrea Chavez, BLM Wildlife Biologist

Michael Scialdone, AWF volunteer

Steve Vrooman, Vrooman Restoration Ecology

By the first Steering Committee Meeting, we knew we were in the process of getting a contract signed with NMED for the Wetlands grant, *Restoring and Protecting Wetlands in Cebolla Canyon Closed Basin*. So one of the tasks of the Steering Committee was to help coordinate the work between the two grants. (Currently, the Wetlands grant is still proceeding. It will be concluded this year, except for some further monitoring next Spring.) The Wetlands grant only covered Reaches 1, 3, 4, 6, and 7, so all work on Reaches 0, 2, and 5 was done under this grant. Work on the other Reaches was divided between the two grants.

We held seven Steering Committee Meetings over three years. Minutes of those meetings are included with this report as **Appendix A**. In addition, we held a number of

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other meetings with the BLM regarding NEPA, and a meeting with the EPA regarding cattle grazing in the project area. Minutes of the grazing meeting are included in Appendix A.

**Contracts and Reimbursements.** RPA contracted with Zeedyk Ecological Consulting to *do a restoration reconnaissance of the area, develop a design for restoration, supervise restoration of Reaches 0-8, and help with monitoring*; with Keystone Restoration Ecology to *do monitoring*; and with Rangeland Hands to *implement restoration of Reaches 0-8, per restoration design of June 17, 2011*. We have made 10 previous reimbursement requests and the eleventh and final request has been sent with this report.

**Reports.** We have submitted five semi-annual reports. They are included with this report as **Appendix B**.

***Task 2: Restoration Reconnaissance.*** *We will conduct a structures and materials inventory of the Cebolla Creek sub-watershed from Reach 0 to Reach 8 in order to assess the appropriate location of restoration structure placement and other restoration activities. Specific locations for installing best management practices will be identified and mapped.*

A restoration reconnaissance was conducted May 19-21 and June 15-17, 2009 with Bill Zeedyk, NMED, and AWF volunteers with a long history in the area. Detailed notes were taken on restoration design details between Reach 0 and Reach 8. Specific locations of BMPs to be installed were GPSed, categorized, and mapped. Another trip was necessary to develop a tentative restoration design, so Bill, NMED (Matt Schultz), and Steve Vrooman of Keystone Restoration Ecology went out October 12-14, 2009. Other field trips were taken by Bill, NMED, and the BLM to determine if other areas where work might be needed should be included in the NEPA document as potential future work. Some sites in Reach 8 were included but other sites in other reaches and ancillary tributaries were dismissed as not feasible at this time. The notes and maps from the restoration reconnaissance are **Appendix C**.

***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.*

**404.** Cebolla Canyon has been determined to be non-jurisdictional by the Army Corps of Engineers so 404/401 permits were not required.

**NEPA.** A detailed narrative of the restoration plan along with maps was submitted to the

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BLM for NEPA preparation and Proposed Action public notification in 2009. A preliminary Draft Environmental Assessment was completed by Steve Fischer of the BLM (now retired) in May 2010 and sent to Steering Committee members for review. BLM archeology staff took at least two field trips to the area to help them complete their input for the EA and for the Wilderness Exception.

A second draft was nearly complete in September 2010. At that point, the Bureau of Land Management (BLM) decided to re-draft the EA for this project. That took over six months and required six meetings of RPA, NMED, and some of our contractors with the BLM to complete.

We had been assured by the BLM that the EA would be completed by September 2010, and indeed a draft, which was circulated among the project partners, was nearly complete at that time.

It was later in 2010 that the project partners learned that the EA was being re-drafted, but we were not told why. We held several meetings with BLM management and staff to address concerns that came up during this re-drafting: October 7, November 10, November 29, and December 17, 2010 (conference call), February 28, and March 7, 2011. We were asked for extensive additional information about the project. All information requests were met by the deadlines stated.

The EA went out for public comment on February 12, 2011. It was not until it was publicly available that the project partners discovered that the alternative that had been planned since the inception of the project (*Alternative B*) was no longer the preferred alternative. A different preferred alternative (*Alternative C*) had been developed by BLM staff without input from the project partners.

The major issue for the BLM appeared to be the use of heavy equipment in the Wilderness. They felt that the “minimum tool” analysis required no motorized equipment in much of the project area, which would have made most of the proposed restoration work impossible. After the EA came out, NMED and our consultant Bill Zeedyk met with BLM staff and worked out a compromise, which included elements of the original design along with modifications from the BLM’s *Alternative C*. The partners agreed on a design that used some equipment in the Wilderness and in some places only allowed handwork.

The Record of Decision and Finding of No Significant Impact were signed in April 2011. The EA, FONSI, and Record of Decision are included in **Appendix D**.

***Task 4: Wetland Restoration Design.*** Under this task, restoration work to return Reaches 0, 2, 5, and 8, as well as portions of 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

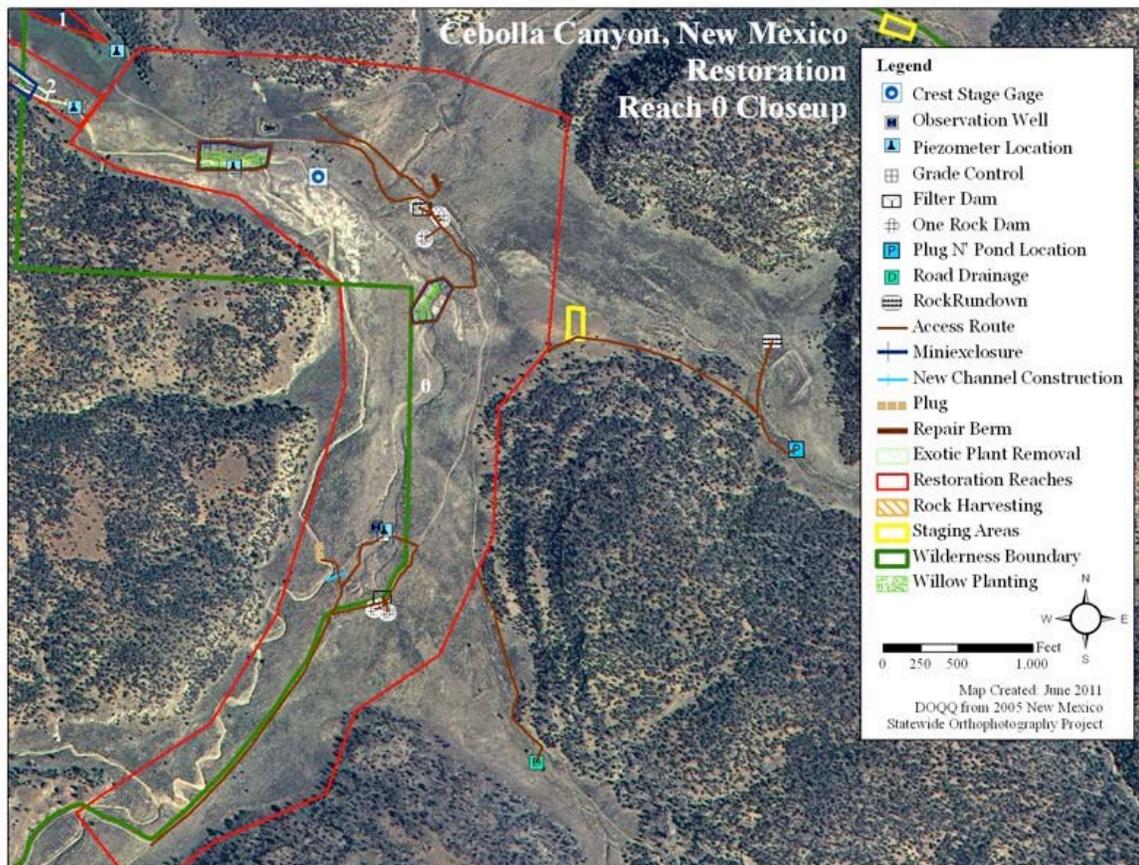
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*have experience in the area.*

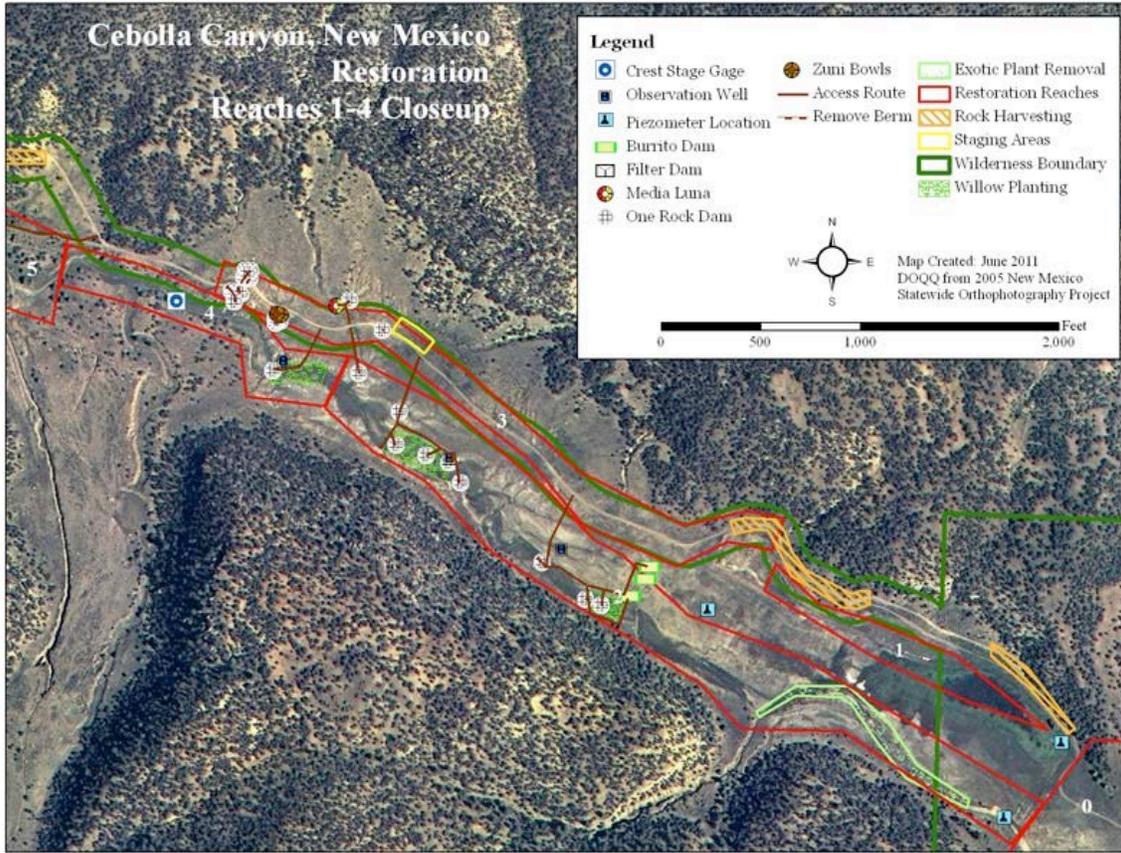
Zeedyk Ecological Consulting developed a restoration design that was “tweaked” after the geomorphological monitoring indicated that the elevation in Reach 5 was different than originally thought.

Dave Mattern of the BLM was to design a portion of the Reach 6 headcut work. We received some information on that, but not a complete design. It was later decided that the BLM would do this work with their own money, so we have not included that design in our design documents.

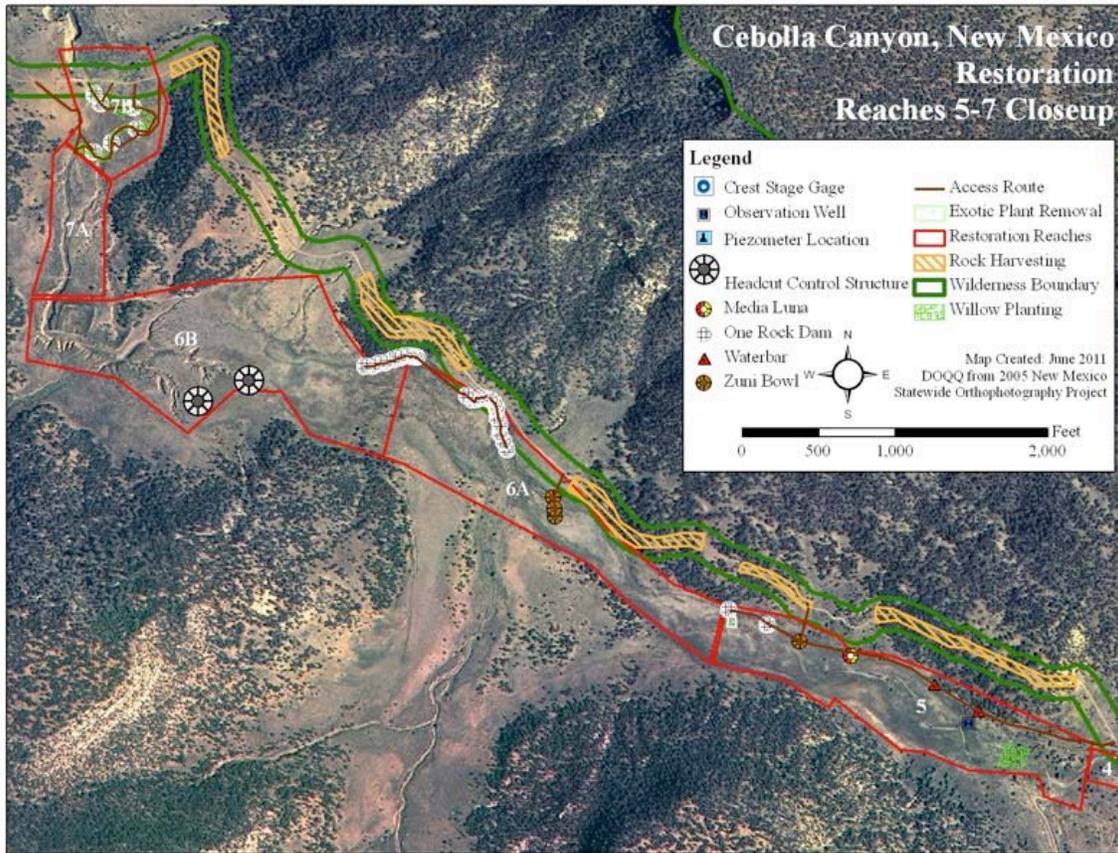
Zeedyk Ecological Consulting’s restoration design was further modified per the discussions with the BLM regarding use of motorized equipment in the Wilderness. That design is reflected in **Appendix E** and in the charts below. That design was the design followed when on-the-ground work commenced in 2011.



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**Task 5: Install Fencing.** *Approximately 15 volunteers (over two 10-hour volunteer days) will install a temporary fence (exclosure) around the wetland in Reach 0 to protect it from grazing and allow the wetlands to develop from the other work that will be done in Reach 0 (see Task 6). It is expected that at least 20 more acres of wetland will be created this way.*

A fence inventory was initiated in which all the fences in Cebolla Canyon were being GPS located, mapped, and categorized. Discussions were begun with the BLM grazing permittee about placement and maintenance of fences. The York Ranch is currently working on a Coordinated Resource Management Plan (CRMP) under a New Mexico Association of Conservation Districts assistance agreement. A CRMP is a conservation plan for a ranch that includes state, and/or federally managed lands within the boundaries of the ranching operation. The goal of CRM is to enhance the quality and productivity of natural resources by achieving compatibility among the multiple uses in a specific area. The objective is to improve and maintain natural resources in ways consistent with the priorities of the landowners, land users, interest groups and land management agencies.

Under this plan, they would construct fencing and install wells and drinkers in addition to limiting/rotating their grazing period on the BLM grazing allotment. The CRMP will be

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written in an EA format to facilitate the NEPA process. This is a positive development for the wetland resources of Cebolla Canyon since before these planning efforts there lacked an evident grazing management plan. There have been historic trespass livestock issues in the allotments as well as Acoma Pueblo cattle coming into Cebolla Canyon from over the rim, which is not fenced, and more discussions with multiple stakeholders are needed to address these issues. For the first time, in June 2012, there were no trespass cattle in the project area.

In addition, a need for an upper end riparian pasture in the 300-acre flat area at the head of the canyon has been identified by the BLM. A riparian pasture involves fencing to delineate pastures associated to area specific management objectives, or to establish permanent, temporary or seasonal exclusion from specific area. According to the BLM Technical Reference "Grazing Management for Riparian-Wetland Areas," a riparian pasture is applicable where the riparian zone encompasses an area large enough to be managed separately from the uplands. Because it is separate from the rest of the allotment, it can be grazed or rested depending on current conditions and stream riparian needs (Elmore and Kauffman 1994). Platts and Nelson (1985) found that the timing and location of grazing in specially managed riparian pastures could be controlled much more effectively than in large allotment pastures, providing an easier way to make grazing compatible with other resource uses. This would facilitate management for riparian function objectives in the riparian area, and allow for better utilization of uplands.

The BLM has submitted a Habitat Stamp Program proposal to the New Mexico Department of Game and Fish for additional fencing money (~\$80,000). The fencing proposal for Habitat Stamp Program funds was voted down for 2013. The next available funding time period is 2014. Maybe with more details from the CRMP(s) included, the proposal will gather more support. Other BLM funding sources might also be available.

Two enclosure fences were constructed in September and October 2011 to: 1) create a lake delta and sediment plug to restore two acres of wetlands upstream in main and side channels, and 2) protect the sediment plug from wind and stream erosion in order to maintain water levels and improve water quality in "Lake Cebolla." The areas within the enclosures were planted with herbaceous and woody wetland plants by volunteers in May 2012.

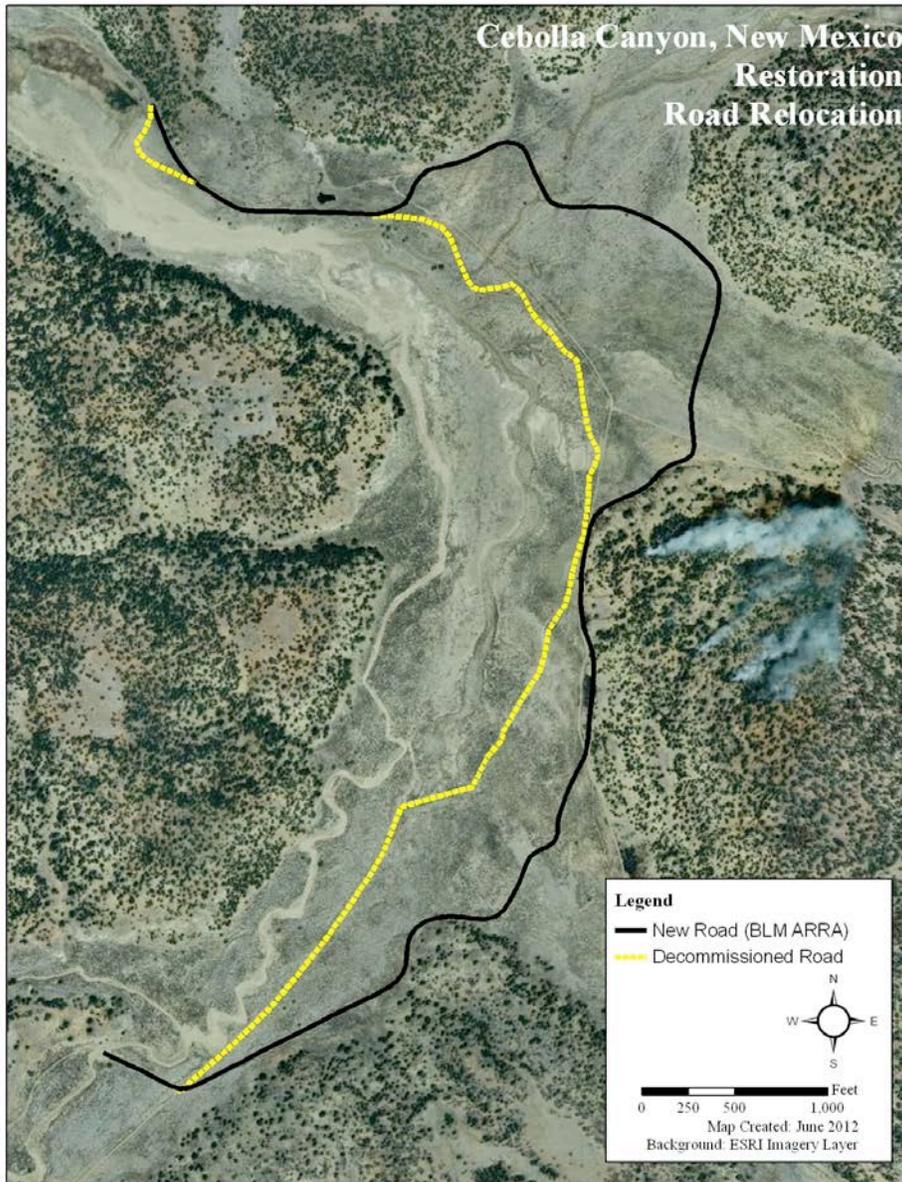
***Task 6: Reach 0 Implementation.*** *Reach 0 has eroding roads, which run under and through areas of wetland that need to be restored. There is also a pond in the area that needs to be obliterated so the area can be reconnected to the wetland. And there are berms that need to be removed so the creek can return to its original location. We expect that we will:*

- 1. Replace the current roads with new roads in higher and drier locations.*
- 2. Rip and restore the decommissioned roads.*
- 3. Remove the stock pond impoundment and build water tank instead.*

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4. *Remove berms and plug a gully.*
5. *Return the creek to its original channel in the valley center.*
6. *Move the existing cattle guard.*

The BLM did the major road re-location in this Reach with their ARRA money. The road relocation moved the main Cebolla road out of the valley bottom above and in Reach 0, which will expand the area available for wetland restoration and reduce hydrological alterations in critical areas. The old road was capturing water that should have been going to the wetlands.



Unfortunately (or fortunately!), when we had our equipment contractors go out last August to start work, they were greeted with several large rainstorms, which caused

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problems on the other sections of the road. When they were unable to do the restoration work, they spent time on fixing and draining washed out and muddy roads. (They had some extra time as they got stuck out there for a few days and couldn't leave!)

All machine work and handwork in Reach 0 has been completed per the June 17, 2011 post-NEPA Design (Appendix E). Among other things, we breached a berm and created a new channel, did some grade control structures, plugged the existing downcut abandoned irrigation ditch and redirected stream flow via a shallow pond back into historic remnant channels on the meadow surface, constructed mini-exclosures to create a lake delta and sediment plug to create two acres of wetlands upstream in the main and side channels, and put in a number of one-rock dams to stabilize the channel bed by slowing water flow, increasing roughness, recruiting vegetation, capturing sediment, and gradually raising the bed level over time. Volunteers planted willows within the two mini-exclosures in May 2012.

Treatment	Location	Expected results
Rolling dip road drain, Reconstruction of Main Access roads	SE tributary	Wetland expansion, flooding of large area, elimination of rabbitbrush
Plug and Pond, Rock Rundown	E tributary	Wetland expansion, flooding of large area, fixing of cattle tank
Four one rock dams, filter dam, berm repair, mini- exclosure	N tributary	Wetland expansion, flooding of large area, restoration of natural channel flow
Road drainage, three one rock dams, one filter dam, berm removal and channel construction, earthen plug, mini-exclosure	Main channel of Cebolla Canyon	Wetland expansion, filling of old and new channels of Cebolla Creek, creation of wet meadow communities, elimination of Rabbitbrush

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*[Top, previous page] The berm at Reach 0 before it was breached. [Bottom, previous page] During the breaching. [This page] After the berm was breached, rewetting a considerable area.*

**Task 7: Reaches 1 and 2 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 under the Wetlands grant. This will redirect runoff to rewet the old natural channel. We will then construct structures on the wetlands downstream of Cebolla Spring (Reach 2), where water escapes into a gully, drying out the soil. These structures will consist of sandbags filled with local sand then covered with filter cloth, and finally adorned with dead brush to dissuade large animals from trampling on and destroying the dams. These sandbag structures are intended to block escaping flow and retain the water in the wetlands. Water will pond behind them and allow ground saturation to increase and expand. We will use volunteer labor to place the sand bags.*

Some of the work originally contemplated in these reaches had to be re-designed as it relied on equipment work in the Wilderness Area. In Reach 1, we removed a conveyance ditch to reconnect the spring to valley right. We hope to gain one acre of high quality wetland there.

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In Reach 2, we installed three burrito dams (as originally contemplated) and eight one-rock dams, to retain spring flow on the right terrace, re-wet the terrace, form a pond fed by the spring, to raise the grade and trap sediment, and to reconnect the channel to the floodplain, thus accelerating wetland expansion.



*The Acoma  
YCC crew  
working on a  
large one-rock  
dam in Reach 2  
in May 2012.*

In addition to the equipment work, we harvested a lot of rock along the road, with permission from the BLM. The rock had been a problem in terms of getting down parts of the road and it saved us money, since we had to buy less rock. Having rock delivered was also a problem because the rain made the road very slick and muddy for some time and the rock trucks had trouble getting to the project site. We mapped out the areas where we would harvest the rock and the access routes to the project sites, and we had a BLM archeologist on site during the harvesting, to make sure we did not disturb any archeological sites. The Canyon had been extensively homesteaded in the early 20<sup>th</sup> Century and there also are a lot of much older archeological sites. Our rock inventory is included in Appendix E.



*Harvesting  
rock along  
the road.*

**Task 8: 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 will haul rock from Grants to create the fords (permeable fill structures). In addition, we will re-contour the road and build some in-stream structures to help hold the water up drainage.*

Most of the work originally contemplated in this reach had to be re-designed as it relied on equipment work in the Wilderness Area. We put in two Zuni Bowls to stabilize actively eroding headcuts and prevent headcut migration. We installed a media luna to speed development of an alluvial fan. And we are still installing 16 one-rock dams to raise the grade, trap sediment, and reconnect the channel to the floodplain. This should be completed in August–September 2012.

**Task 9: 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 may need to install a low wicker structure at the existing channel by the proposed 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 be using money from the Wetland grant to supplement the RERI money to complete this important task. We will hold six 10-hour workdays (of approx. 15 volunteers each) over two years to install 12 moist soil*

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*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.*

Most of the work originally contemplated in this reach had to be eliminated as it relied on equipment work in the Wilderness Area. We installed one large one-rock dam by hand as it was the last chance to aggrade the valley bottom before the channel grade steepens.

***Task 10: Reach 5 Implementation.*** *We will need to do headcut/gully rehabilitation and grade stabilization activities involving hand-work. This may be suitable as an Americorps/YCC project.*

We installed two water bars to drain abandoned roads. We installed four Zuni bowls to stabilize actively eroding headcuts and prevent headcut migration. We installed one media luna to disperse erosive channelized flow and re-establish sheet flow. We installed three one-rock dams to raise the grade and trap sediment, prevent further incision, and reconnect the channel to the floodplain. Much of this work was done with volunteers.



*AWF  
volunteers  
constructing a  
one-rock dam  
in April 2012.  
[Next page]  
Constructing  
the media luna  
with equipment  
last fall.*



**Task 11: Reach 6 Implementation.** *AWF installed a small “worm ditch” here to starve the headcut. A new ditch of greater capacity (approximately 400 cfs) may be needed, or we might directly treat eroding headcuts and install grade control structures. 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 we will need to add numerous one-rock dams to raise the grade and establish floodplain access in the riparian pasture. We may pick up rocks from the road with a front-loader to build the dams and stockpile them in or we may need to haul them from Grants. We will hold six 10-hour workdays (of approx. 15 volunteers each) over two years to do the hand work.*

Reach 6 was divided into two sections, Reach 6A and 6B. Reach 6B has a very large headcut in it. We contemplated using the worm ditch procedure described above, but neither NMED nor the BLM was completely happy with that design. In the end, the

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BLM decided to design and pay for the work itself. It has not yet commenced, but the BLM has said that they would like to do the work this summer.

In Reach 6A, we had to re-design our work as it originally relied on equipment work in the Wilderness Area. We installed three Zuni bowls to stabilize actively eroding headcuts and prevent headcut migration and installed 25 one-rock dams to raise the grade and trap sediment, prevent further incision, and reconnect the channel to the floodplain.





*[Top, previous page] Before work in Reach 6A. [Bottom, previous page] Craig Sponholtz working on a Zuni Bowl in Reach 6A. [This page] The finished product.*

***Task 12: 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.

We are still in the process of installing six large one-rock dams, to aggrade the channel, using the Acoma SCC crew. This should be completed in August–September 2012.

***Task 13: Reach 8 Implementation.*** We need to replace the current road with a new road in a higher and drier location well away from developing gullies. The new road will need to be constructed with rolling dips to direct the water off the road and onto the wet meadow areas. We will also need to rip and re-vegetate the decommissioned road.

The BLM re-located the road in Reach 0 and repaired other sections of the main Cebolla road using their ARRA money. This section has been improved, but still potentially

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needs to be re-located. At this time, the BLM has not found a suitable place to re-locate it because of archeological concerns.

**Task 14: Monitoring.** *Monitoring will continue throughout this project and for three years post-installation. Baseline data collection will begin with 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 (Reaches 0-8). Additionally, we will install piezometers to collect information about the hyporheic zone associated with Cebolla Creek. We hope to also obtain information on macroinvertebrates, wildlife (for future translocation potential), and soils (for future willow planting potential). 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.*

A Quality Assurance Project Plan for both the Wetlands and RERI grants was approved in June 2009.

Steve Vrooman of Keystone Restoration Ecology was contracted by the Rio Puerco Alliance to perform vegetation, geomorphology, and wetland delineation monitoring to assess the success of the project. He drafted a monitoring plan in 2009 that included vegetation monitoring through line-point intercept transects; fluvial geomorphology measurements; hydrological properties including depth to shallow groundwater; character of the soils including hydric soil indicators; and repeat photography (all aspects of project). In addition, NMED performed water quality testing in December 2009.

Baseline geomorphology monitoring was completed in Fall 2009. Baseline vegetation monitoring and wetland delineation baseline were started in Spring 2010 and were completed in September 2010. Further monitoring was done this Spring and a report written for Reaches 0, 2, and 5. This monitoring data will be re-taken in fall 2012, and a final report written for the EPA's Wetlands Program that includes all monitoring data from both grants.

**Groundwater Monitoring.** Ellen Soles was subcontracted to conduct the groundwater monitoring under the Cebolla Wetlands grant. A site visit was held to locate and rank positions for piezometers, monitoring wells, and crest stage gauges. This information

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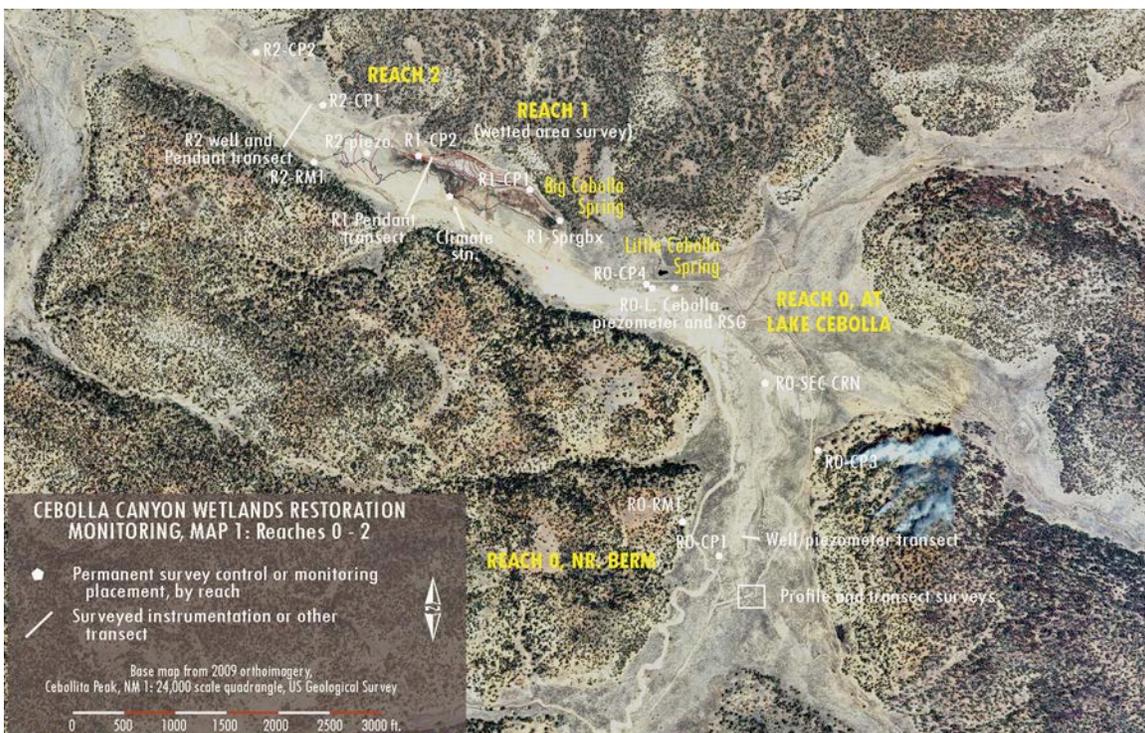
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was included in the EA. Installation started at the end of May 2011 and finished in July, in part with the help of the Acoma Southwest Conservation Corps. Baseline monitoring was conducted before work started in August 2011. Further groundwater monitoring was done this Spring. A report on results so far is included in Appendix F.



[Top] Ellen and the Acoma SCC group installing groundwater monitoring equipment.  
[Bottom] Groundwater monitoring map.



*Small Mammals.* We were able to get a volunteer group from Fuhrman University out for

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a few days in 2009 to conduct a small mammal survey. They discovered that Reach 8, which has already been extensively improved by AWF, is now home to an endangered bat, the Townsend's Big-Eared Bat, a riparian obligate species. Reach 8 was too dry before to have supported this species. The report also made it clear that there are a number of species that should be there but aren't. If our restoration is as successful as we expect, we should be able to re-introduce some of those species, like the meadow jumping mouse.



*The Townsend's Big Eared Bat,  
found in Cebolla Canyon, October  
13, 2009.*

All monitoring plans and reports, as well as the QAPP, are included in **Appendix F**.

**Deliverables. See Appendixes A-F.**

To foster information exchange among stakeholders from different affiliations, many of these deliverables have also been posted to the Forest and Watershed Health Information Clearinghouse website "All About Watersheds" at:

<http://allaboutwatersheds.org/groups/CWP>.

**How We Met Anticipated Objectives**

*1. 40+ acres of wetland created*

We can document an increase in wetlands created in Reach 0 of 7.4 acres in what we call Lake Cebolla. When more monitoring is done in the Fall for the Wetlands grant we expect to be able to document much more.

*2. 1 mile+ of rewetted stream reach*

In Reach 0, we can document:

- .7 miles of re-wetted stream reach from removing the diversion dam.
- .5 mi in the east tributary from installing the plug and pond.
- .1 mi in the north tributary from one-rock dams.
- .2 mi in the southeast tributary from road work.

*3. 2 miles of reclaimed roads*

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Because of the BLM's ARRA money, we were able to make major improvements in the roads along Cebolla Canyon. In Reach 0 we moved the road out of the valley bottom, so it is no longer capturing water that should be going to the wetlands, restoring 1.8 miles of road. Rangeland Hands improved about 4-5 miles of the other part of the road.

**4. *Measurable increase in inundation and therefore wetland vegetation***

See #1 and #7.

**5. *¼ mile of restored stream reach***

We can document .5 miles of restored stream reach in Reach 2 and 1 mile in Reach 5.

**6. *Fencing to protect restored vegetation***

The BLM would not allow us to install some of the exclosures we wanted to install, but we did construct two mini-exclosures in Reach 0 to create a lake delta and sediment plug to create two acres of wetlands upstream in the main and side channels. In addition, the BLM is planning on constructing a third riparian pasture to protect the work we have done from grazing.

**7. *Measurable increase in moist soil***

We can currently document an increase in moist soil in Reach 0:

- 3 acres in the north tributary
- 5 acres in the southeast tributary
- 1.8 acres in the east tributary
- 7.4 acres in Lake Cebolla

We expect to see even more of an increase in the monitoring results from the Fall 2012.

**8. *Measurable increase in sinuosity in steam channel***

We can document .7 miles of increase in sinuosity in Reach 0 where we moved the water back into the natural channel from the agricultural diversion dam.

**9. *Measurable decrease in eroding headcuts and increase in aggradation***

Headcuts in the three tributaries in Reach 0 were fixed with the plug and pond and are currently not eroding. In Reaches 3, 5 and 6, we installed Zuni bowls to ameliorate headcuts. Those headcuts are currently not eroding.

**Photos of the project site (before and after) are included in this report and in Appendix F.** As part of the negotiation over the re-design with the BLM, they asked for before and after photos of all structures. The original photopoints established in 2009 did not include all of these areas, so further photopoints had to be established. The latest version of the Cebolla restoration treatment photopoints is included, but it is still a

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River Ecosystem Restoration Initiative**

**PSC #096-667-5000-0015; 2009**

**Final Report**

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working draft and rough around the edges. One disclaimer is that many of the before photos were taken just before construction with the heavy equipment when there was a lot of water in the area from the August rainstorms. However, many of the after photos, which really are as-built photos, were taken a few weeks later when things started to dry out. This is noticeable in many of the photo pairs. This effect will lessen as the time of year becomes consistent in future photo-monitoring. For example, in the next round of photo-monitoring all the structures will be photographed in the early fall at the same time and therefore more comparable to the before photo.

### **Analysis of Monitoring Data**

Reports analyzing the monitoring data to date are included in Appendix F. Most of the measurements will be re-taken in the Fall 2012 and included in the monitoring report for the Wetlands grant. Initial, limited data are indicating changes to the system due to our work. For example, the grade has been raised two feet in Reach 0. Many acres of the valley and stream are now being re-wetted and wetland vegetation is expanding. Headcuts have been stopped. Water is no longer being trapped by poorly placed and maintained roads or by historic agricultural diversions. That water is now returning to its natural channel and once again inundating former wet meadow and wetlands.

### **Unexpected Benefits**

Because the BLM got almost \$300,000 in American Recovery and Reinvestment Act of 2009 (ARRA) money, they were able to re-locate the road in Reach 0 and make improvements to the rest of the Cebolla Road when we would not have had enough money to make such a big difference in reducing sediment into the wetlands from the roads. In addition, the BLM offered to pay for the remediation of the very large headcut in Reach 6B, which enabled us to do all of the other work in the other reaches. If we had had to use our money from this grant and the Wetlands grant on the large headcut, we would have gotten much less accomplished throughout the watershed.

### **Additional Funds Leveraged**

Other funding was obtained for restoration activities in the Cebolla Canyon area, including a Wetlands grant of \$265,239 and Bureau of Land Management (BLM) federal stimulus funding (approximately \$300,000) from the American Recovery and Reinvestment Act of 2009. These monies allowed us to expand the scope of the restoration activities within Cebolla Canyon, including adding more reaches to be restored and relocating the road out of the valley bottom. In addition, RPA received a \$25,000 grant from the New Mexico Community Foundation to have the Acoma Student Conservation Corps (SCC) come out later this summer to finish handwork on the project. Because of the change in the design during the NEPA process, there was more handwork to be done than we originally envisioned and we were not sure it could all be completed by volunteers.

### **Project Obstacles or Problems that Might be Avoided in the Future**

We had several problems in finishing this project, although most were also benefits!

We had to delay the actual work on the ground because of the negotiations with the BLM over the design that would be approved under NEPA. They were most concerned over the use of motorized equipment in the Wilderness Area. It is unclear how we could have avoided this problem as the BLM originally told us there would be no problem. But, there was a change in personnel and thus a different interpretation of the Wilderness regulations. In the end, the contractors were reasonably happy with the work allowed, although there were other things that they had wanted to do that were not allowed. These negotiations also resulted in the BLM taking responsibility for the large headcut in Reach 6B, which allowed us to complete more work in the rest of the project areas.

Because of the delay in reaching agreement with the BLM on the design, our contractors were not able to get started with equipment work until August 2011. They then were inundated with several large rainstorms. While the water allowed us to see the benefits of the work we were doing, it caused significant delay and problems receiving rock shipments, harvesting rock from the roads, and getting some of the restoration work done. When they were unable to do the restoration work, our contractors spent time on fixing and draining washed out and muddy roads. On the positive side, the roads were then fixed, which put us in a better position when there was more rain, as the roads did not wash out and dried out quickly.

Because of the additional handwork over machine work, our estimates of what could be done by volunteers had to be re-worked. In order to make sure the work was completed, RPA wrote a grant to the New Mexico Community Foundation for \$25,000 to have the Acoma SCC come out for two-three weeks. Luckily, we received that grant. This will also allow us to solidify our relationship with Acoma and to train more youth leaders in watershed restoration.