

PROJECT PROPOSAL

Targeted Watershed Restoration Initiative in Torreon Wash

ABSTRACT

The Rio Puerco Alliance, in partnership with the Rio Puerco Management Committee, the Navajo Nation, and various State and Federal agencies, proposes to improve overall watershed conditions and eliminate water quality impairments in the Torreon Wash segment of the Arroyo Chico subwatershed. The main strategies focus on decreasing sedimentation and erosion, increasing desired vegetation, decreasing non-native and invasive species, enhancing infiltration of precipitation, and decreasing runoff. An ultimate goal will be to teach coming generations how to improve water quality and increase water quantity and agricultural yield, while reducing impairment. Outcomes will include significant reduction in sediment going into the Rio Puerco, improved local economies, and, through extensive outreach, demonstration to other communities of the benefits of these techniques.

CHARACTERIZATION OF THE WATERSHED

The geographic area being focused upon under this project is the Torreon Wash area of the Arroyo Chico drainage (Figure 1). This area rose to the top of a Rio Puerco Management Committee (RPMC) prioritization because Torreon Wash and the Arroyo Chico have the lowest level of vegetative cover, with riparian vegetation almost non-existent, and the highest level of bare ground and erosion. Both Torreon Wash and the Arroyo Chico are ephemeral to semi-ephemeral streams, flowing in response to spring snowmelt and summer storms and classified as calcium sulfate and sodium sulfate water. The pre-dominant ions are sodium (Na) and sulfates (SO₄) with increasing concentrations as the flows move downstream. Salinity (salts) concentrations also increase in the water as it flows downstream. This is a result of porous sandstone and inter-bedded shales and dissolved solids, which are inorganic ions of sodium, potassium, calcium, magnesium, bicarbonate, chloride, and sulfates. Several springs can be found in the area and are often manifested through small surface flows and/or white precipitate crusts. The ephemeral nature of the stream precludes any fishery, and both livestock and wildlife make extensive use of the stream and adjacent corridor. Riparian areas are related to and dependent on their adjacent waterways, such as the Arroyo Chico and Torreon Wash and its tributaries, because the presence of water for all or part of the growing season determines their extent and vigor. Vegetation along the waterways is almost exclusively upland shrubs and grass species such as rabbitbrush and sacaton, except in those areas that receive surface runoff when the channels flow. There, sedge, willows and cottonwoods grow. In some areas, tamarisk has begun to encroach.

The area is characterized by mesas, buttes, ridges, and rock terraces separated by broad, open valleys, and occasional canyons, and badlands. Pinyon-juniper woodlands and northern desert shrubs represent the vegetative types found. Typical plants found include big sagebrush, four-wing saltbush, mountain mahogany, blue grama, western wheatgrass, Indian ricegrass, galleta, bottlebrush squirreltail, New

Mexico feathergrass, and prickly pear. The local geology consists mostly of Tertiary, transgressive, marine sandstone, and shale formations. The abundant shale results in relatively fine grained soils.

Poor road conditions in Torreon Wash and the Arroyo Chico are causing and accelerating erosion leading to sediment deposition. Roads in the Torreon Wash area are highly susceptible to erosion because they are composed primarily of a sandy loam soil. The roads often become a main conduit of runoff during rain events concentrating and accelerating flows and causing erosion.

In addition to the familiar challenges of restoring land from decades of overgrazing, the dominance of sagebrush, pervasive erosion issues, lack of infrastructure especially fencing and water sources, and ongoing overgrazing from feral and wild horses, the Torreon Wash area has one of the most complex land ownership structures found anywhere. Area residents utilize land with 11 different land status designations.

PROJECT NEED

The Rio Puerco watershed is the primary source of undesirable fine sediment that is annually delivered to the Rio Grande system. According to the U.S. Geological Survey (USGS): “. . . the Rio Puerco basin. . . transports one of the world’s highest average annual sediment concentrations. . . . The largest contributor of suspended-sediment load in the Rio Puerco basin is the Arroyo Chico, which drains 24% of the basin and delivers 34% of the suspended-sediment load.” The Arroyo Chico also contributes most of the runoff. The Corps of Engineers has noted that soil erosion within the watershed surpasses that of any other watershed in the country, yielding 1.36 acre-feet per square mile per year.

The Rio Puerco is listed as a Category 1 watershed (in need of restoration) in *New Mexico’s Unified Watershed Assessment (1998)*. Several reaches of the Rio Puerco and its tributaries, including the Arroyo Chico, are listed as impaired in *“Water Quality and Water Pollution Control in New Mexico” (2000-2002)*, in its Appendix B, the State’s 305(b) Report, and as moderately impaired in the *“2002-2004 State of New Mexico Clean Water Act Section 303(d) List for Assessed River and Stream Reaches.”* Specific pollutants of concern include turbidity, temperature, stream bottom deposits, plant nutrients, as well as individual listings for pH and metals (Al, Se).

The root causes of this pollution, which are a prime concern to the Rio Puerco Alliance (the Alliance), the RPMC, and their cooperators, include, but are not limited to the following conditions:

- The highly erodible materials that make up the region’s surface geology.
- Stream channel modifications that have lead to straightening, bank collapse, and accelerated uplands and tributary headcutting processes.
- Poor grazing management on rangelands, woodlands, and riparian areas that has added to loss of vegetative cover and erosion.
- A combination of urban and rural road development that has led to drainage modification, accelerated runoff, and soil erosion.

This Targeted Watershed Restoration Initiative in Torreon Wash addresses the need to reduce non-point source pollution and to provide support and technical links

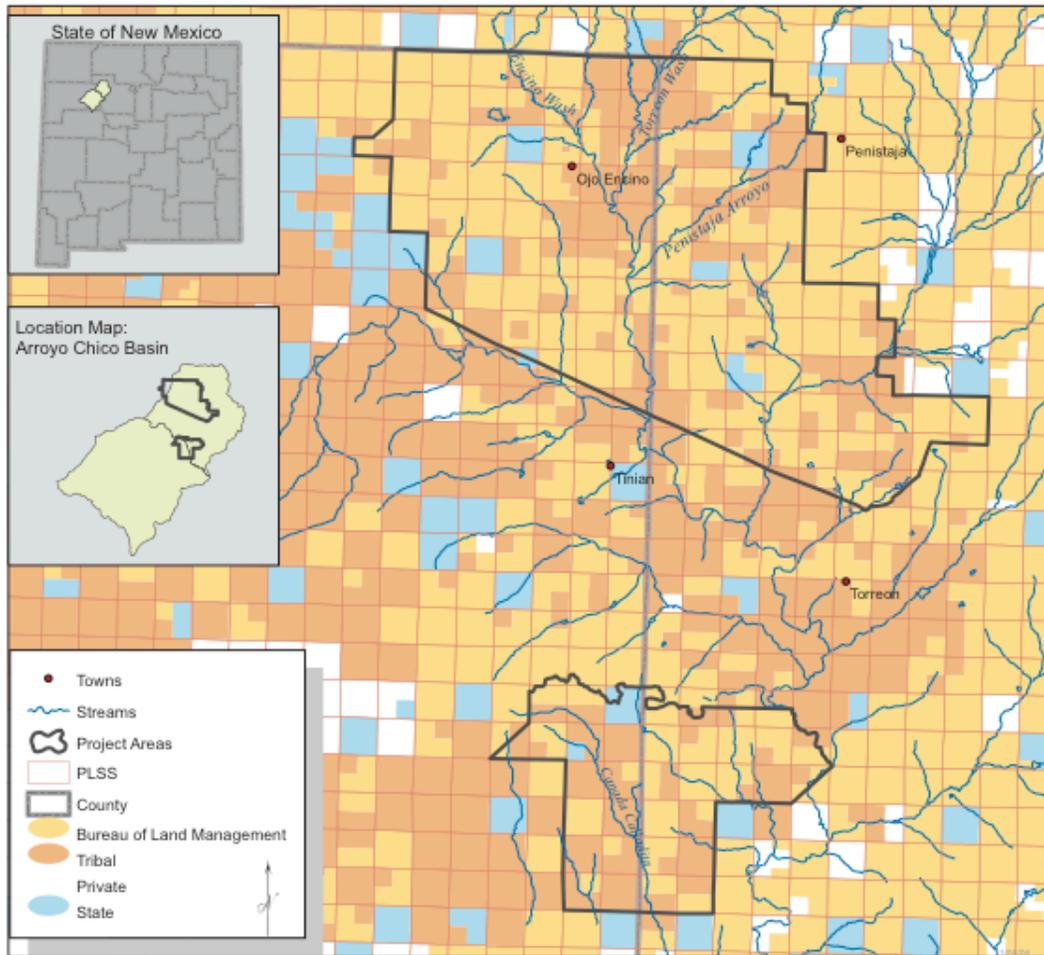


with other ongoing watershed restoration efforts in the Torreon Wash drainage.

PROJECT PLAN

The RPMC has approved and funded a number of individual projects within Torreon Wash. Involvement in the EPA's Targeted Watershed Grant (TWG) program will allow the Alliance, RPMC, and their cooperators to demonstrate and expand innovative ideas and approaches recently identified and implemented in other areas of this watershed. With the additional financial and technical support that this program provides, the effort can be even more thorough, holistic, systematic, collaborative, and soundly based in science. Projects will continue to utilize innovative ideas and approaches, and represent a coordinated and integrated methodology to further define and address the root causes of degradation in this watershed. This will be done through studies of the effects of direct reclamation actions, as well as by involving local residents, youth, and land users in restoration projects that will train them in low technology solutions to erosion problems. The lessons learned here are expected to have high applicability to other areas of the Rio Puerco watershed and the country.

Figure 1: Map of Project Area



Based on 10 years of ongoing RPMC and community meetings, field trips, and work-days, and the slate of current education and on-the-ground watershed restoration projects, the RPMC has identified and prioritized needs and suitable locations for technical assistance and outreach to demonstrate and promote appropriate Best Management Practices in the watershed. The deterioration of the watershed has been studied, observed, and commented on for a long time. The RPMC, currently the most active organization of its kind in the entire watershed, is poised to continue actively doing something about these impacts.

During the timeframe of this project, the Alliance and the RPMC will continually seek to connect assessment and implementation with on-going efforts outlined in the Rio Puerco's existing Watershed Restoration Action Strategy (WRAS dated 2006). In addition, this project will link up with all ongoing cooperative/collaborative restoration efforts in the Torreon Wash area. The overall goals of both the WRAS and the full complement of RPMC projects include improving overall watershed conditions and eliminating water quality impairments of listed reaches of the Rio Puerco and its tributaries. The main strategies focus on decreased sedimentation and erosion on Torreon Wash. Riparian and stream strategies include increasing desired vegetation,

decreasing non-native and invasive species, and developing stable stream geometry. In upland areas the strategies include increasing appropriate vegetative cover and enhancing infiltration of precipitation, resulting in decreased runoff. An ultimate goal of these combined efforts will be to teach the coming generations about techniques that can result in improved water quality, increased water quantity, and agricultural yield, while reducing the overall impairment.

Since 1999, the Ojo Encino Ranchers Committee (the Committee) has been actively engaging grazing permittees in the Ojo Encino Chapter of the Navajo Nation, which stands near the headwaters of Torreon Wash, in progressive land stewardship and natural resource management. They serve as a role model for surrounding Chapters on grazing management and land restoration. The Committee started with 11 member permittees and is now at 20. Roughly half the members are women. Of 110 Navajo Chapters, it is the only official grazing association that is a recognized subcommittee of a Chapter. The current membership of the Committee manages over 35,000 acres.

The Chapter has one of the most complex land ownership structures found anywhere. The Committee members utilize land with 11 different land status designations. In spite of these challenges, the progress of the Committee in restoring land health, in educating land users on how to use land sustainably, and in implementing improvements on the land has been exemplary.

The Committee approached the BLM and RPMC in 2002 to help fund a 10,000-acre sagebrush control project. It was the most ambitious project ever presented to the RPMC for funding. In addition to removing invasive brush and enhancing grasses, the objectives of the project included reducing erosion and soil loss, re-establishing sustainable grazing management, and providing outreach to others in their situation. All of these objectives have been met.

Beginning in spring 2006, the Committee, with the support of the New Ranch Network program of the Quivira Coalition, began a process of developing ranch management plans for each ranch unit. The process began with an on-the-ground assessment of the permittees' allotments. An important component of this assessment was an evaluation of the effectiveness of previous treatments and ongoing management concerns. The New Ranch Network then began working with each permittee to develop a five-year vision or plan for the management of their allotment. These plans consist of a preliminary assessment of the allotment condition, management goals, identifying infrastructure needs, and potential opportunities to partner with neighbors on improvements such as wells and fences. Over half of the members now have these plans. The remainder of the plans will be completed by March 2007. The next step in the development of the plans is the creation of implementation timelines and identifying funding sources. More traditional practices such as water development, cross fencing, and sagebrush treatments will be funded through a combination of NRCS EQIP, BIA, and BLM programs. The funds requested in this grant address resource management issues not covered by these programs, such as watershed restoration, erosion control, drainage management from roads, illegal trash dumping in drainages, re-establishment of riparian vegetation, monitoring, and education and outreach.

In addition, the Committee has decided to begin work with the Rincon Marques area of the Torreon Wash, to help them establish a Ranchers' Committee and to begin development of management and implementation plans.

Task 1: Erosion Control/Water Retention

The soils found at Ojo Encino are highly erodible. Gullies and head-cuts are common. These features have the effect of removing water quickly from the landscape, thereby lowering the surrounding water table. This gradual drying of the landscape has favored deep-rooted shrub species such as sagebrush over native grasses. The goal of erosion control practices is to retain water in the landscape to support a diversity of native vegetation that in turn stabilizes soil.

Bill Zeedyk, retired from USDA Forest Service, is a regionally recognized expert in riparian restoration and erosion control. He has developed a number of low technology "water harvesting" and erosion prevention structures that are constructed in drainages and on their adjacent landscapes. They can be installed quickly using readily available materials such as rocks, logs, and slash materials. They can be effectively applied in upland areas above degraded stream reaches, where gullies can be more easily treated while they are still small to stop further down-cutting and head-cutting. Examples of these low-tech structures include: log head-cut structures, Zuni bowls, wicker-weirs, rock/fabric "burritos," and one-rock dams. Each is suited to a particular situation. For example, one-rock dams, so named because they are only one rock tall, are best used in rocky channels of ephemeral arroyos to raise channel bed elevation and control or modify slope gradient. A one-rock dam, ½ foot high by 3 feet wide by 5 feet upstream, should accumulate 1.5 cubic feet of sediment.

Most of these practices have been successfully applied on a limited basis throughout Torreon Wash in projects funded by the RPMC. Our goal is to expand these applications and document their effectiveness. This work will complement other efforts supported by the NRCS and BLM such as maintaining existing earth tanks to keep them from breaching and cross fencing pastures to assist in developing rest/rotation grazing programs. For the past three years, the RPMC has supported this style of erosion prevention projects at the Torreon Navajo Chapter, training summer youth program workers to install these types of structures. The concepts and activities have now spread to the Ojo Encino, Pueblo Pintado, and Whitehorse Lake Chapters. We intend to greatly expand this effort through community projects and contract work crews. The target audience will expand to include the local tribal youth as well as other landowners, and residents of rural communities. It will be expanded into the Rincon Marques area to complement the Committee's outreach efforts there.

Schedule: July 2007-October 2009

Output: Many structures will be built to reduce erosion and to "harvest" water; approximately 1.5 cubic feet of sediment will be collected per structure. Work will be begun on headcuts. Approximately 4.5 cubic yards of sediment will be collected for each headcut 6' deep, 20' wide, and retreating 1' a year.

Task 2: Roads

Road maintenance is a major contributor to sediment runoff. Unmanaged drainage from roadways contributes to erosion issues offsite. A number of abandoned roads are also contributing to excessive sediment runoff. These roads need to be properly closed, i.e., ripped with waterbars and seeded. We will follow protocols used previously for inventorying and prioritizing road treatments. In addition, we will work with the Counties and the BIA to develop new regulations for road construction. A hands-on workshop in Cuba, New Mexico, entitled “*Water Harvesting from Low Maintenance Ranch Roads*” was a task of the RPMC’s FY02-E San Pablo Subwatershed §319 Project in September 2002. Techniques presented there successfully planted a seed. This project will expand these efforts to eastern Navajo lands. Roads will be selected by the amount of erosion evident and proximity to project upland and channel locales. Some of the practices to be implemented as part of this task include:

- ❖ Construction of rolling dips, waterbars, outsloped sections, grade breaks, cross drains, and other proven treatments that minimize accumulation of runoff on the road surface and spread it onto the surrounding land.
- ❖ Construction of short downhill approaches at low-water crossings where the watercourse is being “captured” by the road surface.
- ❖ At low-water crossings, realign dirt roads that cross drainage channels at an appropriate angle. Some channel reconstruction may also be necessary.
- ❖ Realignment, relocation, or rebuilding problem road segments in order to lessen the grade or provide more favorable drainage options.
- ❖ Properly closing and reclaiming abandoned roads.

Road work and design consultants and a field assistant will be employed to survey, examine, and assess the type of work necessary. The physical layout (stakes and flagging, etc.) will be provided, and the implementation will be carried out by an earth-work contractor.

Schedule: 2007-2010

Output: We will remediate approximately 30 miles of road within Torreon Wash. We will work with Counties and BIA to change current road construction and maintenance methods. If the methods we advocate become common practice, this aspect of the project will pay huge dividends. *Exploratory modeling data shows:*

Road type	Road Length	Native Vegetation Buffer strip	Annual Sediment Delivery (per 500')	Percent Reduction
Insloped, bare ditch.	500	50 feet	34 lbs.	-----
(same)	250	(same)	4.6	86
Outsloped, rutted.	500	(same)	38	-----
(same)	250	(same)	6.8	82

Task 3: Riparian Vegetation Management

Navajos believe that Torreon Wash is their lifeline. The cottonwoods and willows that used to grow along the Wash, were, according to older Navajos, holding the culture together. Salt cedar encroachment, which is a major issue in many southwestern drainages, is still very manageable in the Ojo Encino area. We hope to restore the Navajo lifeline to its culture by removing salt cedar and, where there is no

native cottonwood or willow present, do plantings. Native willow and cottonwood regeneration to stabilize drainage channels in Torreon Wash is hampered by uncontrolled grazing. Plants are now eaten by cattle, horses, and sheep before they can become established. In key areas we will create mini-exlosures to allow this native vegetation to become established. A typical mini-exclosure takes 8 green-tree posts cut into 2 ten-foot sections, 1 roll of net wire, 2-3 pounds of staples and some smooth wire. Also, wildlife groups like the Albuquerque Wildlife Federation will be recruited to provide labor.

Prior to implementation of any vegetation management practice, a vegetation assessment will be conducted. This includes a baseline survey of existing vegetation in the work areas and development of a plant list. Soil samples will be collected and analyzed when such factors as salinity or seed source appear to be an issue. A target desired condition will be established for each of the sites. Performance measures will be focused on RPMC's established priorities for the watershed, including vegetative and habitat health, erosion and sediment reduction, as well as water retention/infiltration and water quality benefits. Each site will coordinate with sites for other work, such as erosion control or road remediation.

Schedule: 2007-2010

Output: Identify and mitigate sites where vegetative conditions are contributing to, or failing to provide protection from, erosion. The eradication of undesirable species and the establishment of proper native species contributes to keeping soils, banks, and floodplains in place and functioning properly. A typical application could be to protect an eroding arroyo bank that is 10 feet high, 200 feet long, with a 1 foot-per-year retreat rate, which would result in saving 74 cubic yards of sediments from collapsing into the arroyo each year.

Task 4: Grazing Management

We will continue the preparation of individual ranch management plans with Committee permittees (20). Preliminary plans include an initial assessment of conditions and describe a 5-year vision for infrastructure improvements, management programs, stocking rates, and range conditions. Each preliminary plan will form the basis for development of an implementation plan, which will identify budgets for improvements and management, sources of funding, and a schedule for implementation work. Quarterly Committee meetings are used for ongoing education about grazing and vegetation management as well as the development of plans.

To complement the restoration work being implemented on individual ranch units, the Committee has proposed establishment of a Grassbank that would be for the exclusive use of Committee permittees and members of a newly formed Rincon Marques committee. The Grassbank would serve a number of functions, including to provide drought relief and to allow the total de-stocking of allotments to allow time for recovery following vegetation treatments. The Grassbank would be located on a currently unutilized allotment at Ojo Encino managed by BLM. The Committee and BLM are negotiating over this allotment.

The Committee has proposed establishment of a Range Rider team to provide support to permittees in a number of livestock management areas. The program element is an innovative approach to addressing a number of grazing management issues. Basic grazing management functions are often hampered by the lack of skilled labor and equipment. A number of permittees are elderly and are not able to implement the more strenuous aspects of ranch management. Funds would be used to manage livestock while on the Grassbank, removing trespass livestock; rounding up wild and feral horses; moving livestock to and from the Grassbank; and doing fence repair and other management.

Schedule: July 2007-July 2010

Output: Management and implementation plans for all Committee members who want them, management plans for Rincon Marques ranchers, Grassbank to help restoration.

Task 5: Trash Dumping

Illegal dumping of trash in streams and arroyos has had a deleterious effect on water quality, as well as promoting erosion and gullying. To remedy this problem, we will remove trash from arroyos and gullies that have become trash dumps and work with the Nation and the Counties to develop options for trash disposal. We will make it difficult to dump trash in illegal areas, make it easier to dump trash in legal areas (the area needs a transfer station), and start a recycling program to minimize the amount of trash.

Schedule: July 2007-October 2009

Output: Six trash dumps cleaned, legal trash dumping sites developed, recycling program.

Task 6: Education and Outreach

Education and outreach is the heart of this proposal. It is hoped that this project can become a model for work throughout the Nation. We have chosen to work in Ojo Encino Chapter because the members of this community have shown a commitment to improving their land and their community and the lives of their children. Specific tasks will be:

- ❖ Outreach: Bringing the Rangeland Health Kiosk (developed under the RPMC's Watershed Initiative grant) for presentations at local schools, fairs, etc., at least twice a year. A web page that will be on the RPMC's new website. Outreach by the Committee members to Rincon Marques Ranchers and others. Other Outreach to Ojo Encino and surrounding communities by a Navajo outreach coordinator and the RPMC's Outreach Coordinator.
- ❖ Wild Horse Youth Program: Horses and horsemanship are major parts of Navajo history and culture. Many Navajo youth have lost a connection with their heritage of horsemanship and, as a result, an important part of their culture. At the same time, unmanaged herds of horses are overgrazing open range, increasing bare ground and erosion, reducing the carrying capacity of the land for other livestock, and degrading the land resources. Horse trails lead to gullies. The goal of the program is to teach tribal youth

about the art of horsemanship, horse health management, and grazing management. Lessons learned from this pilot program would be transferable to other Chapters and tribes throughout the Southwest. The program would involve 10 youth for 8-10 weeks and work with approximately 10 horses a year. Youth would participate 4 hours/day, 3-5 days a week, and would receive a bonus if they complete the program. A regional level clinician would provide one-day trainings at the beginning, middle, and end of the program. A beginner horsemanship instructor would provide training one day a week. Mentors would care for the animals and handle ongoing implementation of the program.

- ❖ Publications: We will continue the *Rio Puerco News* newsletter, which the RPMC has started. It will disseminate information about this project and others to members throughout the Rio Puerco basin. We will print or reprint two Navajo guides on erosion and range management.

Schedule: July 2007-October 2009

Output: Information disseminated to the public; a wild horse youth program; publications.

Task 7: Monitoring

Every monitoring activity paid for by this grant will be performed per full Quality Assurance/Quality Control (QA/QC) requirements, as presented in the EPA-approved *NMED Quality Assurance Project Plan (QAPP) for Water Quality Management Programs (2002)*, which the RPMC used in its 2003 Watershed Initiative. Water quality sampling and measurements, biological assessment, photo-documentation, geomorphic surveying and mapping represent activities that will be performed under strict QAPP methodology. **Proposed monitoring elements:** 1. *Baseline data compilation*; 2. *Photo-Documentation*; 3. *Stream geomorphology surveys, restoration and natural channel design*: The standardized methodologies prescribed by Zeedyk, Rosgen and Harrelson et.al., will be employed. 4. *In-stream W.Q. monitoring*: The results will be incorporated into the NMED Database and STORET, and be available for analysis by NMED-SWQB and the EPA, as well as for RPMC, its cooperators, and the general public. The pertinence of water quality conditions will be applicable throughout this grant project, as well as influencing all the other RPMC efforts this project intends to create links with. 5. *Riparian and upland monitoring*: A variety of methods are available to this task and can be utilized where most appropriate. Indicators include: the presence/absence of rills, gullies, blowouts and bare ground; resistance of soil to erosion; compaction; litter movement; plant community composition; plant mortality and the presence of invasive plants. Cross-sectional or bank edge transects, as well as Proper Functioning Condition (PFC) procedures and select BLM or NRCS protocols are also in this task's toolbox. Transects will be used to closely identify any change in vegetation density, composition and cover. EPA will be provided with a listing of applicable guidance and protocols. 6. We will utilize principals of *Outcome Management Framework* to establish performance targets. We will contact participants and attendees to evaluate outreach, education and volunteer investment activities.

In addition, we hope to begin a volunteer youth monitoring program using interested students in the Science class at Ojo Encino High School.

Schedule: Baseline data accumulation: begin July 2007 Site-specific monitoring, especially photo-documentation and riparian assessment: July 2007-June 2012.

Output: We will conform to all applicable elements of the EPA-approved QAPP (NMED, 2002). Monitoring will be subcontracted and include the contribution of trained youth volunteers. Results will be contributed into the SWQB Database and the STORET system.

Task 8: Project Administration

The Alliance will administer the grant, maintain the Memorandum of Understanding with our cooperators, arrange bi-monthly meetings of the Steering Committee, and make quarterly and final reports to the EPA. The fiscal and administrative responsibility of assuring the workplan elements are realized within the proposed budget and planning constraints are the responsibility of the Alliance and the Steering Committee.

Schedule: July 2007-June 2012

Estimated Costs: \$37,500, Federal (15% Proj. Coord./yr x 5 years @\$50,000/yr; \$29,040, in-kind match from Steering Committee participants (\$21,120: 10 members x 6 hrs/meeting for 18 mtgs for 3 years, 4 mtgs for 2 years x \$16/hr; \$7,920: travel @ .36 x 100 x 22)

Output: Oversight, administration, bi-monthly Steering Committee meetings, technical assistance, quarterly and final reports.

ANTICIPATED OUTPUTS AND OUTCOMES

Task	Outputs	Outcomes
1	Headcut and erosion control structures; water harvesting; education, outreach	Measurably less sediment in waterways; more water held in ground
2	30 miles of road remediated; changes in road design regulations	Measurably less sediment in waterways; more water held in ground; better road designs
3	Invasives eradicated; cottonwoods, willows protected and planted	Measurably less sediment in waterways; more water held in ground; increased riparian vegetation
4	Management and implementation plans for area ranches	Increased grass; measurably less sediment in waterways; more water held in ground
5	Illegal trash dumps cleaned; recycling program; transfer station established	Improved water quality
6	Education, outreach, publications, Wild Horse Youth Program	Dissemination of information to large area re efficacy of these

		methods; education
7	Baseline and ongoing monitoring	Information on efficacy of programs
8	Project Administration	