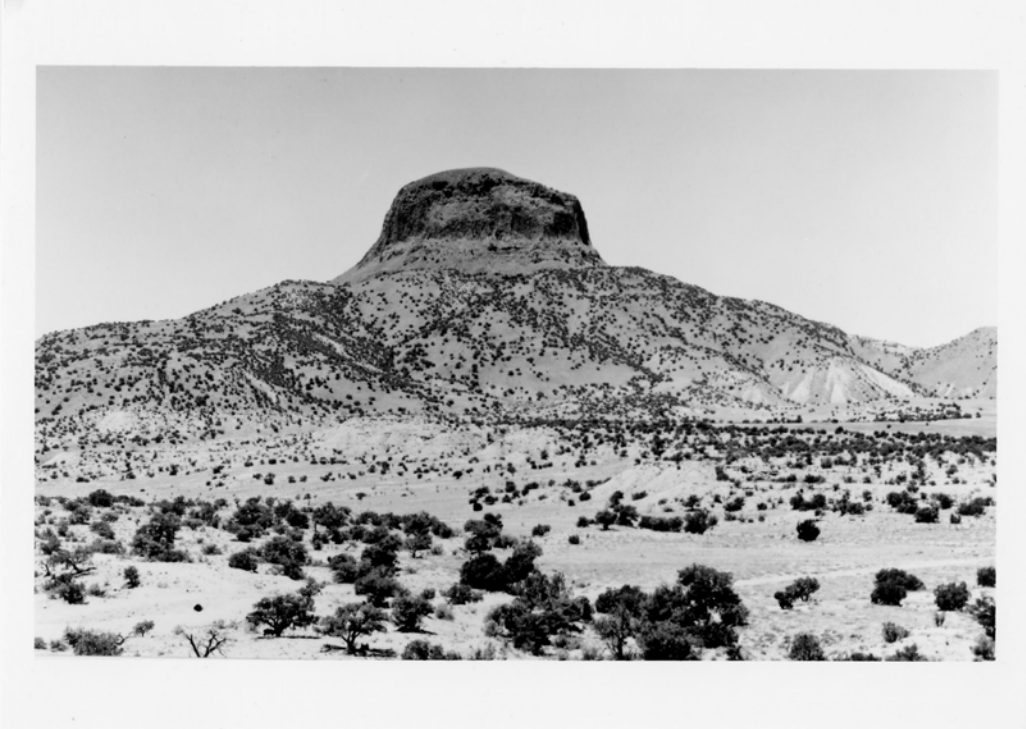

WATERSHED RESTORATION ACTION STRATEGY

(WRAS)

for the

RÌO PUERCO WATERSHED OF NEW MEXICO

Prepared by:

THE WRAS Subcommittee of the

RÌO PUERCO MANAGEMENT COMMITTEE

(Established November 12, 1996, through United States Public Law 104-333)

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(Frontispiece Photo by E.A. Bass, Socorro NM, with B.L. Cook and E.M. Robinson. Library of Congress Prints and Photographs Division, Lot No. 3268.)

INTRODUCTION

The Federal Clean Water Action Plan (CWAP) of 1998 was developed to help meet the goals of the Clean Water Act through the application of state-led cooperative efforts to identify and prioritize watersheds with water quality concerns. Consequently, in 1998, the New Mexico Unified Watershed Assessment (1998) was conducted by a statewide task force in response to the actions mandated in the Clean Water Action Plan. New Mexico's Unified Watershed Assessment identified 21 out of New Mexico's 83 watersheds as "in need of restoration" (Category I). The Rìo Puerco Watershed is included as a New Mexico Category I watershed.

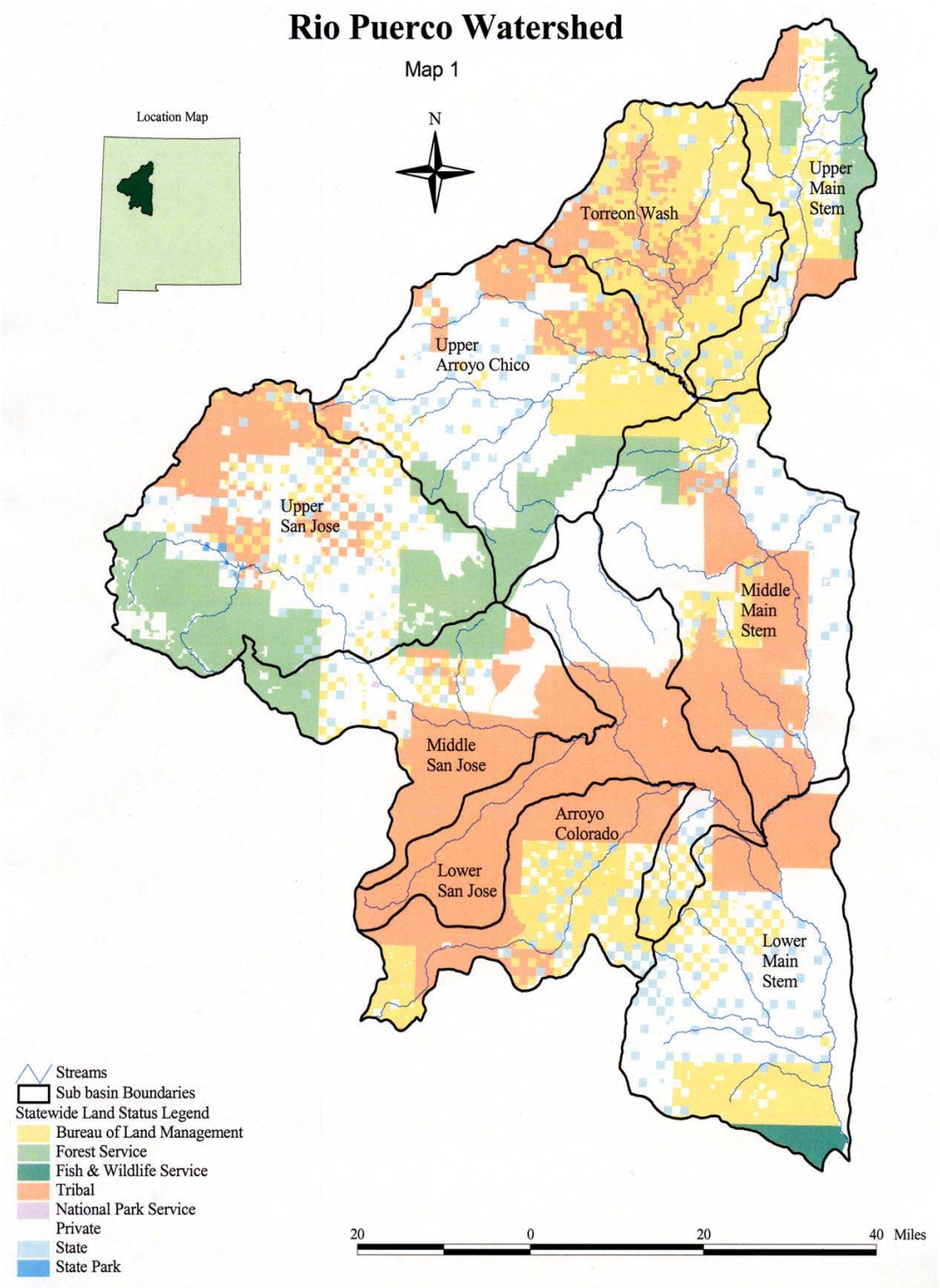
This Watershed Restoration Action Strategy (WRAS) for the Rìo Puerco Watershed is a comprehensive planning document with a focus on restoring and protecting the health of water bodies that are impaired in this Category I watershed. The Rìo Puerco Watershed Restoration Action Strategy is a required product of the Clean Water Action Plan process, and has been developed for a variety of planning, reporting and funding purposes by the Rìo Puerco Management Committee.

This Watershed Restoration Action Strategy contains the following components:

- A description of the Rìo Puerco Watershed and water bodies of concern within the Rìo Puerco Watershed, and a profile of the Rìo Puerco Management Committee - the authors of this plan.
- The public outreach structure and method(s) that will be used to engage and maintain public and governmental involvement including local, state, federal, and tribal governments.
- Monitoring and evaluation activities based on water quality and other goals and outcomes needed to refine the problems or assess progress towards achieving these goals.
- The specific water quality problems to be addressed, the sources of pollution and the relative contribution of sources.
- A blueprint of the actions to be taken and desired water quality, natural resources, socioeconomic and other goals and outcomes, i.e., implementation of pollution control and natural resource restoration measures.
- A schedule for implementation of needed restoration measures and identification of appropriate lead agencies or cooperators to oversee implementation, maintenance, monitoring and evaluation.
- Funding needs to support the implementation and maintenance of restoration measures.

Watershed Setting / Water Quality Concern

The Rìo Puerco Watershed, in west central New Mexico, is the largest tributary to the middle Rìo Grande Basin. The major water bodies in the watershed are the Rìo Puerco, Arroyo Chico and the Rìo San Jose. The Río Puerco Basin includes nine large physiographically defined subwatersheds, draining portions of seven counties, west of the greater Río Grande Basin in the northwest and west-central portion of New Mexico. Originating along the eastern edge of the Continental Divide, the watershed encompasses approximately 7,350 square miles (4.7 million acres / over 1.9M hectares) that contribute flow to the Rìo Grande at Bernardo, NM (see Map Attachment 2). The geological setting dominantly involves relatively soft sedimentary strata, intruded and capped by younger volcanic rocks. The watershed has been studied in great detail by a variety of noted investigators including geologists, geomorphologists, habitat and range management specialists, social scientists, and others.

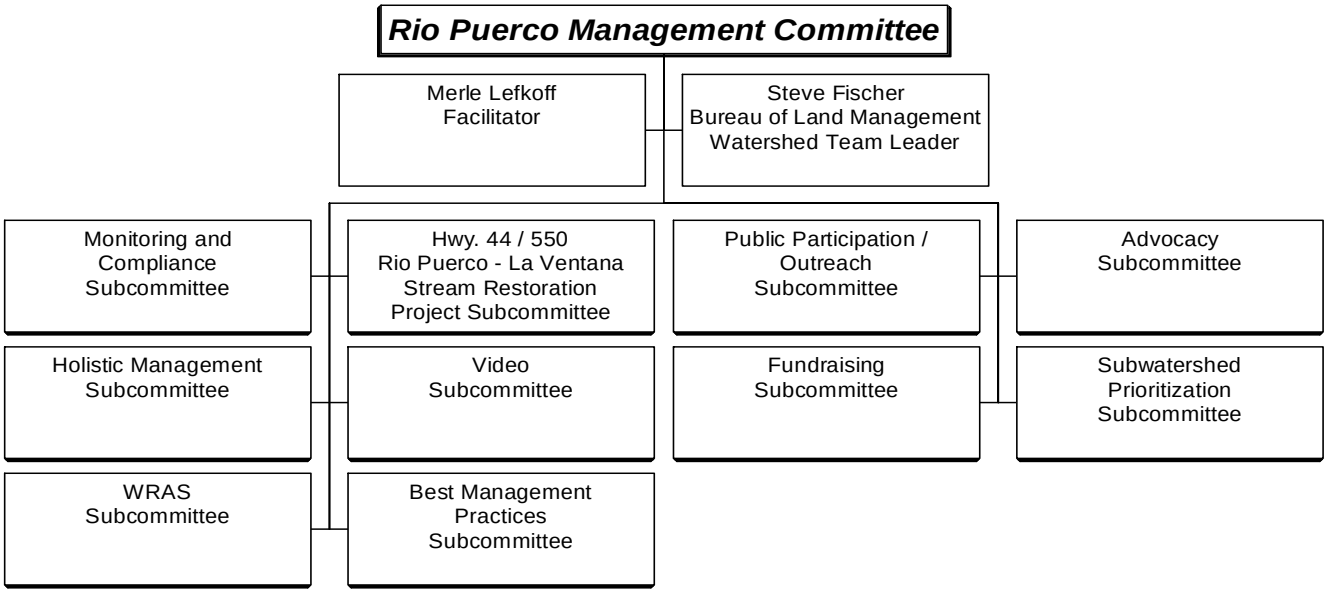

Rio Puerco Watershed
Map 1
Location Map
N
Upper Main Stem
Torreon Wash
Upper Arroyo Chico
Upper San Jose
Middle Main Stem
Middle San Jose
Arroyo Colorado
Lower San Jose
Lower Main Stem
Streams
Sub basin Boundaries
Statewide Land Status Legend
Bureau of Land Management
Forest Service
Fish & Wildlife Service
Tribal
National Park Service
Private
State
State Park
20 0 20 40 Miles

The Rìo Puerco has acquired a worldwide renown as a severely impacted and degraded watershed, synonymous with accelerated erosion processes. While the watershed contributes less than 10% of the total flow, it is a primary source of sediment to the Rìo Grande, contributing a disproportionately large percentage of silt and debris to that system.

Rìo Puerco Management Committee

The Rìo Puerco Management Committee (RPMC), based in Albuquerque, New Mexico, is a collaborative watershed organization (see Attachment 1) established by direction of the Congress of the United States, under the *Rìo Puerco Watershed Act*, Section 401 of the *Omnibus Parks and Land Management Act of 1996*. The Rìo Puerco Management Committee was formed in February 1997, building on an initiative begun by the Rìo Puerco Watershed Committee, a locally led stakeholders group based in Cuba, New Mexico. Passage of the Rìo Puerco Watershed Act of 1996 formalized the RPMC to carry out a broad-based, collaborative effort to restore and manage the watershed. RPMC membership includes state, federal, and tribal agencies, soil and water conservation districts, representatives of county government, residents from the rural communities within the watershed, environmental and conservation groups, and the public-at-large.

RPMC Organizational Chart Showing Established Subcommittees



The mixed land status of the watershed, including large tracts of Federal, Tribal, State, and private lands, contributes to the complexity of the situation, and makes it necessary to enlist the support and cooperation of numerous diverse interests in organizing and implementing projects. The forum provided by the RPMC is an effective approach to the multi-jurisdictional situation.

In passing this legislation, the Congress was demonstrating their commitment and support for the collaborative approach to improving the impaired watershed's condition. This Watershed Restoration Action Strategy for the Rìo Puerco Watershed will summarize the recognized conditions and identify necessary efforts and mechanisms whereby watershed restoration and improvement activities will be pursued by the broad-based membership of the RPMC. The Bureau of Land Management (BLM) has assumed a vital leadership role in the development and support of the RPMC.

This WRAS is a mandatory document for the RPMC's intended applications for watershed restoration and nonpoint source pollution control project funding under Clean Water Act Section 319 (h). In addition, as a living, expandable and updateable watershed planning document, it may appropriately be attached to applications for other avenues of funding, and can be updated and submitted in compliance with the RPMC's obligation to report biannually to the Secretary of the Interior, who presents the report to Congress.

Previous Work

Through their work in the watershed, various State and Federal agencies, Tribal governments, local communities, private landowners, and environmental interest groups have made numerous attempts to upgrade ground cover and vegetation conditions, protect habitat, improve water quality and quantity, establish valid land management practices, and arrest the erosion processes (discussed later in this WRAS). These past efforts can, in some ways, be characterized as disjointed, disorganized, largely non-collaborative, and not fully holistic in their approach. The Rìo Puerco Watershed Act formalized a coordinated effort to restore and maintain this critical watershed by organizing the disparate interests, consolidating available data, and developing sound approaches to watershed restoration by focusing on a reduction of erosion, achieving an increase in native vegetation, and improving riparian habitat. Employing these and other elements, the RPMC intends to achieve the watershed restoration and water quality goals expressed in this Watershed Restoration Action Strategy.

SECTION I. PUBLIC OUTREACH

This section identifies agencies and organizations responsible for the development of the WRAS and implementation of the Public Outreach components. The Rìo Puerco Management Committee (RPMC) has already taken a number of steps to ensure the voice of the stakeholders within the watershed are heard, and to keep interested parties informed of the RPMC's progress.

The RPMC is the lead organization for watershed plan development. The Committee, through its Public Participation Subcommittee, will play a major role in developing, coordinating, and implementing public outreach activities within the watershed.

The RPMC was formed in February 1997, building on an initiative begun by the Rìo Puerco Watershed Committee, a locally led stakeholders group based in Cuba, New Mexico. Passage of the Rìo Puerco Watershed Act of 1996 established the Committee to carry out a broad-based, collaborative effort to restore and manage the watershed.

The varied composition of the RPMC lends itself to widespread gathering and dissemination of information through its constituent agencies and organizations. Public outreach is built into all aspects of the Committee's work, from identifying problems and setting priorities to writing and carrying out a restoration plan. Input from the members, as well as from outside of the Committee, is being used to develop and review this WRAS.

Currently, the major water quality concern in the Rìo Puerco is the extremely high sediment loading that gives the river its name. The Rìo San Jose and the main stem Rìo Puerco are scheduled for development of TMDLs in 2001. Because the majority of the problem is due to the effects of nonpoint source pollution, the New Mexico Environment Department's Surface Water Quality Bureau, as the state's technical lead nonpoint source agency, will work with the RPMC and the Watershed Advisory Group to supplement the public outreach program.

WRAS Development **{tc "WRAS Development " \l 2}**

The RPMC initiated development of a WRAS for the watershed as a logical step toward its stated goals and objectives. The WRAS Subcommittee consisted of participants from the following agencies and organizations:

- Albuquerque Wildlife Federation
- Bureau of Land Management, Albuquerque Field Office

- Ciudad Soil and Water Conservation District
- Navajo Nation, Environment Department
- New Mexico Bureau of Mines/New Mexico Tech
- New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section
- New Mexico State Land Office
- Quivira Coalition
- Sandoval County Commission
- U.S. Geological Survey

Changes suggested by reviewers were incorporated into the final WRAS after consideration and agreement by the Committee as a whole.

WRAS Implementation {tc "WRAS Implementation " \l 2}

The success of water quality protection programs in the watershed depends on the approval and cooperation of the local landowners and various government agencies. The RPMC will be the primary mechanism through which this is accomplished. The composition of the RPMC and its subcommittees has been developed to ensure the success of this function.

The Public Participation Subcommittee will be one of the primary avenues for public outreach in the Rìo Puerco watershed. Involvement of locally-led organizations such as watershed groups, soil and water conservation districts, and local units of government will help ensure full stakeholder representation. Members of the RPMC's constituent agencies will provide technical expertise. Other state and federal programs provide public involvement and education that can be used to complement the group's outreach efforts.

The RPMC has evolved from a gathering of individuals and entities with varying degrees of self-interest to a cohesive organization focused on restoring the environmental and socio-economic health of the watershed and its inhabitants. The membership has survived the growing pains that accompany attempts at consensus by such diverse interests, and matured to the point where issues can be raised and resolved by keeping the committee's goals in mind. In fact, the RPMC has been recognized for collaboration by the U.S. Environmental Protection Agency with its 1998 Environmental Excellence Award and by the Bureau of Land Management with its 1999 Legacy of the Land Award.

The diversity of the RPMC's individual members, and their collective experience in collaborative efforts, will enhance the Committee's public outreach activities.

Public Outreach Efforts To Date

During its four years of existence, the RPMC has accomplished made significant strides toward its goal of public involvement. Actions taken to date include:

- Establishment of two geographically defined working groups, which drew in participants from the respective regions to describe the major problems faced by the watershed's residents and join the effort to restore it. The first is comprised of participants from the northern watershed, beginning at the headwaters of the Rìo Puerco and stretching to the confluence with the Rìo San Jose. The second group focused on the drainage basin from the Rìo San Jose southward to the junction of the Rìo Puerco with the Rìo Grande at Bernardo, New Mexico.

- Newsletter Publication. Feature articles introduced the RPMC to readers and described the organizational achievements that led the EPA to select the Committee as a recipient for its regional Environmental Excellence Award. One thousand copies were printed and distributed.

- Contacts with Congress. The RPMC has kept its congressional delegation informed of its progress by direct communications with the congressmen and staffers. The committee submitted a formal report to Congress in 1998.

- Video production. The RPMC produced a five-minute video to supplement its written report to Congress. Additional footage has been collected and archived with the intent of producing a second video geared toward the general public.

- Field trips. The RPMC and several of its constituent agencies and organizations have sponsored tours of many parts of the watershed to examine existing field conditions, view locations for proposed on-the-ground activities, evaluate projects in progress, learn about innovative land management techniques, and meet with local residents on their own turf.

- "Listening sessions". A series of meetings were held in communities located in the sub-watersheds designated by the RPMC as high priority areas. The purpose was to confirm the choice of these areas, made based on remote sensing data, during the RPMC's sub-watershed prioritization process. This was done by soliciting the residents' views on the nature and severity of the resource concerns and associated problems within their immediate areas, and gauging their interest in the different means of solving those problems. The three listening sessions held to date in Cuba, Torreon, and Ojo Encino were so successful that more are planned for the near future.

- Formation of a Public Participation Subcommittee, which planned and carried out several of the activities listed above. The subcommittee's plans for this year include a work day at one of the project sites, publication of a second newsletter, and follow-ups to the initial listening sessions.

SECTION 2. MONITORING AND EVALUATION

Monitoring, compliance and evaluation of RPMC projects has been a Committee objective since its inception in 1997. Development of a consistent methodology for baseline data collection, verification monitoring, data inventory, and compliance review has been the task of the RPMC Monitoring and Compliance Sub-committee. The following narrative describes the Monitoring and Compliance Sub-committee activities, and monitoring and compliance protocols developed by the Sub-committee to date. These protocols will serve as templates for consistent and compatible monitoring data collection, and fair and accountable compliance review. As with RPMC projects, monitoring and compliance protocols will be reviewed, evaluated for effectiveness, and amended on a regular basis.

The Monitoring and Compliance Sub-committee has undertaken a discussion and review of appropriate monitoring methodologies for the various projects and approaches to solving watershed problems. Our intention is to use methodologies that will actually show the changes and anticipated improvements in the parameters for which restoration projects have been implemented. Another aim of our review is to choose monitoring techniques that can be understood and implemented by all cooperators with different levels of technical expertise. A third aim is consistent and compatible data collection throughout the watershed that will ultimately show watershed-wide trends and changes due to restoration efforts.

Monitoring

The goal of our monitoring plan is to develop a long-range monitoring program with milestones that will continue beyond the implementation of individual projects. Monitoring will be directed at tracking and developing trends

with regard to water quality, and the condition of other natural and socioeconomic resources. Reference conditions/reaches/areas will be identified and monitored to serve as goals for restoration and protection. The success of our projects will depend on the continued implementation of restoration activities and maintenance of completed projects. A long-range monitoring program will assure that project activities are tracked and evaluated beyond the implementation of individual projects. Milestones will keep us on track for restoring the watershed.

Our monitoring plan includes the development of individual project monitoring plans. Technical assistance for the development of project monitoring plans by project proponents will be in the form of periodic workshops conducted by the RPMC Monitoring and Compliance Subcommittee. The workshops will be open to the public and will focus on how to develop a monitoring plan. We propose to use the Quality Assurance Project Plan for Water Quality Management Programs 2000 produced by the Surface Water Quality Bureau of the New Mexico Environment Department as a basis for our training sessions. Other monitoring procedures will be evaluated and accepted by the Subcommittee.

Appropriate monitoring techniques will be chosen to produce valid data that reflects both the successes and shortfalls of the projects. Before project implementation, baseline conditions will be established and monitored. A monitoring schedule will be developed based on the type of project and timing of implementation. Project proponents will report monitoring results in Quarterly Reports to be submitted to the RPMC Monitoring and Compliance Subcommittee for technical review and tracking. Funding for the monitoring component of individual projects will be included in the grant request.

There are some basic needs that must be met for our monitoring plan to be successful. First, we need continuous database management. This is to ensure that monitoring efforts are coordinated to meet the needs of agencies and stakeholders and to maximize the usefulness of the data obtained. Second, we need to establish a cadre of trained monitoring volunteers to help with projects and to help establish baseline conditions throughout the watershed. Third, we need to create a library of monitoring resources for project proponent's use for developing their monitoring plan. Fourth, we would like to develop an information hotline possibly through the creation of a Rìo Puerco Web page and through a column in the RPMC newsletter. The hotline would provide a means for stakeholders to access data and provide monitoring updates. Fifth, with the first four needs in place, we would hold regular monitoring task force meetings to sustain the monitoring initiative and to ensure that enough people and resources are available to continue monitoring.

The implementation of this monitoring plan will produce the following results:

- It will help us meet the goals of the Rìo Puerco Watershed Act of 1996, and the commitments associated with any funding we obtain for Rìo Puerco restoration activities.
- It is essential for evaluation of the effectiveness of Best Management Practices to produce long-term benefits and to reach project goals.
- We will have hard data to show successes of project implementation.
- Collection of these data will improve our understanding of processes that cause resource degradation, social deterioration and financial losses in the Rìo Puerco Watershed.

Compliance and Project Evaluation

The goal of our compliance review plan is to meet project objectives within a scheduled timeframe; to ensure the use of available funding effectively and consistently with the stated project implementation plan; to ensure continued suitability of Best Management Practices (BMPs) to achieve resource restoration and protection during implementation of the project; and to guarantee maintenance of installed BMPs and completed projects.

The Monitoring and Compliance Subcommittee has committed to continuous involvement in compliance review. The compliance plan involves the assignment of a three-person RPMC Compliance Review Team (CRT) to be assigned to each individual project to monitor compliance to the project proposal and goals. The CRT and project proponent will meet initially to review compliance expectations, including completion of any National Environmental Policy Act (NEPA) and State Historic Preservation Act requirements. A site inspection by the CRT would occur within the first six months after project initiation. The CRT will then set up a schedule of additional field reviews as needed. The project proponent will submit quarterly reports describing actions, finances, and project progress. A final report will be required at project completion.

With the help of the Monitoring and Compliance Subcommittee, the CRT would be responsible for recommendations regarding project amendments, additional funding, project termination, or continuing phased and multi-year projects. The recommendations would then be made to the RPMC for consideration and future planning. Project proponents will be expected to include funding needs for compliance reporting as part of each grant.

The expected results of the compliance plan are the following:

- Compliance with the National Environmental Policy Act and other pre-project requirements.
- Completion of approved projects as proposed.
- Continued maintenance of installed projects and other long-range commitments.
- Financial accountability of project proponent.
- Documentation of what works.

SECTION 3. DEFINING SPECIFIC WATER QUALITY PROBLEMS

The Rìo Puerco Watershed, defined under the United States Geological Survey (USGS) Hydrologic Unit Codes (HUC) 130204-130207, is divided into two primary stream segments by the current version of the New Mexico Water Quality Control Commission's (WQCC's) *"State of New Mexico Standards for Interstate and Intrastate Streams"* (October 2000). Segment #2-107, the perennial reach and tributaries to the Upper Main Stem (UMS) of the Río Puerco gather headwaters from the western edge of the Nacimiento Mountains (see attached maps). Segment #2107 also includes the Rìo San Jose, on the western side of the watershed, with tributaries emanating from the San Mateo and Zuni Mountains. In addition, the State-listed area includes segment #2-105, the intermittent or ephemeral flow (generally the central and southern areas of the watershed) below the perennial reaches of the Rìo Puerco, which enters the main stem of the Río Grande.

Select reaches of the Río Puerco and its tributaries are listed as impaired, that is, they fail to fully meet the stream's designated uses. These are defined in "*Water Quality and Water Pollution Control in New Mexico"*, Appendix B - the State's 305(b) Report (2000), and in the 2000-2002 "*State of New Mexico CWA Section 303-D List for Assessed Stream and River Reaches"*. These documents list non-attained uses for individual perennial to intermittent reaches, including the Río Puerco, Nacimiento Creek, Rìo San Jose, La Jara Creek, San Pablo Creek, Rito Leche, Rito de Los Piños, Bluewater Creek, Rìo Paguate, and Rìo Moquino. Current designated uses for coldwater fishery, and a select reach designated as a high quality coldwater fishery, are listed under categories ranging from "impacts observed" to "partially supporting" to "nonsupport." The Rìo San Jose's listed reach has a drinking water source (DWS) designation, and tributaries to the Rìo Puerco UMS are known to provide water for irrigation purposes. The monitored or evaluated impairments of concern include temperature exceedances, stream bottom deposits, plant nutrients, metals, turbidity, dissolved oxygen, and pH. These effects are largely due to a lack of vegetative density and diversity in a region of high erosion potential, and impacts resulting from habitat alteration, agriculture, rangeland impacts, resource extraction, reduction of riparian vegetation, streambank destabilization, and road maintenance activities. The total effected stream

reach is listed at 223.1 miles (359 kilometers) in State documents, but the UWA prioritization listing is currently focused on a total of 119 stream miles (191.5 km).

The region has historically been used for agriculture, grazing, logging, mining, and a wide range of recreational purposes, and though relatively sparsely populated, the encroachment of urban development is increasing. Presently, agriculture is the dominant watershed-wide activity. The specific causes of watershed decline result from the combination of these land uses and their impact on a relatively vulnerable landscape. The listed causes are reflected in the RPMC's stated watershed restoration priorities, and they essentially define the general targets for improvement that this WRAS is pursuing. Specific sites for project implementation (within certain prioritized subwatersheds, as described below) are still being identified.

Subwatershed Prioritization

The RPMC, presently the region's most active and influential watershed organization, is conducting a thorough analysis of the condition of the lands in this watershed as part of their ongoing restoration initiative. A direct effort has been put into characterizing the truly influential ambient, environmental, or land management factors affecting this watershed. This is expected to lead to a recognition and prioritization of locations, natural setting, and management practices contributing to the watershed's present impacted condition. The prioritization effort was organized by a Technical Subcommittee composed of staff from the USGS, NMED, BLM, NRCS, the Navajo Nation, and interested residents. A comprehensive approach was taken to define the watershed's physical condition by delineating its geologic, geomorphic and vegetative settings, and the microclimatic subdivisions in the watershed for the purpose of comparing distinct subwatersheds. Land management, social, and cultural factors are being evaluated, as well.

Initially, a watershed hierarchy was defined for the region. This incorporates the graphic subdivision of the watershed as presented in map attachments #2 and #3. The example shown below describes the hierarchy for the Rìo Puerco Watershed, specifically at the site of the Highway 44/ Rìo Puerco Stream Restoration Project:

Watershed Hierarchy
{tc "Watershed Hierarchy**"}**

Region:	American Southwest
Provinces:	Southeastern Colorado Plateau (along transition zone to E. Basin and Range)
River Basin:	Rìo Grande Basin
Subbasin:	Middle Rìo Grande
Watershed:	Rìo Puerco
Subwatersheds:	Upper Main Stem
Drainage:	Rìo Puerco-La Ventana Reach
Site:	Rìo Puerco at La Guzpa Canyon / "Two Bridges Riparian Enclosure"
Surveyed Location:	Sections 17-20, Township 19 North, Range 1 West (New Mexico Principal Meridian); Sandoval County, New Mexico

As a primary step, the RPMC researched how and where the land's natural components, past or present management practices, and current land use or development is directly contributing to the degraded watershed's condition. Data and graphic information was gathered from a wide variety of existing sources (geologic, soil, erosion and vegetation maps, professional papers, agency files, precipitation data, previous Rìo Puerco studies), and new surface geology and vegetation information was generated via USGS satellite photo studies. The prioritization progressed by focusing on some or all of the following factors (with *Preferred Conditions* underlined):

- Dense versus sparse **vegetative cover**, taking into consideration the dominant type of vegetation, its appropriateness for altitude and slope aspects, high vs. low species composition, and diverse vs. limited age-class distribution;
- Presence or absence, and health of **riparian habitat**;
- High versus low percentage of **bare ground**;

- **Geologic surface units** (soil, residuum or bedrock) that are either susceptible to or resistant to erosion;
- High or low density, and proper or poor condition of **roads**;
- Favorable or degraded condition of **woodlands;**
- High or poor **water quality** (and the types of conditions impacting streams and spring sources);

The RPMC's prioritization effort incorporated consideration of additional social, political, and cultural conditions recognized by the region's residents. The process also put an emphasis on analysis of the listed impairments and causes of pollution identified in State and Federal water quality documents. The greatest opportunities to protect water quality obviously occur in the headwaters regions where perennial to intermittent streams are developed.

Locations rising to the top of the prioritization list were found to be at a relative disadvantage when compared to regions displaying some or all of the preferred conditions. As an additional intangible consideration, our prioritization was tempered by the advice and opinion of knowledgeable local residents regarding areas that are deemed likely to provide valid restoration opportunities. They suggested locations that might have an increased likelihood of gaining local consent and participation, and contributed their knowledge of a landowner's current management practices and willingness to alter management styles in order to seek improvements. This information was combined with the technical determinations of where ground conditions appear to be conducive to restoration (not too far impacted to expect improvement), and areas with a naturally better chance of its seasonal precipitation regime supporting revegetation and restoration efforts. In other words, the RPMC does not believe it can support developing projects in areas where a combination of factors make it unlikely that our efforts could succeed.

After beginning with a concept to generate individual restoration projects across the entire 4.7M acre watershed, the RPMC had been advised to concentrate efforts on a smaller, better defined, and more manageable region. This prioritization has led us to focus on an area of approximately 595,000 acres comprising the Upper Main Stem and Torreon Wash subwatersheds. Taking additional steps, these two subwatersheds are being further evaluated to identify the most important sites for restoration project work in individual targeted drainage systems (see Attachment # 3).

In light of the area's natural conditions, the project efforts we intend to implement are expected to result in improvements to the physical setting and the management of these lands. Project efforts will focus upon improvement of water quality, vegetative diversity and soil stability. These are perceived to be vital elements to achieving measurable watershed restoration and improvement.

SECTION 4. ACTIONS TO BE TAKEN AND DESIRED WATER QUALITY GOALS AND OUTCOMES

Background

The Rìo Puerco Watershed Act grew out of the work begun by the Rìo Puerco Watershed Committee, a subcommittee of the Cuba Region Economic Development Board that was established in 1993. Within the first three years, using funding provided by the U.S. Department of Agriculture (USDA), the committee sponsored a riparian pole planting, acequia improvements, and over 12,000 acres of aerially applied tebuthiuron treatments to control sagebrush.

During this period, the Bureau of Land Management (BLM) was actively pursuing watershed restoration projects in the Rìo Puerco. These included construction of check dams, repair of large detention dams, riparian restoration efforts, reforestation in ponderosa pine sites, encouraging grazing management practices, and sagebrush control. Since 1985, BLM has treated over 49,000 acres of sagebrush and improved over 850 acres of riparian habitat.

In the early 1990's, The U. S. Forest Service - Rocky Mountain Forest and Range Experimental Station in Albuquerque released several studies of the vegetation and soils of the upper Rìo Puerco.

Also in 1993, the Bureau of Reclamation began a review and a new study of the impact of the Rìo Puerco on the Rìo Grande and Elephant Butte Reservoir. Besides their own in-house study, they contracted with the New Mexico Bureau of Mines and Mineral Resources (NMBMMR) to compile an annotated bibliography of previous work done on the Rìo Puerco (well over 1,100 references) and a human-resource catalog of people interested in the Rìo Puerco. These two compilations were put in separate computerized databases maintained by the Bureau of Reclamation (Davis and Cross 1994). Gorbach and others (1996) summarized the findings of the previous work, discussed the expected impacts of sediments from the Rìo Puerco on the Rìo Grande between Bernardo and Elephant Butte Dam, and investigated sediment control alternatives.

The USGS has conducted several studies in the Rìo Puerco under the auspices of global climate change research. Pertinent to this discussion is a sediment budget study by Allen Gellis who instrumented two small basins to evaluate erosion within sites that have contrasting land uses. Jonathon Friedman is trenching various portions of the Rìo Puerco channel to date the sediment deposits. Much of the information collected has been made available to the public via the USGS website: http://climchange.cr.usgs.gov/Rìo_puerco/. This site includes a paper authored by RPMC members in support of the Highway 44 stream restoration project (Coleman, Gellis, Love, and Hadley, 1998).

The NMED-SWQB has completed a number of projects aiming a variety of approaches to control and prevent nonpoint source pollution impacts, including BMP implementation and working with ranching interests. One project of note is the Quivira Coalition's Senorito Creek Project, a two-year effort to stabilize the slopes of the abandoned Nacimiento Copper Mine's overburden pile using intensive cattle use. The project, using Terry Wheeler's Holistic Remediation Process, was funded by NMED through the EPA, with additional support provided by the BLM and Teva Corporation.

Current Goals and Actions

The Rìo Puerco Management Committee established three goals (priorities) to collaboratively affect beneficial change in the Rìo Puerco Watershed. Projects funded by the committee will address:

Goal 1: SEDIMENT REDUCTION
- Sediment Retention
- Erosion Control

Goal 2: VEGETATION AND HABITAT IMPROVEMENT
- Appropriate Vegetative Species and Densities
- Improved Upland, Riparian and Stream Habitats

Goal 3: SUPPORT AND PROMOTION OF OTHER WATERSHED FACTORS
- Interjurisdictional and Interagency Cooperation
- Socio-economic Benefits
- Recognition and Protection of Cultural Resources
- Public Awareness, Education and Participation

To achieve these goals, the Rìo Puerco Management Committee will focus on implementing these objectives:

- Work collaboratively using a consensus-based decision making process that includes and encourages broad participation.

- Collect and manage comprehensive data and information relating to the Rìo Puerco Watershed.

- Research and develop best management practices that address site-specific problems in the Rìo Puerco Watershed.

- Provide public participation opportunities and educate private landowners, communities, other interested publics, and each other in Rìo Puerco Watershed history, geomorphology, concerns, problems and solutions.

- Support and assist in the implementation of site-specific projects that demonstrate best management practices. Projects are ranked for approval based on criteria developed by the Management Committee. Innovation is encouraged.

Based on these goals and objectives, the Rìo Puerco Management Committee has accomplished the following:

A. Highway 550/44 Project

During the construction of State Highway 44 in the mid-1960s, the river was diverted from its original meander and channelized to avoid costly bridge crossings. Over the past 35 years, the channelization has caused a severe channel erosion problem creating extreme road hazards and significant downstream impacts. Several miles of flourishing riparian habitat were lost, and today the highly erosive river threatens sections of the highway. On January 11, 1999, the RPMC and the New Mexico State Highway and Transportation Department signed a precedent-setting Memorandum of Understanding (MOU) to initiate the a stream reintroduction and riparian restoration effort. An offshoot of a major highway widening and reconstruction project on State Highway 44, the La Ventana -Rìo Puerco Restoration Project has the potential to significantly increase water quality in the Rìo Puerco and Rìo Grande.

B. Navajo Nation Assistance Agreement

The BLM and the Navajo Nation have entered into an ongoing cooperative agreement to ensure that land users in the 14 Navajo chapters within the Rìo Puerco basin are involved at the grassroots level in the watershed restoration effort. These communities are located at the headwaters of major drainages that are the areas most in need of restoration. Under this agreement the Navajo Nation Department of Water Resources is providing outreach, education, and community involvement to motivate land users to implement conservation practices that will benefit water quality.

C. Bluewater Ranch Restoration

The purposes of this project were to improve 10 miles of riparian habitat, develop livestock water and cross fencing, and institute rotational grazing on this Navajo Nation ranch. The project was designed to be a demonstration project for the Baca/Haystack Chapter through hands-on field training sessions to educate land users. The project was started but will not be completed because of the chapter's inability to secure the lease for the ranch.

D. Thompson Spring Range Improvement

This ongoing project focuses on erosion control on this range unit of Jemez Pueblo. It is designed to reduce sediment flows and improve water quality by remediating headcuts and improving upland livestock management practices.

E. Acequia Improvements

Acequia associations near Cuba, NM were provided with a small grant to install pipeline to enhance water distribution and reduce stream erosion.

F. Sagebrush Control

An initial amount was provided to control sagebrush on private, public, and tribal lands through tebuthiuron application. Removal of woody species increases native grass production, thereby stabilizing soil and reducing surface erosion.

G. Pueblo of Laguna Range Improvements

A small grant was provided to enable the Pueblo of Laguna to begin improving range management on over 190,000 acres of tribal lands.

H. Sub-basin Prioritization

In 1999 the RPMC began a process to focus on the areas most in need of improvement (refer to the discussion in Section 3). The process used basin-wide scientific data to rank the nine sub-basins on upland watershed function, riparian function, erosion/sediment occurrence, and water quality. The committee is attempting to further refine the focus on subbasins within the Upper Main Stem and Torreon Wash, the chosen sub-basins. The current work is incorporating field visits and town hall meetings to assess the degree of interest and concern of local residents. These town hall meetings have been held in the village of Cuba, and the Torreon and Ojo Encino Navajo Chapters.

Future Actions

Implementation efforts will focus on the following categories of actions that will be necessary to restore water quality and healthy watershed function in the Upper Main Stem and Torreon Wash sub-basins. *Priority actions are preceded by (*).*

Public Outreach

- *Train a cadre of community volunteers to gather baseline data and assist with monitoring.

- *Provide workshops to local landowners on best management practices such as grazing management, erosion control, wetlands protection, road management, noxious weeds, thinning.

- *Continue to work with local people, particularly when it comes to project implementation.

    Continue listening sessions.
    Target future newsletters to selected subwatersheds.
    Develop website.
    Create traveling poster display.
    Complete video project.

- Coordinate management plans with other agencies.
- Support Cuba SWCD's Outdoor Classroom Project.
- Continue to sponsor field visits for elected representatives and other VIPs.

- Provide a presentation to the RPMC about cultural resources and traditional uses.

- Hire a full-time coordinator. Develop 501(c)(3) status.

On-the-Ground Project Work

- *Construct structures to divert Rìo Puerco into its original channel at La Ventana. Restore riparian habitat in channel through grazing exclosure and native plantings.
- *Develop showcase project(s) to remediate an impaired area using a mix of the following practices:

  Control big sagebrush using tebuthiuron, fire, and/or animal impact to reduce woody species and promote native grasses.

  Repair or rebuild erosion control structures that are in poor and unsatisfactory condition.

  Implement road maintenance BMPs. Inventory and close unneeded roads.

  Work with landowners, permittees and lessees to institute improved livestock grazing management.

  Restore riparian habitat through grazing management or exclusion and plantings of native vegetation.

  Inventory and control noxious weed infestations.

  Manage woodland density to restore forest health.

  Reinstitute prescribed and prescribed natural fire.
- Repair headcut at Thompson Spring and develop projects for grazing management (ongoing project).
- Apply Holistic Remediation Process (ex.: Nacimiento Mine) elsewhere while attempting to reduce cost
- Establish a learning/demonstration project for Holistic Resource Management.
- Support roundup of stray horses.

Data Gathering and Monitoring

- *Measure flow and monitor water quality in the main stem and major tributaries of Rìo Puerco. Maintain USGS gaging stations.
- *Monitor in support of TMDLs.
- Support continuous data gathering.
- Inventory headcuts.
- Gather road inventory data.
- Prioritize dam repair needs through analysis of data.
- Gather wildlife, T&E data.
- Gather demographic, socio-economic, and cultural resource information.

SECTION 5. IMPLEMENTATION SCHEDULE

As an illustration of our efforts to achieve the Future Actions described above, the following table presents a cross section of projects in the Rìo Puerco Watershed that have been completed, are currently underway, are planned and scheduled by cooperating agencies, or are under consideration by the RPMC for the near future.

[Note: Acronyms are as follows: BIA- Bureau of Indian Affairs; BLM-Bureau of Land Management; BOR-Bureau of Reclamation; EPA-Environmental Protection Agency; NMED-SWQB-NM Environment Department-Surface Water Quality Bureau; NMSH&TD-NM State Highway and Transportation Department; RPMC-Rio Puerco Management Committee; TNM-Tree New Mexico, Inc.; USFS-US Forest Service.]

Lead Agency	**Projects**	**Duration**	**Status**
BLM	Bluewater Canyon Riparian Area	1989-1992	Completed
NMED-SWQB 319(h)	Bluewater Creek Streambank Stabilization (FY93-B)	1993-1998	Completed
USFS	Bluewater Watershed Projects		Completed
NMED-SWQB 319(h)	Rìo Puerco Mining Impacts (FY94-D)	1994-2000	Completed
Rìo Puerco Watershed Comm. (Cuba)	Sagebrush control, acequia improvements, plantings	1993-Present	**Ongoing**
BLM	Rito Leche Riparian Area	1986	Completed
BLM	Señorito Creek Riparian Enclosure Project	1992-1998	Completed
BLM	Wilson Canyon Riparian/ Ponds Construction Projects	1993-1998	Completed
BLM	Coal Creek	1996-1998	Completed
BLM– Albuquerque Field Office	Spring / Seep Area Development and Protection Projects	1994-Present	**Ongoing**
BLM and local cooperators	50,000 acres of Sagebrush Treatment	1985-present	**Ongoing**
Forest Guardians [NMED-SWQB: 319(h)]	Rìo Puerco Riparian Demonstration Project (FY98-I)	1998-2001	**Underway**
Quivira Coalition [NMED-SWQB: 319(h)]	Señorito Creek Watershed: "*Using the New Ranch"* (FY97-J)	1999-2001	**Underway**
(RPMC:) Cuba Acequia Association	Los Utes Acequia Improvements	1998	Completed

Lead Agency	**Projects**	**Duration**	**Status**
NMED 319(h) / NM Hwy. Dept. / RPMC / BLM / EPA / BOR / TNM	Rìo Puerco-La Ventana Stream Restoration Project (FY95-K, 99-I, 00-L) (Tied to: *Two Bridges Riparian Enclosure Project*)	1996-2003(?)	**Underway**
(RPMC:) Navajo Baca Chapter/ Tree New Mexico	Bluewater Ranch Restoration	1999-2000	Discontinued
(RPMC:) Jemez Pueblo / BIA	Thompson Spring	1999-Present	**Underway**
(RPMC:) Torreon Navajo Chapter/ BIA	Vicente Arroyo	1998-	**Underway**
(RPMC:) Pueblo of Laguna	Range Improvements	1999-	**Underway**
BLM	Prescribed Fire Program	2000-?	**Ongoing**
USFS-Cuba R.D.	Nacimiento Community Ditch Repairs	Summer 2001	Planned and Scheduled
(RPMC:) Engaging Local Land Management Agencies and/or Private Cooperators	***Upper Main Stem Subwatershed Projects:*** - Sagebrush treatments. - Grassland, native vegetation and riparian improvements. - Road projects: proper engineering, maintenance, or closures. - Erosion control BMPs. - Main channel bank erosion treatments - Cuba SWCD: Stream Restoration and Outdoor Classroom Projects	2001-?	(Proposed Projects) (Will seek 319(h) and additional funding)
(RPMC:) Navajo Nation / BIA / Local Chapter Members / Land Management Agencies/ Cooperators	***Torreon Wash Subwatershed Projects:*** - Sagebrush treatments. - Grassland, native vegetation and riparian improvements. - Road Projects: proper engineering, maintenance, or closures. - Erosion control BMPs. - Prescribed/natural fire treatments - Retention dam repair/construction	2001-?	(Proposed Projects) (Will seek 319(h) and additional funding)
(RPMC:) Tree NM / Savory Center for Holistic Mgmt. / Local Cooperator(s)	***Holistic Demonstration Project***	2001-?	(Proposed Project)
(RPMC:) Working with constituent Agencies, Tribes, Watershed Residents, and Cooperators	***Greater Rìo Puerco Watershed Projects*** (Addressing the wide range of impacts in the majority of the other subwatershed regions).	2002-20??	(Desired Long-Term Watershed Restoration Program)

SECTION 6. FUNDING NEEDS

The RPMC was established by the *Rìo Puerco Watershed Act*. Project accomplishments to date have resulted from the contributed efforts of committee members and some funding from the diverse group of agencies and organizations that make up the RPMC. With a committed group of members in place, the RPMC is now seeking to expand its accomplishments through additional funding from outside sources such as existing Federal programs, grant applications, and environmental improvement funding from private foundations.

The present form of this WRAS places immediate focus on the prioritized northern subwatersheds. Other subbasins will be worked on as work is completed in the Upper Main Stem and Torreon Wash.

We believe the original legislation and its expected funding level was appropriate to initiate restoration in this large watershed. Therefore, the funding table that follows contains a forecast for future funding needs that reflects and exceeds the full level of original funding authorized by Congress.

Table of Funding Requirements

Task	Funding				Status
	Federal	State	Other	Total	
Sub-basin prioritization	$ 66,000			$ 66,000	Completed
Highway 550/44 Project–Feasibility & Engineering Design (NMED FY 95-K / 97-Q)	100,000	50,000	(additional match being sought)	167,000	Underway
Highway 550/44 Project–Construction & River Restoration Phase (NMED FY 98-*)	600,000	250,000	150,000 match being sought	1,000,000	Need non-Fed match
Rìo Puerco Restoration: Monitoring & Enhancement (NMED FY 99-I)	105,500	70,000	(additional match being sought)	175,500	Will follow 98-* implementation
Big sagebrush treatments–40,000 acres					Proposed project
Repair erosion control structures–150 structures	7,500,000			7,500,000	Proposed project
Riparian habitat restoration	1,000,000		250,000	1,250,000	Proposed project
Town of Cuba Reach of the Rìo Puerco (Series of erosion and sedimentation, control, channel restoration and cleanup projects)	300,000	100,000	200,000	600,000	Segments underway, additional projects proposed
RPMC administrative costs				30,000	

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