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NEW MEXICO
Nonpoint Source
Management
Program

Annual Report

Surface Water Quality Bureau
Watershed Protection Section



State of New Mexico Nonpoint Source Management Program

2006 Annual Report

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***Copies of this and other reports are available on the Surface Water
Quality Bureau website:***

www.nmenv.state.nm.us/swqb/wps



New Mexico Environment Department

Surface Water Quality Bureau

*Preserving, protecting, and improving New Mexico's
surface water quality for present and future generations.*

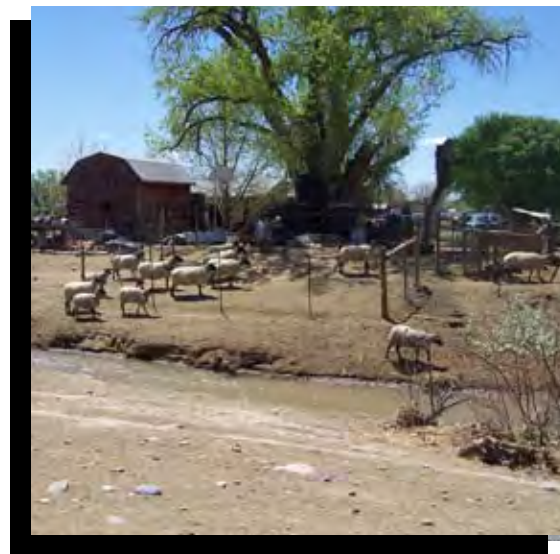
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Introduction

The purpose of this annual report is to provide an overview of nonpoint source management related activities conducted around New Mexico between January and December, 2006. The report identifies programs and actions which address specific nonpoint source pollution problems and help address the goals and objectives outlined in the NMED Surface Water Quality Bureau's (SWQB) Nonpoint Source Management Program Plan. The majority of funding for projects is provided by Clean Water Act section 319(h) grants awarded to New Mexico Environment Department (NMED) by the Environmental Protection Agency (EPA); non-319 funded activities are also included in this report. Projects include implementation of best management practices (BMPs) & 401/404 permits.



What is Nonpoint Source Pollution?

EPA defines nonpoint source pollution to be ... “caused by rainfall or snowmelt moving over and through the ground and carrying natural and human-made pollutants into lakes, rivers, streams, wetlands, estuaries, other coastal waters, and groundwater. Atmospheric deposition and hydrologic modification are also sources of nonpoint pollution”. Nonpoint source pollution (NPS) is also referred to as “polluted runoff”

Federal Clean Water Act's Framework to Manage Nonpoint Source Pollution:

Nonpoint source pollution is the leading cause of water quality degradation in the United States and poses a substantial problem for the health of New Mexico's streams and rivers. When congress amended the Clean Water Act (CWA) in 1987, section 319 was added to establish a national program to control nonpoint sources of pollution. Under §319 (h) funds are made available to state and local agencies, non-profit organizations, and citizen watershed groups to address nonpoint source water pollution.

Section 319 contains three main strategies for addressing polluted runoff:

- Require states to prepare assessments of their NPS pollution problems
- Requires states to develop management programs to address NPS issues
- Create a grant program allowing EPA to fund state programs for NPS assessment and control.

Two prior sections of the CWA designed to manage both point sources and nonpoint source pollution are §303 and §305. Under section 303(d), states are required to list all polluted surface water bodies in their jurisdiction which do not meet state water quality standards (also known as the “impaired waters list”). Under section 305(b), states must publish a biennial report on the health of all surface waters. In New Mexico the 305(b) report includes the 303(d) list and is referred to as the Integrated Clean Water Act §303(d) / §305(b) Report.

Nonpoint Source Pollution in New Mexico

Nearly 95% of water quality impairment identified in New Mexico's streams & rivers is due to nonpoint sources (NPS) of water pollution. Nonpoint sources also account for widespread ground water contamination in New Mexico. Hydromodification can affect attainment of state water quality standards by diverting water out of stream channels, by impounding waters, and through channelizing and dredge-and-fill activities.

The current 2004-2006 State of New Mexico Integrated Clean Water Act §303(d) / §305(b) Report is available at the SWQB office or on our website: www.nmenv.state.nm.us/swqb/mas
[The 2006-2008 §303(d) / §305(b) Report will be available in Spring 2007]

NEW MEXICO'S NONPOINT SOURCE MANAGEMENT PROGRAM

As the designated lead agency for management of nonpoint source pollution, the New Mexico Environment Department (NMED) coordinates activities within the state through the Surface Water Quality Bureau (SWQB) and the Ground Water Quality Bureau (GWQB). In accordance with the federal Clean Water Act, the SWQB has developed a NPS Management Plan.

Our ultimate goal is to manage a balanced program that both addresses existing impairments [those listed under the 303(d) list] and prevents future impairments with WRAS implementation.

The NPS Management Program focuses on:

- The Watershed Restoration Action Strategy (WRAS) (also known as a watershed implementation / management plan) for coordinating watershed restoration efforts
- Fostering watershed associations
- Partnering with agencies, entities, & the public
- Implementing total maximum daily loads (TMDLs)

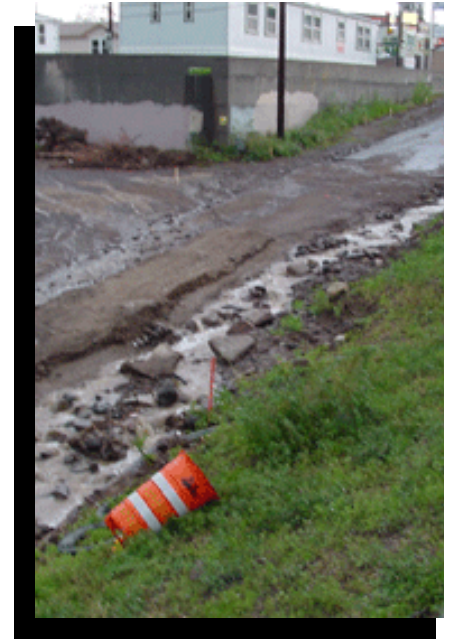
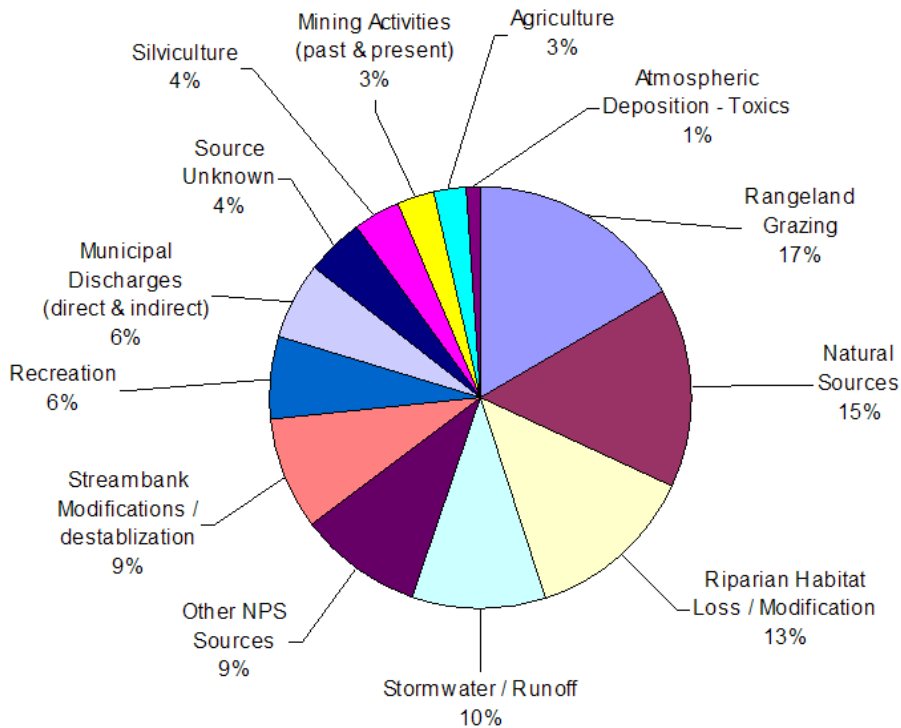
The program also relies on established resource protection, nonpoint source pollution prevention programs, and activities of other land management / resource protection agencies. SWQB identifies programs and activities that will facilitate the achievement of surface water quality criteria and uses a voluntary approach to achieve water quality improvements. Incentives to voluntarily implement projects and restoration efforts include competitive grant funding through §319(h) of the federal Clean Water Act and technical support and guidance through the SWQB.



NMED's *Nonpoint Source Management Plan*
is available at the SWQB office or on our website: www.nmenv.state.nm.us/swqb/wps

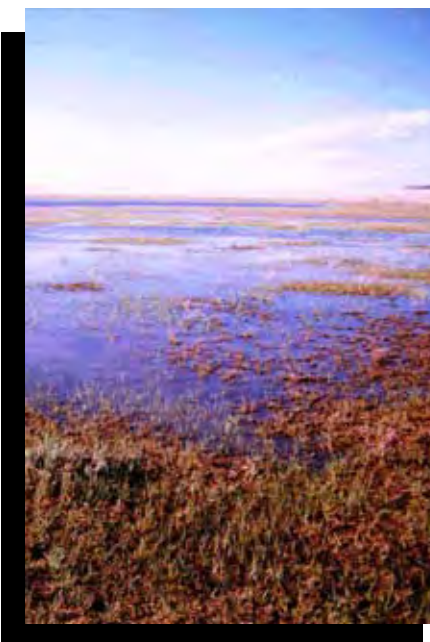
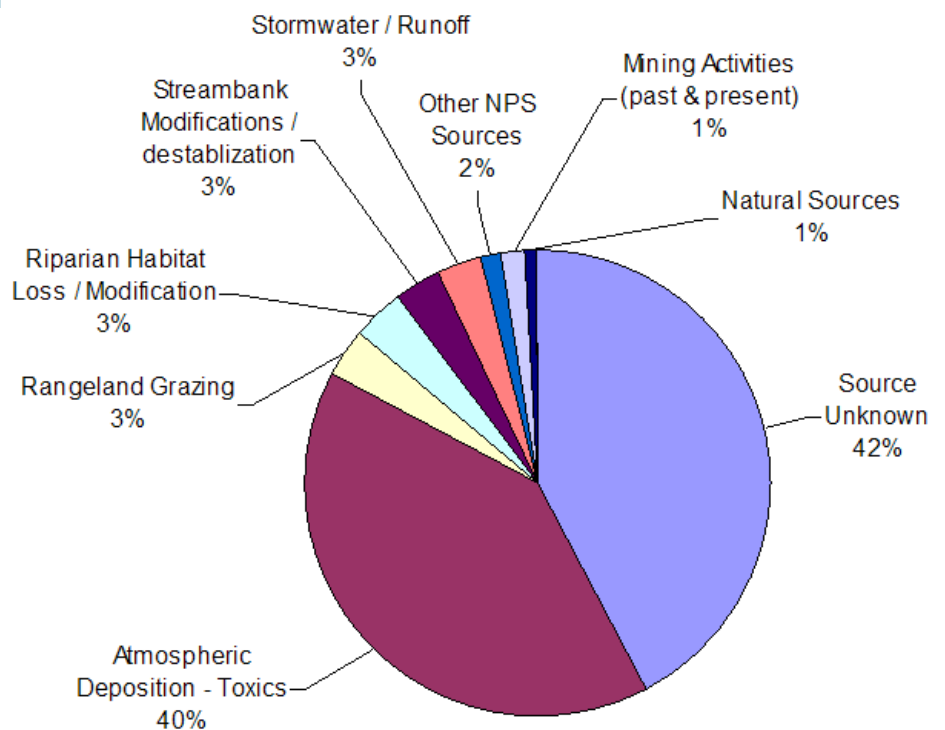
Principal sources of nonpoint source pollution in New Mexico

Rivers & Streams



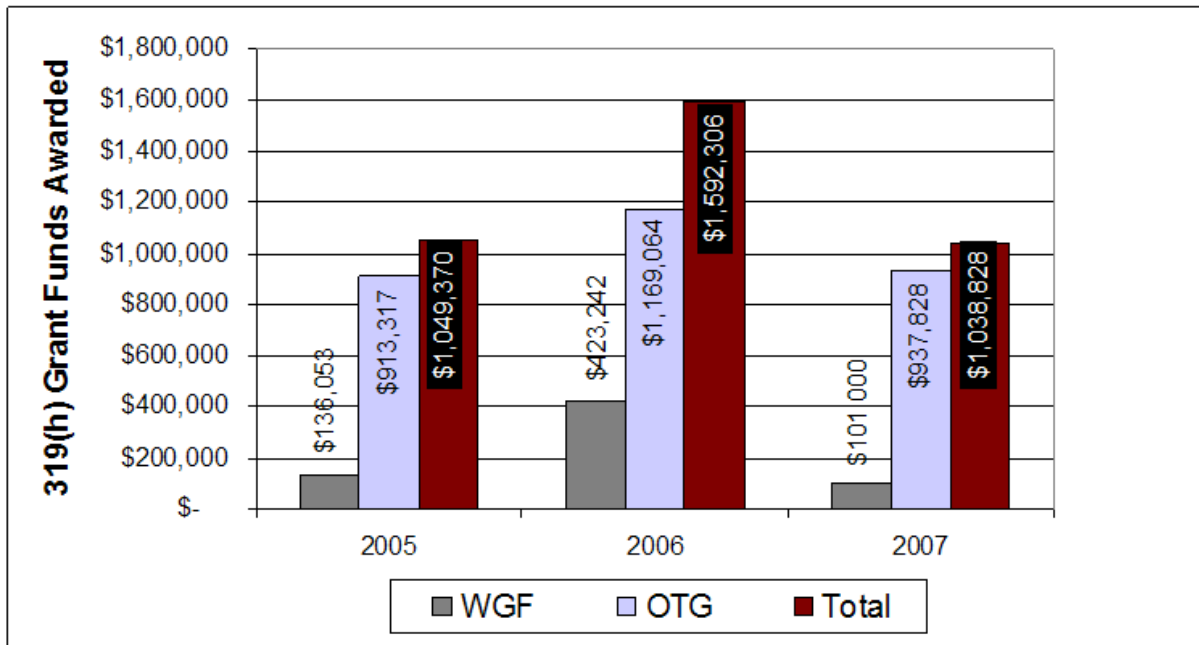
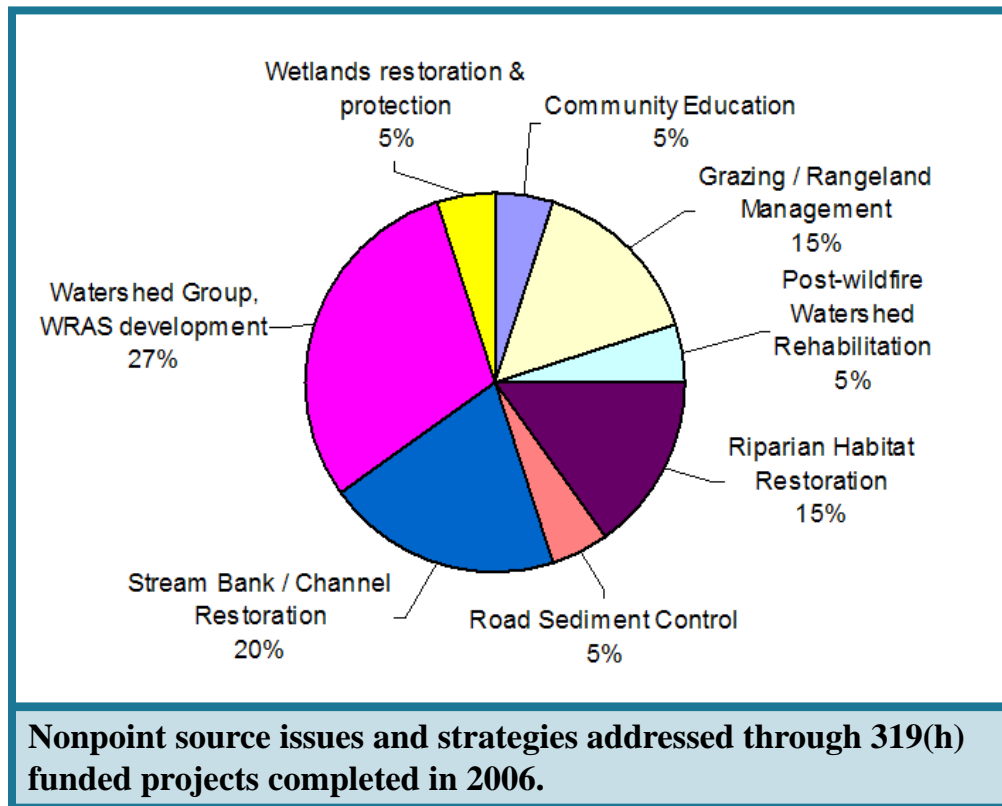
Data in charts derived from the SWQB Water Quality Database in January 2007

Cirque Lakes, Reservoirs, & Playa Lakes



FINANCIAL SUMMARY FOR 2006

CWA Section 319(h) Funding Distribution for 2006



319(h) grant funds awarded to “On -the-Ground” (OTG) and “Watershed Group Formation” (WGF) projects in 2005, 2006, and 2007 (projected).

Year	Project Type	Watershed (8-digit HUC)	319 Funds Awarded
2005	WGF	Pecos Headwaters	\$ 27,700
2005	WGF	Upper Gila	\$ 28,153
2005	WGF	Upper Rio Grande	\$ 80,200
2005	OTG	Rio Grande-Santa Fe	\$ 101,425
2005	OTG	Rio Chama	\$ 125,280
2005	OTG	Pecos Headwaters	\$ 200,000
2005	OTG	State-wide (initial focus in Jemez)	\$ 240,534
2005	OTG	San Juan	\$ 246,078
TOTAL FUNDS FOR 2005			\$1,049,370
2006	WGF	Pecos Headwaters	\$ 33,700
2006	OTG	San Francisco	\$ 41,000
2006	WGF	Tularosa Valley	\$ 42,900
2006	OTG	San Francisco	\$ 43,200
2006	OTG	Conjeos	\$ 56,100
2006	WGF	Animas	\$ 90,912
2006	WGF	Rio Grande - Albuquerque	\$ 110,600
2006	WGF	El Paso - Las Cruces	\$ 145,130
2006	OTG	Rio Grande - Albuquerque	\$ 254,034
2006	OTG	Rio Hondo	\$ 368,480
2006	OTG	Rio Penasco	\$ 406,250
TOTAL FUNDS FOR 2006			\$1,592,306
2007	OTG	San Juan	\$19,122
2007	OTG	Upper Gila	\$19,191
2007	OTG	San Francisco	\$36,700
2007	WGF	Upper Pecos	\$101,000
2007	OTG	Upper Chama	\$160,118
2007	OTG	Upper Pecos	\$210,000
2007	OTG	Upper Rio Grande	\$227,986
PILOT PROJECTS WITH NRCS/EQIP			
2007	OTG	Mimbres	\$65,000
2007	OTG	San Juan	\$199,711
TOTAL FUNDS FOR 2007			\$1,038,828

CWA 319(h) funds awarded to WGF and OTG projects in New Mexico watersheds. Total project budgets also include cash matches and in-kind matches (not included in this table).

Watershed Protection & Nonpoint Source Management Program

The SWQB Nonpoint Source Management Program goal is to implement progressive watershed-based restoration and protection programs with the active assistance of all stakeholders, for all watersheds within New Mexico in order to meet water quality criteria that will fully protect designated uses as described in the NM Water Quality Standards.

As a result of implementing this program, New Mexico hopes to achieve measurable results such as:

- Reduced NPS pollutant loadings
- Successfully implemented TMDLs/WRASs; reducing number of impaired water bodies throughout NM
- Ensure ground water quality for municipal, domestic, and agricultural uses

To accomplish this specific goal, the Management Program has identified key objectives. Over the next five years we will: target all watersheds with completed TMDLs for watershed restoration and watershed group formation projects; develop WRASs in watersheds with impaired water bodies and restoration projects; integrate Wetland Action Plans into WRASs where applicable; and establish a New Mexico Watershed Forum.

“Measure W” of EPA Strategic Plan (2006-2011); New Mexico Priority Watersheds:

In 2006, NMED and EPA identified the 8-digit scale hydrologic units (HUCs) associated with §319(h) projects as representing priority areas for waterbody restoration within the State. During 2007, NMED will refine the information to target certain waters based on the 12-digit scale HUCs and track improvements in water quality as potential successes under EPA’s Measure W (watersheds restored).

The 2007 NPS Annual Report will highlight progress made towards accomplishing this measure.

NONPOINT SOURCE PROGRAM ACTIVITIES	
Implement NPS restoration & protection programs	
<i>319(h) projects completed in 2006</i>	11
<i>319(h) projects in progress</i>	29
<i>319(h) projects awarded for 2007</i>	9
Develop WRASs for all watersheds with impaired surface waters by 2015	
<i># of 8 & 11- digit HUC watersheds that have or contribute to impaired waters (out of 664)</i>	14 & 214
<i>Number of above watersheds represented in a WRAS document</i>	99
<i>WRAS documents developed to date</i>	28
Form watershed groups in watersheds with TMDLs each year with 319(h) funding	
<i>8 & 11-digit watersheds with TMDLs</i>	15 & 188
<i>Watershed groups formed to date (some no longer active)</i>	26
<i>Watershed groups formed in 2006</i>	3
Provide public outreach & education	
<i>Published Clearing the Waters Newsletter</i>	3
<i>Participated in children’s water festivals and other k-12 educational programs</i>	13

New Mexico Wetlands Program Activities

The goals of the New Mexico Wetlands Program are to protect and restore New Mexico's remaining wetlands and riparian areas and to increase self-sustaining, naturally functioning wetlands and riparian areas so they continue to benefit New Mexico's future.



Components of the program include planning, protection, restoration, education, and community involvement. The New Mexico Wetlands Action Plan Program facilitates the development of comprehensive plans for wetlands restoration and protection in watersheds throughout New Mexico. Our program promotes wetland restoration as an integral part of watershed restoration and health. Participation in the program requires the creation of at least 30 acres of new or restored wetlands in the watershed. We are also working toward increasing wetlands protection through monitoring and strengthening water quality standards that pertain to the State's wetland resource. The program encourages volunteer participation in on-the-ground wetland creation projects, and helps obtain funding for these projects. We also provide wetland/riparian education and outreach for schools and interest groups. We are interested in helping to organize local community efforts focused on wetlands in their watershed and composed of local organizations, tribal and cultural groups, private landowners, state and federal agency representatives, and other stakeholders.

Visit the New Mexico Wetlands Program on the SWQB website: www.state.nm.us/SWQB/wetlands

New Mexico Surface Water Quality Standards Program Updates

Amendments to the NM Water Quality Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) as part of New Mexico's 2003-2004 Triennial Review Approved by EPA in Dec. 2006

Amendments applicable to Nonpoint Source issues include:

- Amended definitions in 20.6.4.7 NMAC for "best management practices," "practicable," and "surface water(s) of the state."
- Changes to the antidegradation provision in 20.6.4.8(B)(13) NMAC that clarify implementation of BMPs is voluntary except as provided by federal or state law.
- Changes to the general criteria found in 20.6.4.13 NMAC, especially subsection (A) for suspended and settleable solids and subsection (J) for turbidity.

Information added to support new sections 20.6.4.97, 20.6.4.98 and 20.6.4.99 NMAC to cover ephemeral, intermittent and perennial waters not otherwise classified (includes aquatic life use and recreational use as default uses).

Draft revisions to the antidegradation provision at 20.6.4.8 NMAC that prohibits degradation of water quality in Outstanding National Resource Waters

The purpose of the draft rule revisions is to allow short-term or temporary degradation of the water quality of ONRWs consistent with the federal provision. After reviewing comments, the SWQB revised the draft rule and on December 22, 2006 submitted a petition to the WQCC to amend 20.6.4.8 NMAC. The hearing on the rule change is scheduled to be held on April 10, 2007.

Forest Guardians petitioned the WQCC to designate the headwaters and tributaries within the Pecos Wilderness and designated roadless areas as ONRWs. The hearing on the petition is scheduled for July 10, 2007.

Monitoring & Assessment Program Updates

In 2006 the Monitoring and Assessment Section collected water quality monitoring data for 1282 stream miles and 15,606 lake acres. Assessments were completed for data collected in 2004. Stream miles, lake acres, and assessment units will vary in number depending on which watersheds are being monitored, the size of the assessment units, and the amount of water present in a given year. Watersheds with monitoring activity in 2006 included Canadian (902 stream miles, 29 lake acres), Dry Cimarron (159 miles, 6 acres), Pajarito (118 miles, 25 acres), and Valle Vidal (103 miles, 17 acres).

Year Monitored	Year Assessed	Stream Miles	Lake Acres	# of Stream Assessment Units	# of Lake Assessment Units
2001	2003	895	3,803	69	5
2002	2004	854	13,409	45	3
2003	2005	661	13,932	25	5
2004	2006	711	10,722	48	7
2005		508	1,358	34	2
2006		1,282	15,606	77	14

Monitoring and Assessment protocols and projects...

Nutrient Criteria

Currently, New Mexico has a narrative criterion to determine nutrient impairment, which states, “*Plant nutrients from other than natural causes shall not be present in concentrations which will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state*” (NMAC 2005). This narrative criterion can be challenging to assess because relationships between nutrient levels and impairment of designated uses are not defined, and distinguishing nutrients from “other than natural causes” is difficult.



To address these problems, the SWQB (in cooperation with EPA and the US Geological Survey) revised New Mexico's Nutrient Assessment Protocol for Streams in 2004 using a more robust weight-of-evidence approach. The weight-of-evidence approach uses both causal (total nitrogen and total phosphorus) and response variables (dissolved oxygen, pH, periphyton chlorophyll a, and benthic macroinvertebrate metrics) for assessment purposes. Impairment threshold values were developed for each of the causal and response variables used in the assessment protocol. The values are used to translate the current narrative nutrient criterion into quantifiable endpoints, which can be used in the development of Total Maximum Daily Loads (TMDLs).

During the 2006 field season, the SWQB continued to collect nutrient data for wadeable streams and started compiling nutrient data for non-wadeable rivers and lakes and reservoirs. The data will be combined with historic datasets to develop appropriate Nutrient Assessment Protocols for each unique waterbody. At the moment, threshold values for wadeable streams are being refined using regional data and improved stream classification systems. The refined threshold values will be proposed for adoption into the New Mexico Water Quality Standards in 2007. The SWQB will continue to use the weight-of-evidence approach in proposing nutrient criteria for non-wadeable rivers, lakes and reservoirs, and eventually wetlands.

Bedded Sediment Criteria

The narrative criterion for stream bottom deposits (NMAC 20.6.4.13.A) mirrors the language of the nutrient criterion, and therefore faces similar challenges. The movement of sediment through a watershed is a natural process that varies with stable environmental characteristics such as geology and gradient. This confounds the distinction between natural and anthropogenic sources.

The scope of the current assessment protocol is based on the stressor-indicator relationship between the bedded (settled) sediment and macroinvertebrate community score within representative riffle habitat. The macroinvertebrate community score and percent fines bedded sediment is then compared to a reference site to determine impairment. As more is understood about sediment dynamics and function in the streams of New Mexico, it is recognized that a more encompassing survey, including other habitats within a stream reach, would better represent this relationship in our state. In 2006 the SWQB addressed this issue by following an EPA-developed habitat and macroinvertebrate protocol, the Environmental Monitoring and Assessment Program (EMAP). This system includes monitoring of additional stream channel characteristics during habitat and benthic macroinvertebrate surveys allowing for a more precise, repeatable, and quantifiable representation of the stream.

In 2007 the SWQB will explore incorporating these variables into a revised stream bottom deposit/sedimentation assessment protocol including the development of individual metrics that respond to a sediment stressor rather than the entire macroinvertebrate community score. These changes and additions to the assessment protocol will allow the SWQB to more accurately determine impairment due to excessive sedimentation.



Middle Rio Grande Studies - Water Quality and Fish Health

Fish health monitoring: a pilot study on the Middle Rio Grande (MRG)

Fish are regarded as representative indicators of overall system health because of their position in the food chain. Impairments of fish health may indicate contaminants within the aquatic ecosystem, some of which could remain undetected by water quality monitoring. Monitoring of fish health was conducted at three stations on the MRG. Species collected include common carp (*Cyprinus carpio*) and channel catfish (*Ictalurus punctatus*). A total of 20 fish were collected from each site and examined for external and internal anomalies. Analyses of samples from organs and abnormal tissue will be used to detect changes in the overall condition of the fish, which will supplement other NMED biomonitoring data.

Rio Grande silvery minnow: Middle Rio Grande Fish Health Study

The purpose of this study is to provide accurate information about the status, health and welfare of individual Rio Grande silvery minnow (*Hybognathus amarus*) and their subpopulations throughout the species range through time. Studies will provide a means to directly characterize the health status of wild Rio Grande silvery minnow in relation to water quality and other environmental stressors in the Middle Rio Grande through an entire year, thus capturing variation across seasons. Fish health assessments have become increasingly important tools for identifying poor water quality conditions and managing water quality to benefit fisheries. Seasonally (four times a year), fish are collected from six sites throughout the Middle Rio Grande. A total of 30 Rio Grande silvery minnow will be sampled at each collection site. To establish baseline health or overall condition a fish health assessment is performed. The fish health assessments are a standard system of observation of fish tissues and organs during the field necropsy. The project is funded through a federal grant in collaboration with the U.S. Fish and Wildlife Service and the University of New Mexico.

Water Quality Monitoring of the Middle Rio Grande: Annual Baseline Condition and Trends of Key Water Quality Parameters

The project will establish and conduct a monitoring program to establish annual baseline conditions and trends for key water quality parameters for the Middle Rio Grande. Composite water samples are taken at a total of 10 sites throughout the Middle Rio Grande and sediment samples are collected from the surface layer just below waters edge. Water and sediment samples are analyzed for metals, chemicals, pesticides and herbicides. This study will provide a water-quality assessment and monitoring program for the Middle Rio Grande to assess potential water-quality relationships to Rio Grande silvery minnow health and recovery. The project is funded through a federal grant.



Netting fish, Rio Grande



Rio Grande silvery minnow



Rio Grande

Total Maximum Daily Load (TMDL) Program Update

TMDLs written/pending Jan - Dec 2006	3 TMDLs written, 1 pending
Total TMDLs completed to date	143 (1 pending)
8-digit HUC watersheds with TMDLs	15 (out of 83 watersheds)
TMDLs in 8-digit HUCs + impairments for 2006	
Jemez Watershed	3 TMDLs: temperature, turbidity
Rio Puerco Watershed	1 TMDL: sedimentation/siltation (SBD)
SWQB met its commitment to EPA to write 18 TMDLs for Federal Fiscal Year 2006 (October 2005-October 2006)	

A complete list of TMDLs can be found on the SWQB website at: www.nmenv.state.nm.us/swqb/TMDL

New Mexico Mining Act (NMMA) Program Activities

NEW MEXICO MINING ACT ACTIVITIES	
Mine Applications	
<i>Minimal Impact Mines</i>	2
<i>Exploration Projects</i>	19
Closure/Closeout Plans	
<i>Final Plan Approval</i>	3
<i>Plans (Review/Comment)</i>	15
General Permit Certifications	6
Mine Site Investigations/Inspections	45
Public Meetings	9

Two staff positions in SWQB's Watershed Protection Section are responsible for review and comment on proposed mining activities as they will affect, or are to be regulated by, New Mexico surface water quality standards. In addition staff review and comment on exploration and mine permit applications, mine site closure/closeout plans and mine site discharge permits. This work insures that any range of discharges from exploration, mining or mine reclamation activities does not adversely impact surface waters of the state. Accomplishment of these objectives often requires coordination between WPS and other sections within the Surface Water Quality Bureau, Ground Water Quality Bureau, Air Quality Bureau, Mining and

Minerals Division, NM Department of Game and Fish, USEPA, NM State Historic Preservation Office, US Forest Service, US Bureau of Land Management and the mine operators, including their consultants.

Other mining related activities not associated with the New Mexico Mining Act include oversight of surface water concerns for the Terrero Mine Administrative Order of Consent (AOC) and the Molycorp Mine AOC. This oversight involves representing surface water quality concerns at both interagency and public meetings, review and comment of documents and field investigations. There are three closed but not reclaimed Uranium mine sites in the State currently under Stage 1 Abatement Plan and Closeout Plan development. They include the St. Anthony Mine, Section 27 Mine and the JJ#1/L-Bar Mine in which staff are involved. Stage 1 of the Abatement Plan is to design and conduct a site investigation looking into the extent of surface water and ground water contamination at these closed uranium mine sites.

CWA Section 401 - Discharge of Dredge or Fill Program Activities

CWA Section 404/401 Water Quality Certifications and Actions:

Nationwide Permit Activities Certified (40 in Ephemeral Watercourses)	86
Individual Permits Certified	9
Total	95

Other Actions:

No permit (SWANCC)	1
No permit (Tulloch)	3
No permit necessary	11
Withdrawn	1
Total	16

Other Coordination/Activities:

Certifications in Progress	19
Complaint	2
Consultation	5
Total	26

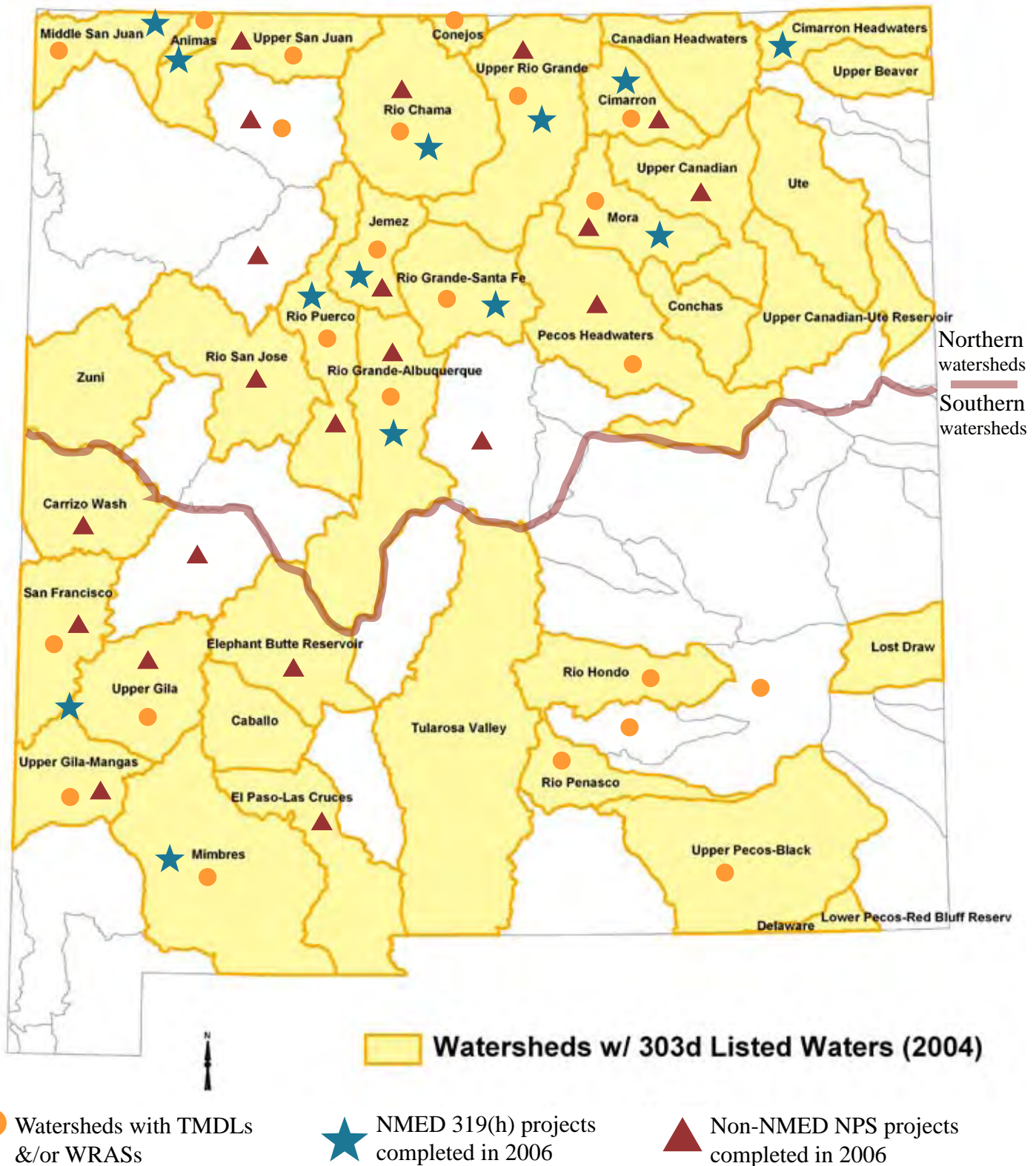
Program staff continued to review the Discharge of Dredge or Fill projects for Water Quality Certification under Section 401 of the federal Clean Water Act.

The purpose of the Water Quality Certification Program is to ensure that Section 404 Discharge of Dredge or Fill permits issued by the U.S. Army Corps of Engineers (Corps) comply with state water quality standards. Certification for the Corps Nationwide Discharge of Dredge or Fill permits in ephemeral watercourses were addressed under a blanket certification issued in March 2002. Individual Discharge of Dredge or Fill permits in perennial, intermittent or ephemeral watercourses; and Nationwide Dredge and Fill permits in perennial or intermittent watercourses and wetlands require project-specific certifications. The certifications include a list of conditions to be met by the applicant and designed to protect water quality standards and designated uses.

For this purpose, the state has been divided into four geographic jurisdictions. Duties continue to be assigned to five staff in the Santa Fe, Silver City, Las Cruces, and Las Vegas Offices. Of the five, one position is jointly funded between NMED and New Mexico Department of Transportation (NMDOT) and acts as a main point of contact for water quality concerns relating to NMDOT transportation, construction, and maintenance projects. Staff duties related to the Water Quality Certifications program include, but are not limited to, coordination, consultation, inspection, and outreach.



New Mexico Watersheds with Impaired Waters



For a complete listing and description of impaired waters see the New Mexico 303(d) / 305 (b) Integrated Report available on the SWQB website at: www.nmenv.state.nm.us/swqb/MAS

Clean Water Act Section 104(b)(3) Grant Projects

Through section 104(b)(3) of the Clean Water Act, EPA makes grants available to promote the prevention, reduction and elimination of pollution. Funds are to be used to focus on innovative demonstration and special projects.

New Mexico Wetlands and Riparian Corridors - From Plan to Action Phase I

Funding: Federal 104(b)(3) \$81,000, In-Kind Match \$27,500

Project Dates: September 2003 - January 2007

Watershed areas Covered: State-wide

To find out more about this project
visit the newly created
NM Wetlands Program website:
www.nmenv.state.nm.us/wetlands

Project Goals:

- To establish a state Wetlands Program and incorporate program elements into routine activities of SWQB
- To protect, restore, and enhance wetlands by developing and implementing “Wetlands Action Plans” (WAP) by established watershed groups statewide

Project Summary:

- Wetlands program coordinator position and tasks for program staff developed
- Statewide Wetlands Workgroup developed
- Program website created
- Wetlands Action Plan information outreach to stakeholders, watershed groups, and other agencies: development of a guidance outline (full guidance document under development), presentations, and fact sheets
- Technical assistance for WAP development to 3 watershed groups, two draft WAPs submitted to EPA: Conejos Watershed, Lower Rio Grande (Riverside WAP), and Valles Caldera National Preserve (WAP)
- Elements for wetlands monitoring incorporated into SWQB QAPP and approved by EPA. Site specific QAPPs developed for WAP projects

Project challenges & Lessons Learned:

- Underestimation of time and effort to develop a State Agency Program
- No funding available for developing Wetlands Action Plans for watershed groups. WAPs developed by SWQB staff with pro bono watershed assistance.
- Significant time spent on proposal development for EPA Wetlands Program Development Grants for State/Tribal Outcome Wetland Demonstration Program but funding was not appropriated.



Lower Rio Grande WAP meeting



Jemez River wetlands

Clean Water Act Section 319(h) Grant Projects

The 319 grant program concentrates awards on projects located in watersheds with impaired waters and with completed TMDLs. A WRAS is required to be completed before On-the-Ground projects are initiated.

Though many projects have been implemented under the 319(h) Grant Program, there has been little monitoring to provide data showing the impact of those projects on water quality. Monitoring is included in several project's workplans, results are expected in the next few years. Often it takes 5-10 years of monitoring to acquire conclusive evidence of a project's direct affect on water quality. Challenges for long-term monitoring are present in many project areas and include lack of volunteers, training, and equipment. In many cases, however, anecdotal observations and preliminary monitoring have shown positive effects on water quality particularly with regards to temperature, sedimentation, stream channel morphology, and riparian vegetation.

Projects in the following sections are identified as either Watershed Group Formation (WGF) or On-the-Ground (OTG) to reflect the type of 319 (h) grant funding they received.

Watersheds represented by these projects are listed below along with their 8-digit HUC
(Hydrologic Unit Code number used to identify their location and their relation to smaller or larger watersheds)

Project summaries are grouped according to which 8-digit HUC they fall within

Northern New Mexico Watersheds	Southern New Mexico Watersheds
Animas (14080104)	San Francisco (15040004)
Cimarron (11080002)	Upper Gila (15040002)
Cimarron Headwaters (11040001)	Upper Gila-Mangas (15020002)
Conejos (130100050)	
Jemez (13020202)	
Middle San Juan (14080105)	
Mimbres (13030202)	
Mora (11080004)	
Rio Chama (13020102)	
Rio Grande - Albuquerque (13020203)	
Rio Grande - Santa Fe (13020201)	
Rio Puerco (13020204)	
Upper Rio Grande (13020101)	

Summary of 319(h) projects completed in 2006 by NMED Surface Water Quality Bureau Watershed Protection Section

Year Started	8-HUC Watershed	Waterbody / sub-watershed	Project Type / BMPs	303(d) Listed Impairments	319 Funds Used	% of total	Match (C+IK)	Federal Match	Total Match	% of total	Project Total
2000	San Juan, Upper Rio Grande, Cimarron	San Juan, Red River, Cimarron	Watershed group formation	Aluminum, Fecal Coliform, Nutrients, SBD, Temperature, Turbidity,	\$ 218,369	60%	\$ 145,579		\$ 145,579	40%	\$ 363,948
2002	Animas River	N/A	Stream bank / channel restoration	Sedimentation (delisted), Nutrients	\$ 136,161	51%	\$ 132,421			49.30%	\$ 268,582
2002	Cimarron Headwaters & statewide	Dry Cimarron River	Grazing / Rangeland management, Stream bank / channel restoration, Riparian habitat restoration	originally: pH, total dissolved solids, temperature, total ammonia, and stream bottom deposits; all de-listed after new assessment in late 2002	\$ 320,617	34%	\$ 617,897			65.84%	\$ 938,515
2002	Mora	Sapello	Post-wildfire rehabilitation, Grazing / Rangeland management, Stream bank / channel restoration, Riparian habitat restoration		\$ 139,611	57%	\$ 105,266			42.99%	\$ 244,877
2002	Rio Grande-Santa Fe	Las Huertas Creek Watershed	Watershed group formation, WRAS development	Sedimentation/Siltation	\$ 36,385	41%	\$ 51,716			58.70%	\$ 88,101
2002	Rio Puerco	San Pablo	Grazing / Rangeland management, Road sediment control, Stream bank / channel restoration, Riparian habitat restoration	Sedimentation / Siltation; Nutrients / Eutrophication Biological Indicators	\$ 179,500	54%	\$ 95,498	\$ 58,439	\$ 153,937	29%	\$ 333,437
2003	Jemez, Chama	N/A	Watershed group formation	conductivity, stream bottom deposits, total organic carbon, chronic and acute aluminum, pH, temperature, turbidity, sedimentation, nutrients, mercury, fecal coliform, total ammonia, dissolved oxygen	\$ 184,000	59%	\$ 128,325		\$ 128,325	41%	\$ 312,325
2003	Rio Grande – Albuquerque, Rio Grande – Santa Fe	N/A	community education	Middle Rio Grande – Fecal coliform. Santa Fe River – low flow alterations (above WWTP), sedimentation, dissolved oxygen, and pH (below WWTP).	\$ 57,866	38%	\$ 93,800			61.85%	\$ 151,666
2003	Rio Grande-Santa Fe	San Pedro Creek	Watershed group formation, WRAS development	None	\$ 15,917	38%	\$ 26,509			62%	\$ 42,426
2004	Upper Rio Grande, Mimbres, Conejos	N/A	Watershed group formation		\$ 177,600	60%	\$ 118,400			40.00%	\$ 296,000
2005	Upper Gila, Upper Gila-Mangas, San Francisco	Gila River	Watershed group & WRAS formation	Chronic Aluminum, Conductivity, Nutrients, Temperature, Turbidity	\$ 53,207	51%	\$ 50,989		\$ 50,989	48.94%	\$ 104,196
					\$ 844,086	54%	\$ 670,503	\$ 58,439	\$ 728,942	46.34%	\$ 1,573,028

Northern New Mexico Watersheds

Animas River Watershed

The Animas River is one of the largest rivers in the western United States which is still unregulated by large dams. It's headwaters are high in the San Juan Mountains of Colorado giving the river predictable peak flows in the spring. The lower portion of the watershed is a rapidly urbanizing agricultural valley. Agricultural and urban development have encroached on the river in many places, with loss of floodplain area and wetlands as a result. Where this encroachment has occurred, the river is typically confined by a levee on one or both sides of the river, which may be composed of scrap concrete, river cobble, or old car bodies.

Animas River Channel Restoration Project

Funding: Federal 319(h) \$136,161, In-Kind Match \$132,420, Project Total \$268,582

Project Type: (OTG) Stream bank / channel restoration

303(d) listed impairments: Sedimentation (delisted partway through project), nutrients

NPS Issues Facing Watershed: Portion of nutrient impairment possibly caused by disconnection of the Animas River from hyporheic zone underlying adjacent floodplains. Loss of wetlands and urbanization also simplified drainage networks and reduced opportunities for wetlands to act as nutrient sinks or for wetlands to attenuate nutrient loading over time.

Project Summary:

The project addressed the stability of a streambank meander with a high risk of avulsion. This involved shaping the river channel and adjusting stream flow for a self-cleaning effect, while allowing for a flood plain during times of high flow. The property is agricultural with irrigated pasture, hay fields, and several areas of natural wetland and riparian vegetation including cottonwood and willow bosque with some Russian olive. With cooperation from the City of Farmington, the project further reduced sediment and nutrient loads for the lower Animas River and for the San Juan River just downstream through the construction of detention basins in arroyo channels.

BMPs Implemented:

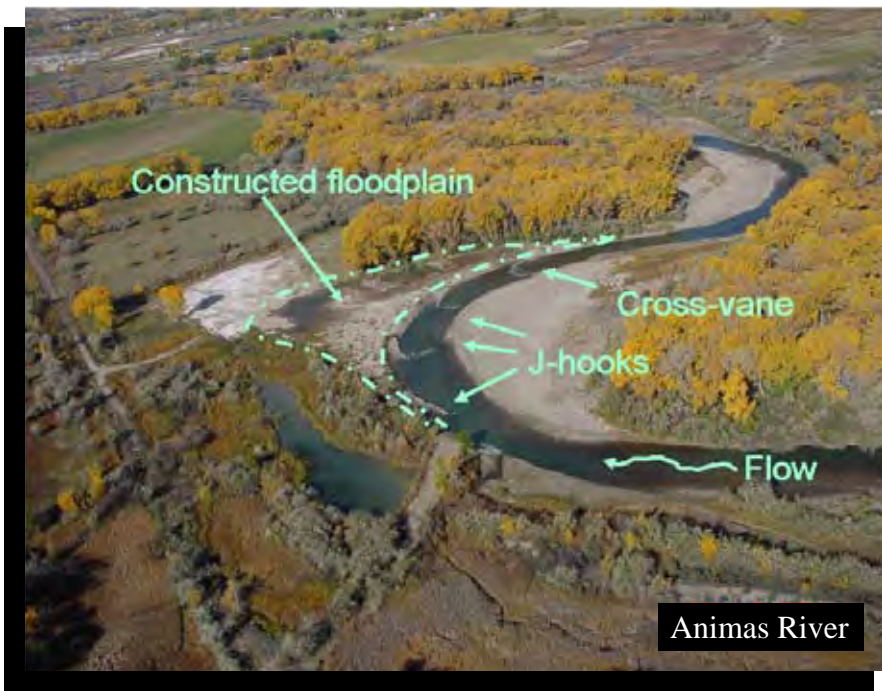
- Initially project included realignment of channel to reduce radius of curvature in tight bend, construction of a floodplain, construction of three j-hooks, construction of a cross vane, and planting of willows and other riparian woody vegetation, some sod transplants and seeding, on the banks and constructed floodplain.
- Towards end of project j-hooks and cross vanes were re-constructed into boulder vanes similar to j-hooks but which do not provide grade control the way that j-hooks do.
- Project also included large stormwater detention ponds constructed voluntarily in urbanizing areas by City of Farmington to reduce sediment and nutrient laden storm flows to River.

Project Results:

- Project area appears to have been stabilized and threat of avulsion reduced
- Protected farmland, preserved existing wetlands, created approx. 2 acres new wetlands, demonstrated relatively inexpensive restoration methods.
- Increased awareness of alternative bank stabilization methods in San Juan County

Public Education & Outreach:

- Hosted several informal tours of the project site for interested individuals and organizations
- Outreach directly resulted in similar project on Animas River south of NM-CO state line, so far successful; and has resulted in the incorporation of some demonstrated design principles in recreation development (boat ramps, kayaking features) by the City of Farmington and the River Reach Foundation.
- Land owner presented to San Juan Water Commission describing need for project and methods used; wrote article for Aztec News; Farmington Daily Times published front page article of the project



Cimarron Headwaters (Dry Cimarron Watershed)

Using the New Ranch: Riparian Education and Restoration (local and state-wide project components)

Funding: Federal 319(h) \$320,617; In-Kind Match \$ 617,897; Project Total \$938,515

Project Type: (OTG) Grazing / Rangeland management, Stream bank / channel restoration, Riparian habitat restoration

303(d) listed impairments: initially - pH, stream bottom deposits, total dissolved solids, temperature, total ammonia (all removed after project started, TDS and temp remained in downstream section); preliminary 2006 data indicate downstream area may be impaired due to DO exceedence.

NPS Issues Facing Watershed: Rangeland grazing among probable NPS pollution sources on 2,474 miles of stream in NM. Locally Dry Cimarron River affected by hydromodification (meanders being cut off and diversion for irrigation), grazing practices, and removal of riparian vegetation.

Project Summary:

This project focused on private property used for grazing known as the Rainbow Ranch, encompassing two miles of the Dry Cimarron River close to its headwaters. The owner approached the Quivira Coalition for help in restoring this riparian area where, for many years, the family had allowed approximately 80 head of cattle to settle. This three-year project had three parts: education and outreach, educational materials, and riparian restoration.

Riparian Restoration & BMPs Implemented:

- On Rainbow Ranch: produced grazing plan (included creation of riparian pasture to be used only under specific and infrequent circumstances)
- Implemented grazing plan through construction of fencing, stabilized banks with structures built by volunteers during workshops, prevented further downcutting with larger structures built by contractors, restored flow and stream length to two meanders previously cut off, planted willows, used site as educational tool in reaching area ranchers
- At Largo and Loco Creeks near Quemado and Mesteño Draw near Mountainair: volunteers stabilized banks or gullies near riparian area at hands-on workshops
- Workshops on rural road maintenance and construction methods that promote proper drainage and minimize erosion included demonstration work on roads in the Newkirk (lower Canadian watershed), Rowe Mesa (mostly Galisteo and Pecos headwaters watersheds) and Cimarron (Cimarron watershed) areas.



Education and outreach:

- 31 educational events or hands-on workshops held at various locations around New Mexico: 15 outdoor riparian restoration & other water-related workshops (6 held on Dry Cimarron River); 11 Outdoor Classrooms on rangeland-health related issues; 3 included Quivira Coalition's Annual Conference; 2 water-related seminars.
- Events attended by 2,331 people with about 25% attending more than one.
- 6 Quivira Coalition newsletters produced and distributed;
- 2 field guides updated & 3000 copies printed: *An Introduction to Erosion Control* by Bill Zeedyk and Jan-Willem Jansens and *An Introduction to Induced Meandering: a Method for Restoring Stability to Incised Stream Channels* by Bill Zeedyk. Project also provided partial funding for printing of 5000 *A Good Road Lies Easy on the Land... Water Harvesting from Low-Standard Rural Roads* by Bill Zeedyk.

Project Challenges & Lessons Learned:

- Development of Watershed Restoration Action Plan for the Dry Cimarron River watershed initially planned; activity delayed then removed from project workplan
- NMED project officer feels if a locally produced watershed plan is desired, a local contractor or subcontractor should be sought out (also early in the project) who is sincerely interested in preparing the plan. Planning efforts should only be conducted when they are viewed as important by affected communities. By educating some community members about water quality issues, this project may have helped bring them closer to this view.

Water Quality Improvements:

- Monitoring data collected do not demonstrate improvement in water quality in a scientifically sound manner, however, they do support that an improvement has occurred.
- Riparian vegetation data indicate that banks are much better protected by vegetation. Photo monitoring also supports this, and suggest that the channel is generally narrower, deeper, and better shaded within the project area.
- Geomorphology data support bed material is somewhat coarser (with 13% gravel in 2005, up from 6% in 2003), a logical result of reduced bank erosion. Geomorphology data also indicate development of more defined pools and riffles (increased habitat diversity) in 2005.

Project Monitoring:

- Photo monitoring will be repeated in 2007. Geomorphology survey may be repeated in 2007 or 2008, as funding and time permit.



Cimarron River Watershed

The Collaborative Watershed Project – Supporting TMDL Implementation in Northern New Mexico in the San Juan, Red River and Cimarron watersheds

Full project summary under San Juan Watershed

Conejos River Watershed

Proposal for Watershed Group formation in the Conejos, Mimbres, and Upper Rio Grande Watersheds, New Mexico

Funding: Federal 319(h) \$177,600, In-Kind Match \$118,400 , Project Total \$296,000

Project Type: (WGF)

303(d) listed impairments:

NPS Issues Facing Watershed: *Conejos:* irrigation, silviculture, recreation; *Mimbres:* dredge mining, hydromodification; *Upper Rio Grande:* recreation; All: grazing, riparian vegetation removal, stream bank modification / destabilization.

Watershed Group Formation projects reach out to communities in an effort to draft proposals for future On-the-Ground projects and draft Watershed Restoration Action Strategy documents. Rural communities need more resources to maintain group structure with funding of a coordinator as an incentive.

Jemez River Watershed

The Collaborative Watershed Project: Supporting TMDL Implementation in the Chama and Jemez Watersheds in North Central New Mexico

Funding: Federal 319(h) \$ 184,000, In-Kind Match \$ 28,325 , Project Total \$312,325

Project Type: (WGF)

303(d) listed impairments: *Jemez:* conductivity, metals (chronic aluminum), stream bottom deposits, pH; *Chama:* fecal coliform, chronic and acute aluminum, mercury, plant nutrients, sedimentation, total organic carbon, temperature, total ammonia, turbidity variations in dissolved oxygen and modified stream bottom deposits; *both:* temperature, and turbidity, total organic carbon.

Project Summary:

The primary objective of this project was to establish collaborative watershed processes involving all key interests and affected parties in the Rio Chama and Jemez River watersheds. Groups met regularly to develop an organizational structure and WRAS, and to work to implement the mission, goals and objectives identified in the WRAS. Additional objectives of the collaborative community efforts in these two watersheds included:

- Increase local understanding of the Bureau's water quality management system and identify ways in which individuals and organizations can contribute to improving water quality
- Identify non-point sources of pollution and develop a watershed restoration action strategy (WRAS)
- Work toward the remediation of priority sites

Project Results:

Rio Chama:

Through a series of meetings throughout the watershed, local community members worked with representatives from local, state and federal agencies to identify priority issues and sites of concern. Through this process, the group documented water quality and related natural resource issues of concern, potential sources of these concerns, and existing projects and/or proposed strategies to address these concerns. The group also discussed proposed elements to be included in a WRAS for the entire watershed and the process for writing the WRAS. Four sub-watershed groups formed to support local involvement in development and implementation of the WRAS. These include:

- Upper Chama Sub-Watershed Group
- Rios Nutrias, Cebolla and Canjilon Creek Sub-Watershed Group
- El Rito Creek and Rios Vallecitos, Tusas and Ojo Caliente Sub-Watershed Group
- Abiquiu, Coyote, Gallina Sub-Watershed Group

Jemez

Monthly public meetings were held to develop the WRAS, to provide special presentations on selected watershed issues identified in the WRAS (e.g., noxious weeds, wetland restoration, etc.), conduct group organization and business, and to help stakeholders identify and respond to funding opportunities to address selected watershed concerns. Jemez Watershed Group (JWG) produced a WRAS that is identified by EPA as an example for other watershed groups. The WRAS has served as a resource and organizing tool for the JWG, and was used on a regular basis to prepare for subsequent 319 Grant funding cycles and to plan the direction and activity of the JWG. The WRAS was updated in summer 2005 to include additional sites for remedial activity in support of proposals that might be developed by JWG members for the 2006 round of 319 funding.

Project Challenges and Lessons Learned:

Identification of some new insights based on the unique experiences of working with the communities in the Rio Chama and Jemez River watersheds. Some key messages that may be transferable to future work in other watersheds are listed below:



- Website development can serve as a tool for community outreach and involvement
- Identifying school projects helps foster student involvement
- ‘One size’ for the formation of collaborative groups ‘does not fit all’
- Collaboration and group formation takes time and resources
- Interagency coordination facilitates effective watershed group formation and project implementation
- Utilizing smaller groups can help increase local involvement and address differing interests
- Sharing lessons learned from existing watershed groups is helpful to formative groups

Middle San Juan River Watershed

The Collaborative Watershed Project – Supporting TMDL Implementation in Northern New Mexico in the San Juan, Red River and Cimarron watersheds

Funding: Federal 319(h) \$ 218,369, In-Kind Match \$ 145,579, Project Total \$ 363,948

Project Type: (WGF)

303(d) listed impairments: *San Juan:* Fecal Coliform, SBD, Nutrients, Temperature; *Cimarron:* Fecal Coliform, SBD, Temperature, Turbidity, Aluminum; *Red River:* Aluminum

Project Summary:

The primary objective of the collaborative community efforts in the San Juan, Cimarron River and Red River watersheds was to establish collaborative watershed processes involving all key interests and affected parties. These processes were also to:

- Increase local understanding of SWQB’s water quality management system (including TMDLs and load allocations)
- Identify non-point sources controlled under the TMDLs
- Develop locally acceptable remediation plans to achieve TMDL load reductions; Develop a WRAS
- Work toward/remediate priority sites
- Build local capacity through public involvement in all of these activities, and outreach and education

Project Results:

Multi-party, collaborative community watershed groups were successfully formed in the San Juan River, Cimarron, and Red River watersheds. Facilitation of each group was transitioned to local leadership prior to completion of each effort. In all watersheds, participants met on a monthly or quasi-monthly basis to:

- Develop an organizational structure;
- Build understanding and awareness of the Clean Water Act, the 319 non-point source program, related surface water quality issues in the watershed and other watershed concerns;
- Develop a watershed plan to address these concerns, integrating an education and outreach program; and
- Take part in a diversity of watershed activities.
- On a selected basis, smaller groups of participants took part in smaller task or planning groups contributing subject or project specific input to the larger watershed group.

In each of these watersheds, collaborative community groups worked together to develop watershed plans which incorporated priority sites, remediation plans, and best management practices.

Project Challenges & Lessons Learned:

Our work in each of these watersheds reinforced the concept that each community is unique (e.g., different cultures and cultural diversity; different land ownership patterns; different scales of economy; different ecological challenges; etc.) and that an approach to forming a group in one watershed may not work in another.

Early involvement was critical in the formation of all of these groups. Early stakeholder input on sampling locations, parameters, and data management resulted in a more comprehensive database that more accurately represented the state of water quality in the watershed.

- In each of these settings it took time to develop healthy functioning collaborative watershed groups. To set the group up for success, sufficient resources are needed to support the infrastructure and staffing necessary to form and support a volunteer group and maintain it over an extended period of time.
- When TMDLs are not complete prior to the formation of a watershed group it is difficult for a group to identify and confirm non-point sources of contamination.
- There will always be many different efforts underway in the communities. The Bureau and the OSE could also combine the water planning and CWA efforts.
- Where possible, identify and involve key entities that have the ability to bring funds to a group early on in the collaborative process (i.e. Soil and Water Conservation Districts).
- Working with a smaller group or subcommittee of stakeholders to develop the initial draft of the WRAS helps to simplify the document production process.



San Juan River



Bitter Creek (Red River Watershed)



Cimarron River

Mimbres River Watershed

Proposal for Watershed Group formation in the Conejos, Mimbres, and Upper Rio Grande Watersheds, New Mexico

Full project summary under Conejos Watershed

Mora River Watershed

Sapello Watershed Restoration Project

Funding: Federal 319(h) \$139,611, In-Kind Match \$ 105,266 , Project Total \$ 244,877

Project Type: (OTG) Grazing / Rangeland management; Post-wildfire rehabilitation; Riparian habitat restoration; Stream bank / channel restoration

303(d) listed impairments: Warmwater fishery and marginal cold water fishery was partially supported in the 2002 303(d) report

NPS Issues Facing Watershed: Roads associated with urbanization, overgrazing with removal of buffer zones, legacy erosion on old roads, encroachment of pines, pinon and juniper on valley type terrain.

Project Summary:

This project was initiated as a result of the wildfire in 2000 in the area. The Tierra Y Montes Soil and Water Conservation District (TyM) worked with individuals whose properties had been burned or were downslope from a burn zone. They used BMPs to install structures, assisted with seeding, and mulched the area to minimize loss of soil. Approximately 500 acres were treated. The project progressed to working with property owners whose river banks were unstable. Some of the projects on private land have been used as training for the community to learn how and why streambank stabilization is so important. At least 20 property owners have since also worked with TyM to improve their lands, which has also made for a strong community awareness. A future project will review and improve on the existing WRAS.

BMPs Implemented:

- Several miles of drainages treated with induced meandering and erosion control structures
- Post fire activities included application of “waddles” (straw tubes used to slow down runoff), seeding, and mulching
- Road design that does not create erosion or break the watershed continuity has been encouraged
- Beaver friendly demonstration projects and classes offered to the community

Project Results:

The project provided an awareness of the environmental impacts to their land as well as an economic incentive to increasing and protecting the assets of their land, specifically soil. In an upland situation as this is, soils are not deep and can easily be shifted if the vegetation is removed.

Public Outreach & Education:

Tierra Y Montes staff used this project to demonstrate BMP erosion control structures and road design to benefit both the ecology and increase the economic benefits to the land.

Project Challenges:

Keeping landowners from killing or removing beavers was a challenge.

Project Monitoring:

Photomonitoring stations have been developed and SWQB staff will periodically monitor this subwatershed.

Photos below show project area before and after changes in land management:



Rio Chama Watershed

The Collaborative Watershed Project: Supporting TMDL Implementation in the Chama and Jemez Watersheds in North Central New Mexico

Full project summary under Jemez Watershed

Rio Grande - Albuquerque & Rio Grande - Santa Fe Watersheds

Children's Water Festival Program: Middle Rio Grande, Santa Fe and Other New Mexico Communities

Funding: Federal 319(h) \$57,866, In-Kind Match \$93,800 , Project Total \$151,666

Project Type: (OTG) education

303(d) listed impairments: Middle Rio Grande – Fecal coliform. Santa Fe River – low flow alterations (above WWTP), sedimentation, dissolved oxygen, and pH (below WWTP).

NPS Issues Facing Watershed: There is a continuing need to educate people who live in the Albuquerque and Santa Fe areas about what they can do to help protect water quality. The reaches of the Rio Grande north of Isleta Pueblo to the Rio Jemez, and the Santa Fe River within and downstream of Santa Fe are listed as degraded. Urban runoff, a primary cause of this degradation, can be reduced if people are informed about the causes of pollution and take action.

Project Summary:

The learning activities of three Middle Rio Grande Children's Water Festivals (MRGCWF) in 2003, 2004, and 2005 and three Santa Fe Children's Water Festivals (SFCWF) in 2004 - 2006 helped students in both areas to understand that water is an essential and limited resource and what each of us can do to protect and conserve our precious water.

- Primary support for festivals in Albuquerque 2003 and 2004, and Santa Fe in 2004 and 2005
- Evaluation tasks and classroom visits continued into 2005 (MRGCWF) and 2006 (SFCWF)
- Provided monetary support for a Children's Water Festival in Silver City in 2006
- Provided technical support (but not direct coordination) for festivals in Silver City, Socorro, Gallup, Carlsbad, and Artesia.

Project Results:

The enduring support by New Mexico's Nonpoint Source Management program of the Children's Water Festival program has produced a stable, sustainable organization that will continue to provide high-quality water education to many of New Mexico's children long after these projects are over.

- Directly provided a day of interdisciplinary water education to approximately 3500 students, and provided classroom visits by water educators to approximately 1000 students.
- Water festival program as a whole (including previous projects) has now reached over 9000 students.



One of the objectives of the classroom visits has been evaluating outcomes. One method of evaluating outcomes is to test students on their ability to answer six big water questions:

- Why is water so important to life?
- What is the water cycle and why is it important?
- What is a watershed and how does it function?
- How do trees, animals, people, soils, and water depend on each other?
- How do our actions affect water quality?
- How much water does my family use?

Rather than testing children before and after the event, the results of the visits are used to provide feedback to presenters, who generally have improved their activities from year to year. The result has been that students have been better able to answer the six big water questions as the festival program has matured.

Students are more quantitatively surveyed, before and after the festival, with a water use questionnaire. The result has been an estimated reduction in water use of approximately four gallons per person per day (including family members).

For more information, please see www.pioneerwest.net and www.waterfestnm.com.

Las Huertas Creek Watershed Project

Funding: Federal 319(h) \$36,385, In-Kind Match \$51,716 , Project Total \$88,101

Project Type: (WGF), and water quality monitoring

303(d) listed impairments: Sedimentation/Siltation

NPS Issues Facing Watershed: Sedimentation/Siltation

Project Summary:

The primary goals of the Las Huertas Watershed Project (LHWP) were development of a Watershed Restoration Action Strategy (WRAS), public outreach and project planning for upcoming on-the-ground Best Management Practice (BMP) implementation. The project involved nine cooperating partner organizations in the non-profit and non-governmental organization sector, five in the New Mexico state sector, three federal agencies, two Pueblos and eight private entities. In addition to CWA Section 319(h) grant funding, some cash match was provided by Las Placitas Association (LPA), and substantial in-kind match from project staff, volunteers and partner agencies. The WRAS compiled a list of recommended BMP's that may be grouped into three general categories: 1). Stormwater and runoff control; 2). Stream channel modifications; and 3). Vegetation restoration. Additional recommended actions include ongoing public outreach and education, and an extensive monitoring program.



Volunteer Monitoring

Project Results:

- Collaborative watershed group created
- WWRAS for Las Huertas Creek watershed created according to EPA guidelines
- Volunteer water quality monitoring program for perennial reaches implemented with assistance of SWQB; data on flow rate, pH, temperature, conductivity, dissolved oxygen and turbidity compiled into a database
- Funding opportunities for watershed restoration activities researched and pursued; two additional grant applications prepared and submitted during course this grant

Public outreach / education

- 11 public workshops and education forums conducted, including a day-long, area-wide stakeholder workshop attended by 68 people
- Public project library created - featuring a poster and set of documents pertinent to the Las Huertas Creek Watershed Project; Watershed Library installed in dedicated area within the Placitas Community Library

Project Challenges and Lessons Learned:

The two major obstacles encountered during the project were:

- Local citizen opposition to BMP implementation in upper Las Huertas Canyon and selected reaches of Las Huertas Creek bordering private property
- Administrative delays in conducting work under the auspices of non-federal agency partners.

Project elements that contributed to obstacles or left room for improvement include:

- Occasional low turnout to public outreach events including 2 of the publicly advertised; some improvements in advertising methods for events may be warranted

- Occasional low response for volunteer monitoring events (Field monitoring and BMP implementation): some advertised field events greeted with initial enthusiasm, but ultimately suffer from low turnout at time of event itself; events involving periodic outings have volunteers participating once then fail to return

Major elements contributing to the success of the project include:

- Competence and experienced partner agencies, including NMED, NMDOT, USFS, and City of Albuquerque Open Space Division
- Enthusiastic volunteer body
- Strong public involvement through extensive workshop program
- Competent and experienced project staff
- Persistence in public outreach message to overcome initial resistance
- Tangible project results to serve as foundation for BMP implementation
- Strong project support from 501(c)(3) sponsor organization (LPA)

San Pedro Creek Watershed Outreach, Education, and Action Project, New Mexico

Funding: Federal 319(h) \$15,917, In-Kind Match \$26,509, Project Total \$42,426

Project Type: (WGF) group focuses on: Grazing / Rangeland management, Riparian habitat restoration, Road sediment control, Stream bank / channel restoration, Urban stormwater, Water quality monitoring

303(d) listed impairments: none

Project Description:

This watershed group-formation grant was awarded to the Intermountain Conservation Trust. The Trust had formed, incorporated, and developed their initial Watershed Restoration Action Strategy before applying for the grant. The purpose of this project was primarily to support ongoing outreach efforts, especially in cooperation with the local high school. This project grew from earlier SWQB outreach efforts, particularly the Volunteer Monitoring Program (formerly funded under CWA Section 106). An interested group of homeowners continued this stream work. Prior to applying for 319 funding, this group conducted volunteer monitoring (they funded it themselves), actively participated in the management of a local conservation easement, and successfully petitioned the WQCC to classify the subject stream. They became active in local land-use hearings, and they incorporated under 501(C)(3) to promote environmentally-sound land use decisions, especially in the East Mountain area of Albuquerque.

Project Activities & Results:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Host meetings • Identify stakeholders • Develop & publish newsletter • Develop Riparian Restoration Plan • Advertise educational workshops | <ul style="list-style-type: none"> • Develop brochures, and other outreach materials • Sponsor outreach activities & informational booths • Hold workshops and community work days • Conduct volunteer photomonitoring • Conduct geomorphological monitoring (HS students) |
|--|---|
- Develop local stakeholder participation: schools, developers, ranchers, private landowners, and the citizenry at-large
 - Organize meetings of stakeholders and advocates (through existing Intermountain Conservation Trust)

Public Education & Outreach:

- *East Mountain High School awareness:* Support the local high school's environmental science curriculum; build watershed model, train students to conduct outreach demonstrations and info booths at community events, create ICT website
- *Community outreach:* workshops, flyer, newsletter

Project Challenges and Lessons Learned:

- Watershed group efforts often rely on one local key player. Such a key player in this project moved on which disrupted the group.
- 303(d) listings can help focus a watershed group. Faced with no such listing, this group was tasked to identify their own "issues", which largely centered on preventing further degradation. Their stream, San Pedro Creek, met WQS (but just barely).

Rio Puerco Watershed

San Pablo, San Miguel, and Senorito Creeks drain the west face and foothills of the Sierra Nacimiento, coalescing into a single incised channel as they descend toward the west-southwest. The combined tributaries join the upper main stem of the Rio Puerco approximately seven miles south of Cuba, NM.

San Pablo Subwatershed Collaborative Restoration Project

Funding: Federal 319(h) \$179,500 , In-Kind Match \$95, 498 match + \$58,439 Fed. contribution, Project Total \$333,437

Project Type: (OTG) Grazing / Rangeland management, Riparian habitat restoration, Road sediment control, Stream bank / channel restoration

303(d) listed impairments: Sedimentation / Siltation; Nutrients / Eutrophication Biological Indicators

NPS Issues Facing Watershed: soil erosion, road runoff and maintenance needs, rangeland impacts, as well as impacted riparian conditions, brush management, a need for local landowner education and outreach, and documentation of previous or current restoration project results.

BMPs Implemented: education, riparian restoration, road inventory, construction and re-engineering, and the implementation of erosion control measures

Project Description:

The San Pablo Project was proposed and submitted by the Rio Puerco Management Committee (RPMC). The Cuba Soil and Water Conservation District assumed the role as contractor and fiscal agent and hired a Project Coordinator. Other organizations provided ancillary support, with the Bureau of Land Management providing by far the largest amount of assistance. The project was a three year effort to address NPS pollution largely due to soil erosion in the 37,000 acre subwatershed. The focus was on reducing erosion at stream, drainage, and riparian sites; reduce sediment transport off local dirt roads; improve local land management practices; and increase public and landowner awareness and capabilities via outreach and education activities.

Project Activities & Results:

- Design, construct, and utilize a Mobile Land Health Education Kiosk
- Provide outreach and education workshops about improved watershed, road construction, and land management practices.

- *‘Emilio’s Corner’*: Heavy livestock grazing, overly steep, and active headcutting left a segment on private lands along San Pablo Creek in very poor condition. Implementation of a two stage effort for stabilizing and remedying impacts included: 1) Two log and fabric drop structures installed; allowed flashy seasonal flows to travel through area without further damage to channel bottom. 2) Fencing livestock out of segment allowed lush and protective floodplain and bank vegetation to return.
- *Triple Culvert Project*: Located immediately above the confluence between San Pablo and the Rio Puerco. The BMP effort had two independent erosion problems, each addressed via separate approaches:
 - Previous road construction, shoulder widening, and culvert extension destabilized the streambed:
 - ⊙ Set of 3 culverts set into a single concrete-faced structure below the elevated highway roadbase. Structures massive sizing necessary due to high-intensity/high-volume rainstorms and flashy flows
 - ⊙ Upstream side of structure: approaching channel reshaped, graded, and armored with rock and wire.
 - Restricted channel, rapidly eroding banks downstream of the apron, covered primarily by salt cedar
 - ⊙ Widened stream confluence zone, removed non-native vegetation, improved channel to better accommodate high flow events
 - ⊙ Created rock mattress and gabion-armored plunge pool off concrete apron to allow better transition of flow and decrease erosion



Public Outreach and Education:

The Land Health Education Kiosk, developed during the San Pablo Project, is expected to have wide-ranging application and a long service life. It has been displayed at numerous group functions, conservation workshops, Navajo Chapter Meetings, County fairs, and various school activities in the region. It provides:

- Poster presentations, pamphlets, and instructive videos and demonstrations for the public
- Rainfall simulator using an oscillating spray head to realistically simulate southwest rain conditions (large fast-moving raindrops) on various New Mexico soil types and vegetative cover.

Project Challenges & Lessons Learned:

Overall, the San Pablo project implementers view this 319 project as a mixed success. It was highly successful in meeting several major erosion control and education/outreach goals, but only limited gain was made towards the primary goal of gaining and maintaining broad local collaboration and acceptance of recommended innovative approaches to land restoration and land management.

Improvements to water quality (observed / expected):

The headcut-arresting and vegetation recovery BMPs implemented at Emilio’s Corner have reversed former

erosive trends in the San Pablo channel. The Triple Culvert will prevent massive erosion and sediment transport from its site into the Rio Puerco. The long term effectiveness of the Kiosk as an education, outreach, and training tool is dependant on finding opportunities to display it and responding to requests for its use by schools and other conservation and agricultural organizations.

Plans for project monitoring

The private land interests served by this project's BMP implementations are expected to maintain structures and site conditions into the future, assuring their effectiveness. RPMC and its cooperators will need to see to it that participating agencies (especially the NMDOT) follow through with their commitments to finish projects (especially at Triple Culvert) so that the project's engineering and construction work is preserved and continues to function well into the future.

Upper Rio Grande Watershed

The Collaborative Watershed Project – Supporting TMDL Implementation in Northern New Mexico in the San Juan, Red River and Cimarron watersheds

Full project summary under Middle San Juan Watershed

Proposal for Watershed Group formation in the Conejos, Mimbres, and Upper Rio Grande Watersheds, New Mexico

Full project summary under Conejos Watershed

Southern New Mexico Watersheds

Mimbres Watershed

Proposal for Watershed Group formation in the Conejos, Mimbres, and Upper Rio Grande Watersheds, New Mexico

Full project summary under Conejos Watershed

Gila and San Francisco Watershed

The Gila River flows 600 miles from its headwaters in the mountains of southwestern New Mexico to its confluence with the Colorado River near Yuma, Arizona. One of the Gila's most significant tributaries is the San Francisco River. From its headwaters in Arizona, the San Francisco crosses into New Mexico and flows for about 90 miles near the state line before topography sends it back toward its confluence with the Gila in Arizona, about 40 miles to the west of the border between the two states.

The Gila Watershed Partnership New Mexico

Funding: Federal 319(h) \$53,207; In-Kind Match \$50,989; Project Total \$ 104,196

Project Type: (WGF)

303(d) listed impairments: Chronic aluminum, conductivity, nutrients, temperature, turbidity

NPS Issues Facing Watershed: Expansion of ponderosa forest and pinyon-juniper woodland (occurring in this region over the past 100 years) are linked to losses in native ground cover, including grasses. In 1998 a statewide task force identified 21 out of 83 New Mexico watersheds as Category I, “in need of restoration.” The Gila River is designated as a Category I watershed.

Project Summary:

This Watershed Improvement Plan and Strategy (WIPS) is an inventory and data resource in support of a watershed-based approach to water resource planning. The project outcome will be dependent on supplying available data to the public, the public using WIPS as intended, access to the data, practicality of modeling using available data, and follow-up monitoring by the public or resource practitioner. More than half of regularly scheduled watershed group and SWCD meetings were attended during the WIPS development period.

Project Challenges & Lessons Learned:

Watershed group formation is not a truly holistic process. It is not practical to assume that an entire watershed (in this area) can be represented by a person or group. Collaboration is not total agreement, but more intellectual effort. It is a term best applied when a group forms and recommends without conflict that disables the group formation. The public at large is not informed or educated on WPS/NPS issues.



Gila River



San Francisco River

Other State-Wide Projects Directed at NPS Issues - 2006

Summary of Projects Completed by Non-NMED Agencies

Bureau of Land Management (BLM), Natural Resource Conservation Service (NRCS), New Mexico Department of Transportation (NMDOT), United States Forest Service (USFS)

These land management agencies completed various projects around New Mexico that ultimately contribute to the reduction of nonpoint source pollutants in surface waters. The most common NPS issues that are being addressed are: excessive erosion (due to over-grazing, vegetation removal, or fire), sedimentation, encroachment of exotic vegetation, stream bank stability, excessive nutrients and excessive water temperature. Projects in the following watersheds included: erosion reduction, livestock exclusion, salt cedar removal, fuels reduction, trail and road maintenance, wildlife habitat improvement, protection of riparian areas, bank stability, and re-vegetation.

**No status of water quality results or water quality improvements was reported by agencies to NMED*

Northern New Mexico Watersheds

Animas Watershed

BLM, Farmington Field Office: Animas River

Blanco Canyon Watershed

BLM, Farmington Field Office: La Plata, Largo Canyon

USFS, Carson National Forest: Tapequito Cr.

Upper San Juan Watershed

BLM, Farmington Field Office: Kutz Canyon, La Jara Canyon, Middle San Juan River

USFS, Carson National Forest: Canon Bancos, Carracas Canyon

Upper Rio Grande Watershed

USFS, Carson National Forest: Arroyo Aguaje de la Petaca, Red River, Rio Costilla - Comanche Creek, Rio Grande del Rancho, Rio Hondo, Rio Pueblo - Rio Embudo

Rio Chama Watershed

USFS, Carson National Forest: Canjilon Creek, El Rito Creek, Rio Nutrias, Rio Tusas / Rio Vallecitos

USFS, Santa Fe National Forest: Cecilia Canyon Creek, Rio Gallina

Cimarron Watershed

USFS, Santa Fe National Forest: Ponil Creek

Mora Watershed

USFS, Santa Fe National Forest: Rio de la Casa

Pecos Headwaters Watershed

USFS, Santa Fe National Forest: watershed group and WRAS development, watershed-wide

Jemez Watershed

USFS, Santa Fe National Forest: watershed-wide projects

Arroyo Chico and Rio Puerco Watershed

USFS, Cibola National Forest: Los Indios Canyon

Rio San Jose Watershed

USFS, Cibola National Forest: Bluewater Creek, Pole Canyon, Prop Canyon

Rio Grande-Albuquerque Watershed

USFS, Cibola National Forest: Canon Barranco, Cedro Creek, Priest Canyon

Upper Canadian Watershed

USFS, Kiowa National Grassland: Canadian River

Western Estancia Watershed

USFS, Cibola National Forest: Canon Barranco, Ox Canyon

Southern New Mexico Watersheds

Elephant Butte Watershed

USFS, Cibola National Forest: Baney Canyon

Plains of San Agustin Watershed

USFS, Cibola National Forest: Point of Rocks Canyon

USFS, Gila National Forest: Alamacito Canyon

Upper Gila-Mangas Watershed

USFS, Gila National Forest: Bear Creek, Mangas Creek, Sacaton Canyon, Sapillo Creek

Upper Gila Watershed

USFS, Gila National Forest: Corduroy Canyon, Middle Fork Gila River, Mogollon Creek, Sapillo Creek, Wall Lake, West Fork Gila River

San Francisco Watershed

USFS, Gila National Forest: Mineral Creek, Negrito Creek, Saliz Creek, San Francisco River (mainstem, Lower, Middle, Upper), Tularosa River

Carrizo Wash Watershed

USFS, Gila National Forest: Largo Creek

El Paso-Las Cruces Watershed (Lower Rio Grande)

USFS, Gila National Forest: Black Canyon, Mimbres River

Little Colorado Headwaters Watershed

USFS, Gila National Forest: Coyote Creek

San Simon Watershed

USFS, Coronado National Forest: San Simon River, Deer Creek, Skeleton Canyon

San Bernadino Valley Watershed

USFS, Coronado National Forest: Upper San Bernadino Valley

State-Wide Projects

The **NRCS** completed several projects in counties around New Mexico:

Comprehensive Nutrient Management Plans: Trainings focused on animal feeding operations to prevent runoff and leaching of animal manure into surface and ground water. Plans were developed in Roswell, Clovis, Las Cruces, Portales, Carlsbad, Socorro, and Estancia.

Nutrient Management: A certification program on nutrient and pest management for NRCS and CES employees, other agencies, private consultants, and producers.

Conservation Buffers: These measures were applied to reduce sediment loss and runoff and include riparian forest buffers, field borders, grassed waterways, stream bank and shoreline protection, and windbreaks / shelterbelts. They were applied mainly in Curry, Harding, Lincoln, McKinley, Quay, San Juan, Santa Fe, Taos, and Union counties.

Other management practices applied include: irrigation water management, pest management, prescribed grazing, residue management, and waste management.



USFS, Carson National Forest, El Rito Ranger District:

Channel treatment as part of a post-wildfire rehabilitation project along El Rito Creek in the Rio Chama Watershed.



USFS, Carson National Forest, El Rito Ranger District:

Riparian vegetation response in grazing exclosures, La Jara Canyon, Upper San Juan watershed.

List of Abbreviations in This Report

BLM	Bureau of Land Management	NRCS	Natural Resource Conservation Service
BMP	Best Management Practice	ONRW	Outstanding National Resource Waters
CES	Cooperative Extension Service	ORV	Off-Road Vehicle
CWA	Clean Water Act (Federal)	OSE	Office of State Engineer
EPA	US Environmental Protection Agency	SWQB	Surface Water Quality Bureau
GWQB	Ground Water Quality Bureau	US	United States
HUC	Hydrologic Unit Code	USFS	United States Forest Service
NM	New Mexico	WQCC	NM Water Quality Control Commission
NMED	New Mexico Environment Department		



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