State of New Mexico
Nonpoint Source Management Program

2005 Annual Report

prepared by:
New Mexico Environment Department's
Surface Water Quality Bureau
Watershed Protection Section
In cooperation with:
Bureau of Land Management, Natural Resource Conservation Service,
New Mexico Department of Transportation, New Mexico State Land Office,
& US Forest Service

State of New Mexico Nonpoint Source Management Program

2005 Annual Report

Published by the Watershed Protection Section of the
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Cover Photo: Folsom Falls, Dry Cimarron River, NM

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January 25, 2006

Brad Lamb
Regional Watershed/Nonpoint Source Program Coordinator
U.S. Environmental Protection Agency
Region 6 (6WQ-EW)
1445 Ross Ave.
Dallas, Texas 75202

Dear Mr. Lamb,

In 2005, the New Mexico Nonpoint Source Management Program successfully completed projects that will assist in the effort to abate nonpoint source pollution. The Monitoring and Assessment Section of the Surface Water Quality Bureau is in the process of compiling the 2006-2008 Integrated 305(b)/303(d) list report. We will have a better idea of what parameters for specific stream reaches will be removed from the New Mexico impaired waters list later this spring.

The success of the projects and improving rivers/streams is due to continued partnerships and dedication. New watershed groups are being formed annually to strengthen our collaborative effort against NPS pollution as well as our on-the-ground projects. We continue to expand our program and will be funding 12 new projects in 2006.

All the agencies and organizations in New Mexico who are cooperatively tackling the State's NPS issues appreciate the support of the Environmental Protection Agency in this effort and look forward to continuing success and cooperation in protecting our water quality.

Sincerely,

Marcy Leavitt
Bureau Chief

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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, 2005. 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.

Nonpoint Source and the Federal Clean Water Act:

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.

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 costal waters, and groundwater. Atmospheric deposition and hydrologic modification are also sources of nonpoint pollution". *Nonpoint source pollution is also referred to as "polluted runoff"*

Section 319 contains three main strategies for addressing polluted runoff:

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

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
(2006-2008 Report will be available in Fall 2006)

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 may 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.

Principal sources of surface water NPS pollution in New Mexico include:

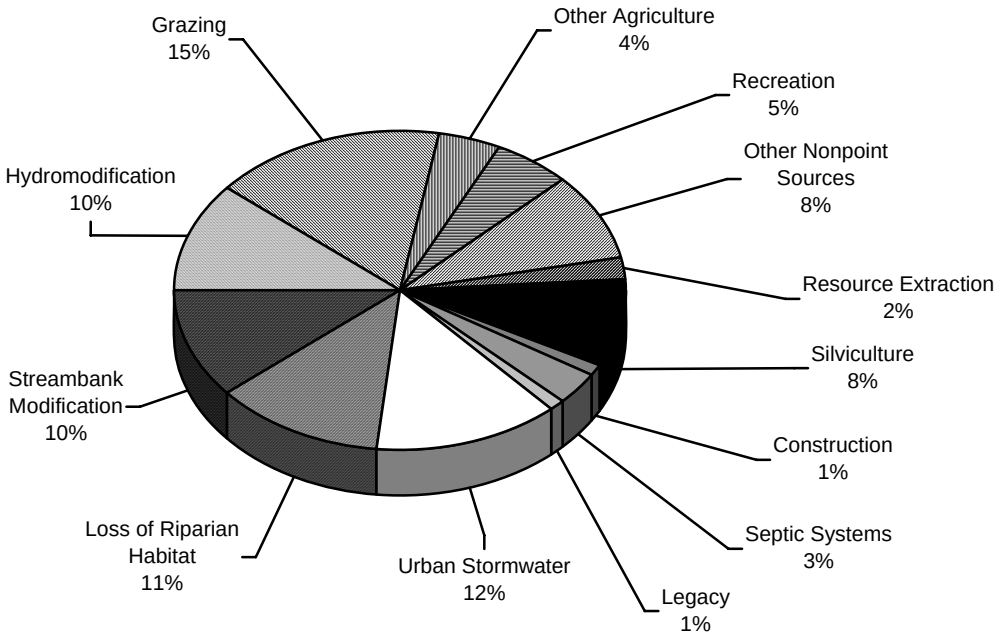


Chart from 2004-2006 State of New Mexico Integrated Clean Water Act §303(d)/§305(b) Report

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, last updated in 1999. A new draft document has been developed and will be completed in Spring, 2006.

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.

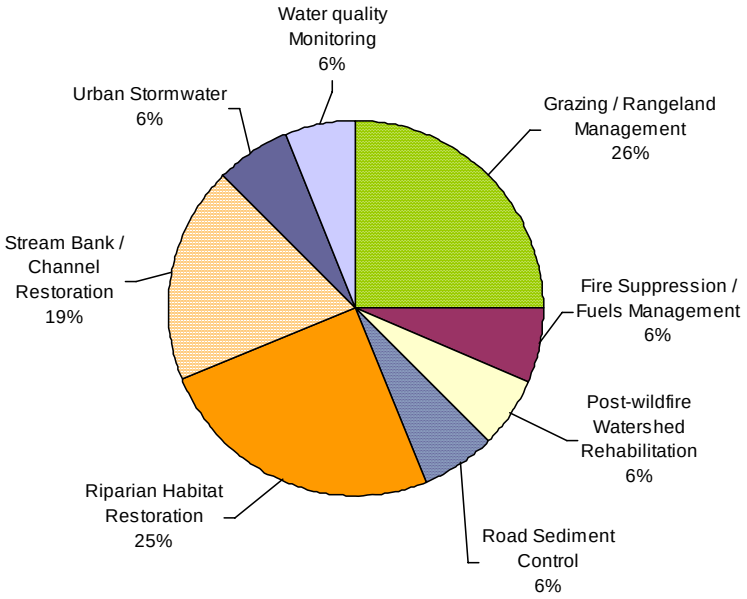
The NPS Management Program focuses on:

- 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)

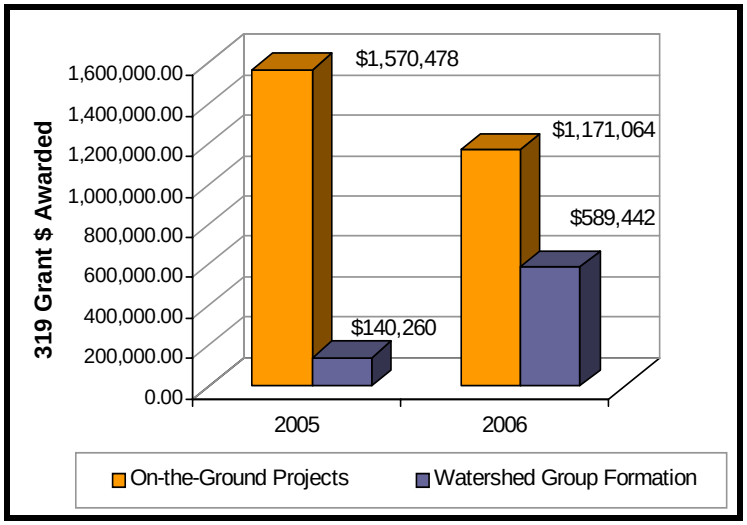
The program also relies on established resource protection, nonpoint source pollution prevention programs, and activities of other land management / resource protection agencies. SWQB identifies programs and activities that will facilitate the achievement of surface water quality criteria and uses a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

New Mexico's most recent *Nonpoint Source Management Program Plan* is available at the SWQB office or on our website: www.state.nm.us/swqb/wps

CWA SECTION 319(H) FUNDING DISTRIBUTION FOR 2005



Nonpoint Source issues addressed by 319(h) funded "On-the-Ground" projects completed in 2005



319(h) grant funds allocated for On-the-Ground and Watershed Group Formation projects in 2005 and 2006 (projected).

The table on the following page details information regarding all 319 grant projects completed by SWQB cooperators in 2005...

Year Started	8-HUC Watershed	Waterbody / sub-watershed	Project Type / BMPs	303(d) Listed Impairment	319 Funds Used	% of total	Match (C+IK)	% of total	Project Total
2001	Mora River	Mora River	WRAS development & outreach	lead, stream bottom deposits, temperature, turbidity	$ 132,700	84%	$ 24,416	16%	$ 157,116
2001	Gila River	Gila River	floodplain restoration, land use, riparian vegitation, stream bank stabilization	aluminum, temperature	$ 88,313	71%	$ 36,340	29%	$ 124,653
2001	Middle Rio Grande	Tijeras Creek	urban stormwater runoff	fecal coliform (Rio Grande)	$ 48,000	50%	$ 47,496	50%	$ 95,496
2001	Mora River, Pecos River, Rio Chama	Cow & Willow Creeks, Rio Santa Barbara, Rito San Jose, Rio Tusas	rangeland management / rest from grazing	temperature (Chama , Cow), turbidity (R. Santa Barbara), sedimentation (Tusas)	$ 192,000	59%	$ 132,486	41%	$ 324,486
2001	Upper Rio Grande	Costilla Creek, Comanche Cr., Cordova Cr.	3 WRAS, rangeland management, road sediment control, riparian & stream resoration,WQ monitoring	temperature	$ 217,554	35%	$ 401,645	65%	$ 619,199
2001	Rio Grande - Santa Fe	Santa Fe River	riparian restoration, shading, stream bank stabilization	Chlorine, Dissolved Oxygen, pH, stream bottom deposits, temperature	$ 51,000	41%	$ 73,000	59%	$ 124,000
2002	Rio Chama	Rio Gallina	livestock grazing, riparian restoration	***none listed***	$ 153,665	33%	$ 318,560	67%	$ 472,225
2002	Rio Grande - Santa Fe	Galisteo River	managed grazing plan, stream restoration	conductivity, temperature	$ 267,966	55%	$ 215,384	44%	$ 484,350
2002	Pecos Headwaters	Gallinas River	forest thinning, fuels reduction, WRAS development?	Temperature	$ 72,894	53%	$ 65,900	47%	$ 138,794
2003	Cimarron River	Middle & North Ponil	Post-wildfire rehabilitation	fecal, phosphorous, stream bottom deposits, temperature, turbidity	$ 270,635	44%	$ 350,000	56%	$ 620,635
2004	Upper Gila	Taylor Creek	WRAS development	metals (chronic aluminum), temperature	$ 31,728	56%	$ 24,830	44%	$ 56,558
2004	Upper Rio Grande	Rio Pueblo de Taos	watershed group formation, WRAS development	temperature, stream bottom deposits	$ 17,800	58%	$ 12,680	42%	$ 30,480
TOTALS					**$ 1,544,255**	**48%**	**$ 1,702,737**	**52%**	**$ 3,247,992**

SURFACE WATER QUALITY BUREAU UPDATES

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, all watersheds with completed TMDLs will be targeted for watershed restoration and watershed group formation projects; watersheds with impaired water bodies and restoration projects will develop WRASs; Wetland Action Plans will be integrated into WRASs where applicable; and a New Mexico Watershed Forum will be established.

Outcomes / Performance Targets	Activities
Implement NPS restoration & protection programs	• 319(h) projects completed this year : **10** • 319(h) projects In progress: **24** • 319(h) projects Awarded this year (start in FY 06): **9**
Develop WRASs for all 11-digit watersheds with impaired surface waters by 2015	• Total WRAS developed to date: **25**
Form watershed groups in watersheds with TMDLs each year with 319(h) funding	• Groups formed to date: **37** • Formed in 2005: **3**
Provide education & outreach	• Published *Clearing the Waters* - SWQB Watershed Protection Section newsletter (3 issues: Winter/Spring, Summer, Fall) • Participated in: Santa Fe Children's Water Festival (Feb.); Gila River Water Festival (April); Summer Environment Academy, Ruidoso (July), Middle Rio Grande Children's Water Festival, Albuquerque (Oct.) • Many outreach activities also took place as part of individual 319(h) Grant projects
Update / improve MOUs and MAAs by 2010	• In progress
Formalize partnerships with county & municipal governments and Soil & Water Conservation Districts by 2010	• In progress

Performance Targets from New Mexico NPS Management Plan (2004)

MONITORING & ASSESSMENT PROGRAM UPDATES:

In 2005 the Monitoring and Assessment Section collected water quality monitoring data for 508 stream miles and 1,358 lake acres. Assessments were completed for data collected in 2003. Stream miles, lake acres, and assessment units will vary in number depending on which watersheds are being monitored and the amount of perennial water present in a given year.

Year Monitored	Year Assessed	Stream (miles)	Lakes (acres)	# of Stream Assessment Units	# of Lake Assessment Units
2001	2003	895	3803	69	5
2002	2004	854	13409	45	3
2003	2005	661	13932	25	5
2004	2006	711	10722	48	7
2005		508	1358	34	2
2006		780*			

** numbers for 2006 are estimated*

New innovations in monitoring and assessment...

Several programs within SWQB are being developed to improve the monitoring and assessment process. These innovations will help to identify, track, and resolve water quality problems stemming from nonpoint source related pollution.

Nutrient Criteria -

Algae on stream bottom

Currently, the State of New Mexico has 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 the 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 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. These 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).

Threshold values for wadeable streams are currently being fine-tuned 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 lakes and reservoirs, non-wadeable rivers, and wetlands.

Fish Health -

Rio Grande Cutthroat Trout

The Middle Rio Grande bioassessment survey is adding a new fish health component which will be used to:

- *Determine presence of environmental contaminants and their effects on fish*
- *Provide data that may warrant further investigations into fish consumption advisories*
- *Determine overall biotic integrity of the Middle Rio Grande.*

Impairments of fish health may indicate contaminants within the aquatic ecosystem, some of which remain undetected by water quality monitoring. Monitoring of fish health will be performed at four stations from January through March 2006. Fish will be examined for external and internal anomalies and tissues will be collected and submitted for laboratory analyses. A final report is expected by December 2006.

Bioassessment -

Plecoptera

Biological data (e.g., macroinvertebrate, algae, and fish communities) are necessary to assess the health of New Mexico's surface waters and to measure the attainment of biological integrity goals as directed by the Clean Water Act and characterized by the state of New Mexico.

NMED established a Biological Assessment (bioassessment) Program in 1979. Early programs were site specific and concentrated on point-source discharges in high quality mountain streams such as the Rio Hondo, Red River, and Chama River.

Bioassessment consists of comparing the biological condition of a stream to a reference condition, (an aggregate of conditions in unimpaired streams of a region). Reference conditions are "best available" conditions where biological potential is at its highest for the particular region or area. These reference conditions are representative of sustainable ecosystem health.

Currently NMED is developing a Stream Condition Index (SCI) for New Mexico based on the data collected from 1979 to present. These SCIs are used as primary indicators of ecosystem health and can identify impairment with respect to the reference (or natural) condition. The indices are composed of biological attributes (or *metrics*) that represent elements of the structure and function of macroinvertebrate assemblage. Metrics are specific measures of diversity, composition, and tolerance to pollution, which provide information on the biological integrity of the waterbody.

Benefits expected from the implementation of the New Mexico SCI will apply to a broad spectrum of management programs, including:

- *Characterizing the existence and severity of point and nonpoint source impairment;*
- *Targeting and prioritizing watersheds and ecosystem management areas for remedial or preventive programs;*
- *Evaluating the effectiveness of nonpoint source best management programs;*
- *Screening waterbodies for Aquatic Life Use attainability; and*
- *Developing a basis for establishing biocriteria that relate to the CWA and New Mexico Water Quality Act water quality goals.*

Total Maximum Daily Load program update:

TMDL Documents Completed in 2005:	24	(17 approved, 7 pending)
TMDL Documents Completed to Date:	140	(133 approved, 7 pending)

A complete list of all *Total Maximum Daily Loads (TMDL)* and links to the documents is available at the SWQB office or on our website: www.state.nm.us/swqb/tmdl

Impairments Included in TMDLs for 2005

Watershed (8-digit HUC)	Impairments
Lower Pecos	Bacteria, Nutrients, Temperature, Turbidity
Pecos Headwaters	Temperature, Turbidity
San Juan River	Dissolved Oxygen, Fecal, Nutrients, Sedimentation/Siltation, Selenium
Upper Rio Grande	Aluminum, Nutrients, Turbidity

New Mexico Surface Water Quality Standards 2005 revision:

In July 2005 SWQB, on behalf of the Water Quality Control Commission (WQCC), finalized amendments to the NM Water Quality Standards for Interstate and Intrastate Surface Waters as the last step in NM's 2003-2004 Triennial Review. Changes included in the amendments applicable to Nonpoint Source issues include:

- Amended definitions for "best management practices," "practicable," "surface water 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 (A) for suspended and settleable solids and (J) for turbidity.
- New default sections 20.6.4.97, 20.6.4.98 and 20.6.4.99 NMAC to cover waters not within the segment specific language within Sections 20.6.4.101 through 20.6.4.899 NMAC and now include an aquatic life and recreational use as default uses.

New Mexico's first Outstanding National Resource Waters (ONRW) Designated !
Rio Santa Barbara (May 2005) & the waters of the Valle Vidal (Dec. 2005 / Jan. 2006

The revised *NM Water Quality Standards* are available at the SWQB office, or on our website: www.state.nm.us/swqb/standards

New Mexico Mining Act Activities:

SWQB staff review and comment on various activities to insure discharges from exploration, mining or mine reclamation activities do not adversely impact surface waters of the state.

Mining activities include:

- Proposed mining activities as they will affect, or are to be regulated by, SWQB
- Exploration and mine permit applications, mine site closure/closeout plans and mine site discharge permits
- State certification for activities covered by the 404 permit through the Army Corp of Engineers.

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
- Two active Abatement Plan Investigations for the United Nuclear Corp. at the St. Anthony Mine and the Section 27 Mine looking into the extent of surface water and ground water contamination at these two closed uranium mine sites.

2005 accomplishments:

- Developed a water quality certification for recreational placer mining activities covered under a General Permit issued through the Mining and Minerals Division, New Mexico Energy, Minerals, and Natural Resources Department. (7 water quality certifications with conditions issued for these permits to date).
- Participated in Decision Makers Field Conference for State government and industry leaders, focusing on mining issues in New Mexico.
- Prepared a section of the guidebook titled *Watershed Protection and Restoration in New Mexico – With a Focus on the Red River Watershed.*

NM Mining Act Staff Activities

Mine Applications
Minimal Impact Mines = 5
Exploration Projects = 12

Closure / Closeout Plans
Final Plan Approval = 3
Documents (Review/Comment) = 12

Mine Site Investigation / Inspections = 35
Public Hearings = 2
Public Meetings = 12

CWA Section 404/401 Water Quality Certifications and Actions:

Discharge of Dredge or Fill Activity Certifications
Nationwide Permits = 107 (50 in Ephemeral Watercourses)
Individual Permits = 16
Total = 123

Other Authorizations and Actions:
SWANCC = 9 as of October 2005
Other Coordination/Activities = 26

Total 149

CWA Section 401 - Discharge of Dredge or Fill Program 2005 Activities

- Continued to review the Discharge of Dredge or Fill projects for Water Quality Certification under Section 401 of the federal Clean Water Act.
- Certification for the Corps Nationwide Discharge of Dredge or Fill permits in ephemeral watercourses addressed under blanket certification issued in March 2002.

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.

Individual Discharge of Dredge or Fill permits in perennial, intermittent or ephemeral watercourses; and Nationwide Dredge and Fill permits in perennial or intermittent watercourses 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 from three to now four geographic jurisdictions. Duties have been assigned to five staff in the Santa Fe, Silver City, Las Cruces, and Las Vegas Offices. In September of 2005, a newly created position shared between NMED and New Mexico Department of Transportation (NMDOT) was filled. This position acts as the 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.

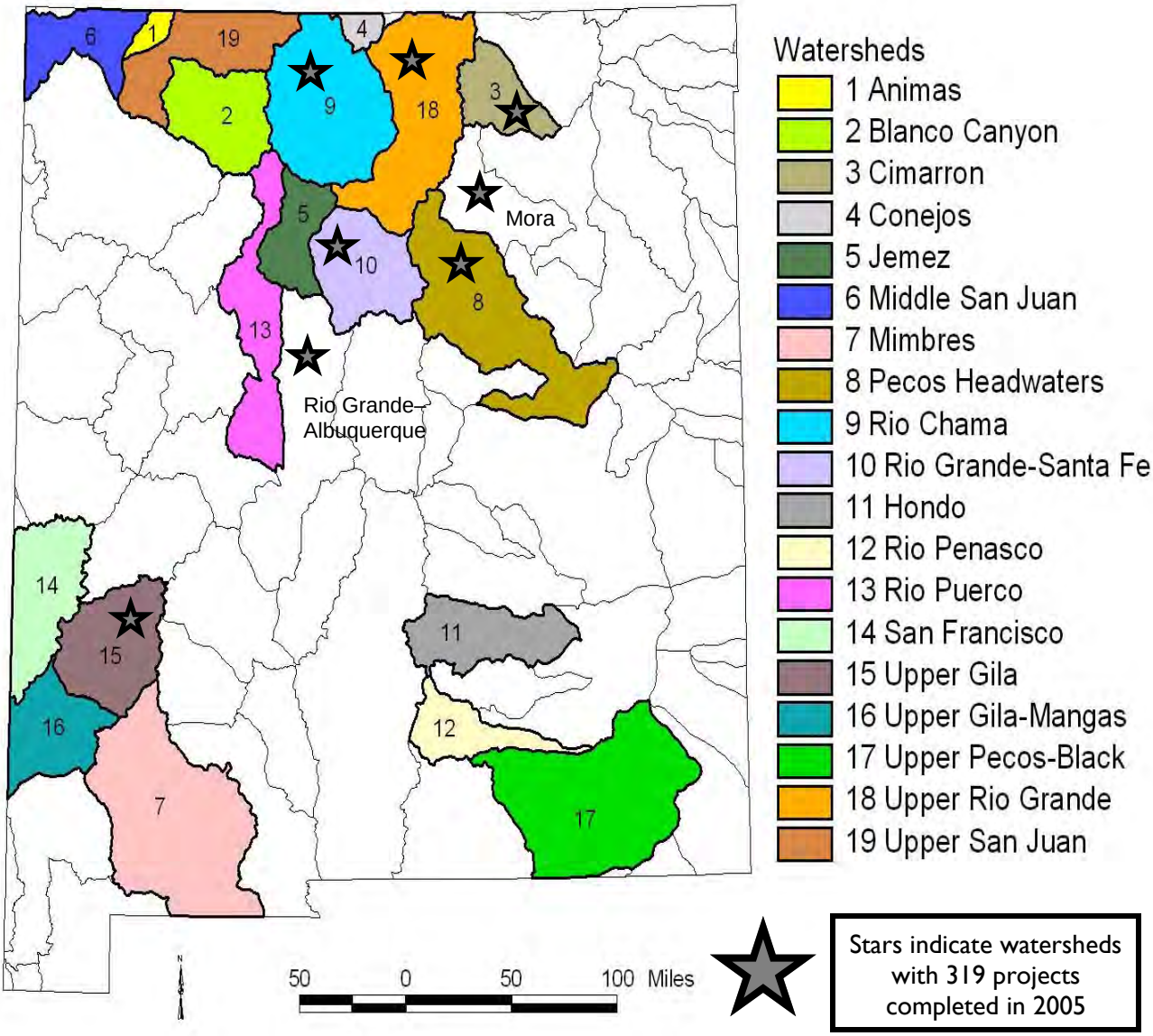
SUMMARIES OF 319 PROJECTS COMPLETED IN 2005

Addressing impairments in New Mexico's water quality through Nonpoint Source Management 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.

WRASs available on our website: www.state.nm.us/swqb/wps under the "watershed planning drop down menu

Watersheds with WRASs and/or TMDLs



319(h) grant funds distributed by watershed and project type. Finds awarded in 2004 & 2005 for Fiscal Years 2005 & 2006.

OTG = On-the-ground
WGF = Watershed Group Formation

Year	Project Type	Watershed	319 Funds
2005	OTG	San Juan	$246,078
2005	OTG	State-Wide	$481,068
2005	OTG	Santa Fe	$116,590
2005	OTG	State-Wide	$252,140
2005	OTG	Rio Vallecitos	$144,000
2005	OTG	Rio Vallecitos	$119,500
2005	WGF	Upper Pecos	$27,700
2005	WGF	Gila	$32,360
2005	WGF	Upper Rio Grande	$80,200
TOTAL FUNDS FOR 2005			**$1,499,636**
2006	OTG	Upper Rio Hondo	$368,480
2006	OTG	Penasco	$408,250
2006	OTG	Conejos	$56,100
2006	OTG	San Francisco	$43,200
2006	OTG	San Francisco	$41,000
2006	OTG	Las Huertas	$254,034
2006	WGF	Three Rivers / Tularosa	$50,000
2006	WGF	Upper Pecos	$33,700
2006	WGF	Paseo del Norte (El Paso - Las Cruces)	$145,130
2006	WGF	Rio Grande (middle)	$110,600
2006	WGF	Canadian & Cimarron Headwaters	$159,100
2006	WGF	Animas	$90,912
TOTAL FUNDS FOR 2006			**$1,760,506**

Projects in the following sections are identified as either Watershed Group Formation (WGF) or On-the-Ground (OTG) to reflect which 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
Cimarron River (11080002)	Upper Gila River (15040001)
Mora River (11080004)	Gila River (15040001110)
Pecos Headwaters (13060001)	
Rio Chama (13020102)	
Rio Grande (Middle) (13020203)	
Rio Grande - Santa Fe (13020201)	
Rio Grande (Upper) (13020101)	

NORTHERN NEW MEXICO WATERSHEDS

CIMARRON RIVER WATERSHED

Ponil Complex Fire Rehabilitation

- **Funding:** *Federal 319(h) ($270,635), In-Kind Match ($350,000), Total Project Cost ($620,635)*
- **NPS issues facing the Middle & North Ponil River watershed**: *vegetation loss and soil damage due to extensive wildfire in 2002*
- **303(d) listed impairments:** *Fecal coliform, stream bottom deposits, phosphorous, temperature, turbidity*
- **Project Type:** *On-the-Ground, post wildfire rehabilitation*

Project Description:
Boy Scouts from across the country have worked with the Philmont Scout Ranch in North Central New Mexico to control erosion and reduce sedimentation of the Middle and North Forks of Ponil Creek. The stand-replacement fire that occurred in the Ponil watershed in 2002, resulted in not only significant vegetation loss, but also the development of hydrophobic soils. These conditions lead to excessive runoff and erosion and can dramatically increase stream sedimentation. From 2003-2005 the scouts were involved with restoration projects along the watershed's ridge tops (seed planting along the ridge tops allows re-vegetation to occur at a faster rate as seeds move down slope).

Project Outcomes:
- Over 590 acres hand raked, seeded, and covered with mulch
- Significant educational and outreach components (benefited NM scouts as well as those from other states)
- Visual observation of areas shows seeding has been very successful in generating new vegetation

MORA RIVER WATERSHED

Mora River Valley Community Based Watershed Project

- **Funding:** *Federal 319(h) ($132,700), In-Kind Match ($24,416), Total Project Cost ($157,116)*
- **NPS issues facing the Mora River watershed**: *Increasing population, land use changes (rural-wild to urban-rural interface)*
- **303(d) listed impairments:** *Lead, stream bottom deposits, temperature, turbidity*
- **Project Type: (WGF)** *WRAS development &* outreach awareness of watershed protection issues

Project Description:
The non-profit La Jicarita Enterprise Community (LJEC) was awarded this grant to address a variety of listed impairments. In 2002 LJEC hired a Watershed Coordinator to: acquire resource materials from federal and state agencies for the use of community members, publish a quarterly newsletter, develop a WRAS, develop field demonstrations, and a Community Education and Outreach Plan. The coordinator worked with from staff at the New Mexico Rural Water Association (NMRWA), and the SWQB Outreach Coordinator on these tasks.

Project Outcomes:
- Kitchen Table Meetings with watershed residents
- Time in the classrooms of the Mora Valley Independent Schools, the Community Academy of Sciences and Math Program (NM Highlands University), and LUNA Community College; many field trips and project work days spent on private and public lands
- WRAS developed (still in early draft form only)
- LJEC contracted with NMRWA to complete tasks in the grant's workplan

Project Challenges:
- Lost Watershed Coordinator less than halfway through the project due to contractual dispute
- No progress reported over significant time period; project cooperators non-compliant regarding submittal

PECOS HEADWATERS WATERSHED

Gallinas Municipal Watershed Fuels Reduction Project

- **Funding:** *Federal 319(h) ($72,894), In-Kind Match ($65,900), Total Project Cost ($138,794)*
- **NPS issues facing the Upper Gallinas River Watershed:** *Over-crowded forest*
- **303(d) listed impairments:** *Fecal coliform, stream bottom deposits, phosphorous, temperature, turbidity*
- **Project Type:** *(OTG) Forest Thinning; improve water quality & quantity*

Watershed Description:
84 square miles (~ 51 sq. miles of National Forest Land); designated high quality cold water fishery; contributes ~ 90% of the water to Storrie Lake (irrigates > 6,540 acres, primary source of domestic water supply for the City of Las Vegas serving approximately 20,000 people).

Project Description:
The objective of this project was to implement measures identified in the 2003 Watershed Restoration Action Strategy (WRAS) incorporating the 1994 Gallinas River Watershed Plan as necessary to maintain US Forest Service Pecos/Las Vegas Ranger District, focused entirely on forestry practices in the upper watershed.

Project Outcomes:
- 200 acres thinned to reduce overstocked conditions and improve watershed by increasing herbaceous and woody ground cover (final 100 acres will be completed in 2006)
- Prescribed burned areas after fuel wood is removed to reintroduce fire as natural ecological process and improve watershed conditions by reducing sapling competition and increasing ground cover
- Tours were conducted to partners and interested individuals
- Evaluating effectiveness of Best Management Practices (BMPs) is on going. BMPs implemented:
  - *Seasonal closure*—used to protect soil resource and roads from vehicle damage
  - *Lop and scatter*—used to help hold moisture in soil after canopies were removed from thinning; allows for fine needles to reach soil faster and makes nutrients available for soil productivity
  - *Contour felling*—used to fell trees on steeper slopes; helps hold soil in place and provide nutrients for shallow soils

Before Thinning: typical over-stocked stand of trees in 2003

After Thinning: Reduction of over- story shading provides opportunity for herbaceous and shrubby vegetation to cover the ground instead of pine needles.

Valle Grande Grass Bank Water Quality Improvement Project

- **Funding:** *Federal 319(h) ($192,000), In-Kind Match ($132,486), Total Project Cost ($324,486)*
- **NPS issues facing the watersheds involved:** *overgrazing*
- **303(d) listed impairments:** *Temperature (Chama River, Cow Creek), Turbidity (Rito Santa Barbara), Sedimentation (Rio Tusas)*
- **Project Type:** *(OTG) - rangeland management, rest from grazing*

Project Description:
From 2001 to 2005, the Valle Grande Grassbank (located on the east side of Rowe Mesa, Santa Fe National Forest) hosted a total of 1,133 head of cattle from four allotments utilizing approximately 5,665 animal unit months of forage. Selected participating allotments were those with need for restoration and with merit for a combination of successful treatments on National Forest lands:

- **Capulin Allotment *(Mora River watershed)*,** Santa Fe National Forest— composes a significant part of the Rito San Jose's watershed, which along with several other streams within Mora River watershed, have water quality problems related to a variety of agricultural impacts, rangeland grazing among them. This project has provided some needed awareness of progressive range management to the Capulin Allotment permittees.
- **Rosilla Allotment *(Pecos Headwaters)***—straddles the divide between 303(d)-Listed Cow and Willow Creeks; deferment from grazing in 2001 permitted the Allotment to partially recover following the canopy-replacing Viveash Fire of 2000
- **Santa Barbara Allotment *(Upper Rio Grande watershed)*** Carson National Forest—contains the Rio Santa Barbara and its forks, New Mexico's first Outstanding National Resource Water
- **Tio Gordito Allotment *(Rio Chama watershed)*—**Rio Tusas forms one allotment boundary, it's listed for sedimentation and thought to be impacted by cattle grazing; project supported the Tio Gordito permittees in hiring a herder to improve distribution of cattle, in addition to resting the Allotment from grazing for three seasons

Project Outcomes:

- BMPs provided: rest from grazing for four grazing allotments on the Santa Fe and Carson National Forests.
- Helped Valle Grande Grassbank grow into a stable institution, with more diverse funding base and a promising future for supporting sustainable ranching in northern New Mexico.

The Valle Grande Grassbank project helped improve and maintain the water quality of the Rio Santa Barbara

East Fork of Rio Santa Barbara—New Mexico's First Outstanding National Resource Water—within the Santa Barbara Grazing Allotment

RIO CHAMA WATERSHED

Rio Gallina Riparian Watershed Project

- **Funding:** *Federal 319(h) ($153,665) Cooperators Match ($205,200), Non-Match Funds ($113,360), Total Project Cost ($472,225)*
- **NPS issues facing the Rio Gallina watershed**: *Over grazing*
- **303(d) listed impairments:** *none listed*
- **Project Type:** *(OTG) – Rangeland / grazing management*

Project Description:
This project was implemented to assist the USFS (Coyote Ranger District) and grazing permittees in reducing the negative influence on water quality associated with livestock grazing along the Rio Gallinas and it's tributaries. The project area includes 31% of the 180,000 acre Rio Gallina Watershed, 19 miles of perennial streams, and 500 acres of riparian area. Eighteen percent of the area had conditions supporting soil loss in excess of tolerance, but less than potential levels.

Project Outcomes:
- 1.5 miles of Rio Gallina excluded from livestock grazing using fencing and natural barriers
- Livestock in drawn from riparian areas of Rio Gallina & Tributaries toward new upland water sources
- Boundary fences improved between grazing allotments and riparian areas and within individual allotments

Public Outreach:
- Involvement in project planning process
- Local school district science and agriculture programs (American Fisheries Society Hutton Student Scholarship Program)

Water Quality Results:
Water quality data will be collected, evaluated, and assessed annually by the USFS Coyote Ranger District. It is anticipated to take 10-15 years to accurately determine the project's success.

Trick Tank constructed to draw livestock and wildlife from riparian areas of Rio Gallina.

Hand made ATV cattle guard to keep cattle from the Rio Gallina.

RIO GRANDE (MIDDLE) WATERSHED

Tijeras Creek Urban Runoff Education and Demonstration Project

- **Funding:** *Federal 319(h) ($48,000) Cooperators Match ($47,496), Total Project Cost ($95,496)*
- **NPS issues facing the Tijeras Creek watershed**: *Urbanization, storm water runoff*
- **303(d) listed impairments:** *fecal coliform (Middle Rio Grande)*
- **Project Type:** *(OTG) demonstration of BMPs for urban stormwater runoff*

Project Description:
The Ciudad Soil and Water Conservation District of Albuquerque designed this project to demonstrate BMPs for treating urban stormwater runoff prior to it reaching a river system, and to disseminate that information to a variety of audiences within the middle Rio Grande watershed. The project was an outgrowth of earlier efforts to capture runoff from the roof of A. Montoya Elementary School in Tijeras.

Project Outcomes
- Baseline conditions determined via narrative descriptions, vegetation diversity and density surveys, cross-sections at selected locations, and photo documentation
- Removed and chipped dense stands of invasive Siberian elms & treated an infestation of dalmation toadflax prior to commencing earthwork, to avoid spreading the plants
- Volunteers assisted periodically with hand pulling new plant growth, and landscape contractor treated both elm and toadflax re-sprouts with herbicide as they emerged
- Reduced impacts of stormwater runoff from 16+ acres of impervious surface on school campus, turning it to a resource for an adjacent stretch of Tijeras Creek
- BMPs included: rundowns from sidewalk cuts, surge basins, and other erosion control features to remove energy from flows exiting culvert outlets or overflowing spillways, building contour berms and swales, in-ground "sponges," and wicks. Staff and volunteers planted native trees and shrubs in moisture-retaining areas. Students installed a small water-harvesting structure for their upland plantings

Outreach & Education:
- Project featured in photos and newspaper articles (Albuquerque Journal, East Mountain Telegraph, and The Tijeras Independent, and in the Roosevelt and A. Montoya school newsletters)
- Large, permanent, interpretive sign was installed at the project site
- Numerous site tours for conservation and stormwater management professionals, educators, and the general public
- 2 successful workshops held in June 2004, each geared to specific audiences
- Involved students, teachers, and parents from Montoya Elem. and the nearby Roosevelt Middle School
  - Classroom activities, field days, guest educators, monitoring and hands-on improvements at the site
  - Project incorporated into one gifted class's curriculum and became catalyst for establishing an Environmental Club at the Middle School, which was continued in the 2004-2005 school year
- Cooperators and volunteers donated many in-kind services and much time to the effort

BMPs included rundowns from sidewalk cuts, surge basins, and other erosion control features to remove energy from flows exiting culvert outlets or overflowing spillways, building contour berms and swales, in-ground "sponges," and wicks.

Staff and volunteers planted native trees and shrubs in moisture-retaining areas. Students installed a small water-harvesting structure for their upland plantings.

RIO GRANDE - SANTA FE WATERSHED

Galisteo Watershed Restoration Project, Phase 2

- **Funding:** *Federal 319(h) ($267,966) Cooperators Match ($215,384), Total Project Cost ($484,350)*
- **NPS issues facing the Gallisteo Creek watershed**: *Stream channel modifications that have led to bank collapse, poorly managed grazing on rangelands, woodlands, and riparian areas, and urban development impacts that lead to accelerated runoff and soil erosion.*
- **303(d) listed impairments:** *Conductivity, temperature*
- **Project Type:** (OTG) Riparian restoration, shading, streambank stabilization, demonstration projects

Project Description:
This project with Earth Works Institute (EWI) of Santa Fe, is a continuation of the group's successful 2000 NPS project. The goal of these projects have been to develop a working landscape in the watershed that reflects people's sense of stewardship and caring for the land. Community meetings helped EWI identify a great need for models and educational initiatives that demonstrate and promote appropriate BMPs. The watershed's size, impacts of rapid urban development, and relative unfamiliarity of many landowners with local climate and landscape conditions underscore this need. Deterioration of the watershed has been overlooked for a long time, and this is the only program of its kind in the entire watershed.

Project Outcomes:
- Disseminated education and outreach materials in community; participated in school education programs & outreach and community organizing; technical assistance and educational workshops for landowners
- Developed & successfully distributed technical field guides, outreach and education materials (*Induced Meandering Field Guide* and the *Rangeland Health Field Guide* required reprinting)
- Developed managed grazing plan for various pastures in the watershed
- Stream restoration techniques (induced meandering) proven effective for most moderately impacted stream reaches in watershed (may not work for severely impacted reaches with steep cut banks, unnaturally long river bends, and/or excessively high peak flows)
- WRAS updated
- Developed Landscape Management Assistance Services Program to provide future follow-up services to existing restoration areas, private landowners, communities, and public land management agencies

Project Challenges: & Lessons Learned:
- Interest in managed grazing plan limited; livestock operators include many recreational horse owners reluctant to remove their animals from the land when this would be advantageous
- Paperwork & monitoring requirements made implementation of plan unpopular with local users
- Managed / restorative grazing technique tested, but aborted mid-project due to a lack of forage and uncertain rainfall; several more years needed to determine appropriateness of technique for this area
- Induced Meandering requires long-term landowner (and community) involvement for monitoring, adjustments, and repairs
- Projects such as this, even with duration of 5-6 years, do not generate sufficient amount of detailed measurable results about precise amount of NPS pollution reduction achieved in project period
- BMPs are not as "simple" as they appear: they require considerable experience, know-how, and professional supervision regarding planning and design, installation, and follow-up. The goal to develop readily available & replicable techniques for private landowners has proven elusive

A sand bag erosion control technique: Large jute bags, filled with partly decomposed wood chips and on-site dirt, native seed mixes (jute-bag technique developed & tested at EWI ranch in 2004 & 2005—applied at 2 demonstration sites. Promises to be effective, but needs to be tested and monitored for several years to prove long-term viability.

Santa Fe River Restoration Project Phase II

- **Funding:** *Federal 319(h) ($51,000) Cooperators Match ($73,000), Total Project Cost ($124,000)*
- **NPS issues facing the Santa Fe watershed**: *Urbanization, non-functioning riparian system, gravel mining, storm water runoff, illegal solid waste disposal, off road vehicle use*
- **303(d) listed impairments:** *chlorine, dissolved oxygen, pH, stream bottom deposits, temperature*
- **Project Type:** *(OTG) – Riparian restoration, shading, stream bank stabilization*

Watershed Description:
Santa Fe River headwaters in Sangre de Cristo Mountains; upper reaches impounded with series of dams for municipal use by the City of Santa Fe; lower reaches through urbanized area of Santa Fe County ephemeral with non-functioning riparian system.

Project Description:
Through a multi-phased, multi-partner effort, the NM State Land Office (SLO) implemented a rehabilitation project along a one mile section of the Santa Fe River on state trust lands. Phase I of this project began in 1999 and Phase II concluded in December 2005. Challenges at this site included extensive bank erosion, channelization, improperly constructed river crossings, solid waste accumulation, and a general lack of riparian vegetation. To reduce erosion and sedimentation, numerous BMPs were installed to create better conditions in the riparian floodplain. Multi seasonal work was essential to establish a stable meander pattern and decrease channel slope.

Project Outcomes:
- Willow bundles and root-wad revetments installed in two locations
- Boulders used to establish grade control structures and increase meander length
- Steep banks angled back to a more stable slope, reseeded with native grasses and forbs, and mulched
- Willow whips planted extensively to stabilize channel and encourage riparian wildlife habitat.
- Poorly-designed low water crossing removed
- 100s of tons of trash, old tires, and other debris removed in several SLO / community river clean-ups
- Usually a dry river bed, the final year of this project saw flow increase dramatically
- Non-native plant species removed in riparian area
- Substantial changes in morphology of floodplain made through large and small modifications
- Switching to softer, incremental management practices, as opposed to large-scale channel modifications enabled bank stabilization and better erosion control thereby increasing water quality downstream in the perennial section

Project Monitoring :
Recent flood events and increased impervious surfaces have made working in a modified system difficult to predict and model. Finding the right geometry for the river has taken much trial and error and it may still be unable to withstand severe high intensity flooding. Ultimately how well these modifications hold may be determined by the state of the river upstream, which will require a concerted effort from the community. The SLO section of river will be managed in the future by Santa Fe County and the local neighborhood. Methods and techniques used to evaluate the successes and obstacles of this project include stream channel profiles, aerials photographs, before and after photos of site changes, vegetation techniques, piezometer/ monitoring well data, and public education and outreach designed specifically to increase public participation and knowledge about the project.

Before...

After...

Santa Fe River Restoration Project

Students rake in seed along the river bank.

Erosion control seed mat and boulders placed to minimize erosion.

RIO GRANDE (UPPER) WATERSHED

Rio Pueblo de Taos Watershed Project

- **Funding:** *Federal 319(h) ($17,800), In-Kind Match ($12,680), Total Project Cost ($30,480)*
- **NPS issues facing the Rio Pueblo de Taos watershed**: *chanalization, loss of riparian habitat*
- **303(d) listed impairments:** *stream bottom deposits, temperature*
- **Project Type:** *(WFG) - WRAS Development*

Project Description:
Major landowners and stakeholders were identified & meetings with neighborhood associations, business leaders, Taos Waste Water Treatment Facility, City of Taos, Taos Pueblo, BLM, USFS, and many other agencies. A Clean Water Act workshop covering water quality standards, the 303(d) list, and TMDLs was conducted for all identified stakeholders. The training provided pertinent policy issues surrounding the impairment of the Rio Pueblo de Taos and also served as a forum for stakeholders to identify what pollution they believe is impacting the river.

Project Outcomes:
- Formation of Rio Pueblo De Taos Watershed Group & Development of a WRAS

Comanche and Cordova Creeks WRAS, Education & Restoration Project

- **Funding:** *Federal 319(h) ($217,554) Cooperators Match ($401,645), Total Project Cost ($619,199)*
- **NPS issues facing the Comanche & Cordova Creeks watershed**: *overgrazing, road impacts*
- **303(d) listed impairments:** *temperature*
- **Project Type:** *(WGF & OTG) – WRAS development, grazing management, road improvement, in-stream structures, erosion control, and education*

Project Description:
A watershed group was formed for Comanche Creek to manage and implement watershed restoration measures targeting sources of water quality impairment. Measures included: grazing management improvements; BMPs to reduce erosion and headcuts in Comanche Creek tributaries; in-stream structures to improve channel characteristics; road improvements to reduce erosion, and stream and floodplain impacts. Education and outreach were also significant elements of the project.

Project Outcomes:
- WRAS's developed & baseline data collected for Comanche Creek. Cordova Creek, and Rio Costilla Watersheds. 11 monitoring sites established, 6 monitoring reports
- BMPs installed: 17 in-stream vanes, 42 mini-exclosures to promote streamside vegetation, 171 upland erosion control structures, 1.2 miles of road obliteration, 11.7 miles rolling grade dips & waterbars, 6 culverts or stream crossings treated
- Education & outreach: 10 volunteer work weekends, 15 state-wide workshops, two 2-day conferences, 780 workday & workshop participants, 8 newsletter articles, 5000 copies of "Water Harvesting from Low Standard Rural Roads" book, 3 permanent signs at Comanche Creek, website designed with useful information and specifications for BMPs (www.commanchecreek.org).

Water Quality Results: Water quality monitoring will occur in Phase 2.

Workshop on Rangeland Health teaches participants about properly functioning ecosystems and the role of grazing.

NM Trout volunteers installing vane structure in Comanche Cr. during a work weekend.

SOUTHERN NEW MEXICO WATERSHEDS

GILA RIVER (UPPER) WATERSHED

Gila Riparian BMP Project/The Nature Conservancy (TNC)

- **Funding:** *Federal 319(h) ($88,313) Cooperators Match ($36,340), Total Project Cost ($124,653)*
- **NPS issues facing the Gila watershed**: *incompatible agricultural practices, removal of riparian vegetation, and stream bank modification/destabilization*
- **303(d) listed impairments:**
- **Project Type:** *(OTG) – Riparian habitat restoration, flood plain restoration, stream bank stabilization*

Project Description:
This project directly addressed all three sources of non point source pollution identified for this reach of the Gila River by the NMED Surface Water Quality Bureau: incompatible agricultural practices, removal of riparian vegetation, and stream bank modification/destabilization.

Project Outcomes:
- Replaced incompatible agricultural practices with more conservative form of land use by planting to improved pasture using native grasses and forbs, completed in summer of 2003
- Restored riparian vegetation – cottonwoods, willows, sycamores, and riparian-obligate shrubs restored to the riparian zone via pole planting and irrigation
- Stabilized stream banks in sustainable fashion through bioengineering approach emphasizing establishment of native trees & shrubs, development of stable floodplain soils, improvement of floodplain functionality, & elevation of alluvial aquifer leading to reestablishment of historic wetlands, wet meadows and ponds.
- Creation of ponds integral to designated wildlife/wetland irrigation system—will reduce loading sediment, salinity, sulfates, chlorides, total dissolved solids (TDS), nutrients, phosphorous, nitrogen and organic pollutants in return flow to Gila River
- Educational component & cooperation by, students and teachers, University of New Mexico, New Mexico State University, University of Arizona, Northern Arizona University, local resident population, public and private schools and others

Taylor Creek, Upper Gila Watershed Restoration Project

- **Funding:** *Federal 319(h) ($31,728) Cooperators Match ($24,830), Total Project Cost ($56,558)*
- **NPS issues facing the Upper Gila watershed**: *over-grazing, fire suppression, watershed geology, and loss of riparian vegetation (pollution problems include temperature, turbidity, sediment transport, and chronic aluminum)*
- **303(d) listed impairments:** *Aluminum, temperature, turbidity*
- **Project Type:** *(WGF)- WRAS development*

Project Description:
The objective of this project was to form a watershed group of local stakeholders, and develop a holistic watershed management plan to improve watershed health and water quality based upon best management practices, by identifying objectives and goals that are feasible, attainable, and beneficial to the stakeholders.

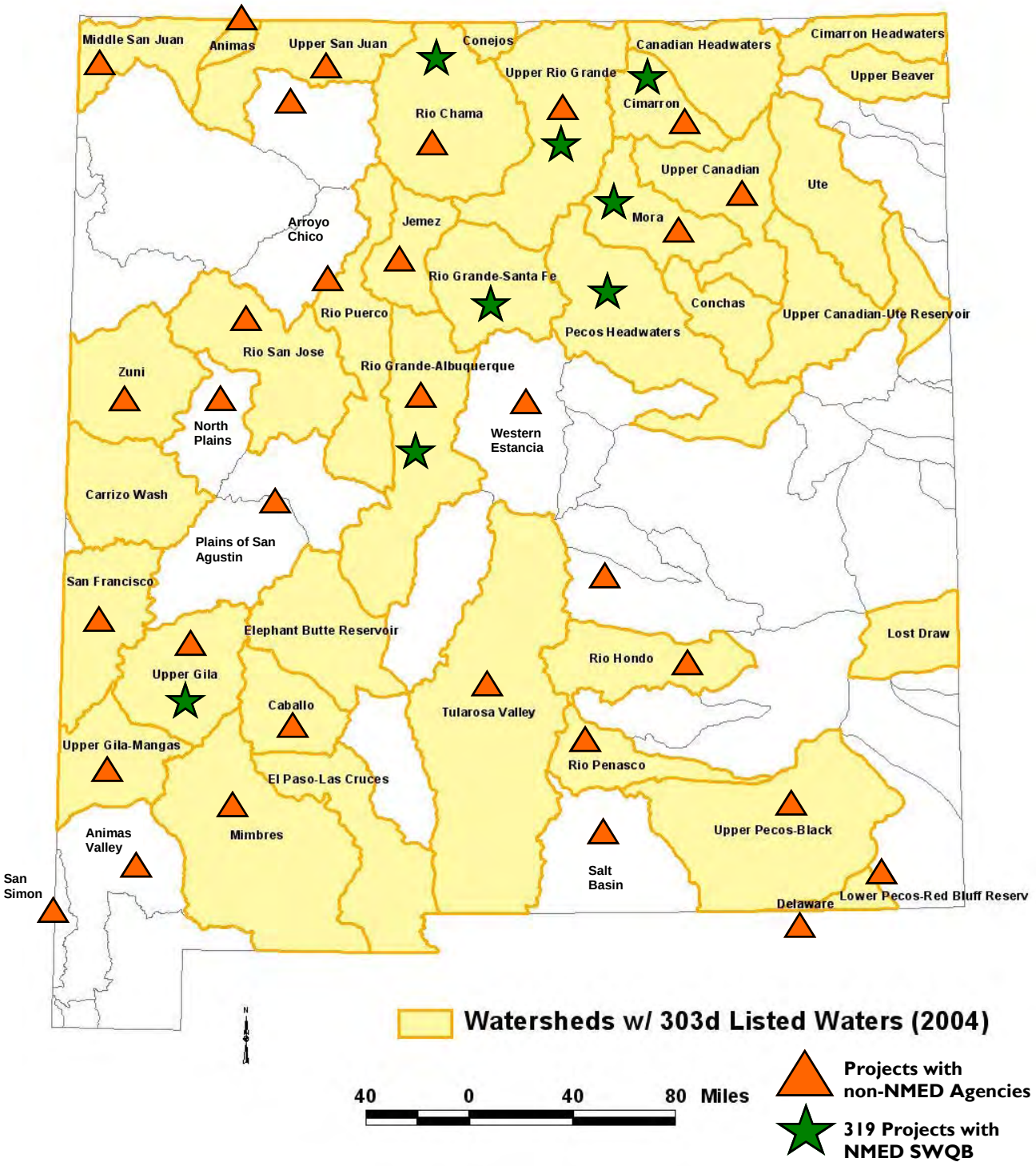
- **Project Outcomes:**
- Sierra Soil & Water Conservation District took lead role in developing workgroup to address nonpoint source issues within the watershed; Formation of Taylor Creek Watershed Committee
- Initial watershed assessment (sediment yield survey, sedimentation survey on Wall Lake)
- Initial restoration work (stream barbs installed on Taylor Creek for bank stabilization and redirect flow away from an existing cut bank)
- WRAS developed

SUMMARY OF PROJECTS COMPLETED BY NON-NMED AGENCIES*

Bureau of Land Management, NM Dept. of Transportation, NM State Land Office, Natural Resource Conservation Service (NRCS), US Forest Service

** Information presented in summaries varies depending on type of information provided by the various agencies*

Impaired Watersheds *[303(d) listed]* with NPS Projects Completed in 2005



NORTHERN NEW MEXICO WATERSHEDS

Northwest : Animas, Blanco Canyon, Middle San Juan, Upper San Juan

Bureau of Land Management Projects:

The BLM completed 6 projects in the Northwest NM area:

Watershed (s)	Project Description:	Water Quality Impact
Animas, Blanco Canyon, Upper San Juan	• Sagebrush thinning (8,000 acres)	• Reduce runnoff, soil erosion, & sedimentation • Increase water infiltration • Increase herbaceous plant growth
Blanco Canyon	• Silt fences placed in channel where excessive stream bank erosion is occurring.	• Reduce bank erosion, & sedimentation • Create riparian seedbed • Increase herbaceous plant growth
Blanco Canyon, Middle San Juan, Upper San Juan	• Retention dams constructed to help curtail and heal head cutting and gully formation.	• Reduce amount of sediment and salt loading to San Juan River system • Retained water available for livestock & wildlife • Slowly recharge watershed by percolation.
Blanco Canyon, Middle San Juan, Upper San Juan	• Invasive weed management (400 acres)	• Several salt cedar & Russian olive areas treated in riparian areas—improves water quantity
Upper San Juan	• 45 Straw bale check dams constructed	• Reduce erosion & sedimentation to San Juan River in areas of highly erosive soils
Animas, Upper San Juan	• Improvements to unpaved roads	• Reduce erosion and sedimentation to waters in San Juan River basin

Sediment Traps

PROJECT SPOTLIGHT—BLANCO CANYON WATERSHED

Sedimentation traps were constructed in the streambed where excessive stream bank erosion was occurring. The trapped sediment creates an excellent seedbed for the establishment of riparian vegetation and stabilization of eroding stream banks The project, done in cooperation with oil & gas operators and a local grazing allotee has achieved excellent result. Previous attempts to improve same riparian area by planting whips or poles have resulted in very poor success (<5%). Within months of project completion and following first flow events, desirable native vegetation can be observed growing.

North Central & Northeast : Cimarron, Mora, Jemez, Rio Chama, Upper Canadian, Upper Rio Grande,

NM State Land Office :

The NM State Land Office completed 2 projects in North-Central & NE NM watersheds:

Watershed (s)	Project Description:	Water Quality Impact
Cimarron	• Hazardous fuels reduction	• Watershed improvement & forest health
Upper Canadian	• Hazardous fuels reduction	• Watershed improvement & forest health

US Forest Service *(Carson NF)* :

The USFS Carson National Forest completed many projects in the North-Central & NE NM watersheds. These included Range administration, analysis, & monitoring; Fuels reduction; Wildlife improvements; & Road maintenance. Examples of NPS specific projects include:

Watershed (s)	Project Description:	Water Quality Impact
Cimarron	• Monitoring of channel structures in Heart Canyon	• Provide channel stability, sediment depostion and minimize new erosion resulting from effects of Ponil Creek wildfire.
Rio Chama	• Active participant in Rio Chama Watershed Group	• Contributed to development of WRAS
Rio Chama	• Cattle grazing reduced by 25% and sheep grazing by 50% in El Rito RD	• Reduces impacts of overgrazing - runnoff, & erosion
Upper Rio Grande	• Forest thinning, fuel reduction	• Increase herbaceous vegetation, & infiltration • Reduce fire risk (causes runnoff & erosion)
Upper Rio Grande	• New toilets installed at campgrounds near streams or lakes	• Reduces risk of fecal coliform impairment
Upper Rio Grande	• Hosted Questa High School classes	• Educational outreach regarding water quality considerations in Red River & Eagle Rock Lake

US Forest Service *(Santa Fe NF)* :

The USFS Santa Fe National Forest completed many projects in the North-Central & NE watersheds. These included Trail improvements; fence construction; Riparian vegetation restoration; Education & outreach; and Forest thinning. Examples of NPS projects include:

Watershed (s)	Project Description:	Water Quality Impact
Jemez River	• Trail & stream crossing improvements	• Reduce stream bank erosion & sedimentation • Protects Wild & Scenic East Fork Jemez River
Mora River	• Forest thinning for fuel reduction (210 acres), trail rehabilitation (8 miles), and education (100 students)	• Increase herbaceous groundcover • Reduce trail erosion • NM State University contracted to monitor project effectiveness & watershed improvements

Watershed (s)	Project Description:	Water Quality Impact
Rio Chama	• Willow & aspen planting (5 acres of riparian area); stream bank stabilization (2.5 miles), stream habitat improvement (1.25 miles)	• Reduce erosion & sedimentation • Provide riparian corridor buffer • Improve fisheries productivity & aquatic habitat for Rio Grande cutthroat trout
Rio Chama	• Watershed restoration: riparian area fencing, channel stabilization, road converted to hiking trail, willow plantings	• Reduce erosion, runnoff, and sedimentation • 2 permanent stream / water quality monitoring stations installed—monitoring assistance will be provided by Jemez Mountain School District.

Willow planting on Rio Cibolla in Rio Chama Watershed

Forest Thinning in Mora River Watershed: The left is a control plot with a dense over story. The right is treatment plot with an open over story, large diameter trees, and ladder fuels have been removed.

Jemez Mountain School District students establishing a stream monitoring station and collecting stream data on Cecilia Creek in Rio Chama Watershed.

CENTRAL NEW MEXICO WATERSHEDS

Central : Arroyo Chico, North Plains, Plains of San Agustin, Rio Grande-Albuquerque (Middle Rio Grande), Rio Puerco, Rio San Jose, Western Estancia, Zuni

NM State Land Office :

The NM State Land Office completed 5 projects in Central NM watersheds:

Watershed (s)	Project Description:	Water Quality Impact
North Plains	• Fuels reduction (330 acres)	• Reduce runoff, erosion , sedimentation
Plains of San Agustin	• Luera Mountain meadow restoration (365 acres)	• Reduce runoff, erosion , sedimentation • Increase infiltration
Rio Grande - Albuquerque	• Hazardous fuels reduction—2 projects: Apple Valley (480 acres) & South 14 (95 acres)	• Reduce runoff, erosion, & sedimentation
Zuni	• Fuel break (40 acres)	• Reduce runoff, erosion , sedimentation

US Forest Service *(Cibola NF) :*

The Cibola National Forest completed many projects in the Central NM watersheds. Examples of their NPS projects include:

Watershed (s)	Project Description:	Water Quality Impact
Arroyo Chico & Rio Puerco *(along boundary)*	• Re-establish native plant communities in Pinon-Juniper woodland (350 acres)	• Reduce runoff, erosion , sedimentation • Increase infiltration
Plains of San Agustin	• Fuels reduction & habitat improvement (2,809 acres)	• Reduce runoff, erosion , sedimentation
Rio San Jose	• Re-establish native plants in burned area (1,650 acres)	• Reduce runoff, erosion , sedimentation • Increase infiltration
Rio Grande - Albuquerque	• Sediment control ditch maintenance & rock sediment apron on Las Huertas Creek	• Reduce sediment yield to Las Huertas Creek from road
Rio Grande - Albuquerque	• Survey & design of restoration features along entire Cedro Creek drainage; monitoring	• Restoration of wetlands (30 acres) • Monitoring of restoration work • Project to be completed in 2008
Western Estancia	• Riparian vegetation seed propagation	• Seedlings propagated to be used in riparian restoration projects within ranger district

PROJECT SPOTLIGHT—RIO GRANDE-ALBUQUERQUE WATERSHED

The **Las Huertas Creek Sediment Control Project's** objective was to reduce sediment coming into Las Huertas Creek and improve aquatic species (including cold water fishery) habitat. The project involved maintenance of an existing but unused water/sediment control ditch and the creation of a rock sediment apron to divert and settle water coming from the main water drainage ditch along the highway. Previously, the main drainage ditch carried significant road sediment directly into Las Huertas Creek affecting the riparian area and aquatic habitat many hundreds of feet downstream. The project was a cooperative effort between the New Mexico Department of Transportation, US Forest Service, and volunteers.

US Forest Service *(Gila NF)* :

The Gila National Forest completed 1 project in the Central NM area:

Watershed (s)	Project Description:	Water Quality Impact
Plains of San Agustin	• Prescribed burn (2,925 acres) & Pinon / Juniper removal	• Reduce runnoff, erosion , sedimentation • Increase water table & flow

SOUTHERN NEW MEXICO WATERSHEDS

Southwest : Animas Valley, Caballo, Mimbres, San Simon, San Francisco, Upper Gila & Gila-Mangas

US Forest Service *(Coronado NF & Gila NF)* :

The USFS Coranado (mostly in AZ) and Gila National Forests completed many projects in the Southwest NM watersheds. Examples include:

Watershed (s)	Project Description:	Water Quality Impact
Animas Valley & San Simon	• Monitoring range management allotments & erosion control BMP projects	• Reduce runoff, erosion , sedimentation
Caballo & Upper Gila River	• Trail repairs to improve drainage & prescribed burns	• Reduce runoff, erosion , sedimentation
Mimbres & Upper Gila	• Juniper removal, reduced numbers or non-use status for several grazing allotments, well trough maintanence	• Increase water table level & flow • Reduce runoff, erosion , sedimentation • Stream bank stabilization & riparian area protection
San Francisco	• Salt Cedar removal (217 acres), Ponderosa thinning (180 acres)	• Increase water table level & flow • Reduce runoff, erosion , sedimentation
Upper Gila-Mangas	• Pinon / Juniper removal (1,300 acres), gullly plugs and stream stabilizing structures installed, alternative wildlife & livestock water source constructed	• Increase water table level & flow • Reduce runoff, erosion , sedimentation • Stream bank stabilization & riparian area protection

South Central & South East: Arroyo Del Macho, Delaware, Lower Pecos, Red-Bluff Reservoir, Rio Hondo, Rio Penasco, Salt Basin, Tularosa Valley, Upper Pecos-Black

Bureau of Land Management:

The BLM has completed 11 projects in the south-central and south eastern New Mexico watersheds. Examples of NPS projects include:

Watershed (s)	Project Description:	Water Quality Impact
Delaware River	• Salt Cedar removal (13.5 acres & 1.5 river miles). Continuation of past project	• Provide additional groundcover in place of Salt Cedar to reduce sedimentation • Increase proper function of riparian zone. • Studies show slight increase in stream flow, temperature, dissolved oxygen, and TDS
Delaware River	• Gully plug & small diversion fence constructed at active headcut to trap sediment	• Prevented upstream & downstream movement of headcut • Reduce sediment yield to Delaware River
Lower Pecos - Red Bluff Reservoir	• Brush control to reduce / eliminate mesquite (4,166 acres)	• Past treatments in similar areas show increase in grass cover, shorter flow patterns, and less soil movement—similar results expected here
Rio Hondo	• Juniper removal at 2 sites (458 acres & 131 acres), increase native grasses	• Improve water retention in soil • Reduce sedimentation • Increase understory vegetation
Upper Pecos-Black	• Brush control to reduce / eliminate catclaw & creosote at 3 sites (1,012; 2,011; & 3,514 acres)	• Increase infiltration • Reduce erosion, runoff & sedimentation • Past treatments show improvement to watershed & similar results expected here
Upper Pecos-Black	• Florescene Dye Trace Project • Dye added to drilling fluids at 6 oil/gas wells to test casing integrity	• 12 water sources (wells, spring heads, water courses) outfitted with charcoal traps to detect dye if loss of drilling fluids occur and if fluid enters ground water sources (no results yet)
Upper Pecos-Black	• 4 drilling pads & 1 caliche pit (18 acres) reclaimed; re-seeding & soil stabilization matting used	• Reduce soil erosion & sedimentation • Improve water infiltration

Caliche Pit Restoration
Stabilizing matting used to test enhancement of recovery

Gully plug near Delaware River

NM State Land Office:
The NMSLO has completed 2 projects in the south-central and south eastern New Mexico watersheds.

Watershed (s)	Project Description:	Water Quality Impact
Rio Hondo	• Hazardous fuels reduction (280 acres)	• Reduce runoff, erosion , sedimentation • Increase infiltration
Tularosa	• Hazardous fuels reduction (120 acres)	• Reduce runoff, erosion , sedimentation • Increase infiltration

US Forest Service *(Lincoln NF)*:
Lincoln National forest completed many projects in the south-central and south eastern New Mexico watersheds. For the past year they have been aggressive in reducing fuels on the forest to help improve watershed conditions as well as reduce the risks for catastrophic fires. To date, 12,357 acres have been treated for fuels reduction by thinning or prescribed burn.

The watersheds benefiting from these projects are:
Arroyo del Macho, Rio Hondo, Rio Penasco, Salt Basin, and Tularosa Valley

STATE-WIDE WATERSHED PROJECTS

New Mexico Department of Transportation (NMDOT):
The *NMDOT / New Mexico Environment Department Task Force* was created to provide better communication between both departments regarding environmental concerns.

Water Quality-related accomplishments for 2005 include:

Joint 401/NPDES Position in NMED's Surface Water Quality Bureau (NMED/SWQB)
- Jointly funded by NMED/SWQB and NMDOT filled in September
- Works with NMDOT CWA §404/401 issues primarily to comply with 401 Certification regulations.
- Provides guidance for NPDES implementation

NMDOT Recycling Program:
- Use of compost/mulch for erosion control becoming part of day-to-day operation for DOT projects
- Composted mulch comprised mainly of woodchips from forest thinning projects; combined with native grass seeding or used by itself to hold sediment in place, retain soil moisture, and add organic material to mineral soils; allows natural plant succession to occur
- USFS, NM Recycling Coalition, NMDOT partnership obtained CFRP grant for continued use of compost/ mulch for road projects, maintenance, NPDES and other re-vegetation needs

CWA Section 319(h) Grant awarded to NMDOT District Five:
- For work on NM 169 on Cordova Creek, Rio Costilla watershed
- Abate sedimentation problem & help return stream to a high quality coldwater fishery
- Model for teamwork between NMED & NMDOT to address road issues and restore water quality

104(b)(3) Wetlands Grant to SWQB for Restoring Wetlands & Training Wetlands Specialists:
- Will provide 3-day training session in May 2006 to NMDOT personnel
- Rosgen hydrogeomorphic processes and on-the-ground implementation of BMPs to protect water quality and wetlands resources will be principal topics covered

NMDOT/NMED Task Force Plans for 2006 will include revitalization of the Task Force.

Natural Resources Conservation Service (NRCS)

The NRCS has completed a number of projects throughout New Mexico to address nonpoint source pollution issues. Water Quality-related accomplishments for 2005 include:

Certification & Training Program for Comprehensive Nutrient Management Planning (CNMP)

- For NRCS & Cooperative Extension Service (CES) employees, other agencies, private consultants, and producers.
- 60 Technical Service Providers and 33 NRCS employees have attended training since 2000; there are 17 NRCS and 15 Technical Service Provider Certified Conservation Planners for CNMPs.
- Planners will develope comprehensive nutrient management plans for animal feeding operations to prevent runoff and leaching of animal manure into surface and ground water.
- Comprehensive Nutrient Management Plans developed by NRCS field offices in Roswell (10), Clovis (2), Las Cruces (6), Portales (4), Santa Fe (1), Los Lunas (2), and Lovington (1).

Conservation Buffers

- Reduce sediment loss & runoff
- Applied: riparian forest buffers (257 acres), field buffers (5000 ft.), windbreaks/shelterbelts (85,363 ft.)
- primarily in far north east and east central counties

Irrigation Water Management

- Reduce runoff and leaching
- Applied acres in: northwest counties (54), north-central counties (173), south-central counties (234), northeast counties (2,289), central counties (2302), southwest counties (2,362), southeast counties (4,163), east-central counties (16,497).

Certification & Training Program for Nutrient & Pest Management

- For NRCS & Cooperative Extension Service (CES) employees, other agencies, private consultants, and producers.
- 100 participants trained since 2001.
- Nutrient management practices applied to utilize resources efficiently & reduce nutrient runoff & leaching from croplands
- Applied acres for nutrient management in: north-central counties (4), south-central counties (30), southwest counties (1,372), northeast counties (1,488), southeast counties (2,048), central counties (2,286), east-central counties (4,509).
- Pest management systems applied on cropland, pasture, & rangeland to utilize resources efficiently & reduce pesticide runofff & leaching.
- Applied acres for pest management in: north-central counties (4), south-central counties (30), southwest counties (1,385), southeast counties (1,653), central counties (2,236), northeast counties (4,122), east-central counties (7,222).

Residue Management

- Applied to cropland to reduce sediment loss & runoff
- Conservation crop rotation (49,692 acres), contour farming (129 acres), cover crop (65 acres), mulch till (15 acres), no till (3,442 acres), seasonal residue management (47,593 acres)
- # of counties represented: Central counties (4), East-central counties (4), southeast counties (3), southwest counties (3), north-central / northeast / northwest / south-central (1 county each)

LIST OF ABBREVIATIONS

BLM	Bureau of Land Management
BMP	Best Management Practices
CES	Cooperative Extension Service
CWA	Clean Water Act (Federal)
EPA	United States Environmental Protection Agency
GWQB	Ground Water Quality Bureau
HUC	Hydrologic Unit Codes
NM	New Mexico
NMED	New Mexico Environment Department
NMDOT	New Mexico Department of Transportation
NRCS	Natural Resource Conservation Service
NPS	Nonpoint Source
ONRW	Outstanding National Resource Waters
ORV	Off-road vehicle
OSE	Office of the State Engineer
SLO	New Mexico State Land Office
SWCD	Soil and Water Conservation District
SWQB	Surface Water Quality Bureau
US	United States
USFS	United States Forest Service
WQCC	Water Quality Control Commission