State of New Mexico Nonpoint Source Management Program

2011 Annual Report

New Mexico Environment Department
Surface Water Quality Bureau
Watershed Protection Section

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Nonpoint Source Management Program

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Executive Summary

This annual report to the United States Environmental Protection Agency (EPA) provides an overview of Clean Water Act (CWA) Section 319(h) Nonpoint Source Management Program related activities conducted in New Mexico in 2011 by the Watershed Protection Section of the New Mexico Environment Department Surface Water Quality Bureau. Polluted runoff, or nonpoint source (NPS) pollution, is defined by the EPA as "caused by rainfall or snowmelt moving over and through the ground and carrying natural and human-made pollutants into lakes, rivers, streams, wetlands, estuaries, and other coastal waters and groundwater. Atmospheric deposition and hydrologic modification are also sources of 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 rivers, wetlands, lakes and streams. When Congress amended the CWA in 1987, section 319 was added to provide federal leadership to assist states, territories and tribes in developing programs that address NPS pollution. Under section 319, states, territories and tribes receive grant funding to support activities such as: outreach and education, training, implementation of best management practices (BMPs), and monitoring to assess implementation efficacy.

Milestones are an integral part of the NPS Management Program and a requirement under section 319(b)(2)(c) of the CWA. The 2011 milestones are reported on pages 8-10. Significant achievements include: the release of a request for proposals (RFP) to fund projects with the greatest potential of success under the National Water Program Guidance for Fiscal Year 2011 PAMs WQ-10 and SP-12, the release of a second RFP to fund watershed-based planning, the nomination for the Santa Fe River submitted in 2010 was further developed and accepted by EPA in 2011 (see story page 11), and the completion of three Wetlands Action Plans. EPA also accepted the New Mexico Wetland Program Plan (WPP) as meeting the four elements for such plans (monitoring and assessment, regulation, voluntary restoration and protection, and water quality standards for wetlands). New Mexico's is the only accepted WPP in EPA Region 6 and one of only 21 in the United States meeting all four elements. In addition, ten proposals resulting from the two RFPs were reviewed and four project workplans were developed and submitted to EPA for review. These projects received final approval by year's end, and three of them are in the final stages of contract issuance.

A series of events occurred in 2011 that had an immediate impact on water quality. New Mexico has been experiencing a drought for over 10 years, and 2011 was the driest year since the drought began (see story on page 5). Many rivers and streams experienced reduced flows, storage volumes in lakes and reservoirs decreased markedly, and some smaller streams ceased to flow altogether. By spring, a large portion of the state was in extreme danger of wildfire. By early summer, most of New Mexico's National Forests, which contain virtually all of New Mexico's headwater streams, were under extreme fire conditions with strict visitor restrictions, and forest wide closures. Despite these precautions, small fires began popping up in early April. By the end of June, no fewer than five major wildfires were burning across the state which eventually consumed over 300,000 acres.

The impact of the 2011 fire season on New Mexico's surface waters will be felt for many years. Many areas that received moderate to low intensity fire will rebound quickly and may even be in better condition than prior to the fire, but it is anticipated that many areas will continue to be impacted for years to come. Maintaining the health of New Mexico's watersheds has seldom been more critical.

Introduction

This annual report to the United States Environmental Protection Agency (EPA) provides an overview of nonpoint source management related activities conducted in New Mexico in 2011 by the Watershed Protection Section (WPS) of the New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB). The report presents the state's progress in meeting the milestones outlined in the goals and objectives of the New Mexico Nonpoint Source Management Program, and provides information on reductions in nonpoint source (NPS) pollutant loading and improvements to water quality of New Mexico watersheds as required under Section 319(h)(11) of the Clean Water Act (CWA). The majority of funding for projects listed in this report was provided by 319(h) grants awarded to NMED by the U. S. Environmental Protection Agency (EPA). Additional activities included are projects implemented by the WPS Wetlands Program, CWA Section 401 activities, N.M. Mining Act activities, and nonpoint source projects implemented by other natural resource agencies outside of NMED.

What is Nonpoint Source (NPS) Pollution?

Polluted runoff, or NPS pollution, is defined by the EPA as "caused by rainfall or snowmelt moving over and through the ground and carrying natural and human-made pollutants into lakes, rivers, streams, wetlands, estuaries, and other coastal waters and groundwater. Atmospheric deposition and hydrologic modification are also sources of nonpoint source pollution."

Sediment laden stormwater.

Sediment choking stream bottom.

A few examples of NPS pollution include: bacteria and nitrates from aging or out of compliance septic systems; sediment and ash from forest and rangeland fires; oil, grease and other hydrocarbons from parking lots and roads; sediments from poorly designed unpaved roads; fertilizers, nutrients and bacteria from agricultural practices; and bacteria from pet waste. Increased water temperature resulting from degraded

Cattle along a creek bank.

Overwide stream with no canopy.

streambanks, loss of streambank vegetation, and hydromodification is another example of NPS pollution. New Mexico's most common causes of NPS pollution are nutrients, bacteria, and temperature.

Clean Water Act Section 319

NPS 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 rivers, wetlands, lakes and streams. When Congress amended the CWA in 1987, Section 319 was added to provide federal leadership to assist states, territories and tribes in developing programs that address NPS pollution. Under Section 319, states, territories and tribes receive grant funding to support the following activities: outreach and education, training, implementation of best management practices (BMPs), and monitoring to assess implementation efficacy. Section 319 contains three main strategies for addressing NPS pollution:

- ◊ Requires states to prepare assessment reports of their NPS pollution problems.
- ◊ Requires states to develop a management program to control NPS pollution and improve water quality problems within the state.
- ◊ Creates a grant program to fund implementation of the management program for the assessment and control of NPS pollution.

Clean Water Act Sections 303(d) and 305(b)

Two sections of the CWA designed to manage both point sources and NPS are Sections 303 and 305. Under Section 303(d), states are required to list all polluted surface waters 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 the *State of New Mexico CWA §303(d)/§305(b) Integrated Report*.

New Mexico's Nonpoint Source Management Program

As lead agency for the management of NPS pollution, NMED coordinates activities within the state through the SWQB and the Ground Water Quality Bureau (GWQB). In accordance with the CWA, the SWQB has developed a NPS Management Program planning document (NPS Management Plan). Our ultimate goal is to manage a balanced program that addresses both existing impairments (as listed in the 303(d) list) and prevents future impairments. The focus on existing impairments is directed at those impaired waters for which a Total Maximum Daily Load (TMDL) has been calculated. The TMDL is the total amount of pollutant a waterbody can assimilate daily and still meet water quality standards. In New Mexico TMDLs are generally only calculated on impaired waterbodies. In calculating a TMDL for an impaired waterbody, a target value of pollutant reduction is also provided. The primary focus of New Mexico's Nonpoint Source Management Program is to fund and support projects which implement TMDLs to reduce the pollutant load. An important component of this process is the watershed based plan (WBP) approach as outlined in the guidance provided in the *Nonpoint Source Program and Grants Guidelines for States and Territories* (Fed Reg. Vol 68, No. 205 Sec. III, D a-i). The WBP expands on the information provided in the TMDL by identifying causes and sources of impairment, recommending management measures, estimating expected load reductions from management measures, providing methods to measure implementation success, estimating funding needs, and outlining potential education and outreach efforts.

Stakeholders listen to stream restoration plans prior to a day working on the Dry Cimarron River.

The goal of New Mexico's Nonpoint Source Management Program is:

> ***To implement watershed-based restoration and protection programs with the assistance of all stakeholders, for all watersheds within New Mexico, to meet and maintain water quality standards and beneficial uses of surface water and groundwater resources.***

NPS Management Program

Special Report: Drought, Fire and Impacts to Water Quality

Although New Mexico has been experiencing drought conditions for over 10 years, 2011 was the driest year since the drought began. Some areas experienced the driest year on record and most rivers and streams experienced reduced flows, storage volumes in lakes and reservoirs decreased markedly, and some smaller streams ceased to flow altogether. By spring, a large portion of the state was in extreme danger of wildfire. By early summer, most of New Mexico's National Forests, which contain virtually all of New Mexico's headwater streams, were under extreme fire conditions with strict visitor restrictions, and forest wide closures. Despite these precautions, small fires began popping up in early April with the fire season beginning in earnest on April 28th with the Miller Fire in the Gila Wilderness which eventually burned almost 89,000 acres. By the end of June, fire crews in New Mexico were fighting no fewer than five major wildfires across the state which eventually consumed over 300,000 acres. These include the Las Conchas Fire in the Jemez Mountains, 157,000 acres; the Donaldson Complex Fire on the eastern slopes and foothills of the Sacramento Mountains, 100,000 acres; the Track Fire near Raton, 27,795 acres; the Pacheco Fire in the Sangre De Cristo Mountains, 10,250; and the Wallow Fire, the largest fire in Arizona history which consumed over 500,000 acres in Arizona, and moved into west central New Mexico, 15,407 acres.

Las Conchas fire on July 6, 2011.
(Photo courtesy of John Fowler)

Ash and debris laden floodwaters of San Antonio Creek.
(photo courtesy of Bob Parmenter)

Tree-ring data in most southwestern middle-elevation forests indicate that major fire years such as 2011 were common prior to about 1880. These fires would normally consume fine fuels, kill saplings and tree seedlings, and leave soils and perennial plant communities largely intact. Grazing beginning in the nineteenth century, combined with fire suppression in the twentieth, resulted in denser forests in which fire burns hotter, killing more of the plant community and leaving soils more exposed and resistant to infiltration.

The impacts to water quality cannot be overstated. Streams within the burned areas received immediate impacts especially from ash and debris. These impacts were

Fish kill in the San Antonio Creek. (photo courtesy of VCNP staff)

intensified following the beginning of the rainy season in mid-July that carried ash, debris and fine sediments from the highly erodible burned areas. This impacted the receiving streams with suspended particulate matter, and had negative impacts to both dissolved oxygen and nutrient concentration. This resulted in a large fish kill in both the East Fork of the Jemez River and San Antonio Creek following the Las Conchas Fire. Minor fish kills were also reported in the Rio Grande 50 miles downstream that were attributed to ash and debris from the Las Conchas Fire. Much of the upland areas that received low to moderate intensity fire began recovering rapidly by the end of the summer. In addition, most of the riparian areas that were in prior good condition with stable banks, intact floodplains, and healthy vegetation remain intact. In the vicinity of the Las Conchas Fire there are several 319 projects, wetlands projects, and state funded restoration projects that may be impacted. These will be monitored by 319 and wetlands grant recipients as well as the NPS Effectiveness Monitoring Program.

An immediate concern was the potential impact to the drinking water supplies of Santa Fe, Albuquerque, and Raton. The Pacheco Fire was located just north of the watershed containing Santa Fe's two drinking water reservoirs and did not enter the watershed. The Las Conchas Fire produced ash and debris which were carried downstream threatening the city of Albuquerque's drinking water supply. The Rio Grande only represents a portion of Albuquerque's drinking water and the utility was able to curtail withdrawal from the Rio Grande during times of high ash load. Raton faced the most serious problems from the 2011 fire season from the Track Fire.

Ash and debris from the Las Conchas fire in Peralta Arroyo, a tributary of the Rio Grande.

The Track Fire burned across almost the entire watershed which supplies drinking water for the City of Raton, burning to the water's edge of Lake Maloya and Lake Dorothey, the city's two drinking water reservoirs. The City of Raton acted quickly by contacting state and federal agencies to obtain assistance. The city had prior experience managing the watershed and a comprehensive plan was drawn up immediately following the fire in consultation with NMED, the NRCS, and the U.S. Army Corps of Engineers. The plan included the construction of eight sediment retention basins upslope from Lake Maloya, contour tree felling, installation of silt fence and waddles, application of mulch, and both ground and aerial seeding. Based on a conservative estimate of an

Lake Maloya shortly after containment of the Track Fire.

A sediment retention basin constructed above Lake Maloya.

The same sediment retention basin filled following the first good rain after the fire.

ash concentration of 35%, it is estimated the eight sediment retention basins prevented over 29,000 tons of sediment from entering Lake Maloya. A decision was also made to sacrifice Lake Dorothey in an attempt to trap ash and sediment upstream of Lake Maloya. Water quality continues to be monitored by the City of Raton and the efforts have proven successful for the most part.

The impact of the 2011 fire season on New Mexico's surface waters will be felt for many years. Many areas that received moderate to low intensity fire will rebound quickly and may even be in better condition than prior to the fire, but it is anticipated that many areas will continue to be impacted for years to come. Maintaining the health of New Mexico's watersheds has seldom been more critical.

NPS Management Program Milestones

At the core of the NPS Management Program are specific objectives aimed at reducing and preventing NPS pollution in New Mexico: Watershed-Based Planning, Addressing Water Quality Problems, Water Quality Protection, Education and Outreach, Protect Groundwater Resources, and Interagency Cooperation. Within each objective are specific activities and milestones to meet the objective. Milestones are an integral part of the NPS Management Program and a requirement under Section 319(b)(2)(c) of the Clean Water Act. The following table lists each milestone identified in the NPS Management Plan which has a specific numeric goal and an established time frame, and its status.

Objective number	Objective Short Name	Milestone (abbreviated)	Schedule	2011 Status
1	Watershed Based Planning	All nine planning elements are addressed in watershed-based plans (WBPs).	2012: 3 plans, 49 watersheds. 2014: 2 additional plans, 20 additional watersheds.	In progress. One plan covering one priority watershed was accepted by EPA in 2010.
2	Addressing Water Quality Problems	Improve water quality in priority watersheds, meeting EPA performance measures SP-12 or WQ-10.	Three watersheds by 2012 and three more by 2014.	In progress. One nomination was accepted by EPA for the Santa Fe River for one stream segment and two sixth-level (12-digit) watersheds.
2	Addressing Water Quality Problems	Wetlands Action Plans are implemented in at least one priority watershed per year.	1 watershed per year.	Achieved for 2011. Three Wetlands Action Plans were implemented.
3	Water Quality Protection	The CWA §303(d)/§305(b) Integrated Report does not indicate an increase in the percentage of assessed stream miles designated as impaired.	The Integrated Report is scheduled for completion in 2010, 2012, and 2014.	Nothing to report in 2011 because the list is currently in revision.

NPS Management Program Milestones (continued)

Objective number	Objective Short Name	Milestone (abbreviated)	Schedule	2011 Status
3	Water Quality Protection	The CWA §303(d)/§305(b) Integrated Report provides summaries of water quality survey activity, analysis, and conclusions.	The Integrated Report is scheduled for completion in 2010, 2012, and 2014.	Nothing to report in 2011 because the list is being revised in 2012.
3	Water Quality Protection	NMED proposes to WQCC adoption of water quality standards for wetlands.	2014	In progress.
4	Education and Outreach	The Forest and Watershed Health Program Virtual Library experiences an annual increase in internet hits of at least 10% between 2009 and 2014.	Annually	2011 was the first year of tracking and revealed 12,310 hits.
4	Education and Outreach	NM Watershed Forum is attended by more than 300 people.	2010, 2012, 2014	Planning for the 2012 New Mexico Watershed forum began in 2011.
4	Education and Outreach	Clearing the Waters is published quarterly.	Quarterly	Milestone achieved. Four issues of Clearing the Waters published in 2011
4	Education and Outreach	Clearing the Waters circulation increases to 1000 by 2014.	2014	Milestone achieved. Circulation is estimated at 1,004.
6	Interagency Cooperation	The MOU between NMED and USFS is renewed.	2014	In progress. MOU is currently in review.

NPS Management Program Milestones (continued)

Objective number	Objective Short Name	Milestone (abbreviated)	Schedule	2011 Status
6	Interagency Cooperation	The Agreement in Principle between NMED and USDOE will be renewed.	2010	Milestone achieved. The agreement was extended in 2008 and is valid until 2013.
6	Interagency Cooperation	The MOU between NMED and NMDOT will be renewed.	2010	Incomplete.

The WPS continues to forge relationships to promote interagency cooperation. This is critical in New Mexico where over 30% of the land is managed by the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM). Coordination meetings were held with both agencies in 2011.

On June 8, 2011 a coordination meeting was held between soil water and air specialists from each BLM field office and members of the WPS. Topics of discussion included watershed planning, project funding, forging project partnerships, and load reduction reporting. Additional coordination meetings are anticipated for the future.

A planning meeting was held with the USFS on November 15, 2011 between staff from each National Forest in New Mexico and several SWQB programs. A draft Memorandum of Understanding (MOU) between NMED and the Southwestern Region of the USFS, in review since 2007, was discussed. In addition to other topics, the draft MOU would acknowledge the USFS role in implementing the State's Antidegradation Policy as it relates to NPS pollution on USFS system lands that could affect Outstanding National Resource Waters (ONRWs). USFS staff had requested training on how to apply the Guidance for NPS discharges in ONRWs (available at: www.nmenv.state.nm.us/swqb/ONRW) for specific situations prior to submitting the MOU to the Regional Forester. Accordingly, another subject of discussion was a draft decision process, jointly developed by SWQB and USFS staff, for approving proposed projects that may affect ONRWs.

In 2011 the USFS completed a national watershed condition classification under the Watershed Condition Framework (WCF). The classification uses the 12-digit USGS watershed delineation, and is heavily weighted towards aquatic ecosystem components, including water quality. The WCF proposes to improve the USFS approach to watershed restoration by targeting the implementation of integrated suites of activities in those watersheds that have been identified as priorities for restoration. Each National Forest in New Mexico was directed to develop a watershed restoration action plan for at least one watershed identified as a priority for restoration. These plans were summarized at the meeting in November. Most of the elements of watershed-based plans are included in these plans. One element not yet addressed is element b., an estimate of the load reductions expected for management measures. However, the WCF provides the Forest Service with an outcome-based performance measure for documenting improvement to watershed condition at the forest, regional, and national level. Information on the WCF can be found at www.fs.fed.us/publications/watershed.

Santa Fe River Success Story

The Santa Fe River was nominated for a success story in 2010 under EPAs performance activity measures WQ-10 and SP-12. The nomination was the culmination of efforts to restore the Santa Fe River which began in 1997. Listed as impaired for sedimentation/siltation, dissolved oxygen, and pH, much of the Santa Fe River from Cochiti Reservoir upstream to the Santa Fe Waste Water Treatment Plant was littered with garbage, and essentially devoid of riparian vegetation from off-road vehicle use and livestock grazing. Efforts to restore the river began in 1997 when the WildEarth Guardians (formerly Forest Guardians) received a Partners Grant from the U.S. Fish and Wildlife Service which eventually led to a collaborative effort between the City of Santa Fe, Santa Fe County and the Santa Fe – Pojoaque Soil and Water Conservation District that converted a mostly barren stream into a thriving riparian corridor, and the reach was delisted for pH and sedimentation/siltation. As a result, EPA recognized the Lower Santa Fe River as a success story in 2011.

This accomplishment was highlighted on October 26, 2011 with a visit by Nancy Stoner (EPA's Acting Assistant Administrator for Water) and Al Armendariz (Administrator of EPA Region 6), who toured the site with key cooperators and officials including Santa Fe Mayor David Coss, NMED Cabinet Secretary F. David Martin, and students from the Santa Fe Indian School. During her visit Administrator Stoner stated that she was inspired by "the spirit you see when people work together on these kinds of projects". Reflecting on her blog, she wrote that "The federal, state and local government, along with environmental groups and private citizens all worked together. It shows that water is vital to all of us and success in stewardship is a collaborative effort."

Santa Fe Mayor David Coss, SWQB Bureau Chief James Bearzi, NMED Department Secretary David Martin, EPA Office of Water Assistant Administrator Nancy Stoner, EPA Regional Administrator Al Amendariz, and Students from the Santa Fe Indian School meet on the Santa Fe River to commemorate the Santa Fe River Success Story.

NPS Management Program Objectives Completed in 2011

2011 was a year of routine implementation of the NPS Management Program. Most of the objectives outlined for 2011 in the 2010 NPS Annual Report were met, including:

- A Request for Proposals (RFP) was released in March to select projects to update existing watershed plans relative to EPA's *Nonpoint Source Program and Grants Guidelines for States and Territories* (Fed Reg Vol 68, No 205, October 23, 2003). This activity is directed at completing watershed-based plans containing all nine planning elements, by 2014.
- A second RFP was released in March to select on-the-ground projects with the greatest potential of success under the National Water Program Guidance for Fiscal Year 2011 Program Activity Measures.
- While a nomination for a 319 Success Story under performance activity measures (PAMs) WQ-10 and SP-12 for Comanche Creek was not completed in 2011, the nomination for the Santa Fe River submitted in 2010 was further developed and accepted by EPA in 2011.
- Two one-day workshops on watershed-based planning were presented in 2011 to natural resource specialists and decision makers.
- The Nonpoint Source Program Effectiveness Assessment project for 2008-2011 was completed at the end of 2011, and a final report is in preparation.
- Watershed Protection Section staff provided vital assistance with water quality surveys in the lower Rio Grande, Gila, and San Francisco watersheds.
- The Wetlands Program and the River Ecosystem Restoration Initiative (RERI) were developed and supported in 2011. A vacancy for a wetlands project manager was filled.

In addition to the above accomplishments, ten proposals resulting from the two RFPs were reviewed and four project workplans were developed and submitted to EPA for review. These projects received final approval by year's end, and three of them are in the final stages of contract issuance. A fourth project is not going forward because the environmental nonprofit which submitted the proposal is ending its charter, and withdrew the proposal. More detail is provided on several activities implemented as part of the NPS Management Program in other sections.

NPS Management Program Objectives for 2012

The WPS has identified the following additional NPS Management Program activities to meet program objectives for 2012.

- Release a Request for Proposals (RFP) in February 2012 to select projects that will develop or update watershed plans relative to EPA's *Nonpoint Source Program and Grants Guidelines for States and Territories* (Fed Reg Vol 68, No 205, October 23, 2003). This activity may contribute to

meeting the milestone related to completing watershed-based plans by 2014.

- Release a second RFP in February 2012 to select on-the-ground projects with the greatest potential of success under PAMs WQ-10 and WQ-SP12.N11 (previously called SP-12) in EPA's National Water Program Guidance for FY 2012.
- Complete a nomination for a 319 Success Story under PAMs WQ-10 and WQ-SP12.N11 for Comanche Creek.
- Review changes in the *2010-2012 State of New Mexico 303(d)/305(b) Integrated List for Assessed Surface Waters* relative to identify additional potential candidates for Success Story nomination.
- Continue to develop and conduct watershed-based planning workshops in different communities.
- As described below, the course for future effectiveness monitoring of the Nonpoint Source Management Program will be shaped in early 2012.

In addition, four watershed-based planning projects are scheduled to be complete in 2012. A watershed-based plan is the main deliverable of each project. Each plan, if accepted by EPA, will assist the NPS Management Program in meeting a significant milestone that reads, "By 2012, all nine planning elements identified in the *Nonpoint Source Program and Grants Guidelines for States and Territories* will be addressed in three watershed plans covering forty-nine priority watersheds". These projects are summarized in the following table:

Project Number	Project Title	Scheduled completion date	Streams included	Number of priority watersheds in project area
09-B	Paso del Norte Watershed Based Plan	December 31, 2012	Rio Grande in New Mexico downstream of Elephant Butte Reservoir	37
09-E	Upper Pecos WRAS Improvement, Expansion, and Restoration Planning	June 30, 2012	Bull Creek, Cow Creek, Pecos River (Cañon de Manzanita to Willow Creek)	9
09-G	Río Pueblo de Taos Watershed Comprehensive Planning	June 30, 2012	Rio Pueblo de Taos, Rio Grande del Rancho	10
10-B	Updated Watershed Based Plan for the Cimarron Watershed	June 30, 2012	Cieneguilla Creek, Middle Ponil Creek, Moreno Creek, North Ponil Creek, Ponil Creek, Rayado Creek, and Sixmile Creek	17

NPS Management Program Problems and Concerns

The 2011 Legislature did not pass a bill to fund RERI in FY 2012. NMED developed an initiative called Healthy Rivers New Mexico that would accomplish some of the same goals as RERI. Healthy Rivers New Mexico was included in early versions of NMED's budget request for FY 2013, but the status of specific legislation was unknown at the end of 2011. RERI remains a critical component of match for Section 319 funds for FY 2012 and 2013, but will be insufficient for FY 2014. Because project development (including procurement) requires approximately ten months, the ability of NMED to match Section 319 grants in FY 2014 may depend on legislation for FY 2013 (i.e., the January 2012 legislative session).

The success story nomination for Comanche Creek was not completed in 2011 as planned. Baseline data collection for more recent projects took priority, therefore the nomination was delayed until 2012, but is still being pursued. Similarly, the plan to identify additional Success Story candidates from reviewing changes in the *2010-2012 State of New Mexico 303(d)/305(b) Integrated List for Assessed Surface Waters* has also been postponed until 2012.

The final report for the pilot project, "Nonpoint Source Program Effectiveness Assessment, 2008-2011" will outline strategies for future years of effectiveness monitoring and success story nomination that may assist with managing the associated work load. Potential strategies to manage the work load include: focusing 319 implementation funds to more strictly implement watershed-based plans (which describe monitoring components to evaluate the effectiveness of implementation efforts over time), more intensive review and planning at the project development stage, greater reliance on cooperators to develop project QAPPs and conduct project monitoring, and increased use of weight-of-evidence Success Story nominations based on changes to the 303(d)/305(b) Integrated List.

The NMDOT/NMED liaison position remained vacant in 2011. There are no plans to fill this position, and funds are not available (and have not been requested) to fill it. The vacancy has not resulted in specific reportable problems in 2011.

Effectiveness Monitoring of NPS Pollution Controls

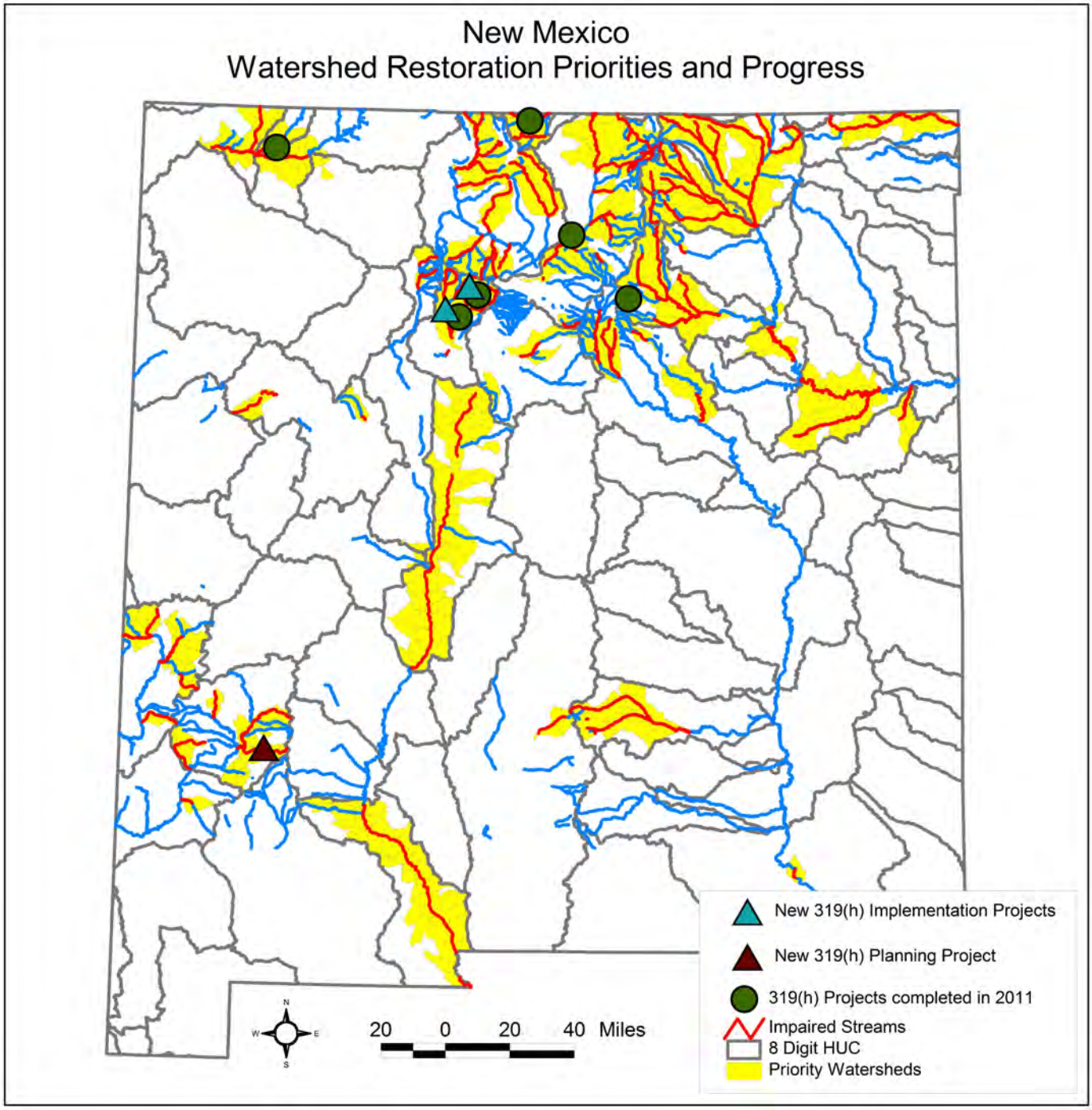
Effectiveness Monitoring continued for a third year in 2011, to document the effects of nonpoint source pollution control projects on water quality. Monitoring is primarily focused on 319 funded projects, RERI projects, and SWQB Wetlands Program projects. The highlight of the program for this year was the completion of the Santa Fe River Success Story, culminating with a site visit from Nancy Stoner, Acting Assistant Administrator for the EPA's Office of Water, to recognize successful restoration efforts. See p. 11 for more details.

A major focus of the program has been monitoring projects implementing temperature TMDLs, using thermographs to record hourly temperature upstream and downstream of project reaches. Stream temperature monitoring was continued for a third year on Bluewater Creek, Rio de los Pinos, San Antonio Creek, and Middle Ponil Creek (see table below). Initial results indicate that the peak summer temperatures in these streams still exceed the standard of 20°C for coldwater aquatic life, but that the projects have had beneficial effects which will continue to increase as vegetation grows over the years. Post-implementation stream temperature monitoring was conducted on Comanche Creek to add strength to the statistical analysis which showed potential beneficial effects in 2010. Baseline data collection was initiated for two new restoration

efforts for Redondo Creek and the Rito Peñas Negras (both in the Jemez watershed). Both projects required coordination with cooperators to complete project Quality Assurance Project Plans (QAPPs). Thermographs were deployed in accordance with the QAPPs, which use the upstream/downstream before/after study design. Monitoring for the Rito Peñas Negras is being conducted in conjunction with the U. S. Forest Service, which collected the upstream thermograph data, and the University of New Mexico Water Resources Program, which completed a more thorough Water Resources Assessment.

The Effectiveness Monitoring Program was initiated in 2008 with a 319 grant from EPA to document the effects of NPS pollution control projects on water quality. The project, "Nonpoint Source Program Effectiveness Assessment, 2008-2011" was completed in 2011, and a final report with analysis of water quality data collected and conclusions to guide future effectiveness monitoring will be complete in early 2012. The report will provide WPS a firm foundation on which to monitor NPS pollution mitigation and assess water quality improvement relative to EPA performance measures.

Waterbody	Data Collection 2011	Comment
Rio de los Pinos	Thermographs	Third year of data collection
Bluewater Creek	Thermographs	Third year of data collection
San Antonio Creek	Thermographs, Sonde Deployment	Third year of data collection
Middle Ponil Creek	Thermographs, Canopy Density	Third year of data collection
Rito Peñas Negras	Thermographs	First year of baseline data
Redondo Creek	Thermographs	First year of baseline data
Dalton Creek	Thermographs	First year of baseline data
Comanche Creek	Thermographs	Post-Implementation monitoring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Watershed Restoration Priorities and Progress
New 319(h) Implementation Projects
New 319(h) Planning Project
319(h) Projects completed in 2011
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Summaries for 319(h) Projects Completed in 2011

Collaborative Water Quality Improvement Project for the San Juan River Watershed, Phase II (FY07-D)

Project Budget:	Federal 319(h): $159,086 Match: $156,555 Project Total: $315,641
Watershed:	Upper San Juan (HUC 14080101), Animas (HUC 14080104), Middle San Juan (HUC 14080105).
Sub-watersheds:	Tucker Canyon-Animas River (140801041003), Cottonwood Arroyo-La Plata River (140801050302), Head Canyon-San Juan River (140801012104).
Impairments:	TMDLs for *E. coli* (San Juan River), dissolved oxygen and sedimentation (La Plata River), and plant nutrients (Animas River).

Project Summary:

The San Juan and Animas Rivers convey approximately 60% of the surface water that flows through New Mexico. The Animas River, a primary tributary of the San Juan, is one of the largest rivers in the western United States that is still unregulated by a large dam. Much of the lower portion of the watersheds are made up of rapidly urbanizing agricultural valleys, and agricultural and urban development have encroached on the two rivers in many places, with loss of floodplain and wetlands as a result.

Phase I, completed in 2008, characterized pollutant loading in the San Juan Basin. Stevens Arroyo in particular appeared to be a geographic hot spot for bacteria loading, and irrigation return flow from flood-irrigated hay fields used as winter pasture was documented as the main source of bacteria to the San Juan River. As a result, a primary focus of Phase II was implementation of agricultural BMPs related to flood irrigation. The project coordinator tried to recruit agricultural producers based on opportunities to improve irrigation practices to improve water quality or reduce the volume of return flows. Producers were encouraged to apply for funding under the Environmental Quality Incentives Program (EQIP) administered by NRCS. The project coordinator also worked with NRCS staff to review ranking criteria for EQIP projects and identify EQIP applications that, if implemented, would assist with TMDL implementation. For three of these applications, Section 319 funds were used along with nonfederal expenses to satisfy the cost-share requirement of EQIP. The project coordinator worked with the NRCS District Conservationist, the local working group, the producers, and the Hub RC&D and San Juan Soil and Water Conservation District (the project fiscal sponsors) to facilitate these arrangements. The initial effort focused on irrigation return flow in the Stevens Arroyo watershed, but a change in the agricultural operation there (unrelated to the project) resulted in far fewer livestock present in the watershed. The project was expanded geographically to appropriate locations relative to impaired sections of each major river in the area. Flood irrigation was converted to center pivot or side roll irrigation at two locations, and to drip irrigation at a third location, in a total of 172 acres of fields managed by three producers.

This project also included management measure implementation unrelated to EQIP. A large project to stabilize the channel of Kiffen Canyon, a tributary of the Animas River, was completed with support from this

project and an earlier Section 319 project completed in 2010. The project created a single narrower channel and provided areas to capture and deposit sediment during high flows. This effort prevented several thousand cubic feet of sediment and associated nutrients from reaching the Animas River. This load reduction was reported in the 2010 NPS Annual Report.

Ongoing outreach and coordination of the San Juan Watershed Group (SJWG) was also supported through this project. A total of twelve SJWG meetings were attended by 44 individuals representing a variety of public agencies (federal, state, local, and tribal), non-governmental organizations, private industry and private citizens, who provided project guidance and project development for future SJWG efforts.

Project Outcome and Load Reductions:

A monitoring task within the project focused on Stevens Arroyo. As noted above, bacteria loading in Stevens Arroyo changed during the project term because of a land-use change that was not caused by the project. In 2006 and 2007, when nearby hayfields were used as winter pasture, *E. coli* loading in Stevens Arroyo averaged 9.5% that of the nearby San Juan River (n=9). In 2010, when the same fields were no longer used as pasture, *E. coli* loading in Stevens Arroyo averaged 1.5% that of the nearby San Juan River (n=8). A t-test comparing these groups of samples indicated that the observed difference is significant (p=0.06).

Average loading within Stevens Arroyo (which flows directly to the San Juan River) decreased by 2.25 x 10^{11} colony forming units per day (although this decrease was significant only at the 88% confidence level). This number may be placed in perspective by comparison with the TMDL for the nearby San Juan River of 1.43 x 10^{12} CFU/day, and the overall load reduction goal published with the TMDL of 4.45 x 10^{12} CFU/day. Modeled load reductions for the irrigation practices that were implemented as part of this project total 1.41 x 10^{10} CFU/day for *E. coli*, and 0.05 lb/day for total phosphorus.

Sapello Watershed restoration Project (FY07-F)

Project Budget:	Federal 319(h): $160,000 Match: $120,570 Project Total: $280,570
Watershed:	Mora Watershed (HUC 11080004).
Sub-watersheds:	Headwaters Manuelitas Creek (HUC 110800040202), Outlet Manuelitas Creek (HUC 110800040203), Manuelitas Creek - Sapello River (HUC 110800040204), Sanguijuela Arroyo - Sapello River (HUC 110800040206)
Impairments:	TMDL for total suspended solids (Sapello River)

Project Summary:

The Sapello River originates in the alpine forest on the east slopes of the Sangre de Cristo Mountains at an elevation of 10,000 ft, and flows east to an elevation of 6,600 ft where it joins the Mora River at the town of Watrous. As the river descends, it flows through piñon-juniper forest before flowing into the tall grass prairie typical of northeastern New Mexico. Manuelitas Creek is the major tributary of the Sapello River with a watershed area of approximately 169 square miles. The area has historically been a sparsely populated remote farming and ranching community where unemployment typically is close to 10%.

Despite the remoteness of the area and the economic challenges, stakeholders in the community have taken an interest in maintaining and improving the water quality of their streams. Stakeholders approached the Tierra Y Montes Soil and Water Conservation District for assistance with problems of both in-channel and upland soil erosion. This project involved implementation of outreach to local landowners to discuss the problems and address solutions, implementing in-stream structures to reduce erosion, planting riparian vegetation, and improvement of poorly designed unpaved roads.

Project Outcome:

Approximately 100 households were contacted in the outreach effort. BMPs included the installation of bank stabilization structures protecting 6,634 ft of stream bank, 210 acres of riparian area planting, 6,400 ft of structures to divert runoff and reduce erosion, 43 acres of seeding, and installation of 2.4 miles of riparian fencing.

Load Reduction:

Load reductions were estimated utilizing the STEPL model for all BMPs except those applied to roads. The WEPP model was used to estimate load reductions from improvements to road drainage. The project is estimated to have reduced erosion by 14.2 tons of sediment per year (78 lbs/day on average). This is relative to the TMDL for the Sapello River of 88.8 lbs/day of total suspended solids.

Road prior to reclamation to reduce sediment runoff.

The same road after reclamation.

The Taos county Land Project (TCLP) Grazing Management System - Noria Pastures (FY07-G)

Project Budget:	Federal 319(h): $227,986 Match: $289,584 Project Total: $517,570
Watershed:	Upper Rio Grande (HUC 13020101).
Sub-watersheds:	Cañada Comanche Watershed (HUC 130201011101)
Impairments:	TMDL for total suspended solids (Rio Grande)

Project Summary:

The project was located in the Cañada Comanche watershed on the 36,000 ac TCLP grazing allotment on the Tres Piedras Ranger District of the Carson National Forest. Cañada Comanche arroyo drains directly to the Rio Grande just downstream of Embudo Creek in the vicinity of the village of La Cienaga. The goal of the project was to reduce soil erosion in the allotment by improving upland range conditions. This was accomplished by installing drinking troughs and erecting pasture fencing to improve grazing management through better distribution of livestock. The project cooperators included the USFS, TCLP Grazing Allotment permittees, NMED, Taos Soil and Water Conservation District, Natural Resources Conservation Service, and the Northern Rio Grande Resource Conservation and Development Council.

Project Outcome:

The range improvements implemented include installation of 2.5 mi of pasture fence, 13 mi of underground pipeline, six 12 ft diameter rubber tire drinking troughs, one 20,000 gallon underground water tank, and a steel pie livestock corral. In a cooperative effort to leverage funds and improve project success similar work was conducted under the Natural resources Conservation services Environmental Quality Incentives Program (EQIP).

Outreach consisted of distributing information about the project to the community through efforts of the Rio Chama Watershed Group and utilizing the contact list for the Upper Rio Grande Watershed Restoration Action Strategy. A site visit was also conducted with members of the local ranching community, USFS personnel, and watershed group members.

Construction of a "large tire" drinking trough.

Load Reduction:

The project is estimated to have increased ground cover from about 5% to about 7% over 10,000 acres, resulting in an estimated reduction in

erosion of 74 tons/yr (sediment), 236.8 lb/yr (nitrogen), and 91.2 lb/yr (phosphorus). The overall load reduction goal for the nearby Rio Grande (stated in the TMDL) is 699,047 lb/day of total suspended solids.

Respect the Rio: Education - Empowerment - Restoration (FY8-4/ULO)

Project Budget:	Federal 319(h): $485,000 Match: $349,656 Project Total: $834,656
Watershed:	Jemez River Watershed (HUC 13020202).
Sub-watersheds:	Rito Peñas Negras (HUC 13020202101), Headwaters Rio de las Vacas (HUC 13020202102, Headwaters Rio Cebolla (HUC 13020202103), Outlet Rio Cebolla (HUC 13020202104), Outlet Rio de las Vacas (HUC 13020202105), Rio Guadalupe (HUC 13020202107), East Fork Jemez (HUC 130202020203), Outlet San Antonio (HUC 130202020204)
Impairments:	TMDLs for temperature, stream bottom deposits and nutrients.

Project Summary:

The Jemez watershed is located in north-central New Mexico and encompasses approximately 1,043 square miles extending from Chicoma Mountain, its highest peak, at 11,561 ft to the Rio Grande Valley at an elevation of 5,084 ft. There is a network of small perennial streams draining to the Jemez River which flows approximately 65 miles before draining into the Rio Grande. The watershed is primarily forest and rangeland and 65% of the watershed is located in the Jemez and Cuba Ranger Districts of the Santa Fe National Forest.

The Jemez watershed has long been a principal recreation area for hunting, fishing, camping and hiking, and impacts as a result of the high visitation rate include unauthorized roads, parking areas, trails and campgrounds. Historic and some present grazing management practices have placed an additional impact on the watershed and one of the primary issues facing the watershed is loss of vegetation in both the uplands and riparian corridors. This has led to increased erosion, and the resultant sediment transport into the system has led to poor water quality.

The concept of Respect the Rio began with the Respect the River program in the Methow Valley Ranger District of the Okanogan National Forest in Washington State to improve fish habitat and reduce the impacts of recreation in riparian areas. Respect the Rio, which began in 2001, was created to address water quality issues in heavily used areas of the Santa Fe National Forest and to meet the needs of the Hispanic population of the southwest. Both programs focus on two areas: outreach and restoration. To conduct outreach, Respect the Rio utilized specialized Contact Rangers, the local media, informational brochures, the Respect the River/Respect the Rio website (http://www.fs.fed.us/rtr/) and interpretive signs. Restoration techniques include the installation of buck and pole fencing and boulder barriers to limit vehicle access, fencing to improve pasture rotation, ground scarification, cattle guard installation, trail restoration and maintenance, road closure and reclamation, and riparian planting.

Buck and pole fence, an aesthetic solution to limit vehicular access.

Project Outcome:

The outreach component is hard to evaluate. With an annual visitor rate of 1.3 million visitors it is estimated the outreach programs educated thousands of people on the importance of watershed protection and restoration. To reduce erosion, over 10 miles of trails were rehabilitated and maintained, 0.7 miles of "visitor created" trails were eliminated, and one pedestrian bridge was installed. To improve upland condition, pasture gates were installed to reduce vehicular traffic and improve management of cattle, 1,200 acres of rangeland were taken out of rotation and rested, cattle guards were installed, 4.5 miles of riparian exclosure fence were installed, and a parking lot was relocated away from the stream.

Load Reduction:

Load reductions were calculated utilizing the STEPL model. It is estimated that the combined load reduction from all the BMPs is 14.9 tons/yr. The temperature model SSTEMP was used to estimate that the Rito Peñas Negras stream temperature could be reduced by 1 degree C, the East Fork Jemez stream temperature could be reduced by 1.5 degrees C using these practices.

The Continued Ecological Restoration of the Rio de Los Pinos (FY08-11/ULO)

Project Budget:	Federal 319(h): $150,000	Match: $100,000	Project Total: $250,000
Watershed:	Conejos Watershed (HUC 13010005).		
Sub-watersheds:	City of Ortiz/Los Pinos (HUC 130100050204)		
Impairments:	TMDL for temperature (Rio de Los Pinos)		

Project Summary:

The Rio de los Pinos enters New Mexico from Colorado, flows within a rural high elevation (averaging 8,500 feet) valley of mostly private land for about 21 miles, then re-enters Colorado. While most of the watershed is public land managed by the US Forest Service, the river itself flows primarily through private

land used for irrigated agriculture, livestock pasture, and residences. In general, the riparian area is in good condition, and the channel has not been highly altered. The average parcel size is large enough to facilitate cooperative management, and development has been light. The New Mexico Department of Game and Fish manages some of the valley land to provide access to anglers, and the quality of the river is respected by anglers and many land owners. Impacts of riparian grazing are evident in some areas. The community was beginning to experience problems with bank erosion, and desired alternatives to conventional bank stabilization that would protect or even improve the fishery.

This project emphasized applied fluvial geomorphology bank stabilization techniques combined with fencing in select areas, and planting of riparian woody species to increase bank protection and shade. Rock structures installed in the stream decreased the width/depth ratio and further increased shade potential while directly improving fish habitat by increasing pool depth and suitable spawning sites. Project Cooperators included the USFS, New Mexico State Forestry, Northern Rio Grande RC&D, Adelante RC&D, and NMED, along with seven private property owners.

Failed irrigation diversion structure and associated bank erosion.

New diversion structure delivers water more efficiently and reduces erosion.

Project Outcome:

The project began with a comprehensive geomorphological assessment which included nine cross sections along a 2.3 mi reach of the Rio de Los Pinos. In-stream structures installed include five boulder cross vanes, six J-hooks, 23 deflectors, and 48 habitat rocks. The project also included 2,664 ft of riparian planting and the installation of 2,000 ft of fencing. The first year of monitoring showed an average decrease in stream width at the nine cross sections of 35%. Thermographs were initially deployed in 2009 by the NMED Effectiveness Monitoring Program to monitor changes in stream temperature. Monitoring continues and evaluation of those data is ongoing.

Load Reduction:

The ultimate effect that may reasonably be achieved with time is an increase in percent shade from 20% shade to 45% shade within the project area. Over the 20.9 mi assessment unit, this equates to an average reduction of 10 j/m^2/sec (Reference: Table 6.6 in the TMDL).

Upper San Antonio Creek Restoration Project (FY08-14/ULO)

Project Budget:	Federal 319(h): $73,478 Match: $141,230 Project Total: $214,708
Watershed:	Jemez Watershed (HUC 1320202).
Sub-watersheds:	Headwaters San Antonio Creek (HUC 13202020201)
Impairments:	TMDL for temperature and turbidity (San Antonio Creek)

Project Summary:

The headwaters of San Antonio Creek are located just west of Los Alamos on the Valles Cadera National Preserve of the Jemez Mountains, in north central New Mexico. San Antonio Creek begins below Cerro Rubio at an elevation of about 9,100 ft and flows in a westerly direction along the northern portion of the caldera through the Valle Toledo and the Valle San Antonio before turning south toward its eventual confluence with the East Fork of the Jemez River. This confluence forms the Jemez River.

The Preserve was created in 2001, and boasts a wide variety of activities from hunting, fishing, biking, hiking, and cross country skiing and snowshoeing during the winter months. Despite the relatively remote location, one of the sources of impairment has been identified as an unpaved road in close proximity to the stream that is utilized by an electrical utility, the Public Service Company of New Mexico (PNM). The grant recipient, the Valle Caldera Trust, worked closely with PNM to examine road drainage and maintenance procedures. This led to the development of management alternatives to the reduce sediment load entering the stream from the road, including replacing and relocating culverts, and managing road drainage and reducing road travel where it impacts the river.

Project Outcome:

Approximately six miles of road were rehabilitated. This involved replacing or relocating 29 culverts, reconstructing the road prism, creating lead-outs and other drainage filters, and replacement of permeable fill to reduce sheet flow off the road and facilitate sub-surface water flow.

Load Reduction:

Load reductions were calculated using the WEPP model. The project is estimated to have provided a sediment load reduction of 1.3 tons/yr. This is relative to the TMDL for total suspended solids for the lower portion of San Antonio Creek of 3,552 lb/day, and a load reduction goal published with the TMDL of 3,152 lb/day.

For More Information

More complete descriptions of completed and in-progress Section 319 projects are available on the Grants Reporting and Tracking System (GRTS), at http://iaspub.epa.gov/grts/projects. All of New Mexico's current 319 projects appear under grants awarded in 2008, 2010, and 2011.

Outreach

Numerous outreach activities are conducted by WPS staff each year. These activities take many forms and include: participating in children's water festivals; giving presentations to stakeholder groups; community organizations, and agency partners; conducting site tours; publishing a quarterly newsletter; and conducting training workshops. In 2011, staff participated in seven Children's Water Festivals, logged over 50 hours of classroom time including three outdoor classrooms for the Albuquerque River Exchange and two days on the Gila River with La Plata Middle School students, and gave dozens of presentations to stakeholders, community organizations and agency partners. The WPS newsletter, Clearing the Waters, continues to be a success. Reaching over 1000 stakeholders and posted on the SWQB website, it contains articles on monitoring and restoration techniques, project updates, a calendar of events and cooperator spotlights. Workshops conducted in 2011 included two on watershed planning, and two on stream geomorphology, restoration and monitoring.

Workshops

Watershed Based Planning

Planning for Improved Water Quality

Two one-day workshops titled *Planning for Improved Water Quality* were presented in 2011 to natural resource specialists and decision makers from environmental nonprofits (including watershed groups), state, local, and federal agencies, major private land owners, educational institutions, and industry. One workshop was conducted in Santa Fe in January (with eleven attendees), and another in Questa in December (with seventeen attendees). Surface Water Quality Bureau staff presented on four topics at each of these workshops: Understanding TMDLs (Tools for Setting Goals), EPA's Nine Planning Elements (with an Example from Taos County), Estimating Pollutant Load Reductions, and Monitoring for Success.

Material was provided to attendees specific to their streams of interest. Attendees at the Santa Fe workshop were interested in a number of different streams, while most attendees in Questa were interested in the Red River. The stronger focus on the Red River at the second workshop enabled more detailed discussions than is appropriate for a group with interest in various streams, and may have helped cement a future planning effort there. A similar workshop presented in 2010 had an apparent desirable result in 2011, in that one of the attendees submitted a revised proposal (their second attempt) for a planning project that resulted in a project workplan approved by NMED and EPA.

Streambank stabilization workshop, Silver City, May 24-25, 2011.

Restoration and Monitoring

Streambank Stabilization Workshop

A streambank stabilization workshop attended by over 30 participants was held May 24-26 in Silver City, and featured

several national Natural Resource Conservation Service presenters from the West National Technology Support Center. The goals of the workshop were to review geomorphological concepts, present a diverse array of streambank stabilization techniques, and increase the success rate of streambank stabilization projects. The workshop agenda consisted of both classroom and field components including fluvial geomorphology, hydraulics, geology, soil mechanics, geotechnical bank stability, sediment transport and scour, vegetative treatment techniques, and structural stabilization techniques. The workshop also provided technical training in streambank stabilization planning, methodology, and implementation for Southwestern ecosystems. The knowledge shared will have conservation benefits for years to come.

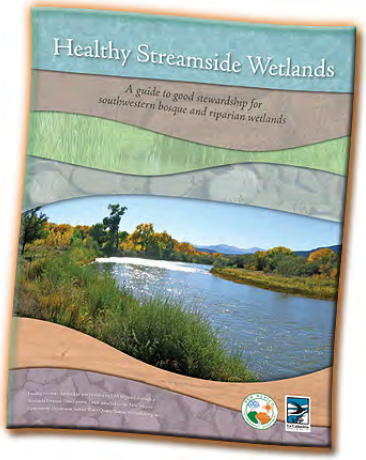
Introduction to Stream Morphology and Monitoring

August 24 through 26 2011, the Cimarron Watershed Alliance hosted a workshop entitled *Introduction to Stream Morphology and Monitoring*. Participants included representatives from Philmont Scout Ranch, Vermejo Park Ranch, Taos Pines Homeowners Association, Ramah Chapter Navajo Nation, Quivira Coalition, the Sonoran Institute, New Mexico State Parks, River Source, Rangeland Hands, Leslie Consulting, New Mexico Department or Game and Fish, NMED, and a number of private individuals. Facilities, accommodations, and instruction were provided by the Cimarron Watershed Alliance, Vermejo Park Ranch, and Philmont Scout Ranch, with technical and instructional support from NMED SWQB staff.

The first day of the workshop was devoted to classroom instruction at the Cimarron Watershed Alliance headquarters in Cimarron. Attendees were given an introduction to stream geomorphology and instruction on various field monitoring techniques. Afterwards participants travelled to Ponil Creek to put these lessons into action. Three teams were formed and each team was assigned a specific monitoring station. Each team was responsible for collecting and processed their own data set. On the final day, each team presented their data to the entire group for critique and discussion.

This workshop produced dual benefits. First as a valuable educational/outreach opportunity for those who participated. Secondly, data collected during the workshop complements the *Ponil Riparian Restoration Project, FY08-13 ULO*. The workshop was the first of its kind sponsored by the Cimarron Watershed Alliance and plans are to make it an annual event.

Publications



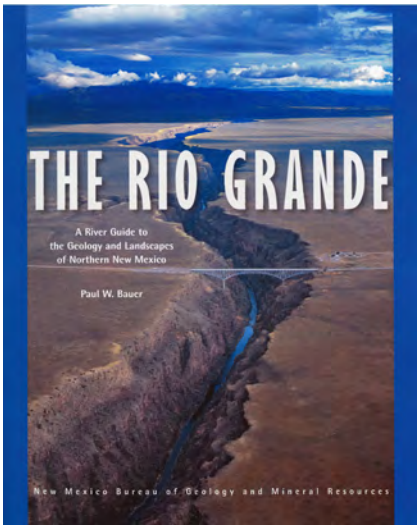
Healthy Streamside Wetlands

The booklet is a monitoring and maintenance guide for landowners, volunteers, and anyone else who is responsible for small southwestern riparian (or streamside) wetlands, woodlands, restoration sites or protected areas. It begins with background information on how river systems, riparian wetlands, woodlands, and floodplain meadows function in the southwestern United States. There are also some relatively simple, easy, and inexpensive techniques to understand how healthy a riparian area or wetland is, and what to do to help maintain it, or make it more healthy, functional, and beautiful. It is not a guide for major restoration work. Rather, it offers suggestions for

how to maintain and manage a riparian area or wetland that is already in reasonably good condition ecologically—in other words, it is not dominated by invasive, non-native trees like Russian olive or salt cedar, and the soil still gets good and wet for at least some of the year. In many cases, this would mean that the area has already benefited from ecological restoration of some kind, like removing invasive trees, perhaps re-planting native plants along bare stream banks, or earthwork to enhance stream meandering. It contains chapters on the characteristics of riparian ecosystems, monitoring and maintenance. The booklet was a collaborative effort between the SWQB Wetlands Program and Dave Morgan of La Calandria Associates, Inc. and funding was provided by US EPA Region 6 through a Wetlands Program Development Grant awarded to the SWQB Wetlands Program.

The Rio Grande: A River Guide to the Geology and Landscapes of Northern New Mexico

More than just a recreation guide, The Rio Grande: A River Guide to the Geology and Landscapes of Northern New Mexico provides information on a broad range of natural history topics and the environmental history (including a summary of water quality issues) of this important river. Waterproof, and richly illustrated with maps, historical photos, and data, the book provides insight to a major river that is geographically near but unfamiliar to most New Mexicans. Author Dr. Paul Bauer and the publisher (the New Mexico Bureau of Mines and Mineral Resources) received recognition from the National Outdoor Book Awards program for producing the Best Outdoor Adventure Guidebook of 2011. Publication was partially supported by Amigos Bravos with Section 319 funds awarded as part of a watershed-based planning project for the Rio Pueblo de Taos. This contribution helped increase the size of the first edition and reduce the cover price, helping more people appreciate and explore the Rio Grande and its valleys and canyons in northern New Mexico and southern Colorado.



Additional Outreach Activities

Tours, Hikes, and Volunteer Monitoring

Other notable outreach events in 2011 include staff coordination with the Silver City Watershed Keepers to conduct four surface water quality monitoring and data collection events at three sites on San Vicente Creek. Turnout for these events ranged from 3 to 25 individuals. Silver City staff also conducted three half-day hikes along San Vicente Creek. This is a popular outreach activity titled “Hydrology and History of San Vicente Creek”. One of the hikes was offered as part of the curriculum of the Western Institute of Lifelong Learning with Western New Mexico University. The hikes usually involved 10-15 individuals and covered two miles of the perennial reach of the creek and two CWA Section 319 funded projects. An eight-hour watershed tour was conducted of the upper Pecos River to showcase a variety of restoration projects, which were funded through a variety of grants including: 319, RERI and other private, state, and federal funds. The all-day tour included landowners, consultants, the U.S. Army Corps of Engineers, members of the Upper Pecos Watershed Association, and SWQB staff.

Wetlands Program

New Mexico Wetland Program Plan

In 2011, EPA accepted the New Mexico Wetland Program Plan (WPP) as meeting the four elements for such plans (monitoring and assessment, regulation, voluntary restoration and protection, and water quality standards for wetlands). New Mexico's is the only accepted WPP in EPA Region 6 and one of only 21 (meeting all four elements) in the United States. More information (including New Mexico's WPP) is available at: water.epa.gov/type/wetlands/wpp.cfm.

Funding Awarded to the Wetlands Program

Three new Wetlands Program Development projects were awarded funding by EPA Region 6 in 2011. The federal grants for these projects total $713,024 in federal assistance awarded through the FY11 EPA Wetlands Program Development Grant Program authorized by CWA Section 104(b)(3).

New Mexico Wetlands – From Plan to Action Phase 3

The project will achieve three activities of the Wetlands Program Plan for New Mexico 1) strengthen our comprehensive wetlands program by developing elements of Wetlands Water Quality Standards (WQS), 2) update and improve Wetlands Action Plan utility and facilitate watershed groups throughout the State to develop "Wetlands Action Plans" on a voluntary basis as an addendum to their Watershed Implementation Plans, 3) work with USFS for the development of appropriate best management practices that will protect wetlands from degradation by human activities that commonly occur in wilderness wetlands (nearly 5,000 acres of which have been nominated as Outstanding National Resource Waters). The final products of the project will include a report describing wetlands management and protection goals and needs, a review of existing NM WQS and their application to wetlands, draft report about standards for New Mexico wetlands, and a plan and timeline for future wetlands WQS Tasks. Additional final products include Wetlands Action Plans for 3 watersheds including the Gallinas and Upper Pecos, NMRAM trained users to facilitate better Wetlands Action Plans, and Best Management Practices directives for protecting ONRW Wilderness Wetlands.

Assessing Beaver Habitat on Federal Lands in New Mexico

The project will create and utilize a Geographical Information Systems (GIS) model to identify potential, suitable and occupied beaver habitat on federal lands statewide, in order to assess wetlands re-establishment potential. The project is expected to estimate the location and amount of stream miles that could support beavers, and the amount of wetland habitat that could be created if beavers were restored to all potential and suitable stream and river habitats. The SWQB will also map existing wetlands in the Jemez Mountains where climate change effects are acute and where conditions may be ideal for beaver reintroduction pilot projects. Finally, SWQB intends to convene a state-wide workshop on beaver and wetlands restoration as a climate change adaptation tool. The workshop will bring together experts on beaver and New Mexico partners that have an interest in creating a beaver and wetlands climate change adaptation strategy. This project will begin the critical process of reestablishing the historic scope of wetlands in New Mexico's headwaters using a cost-

effective partner, the beaver, while building essential partnerships with land management agencies for ensuring success, and demonstrating a tool in climate change adaptation practices and wetland restoration for the state's fragile riparian/wetland ecosystems.

Innovative Design and Restoration of Slope wetlands in the Comanche Watershed, New Mexico

The project will survey, restore, and protect more than sixty acres of degraded slope wetlands in LaBelle, Springwagon, Grassy, Forman and Upper Comanche subwatersheds in the Comanche Watershed entirely within the Carson National Forest in Taos County, New Mexico, creating opportunities for novel restoration demonstration and unique partnerships. Slope wetlands are not uncommon in New Mexico. Slope wetlands generally occur at points of surface discharge or break in slope, and flow unidirectionally down gradient, however, do not always develop a distinct channel. Flow is persistent even during drought conditions making them stable habitat for aquatic and semi-aquatic species. SWQB will contract with experts to survey a number of slope wetlands in Northern New Mexico to identify stressors that cause slope wetland decline, and develop and design restoration techniques that will improve and recover slope wetlands. In addition, a Wetlands Action Plan will be developed for the Comanche Watershed that maps existing wetlands, describes stressors, describes restoration/protection efforts, prioritizes restoration sites, and describes a long-term monitoring plan including condition assessment (NMRAM), potential funding sources and schedule for implementation. A workshop dedicated to wetlands restoration and monitoring will be conducted.

Projects Completed in 2011.

Two projects funded under CWA Section 104(b)(3) Wetlands Program Development Grants and one project under CWA Section 106 were successfully completed this year.

New Mexico Wetlands and Riparian Corridors – From Plan to Action Phase 2

The project was focused on improving and strengthening our Wetlands Action Plan Program and integrating Wetlands Program components into the Surface Water Quality Bureau's planning and programmatic guiding documents. Achievements include developing and incorporating a wetlands element into the Water Quality Management Plan and including nearly 5000 acres of wetlands in an Outstanding National Resource Waters designation for Wilderness areas on USFS lands. This effort for the first time protects specific wetlands from degradation through Tier 3 anti-degradation regulations within the State's Water Quality Standards. In addition, a 5-year Wetlands Program Plan was written and accepted by EPA as the guiding document for future Wetlands Program development in the areas of planning, restoration and partnerships, monitoring and assessment, standards development and regulations. Another task accomplished by this project is the development of Wetlands Action Plans for Silver City Wetlands and an update of the Lower Rio Grande Wetlands Action Plan, The Wetlands Action Plan concept was introduced to a number of watershed groups who are currently ac-

San Pedro Parks Headwaters Wetlands. (photo courtesy of Steve Botcher)

complishing Wetlands Action Plans under other projects and funding sources. In addition, the Playas Region of the Southern High Plains was targeted for Wetlands Action Plans and the Curry County and Lee County Wetlands Action Plans were deliverables for this project. The "Wetlands Across the Colorado/New Mexico Border" Workshop was conducted to establish and strengthen partnerships in watersheds and regions that straddle the Colorado/New Mexico Border from east to west.

Mesilla Valley Bosque State Park Wetlands Restoration Project

The Wetlands Program and the New Mexico State Parks Division (State Parks) of the New Mexico Energy Minerals and Natural Resources Department partnered to conduct wetlands restoration to reintroduce historic wetland conditions on approximately 30 acres adjacent to the Rio Grande in south central New Mexico. The project involved utilizing a variety of methods to achieve the project goals that include: removing exotic plant species by hand and mechanical techniques, mechanical disturbance of coyote willow to promote regeneration, and replanting native riparian and wetland vegetation. In addition, the project developed a docent-training program that will train volunteer staff to educate visitors about wetlands and wetland restoration methods including the restoration techniques utilized for this project.

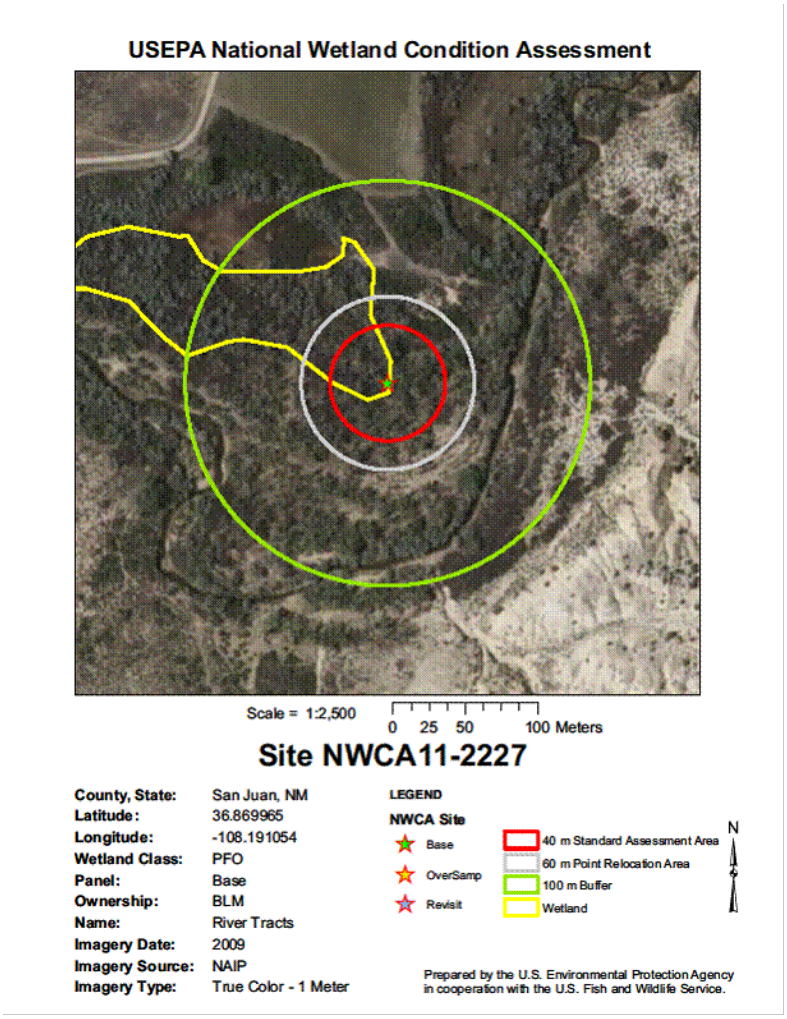
Docents learning wetland plant identification.

As a result of the technical expertise and hard work of the cooperators, the Mesilla Valley Bosque State Park Wetlands Restoration Project was a huge success. The primary cooperators included: the SWQB, State Parks, and the U.S. Fish and Wildlife Service. A docent training was implemented by Nancy Stotz of Desert Scribes. Following three years of difficulties at a previous project site, the project area was relocated, and the entire project was implemented in 18 months. This included project planning, obtaining federal clearances, QAPP development, developing the above partnerships, implementing contracts, implementing all restoration work, developing a monitoring effort, conducting pre and post treatment monitoring, conducting a docent training course, and completing a docent training manual. The project restored 28.5 acres of wet meadow habitat from the salt cedar treatment. Approximately 1.0 acre was restored with coyote willow following disturbance with the brush rake. An additional 1.5 acres of riparian habitat was developed from pole planting of 900 Rio Grande cottonwoods and 100 Gooding's willow. **Total wetland habitat restored was 31 acres.**

Flooding at Mesilla Valley Bosque State Park post treatment. Notice emergence of hardstem bulrush and cattails.

National Wetlands Condition Assessment in New Mexico

The US EPA, states and numerous other partners conducted



a survey of the nation's wetlands to provide regional and national data on the condition of wetland resources. The National Wetlands Condition Assessment (NWCA) is designed using state-of-the art survey techniques such that sampling sites are selected at random to represent the conditions of coastal marine and freshwater wetlands. The assessment will generate statistically valid estimates of the condition of wetland communities and of the extent of key stressors in these resources. The purpose of this project is to provide support to the EPA Office of Water in implementing the assessment of the nation's wetlands. The types of support required for this project included outfitting field crews with the necessary technical skills and training to sample wetland sites in New Mexico and adherence to strict quality assurance and quality control (QA/QC) requirements. Site activities included reconnaissance and sampling, adhering to all shipping and logistical procedures, participating in quality assurance audits, and fulfilling data reporting timelines. New Mexico was assigned nine wetland sites and two repeats that were randomly located throughout the State.
More information is available at http://water.epa.gov/type/wetlands/assessment/survey.

River Ecosystem Restoration Initiative

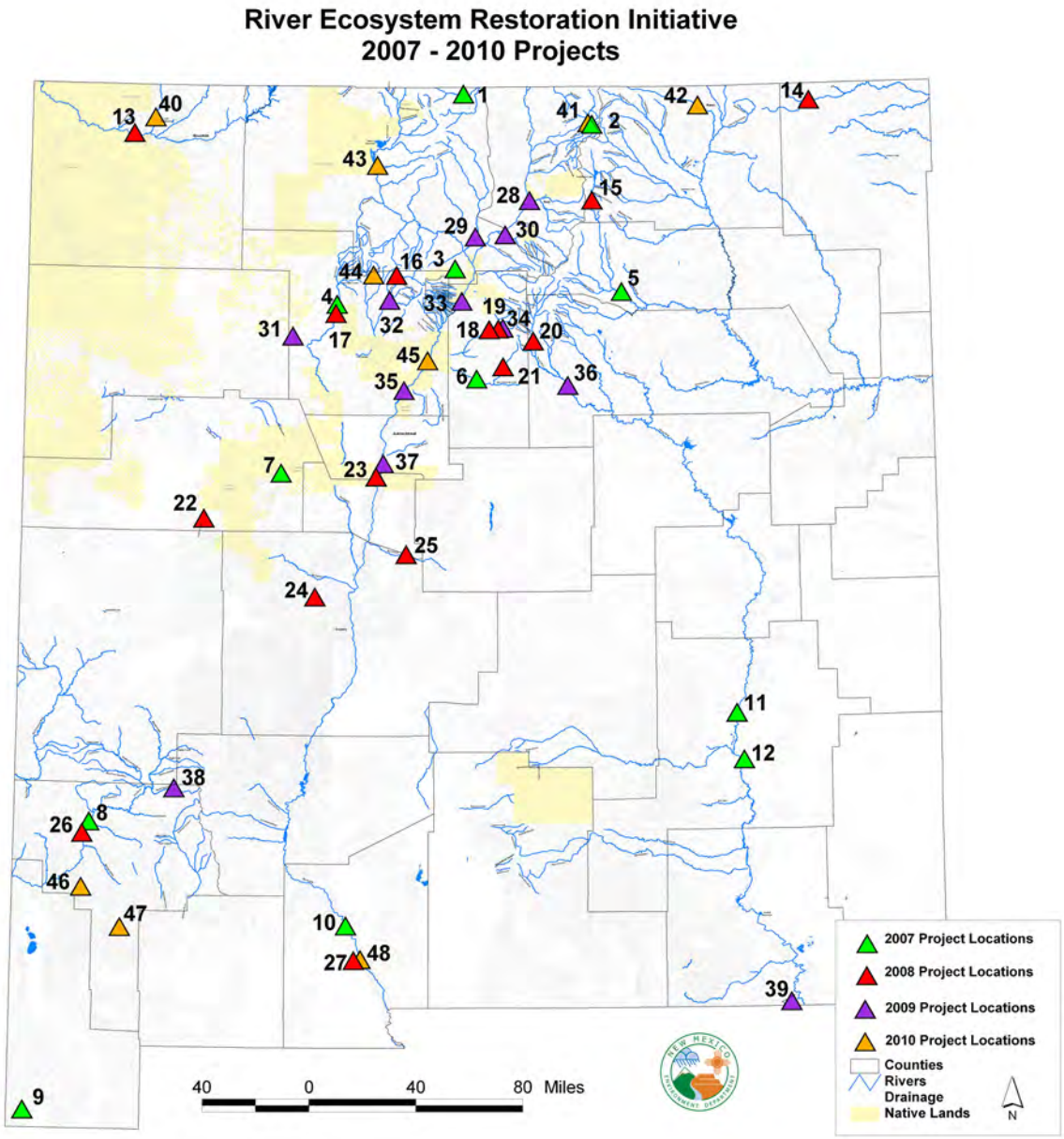
The River Ecosystem Restoration Initiative is a multi-agency state effort to restore in-stream ecosystem and watershed health to major New Mexico river basins. RERI is restoring approximately 95 river miles and 3,345 acres of riparian area in 48 projects throughout the state (see map page 26). Projects have been implemented along the Rio Puerco, Rio Chama, the upper, middle and lower Rio Grande, and the San Juan, Gila, Canadian, Pecos, and Santa Fe rivers, as well as numerous tributaries. A total of $8.2 million in capital outlay funding was appropriated for RERI by the state legislature over a four year period from 2007-2010. RERI complements both NMED's Clean Water Act 319(h) Program and the Wetlands Program that have the goals of improving surface water quality and restoring wetlands respectively. Many of these projects address primary causes of NPS pollution in New Mexico: sediment and temperature. River restoration projects such as those on Comanche Creek in the Valle Vidal and along the Pecos River below the Pecos Wilderness have addressed stream temperature and erosion while enhancing aquatic habitat. Wetland restoration projects such as in Cebolla Canyon in the El Malpais National Conservation Area, and along San Antonio Creek in Valle Caldera National Preserve are directed at reducing erosion and increasing groundwater recharge which increase baseflow and reduce temperature. These restored wetlands will also filter a wide variety of pollutants and provide critical habitat for both terrestrial and aquatic species. A large majority of RERI projects are co-located in the vicinity of a 319(h) or a 104(b)(3) restoration project serving to leverage funds and increase project success.

Cross vane on the Pecos River reduces erosion and creates fish habitat.

Volunteer crew constructs post vane in Comanche Creek to mitigate stream bank erosion.

RERI has engaged a diverse group of stakeholders, including; Tribes and Pueblos; federal and state agencies; local government; soil and water conservation districts; elementary and secondary schools; universities; community groups and organizations; private entities and citizen volunteers. These stakeholders bring to these projects not only a diverse set of skills, but diverse sources of funding as well.

Emerging wetland along San Antonio Creek (channel in foreground) only two weeks after construction.



RERI projects have created hundreds of full-time, part-time, or temporary restoration related jobs in the private sector and have leveraged greater than 1:1 match in in-kind contributions and other funding. The first 12 of the on-the-ground RERI projects were successfully completed in 2011.

Ground Water Quality Bureau

Permitting and Compliance Assistance for Large Capacity Septic Tank/Leachfields

The purpose of this program is to protect ground water quality from NPS pollution attributed to large capacity septic tank/leachfield systems. Technical personnel of the GWQB review discharge permit applications, develop Ground Water Discharge Permits, perform compliance assistance activities, and enforce discharge permit requirements for large capacity septic tank/leachfield systems. Throughout the permitting and compliance assistance activities, GWQB staff provides outreach material and assistance forms and spreadsheets with discharge permits that are helpful to dischargers who are required to complete and submit monitoring reports.

A review of ground water quality data collected from sites having septic systems shows that they contaminate ground water approximately 30% of the time. It is therefore critical to make sure that the sites are discharging pursuant to their discharge permits so that ground water quality is monitored and, if contamination is detected, corrective action can be taken. Overall, the number of facilities brought into compliance with their discharge permits during the 2011 year proved to be a success.

New Mexico Water Fair and Water-Quality Outreach Program

Approximately 75% of the population of New Mexico relies on ground water for their drinking water. Since many communities are concentrated in river valleys where ground water is shallow, their drinking water is susceptible to contamination from NPS pollution from household septic tank/leachfield systems and cesspools. To identify possible NPS water quality problems in rural New Mexico from these systems, the GWQB has conducted free testing of domestic wells ("water fairs") throughout the state for over 10 years. The Water Fair Program reaches domestic well owners and educates them about water quality issues and how they can help preserve or improve water quality in their communities. During the last few years, these activities have been carried out as an EPA-funded Water Fair Program. This program has proven to be very popular with the general public, providing a visible and highly appreciated service to the community. It also provides NMED with valuable information on ground water quality in rural communities. NMED continues to receive numerous requests for water fairs from community organizations, NMED Field Offices, other State, County and City agencies, and private citizens. The Water Fair Program continues to be an important tool for identifying possible NPS water quality problems.

Water quality outreach events include the demonstration of a ground water model/simulator (ant farm). The model is a hands-on visual aid that takes difficult ground water concepts and makes them understandable for all ages. Ground water model/simulator demonstrations are often conducted in schools, community centers or state fair exhibits. Many families in rural New Mexico have become more knowledgeable about water quality, potential for contamination, and pollution prevention. The GWQB conducted eight water fairs and three water quality outreach events. Overall, the level of public participation during 2011 proved to be a success.

CWA Section 401 Certification Activities

Staff continue to process water quality certifications under Section 401 of the federal CWA. The purpose of the Section 401 Water Quality Certification is to ensure that Section 404 Discharge of Dredge or Fill permits issued or authorized by the U.S. Army Corps of Engineers (Corps) comply with state water quality standards.

On April 5, 2011 the WQCC adopted new regulations addressing the certification of federal permits pursuant to Section 401 of the federal Clean Water Act [33 U.S.C. 1341]. The regulations were considered and adopted by the WQCC through their formal public participation process and codified in 20.6.2 NMAC – Ground and Surface Water Protection Regulations. The new regulations were filed with the NM Records Center on April 18, 2010, published in the New Mexico Register on April 29, 2010 with an effective date of May 18, 2011.

The new regulations stipulate that following receipt of an application for CWA 401 certification of CWA 404 Dredge and Fill permits there shall be a public notice period of at least 30 days during which interested persons may submit written comments to the department. The 30-day comment period shall begin on the date of the public notice provided under Subsections C or D of 20.6.2.2002 NMAC.

Following the public comment period provided under Subsection F of 20.6.2.2002 NMAC, the department shall issue a final permit certification including any conditions that the department places on the certification, or issue a statement of denial including the reasons for the denial. The final certification will generally be issued within 60 days from the date a request to grant, deny or waive certification is received by the department, unless the department in consultation with the U.S. Army Corps of Engineers (USACE) district engineer finds that unusual circumstances require a longer time.

To address these changes to the regulations, the SWQB staff have been developing a new certification process to assure efficient processing of 401 certifications. As part of this process the SWQB is planning a coordination meeting with the USACE early in 2012.

CWA Section 404/401 Water Quality Certifications and Actions:	
Certifications	
Nationwide Permits Certified	45
(those in ephemerals)	23
Individual Permits Certified	0
Certifications in Progress	32
Total	100
Other Actions	
No Permit Necessary	16
Withdrawn	1
Enforcement Action	11
Consultation	10
Total	38

New Mexico Mining Act Activities

The New Mexico Mining Act (19 NMAC 10) obligates NMED to review and comment on various applications associated with non-coal mining in New Mexico. Proposed actions range from recreational mining (such as panning for gold) to large mine and mill operations. For exploration applications or modification of existing exploration permits, NMED is provided an opportunity for formal comment. For new mining operations, NMED is responsible to "certify that water quality standards are expected to be met" and to determine that the proposed closeout plan will "achieve compliance with all applicable air, water quality and other environmental standards if carried out as described". For modification of existing operations, NMED has an opportunity to concur with proposed permit changes. In general, NMED has 20 days from receipt of an application to respond.

NMED has an informal team that includes representatives from SWQB, GWQB, and the Air Quality Bureau to review mining applications and otherwise support the work of the New Mexico Mining and Minerals Division. This work involves review of applications, local site conditions (generally including site visits), and applicable water quality standards. SWQB discusses BMPs and other activities with the applicant in an effort to negotiate mining plans that prevent or minimize environmental risks. NMED's written responses often include conditions necessary to ensure compliance with environmental standards.

Beyond permitting actions, this NMED team also participates in meetings and reviews documents in support of the work of the New Mexico Mining and Minerals Division, the US Army Corps of Engineers, the Nuclear Regulatory Commission, and others. In 2011, SWQB reviewed numerous mining notices, applications, restoration plans, hydrologic reports, monitoring plans, and activity reports. SWQB reviewed approximately 18 permit applications, and in the process provided approximately 18 written comments, approximately 17 consultations, and made approximately nine visits to proposed mining or mineral exploration sites.

The earthquake and tsunami on March 11 and the ensuing failure of the Fukushima Daiichi nuclear reactor in Japan, followed by announcements of shifting energy policies in Europe, resulted in lower uranium prices and less exploration for uranium and related mining activities in New Mexico. The continuing increase in the price of gold was coupled with increased recreational placer mining activity, which is also permitted through the New Mexico Mining Act. Exploratory drilling for copper, gold, silver, and other metals was relatively active in southwestern New Mexico in 2011. In response to projected increases in copper prices, Freeport McMoRan began work to re-open the large Cobre Mine near Silver City (within the Mimbres closed basin), and met with USACE and SWQB for discussion about Clean Water Act jurisdiction and permitting. New Mexico's known occurrences of rare earth elements that accompany more common metals is generating continued interest, and more exploration permits for this category of resource is expected in 2012. The state Mining Act was violated in 2011 when a company began working in the OroGrande District (in the Jarilla Mountains north of El Paso) without a permit.

Other Water Quality Protection Programs

NM Water Quality Standards Program

Planning and Protocols

The SWQB released the 2012 Assessment Protocols for a 30-day public comment period on March 22, 2011 and also requested the submission of data packages during this same time period. EPA Region 6 approved the updated & integrated Water Quality Management Plan/Continuing Planning Process (WQMP/CPP), including the Hydrology Protocol, that the WQCC approved May 10, 2011. EPA approved these changes December 23, 2011.

The document can be viewed at www.nmenv.state.nm.us/swqb/Planning/WQMP-CPP/

Proposed Amendments to the NM Water Quality Standards

The WQCC has granted SWQB's petition for a hearing on proposed amendments to the water quality standards. The proposed amendments would change the aquatic life use on the lower Dry Cimarron River from coldwater to coolwater, and it would add new segments establishing water quality standards for approximately 65 lakes in the Rio Grande, Pecos, Canadian, Gila, San Juan and Little Colorado Basins. The hearing is currently scheduled to begin April 10, 2012.

Dry Cimarron River

CWA §303(d)/§305(b) Integrated Report and TMDL Update

The SWQB released the public comment draft of the 2012-2014 State of New Mexico CWA §303(d)/§305(b) Integrated Report for a 45-day public comment period on December 15, 2011 and plan to present it to the WQCC for approval in March 2012.

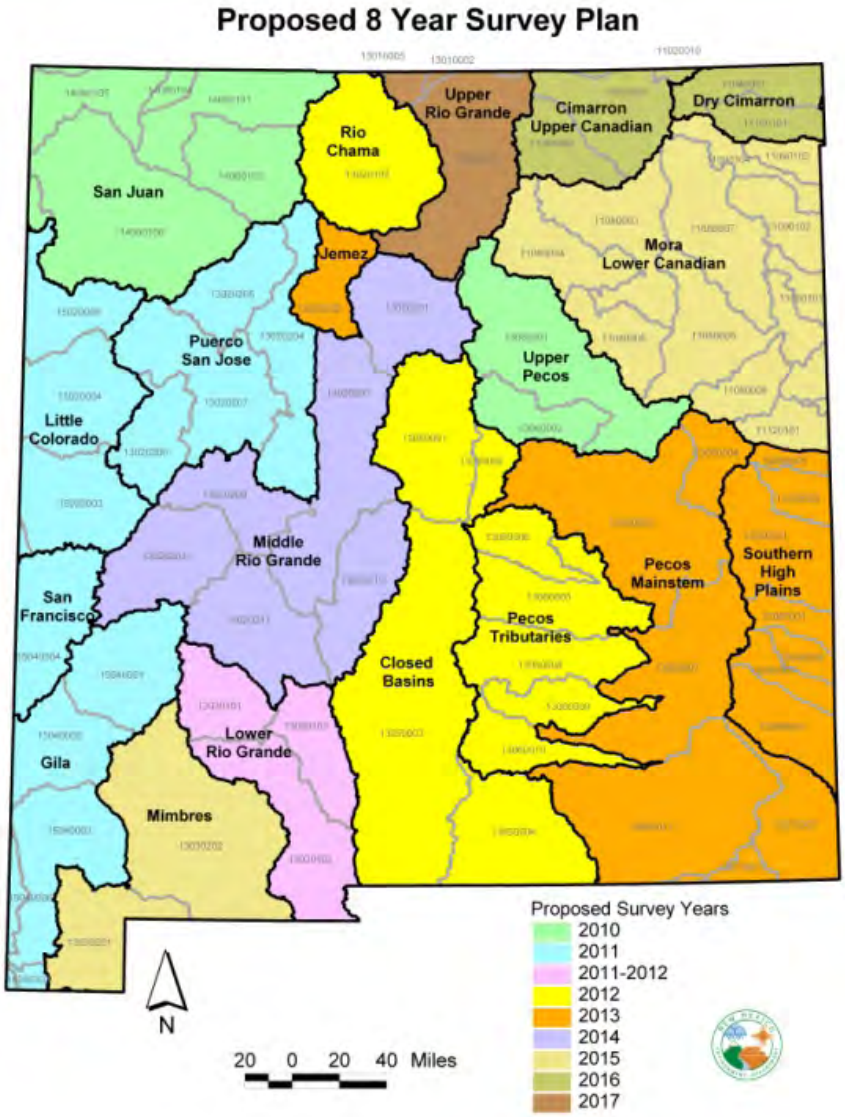
In 2011, the SWQB developed and received approval from both the WQCC and EPA for 19 TMDLs in the Rio Chama watershed, 12 in the Canadian River Part 2 TMDL document, and 6 TMDLs for the waters of the Valle Vidal. SWQB also received WQCC and EPA approval for an update to the 2007 TMDL for the Mora River. TMDLs developed for the Raton Creek watershed were released for 30-day public comment in October 2011 and the SWQB expects to present these TMDLs to the WQCC for approval April 2012.

The Integrated Report and TMDL developments can be viewed at www.nmenv.state.nm/swqb/TMDL

Monitoring and Assessment Program

Water Quality Surveys

The Monitoring and Assessment Section conducted three primary water quality surveys in 2011 collecting water quality data from 109 monitoring locations within 60 stream assessment units and 6 lake assessment units covering 1150 stream miles and 1,120 lake acres. The watersheds surveyed included the Gila and San Francisco (516.3 miles, 120 acres) Rio Puerco and Zuni River (392 miles, 1000 acres) and the Lower Rio Grande (220 miles). These surveys are part of an eight year rotation throughout the state. In 2012 the SWQB will focus on the Sacramento Mountains and the Rio Chama Basin.

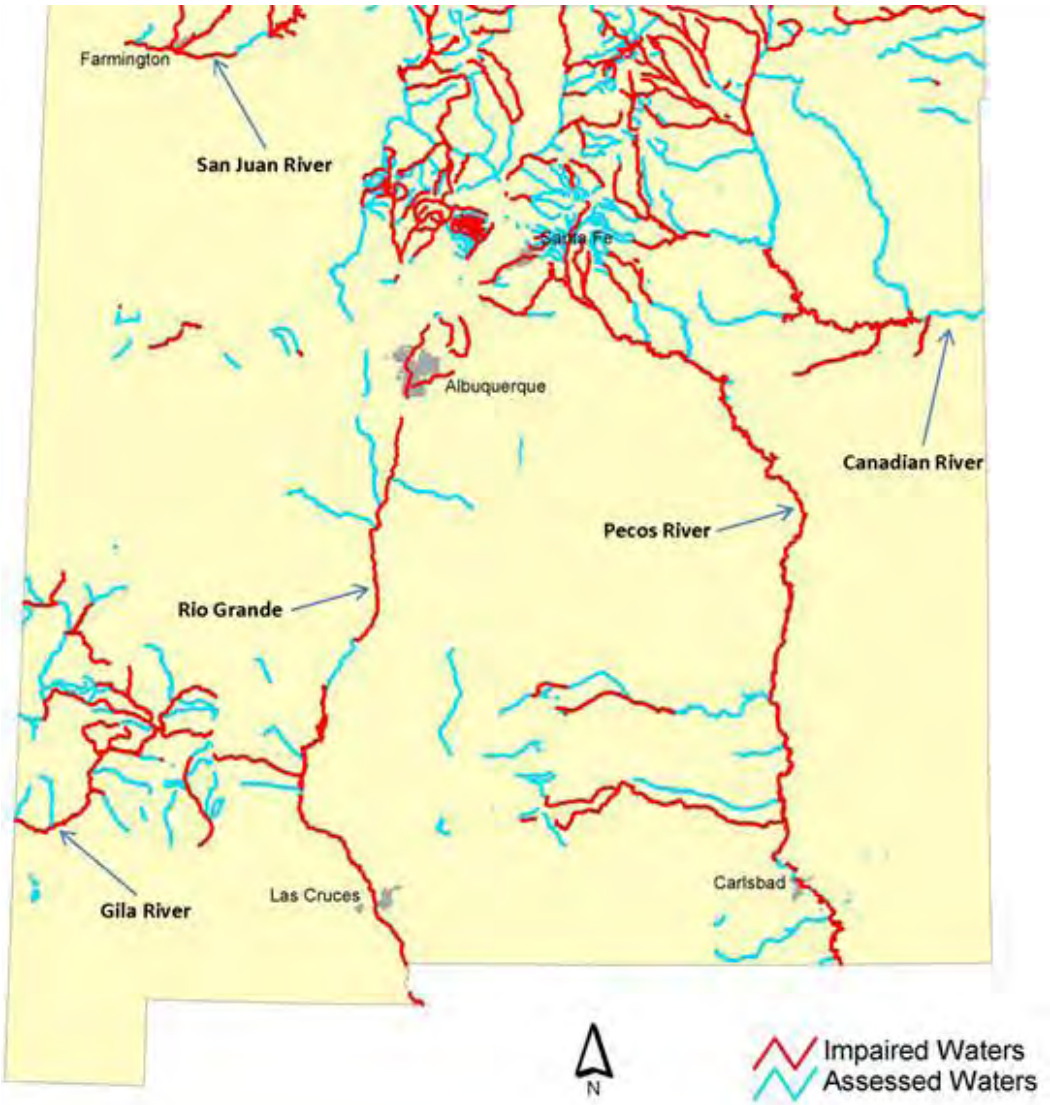


New Mexico's §303(d) List of Impaired Waters

As required by the Clean Water Act, every two years the State evaluates, through application of the State's Assessment Protocols, the data it has collected as well as all readily available water quality data to determine if the water quality standards are met and the use achieved. Similar to most states, New Mexico has utilized a targeted, rotational watershed approach to ambient water quality monitoring since 1998 to achieve comprehensive coverage of waters of the state. Those waters which exceed water quality standards are "impaired" for the associated use and are identified in the Section §303(d) List of Impaired Waters.

Of the approximately 7,000 assessed perennial stream miles in New Mexico, almost 2,763 miles, or 39%, have identified impaired designated uses while approximately 60,500 out of 94,000, or 64%, categorized publically-owned lake, reservoir, or playa acres do not fully support designated uses. Temperature, nutrient/eutrophication, and E. coli are the top three causes of river and stream water quality impairments in New Mexico. Mercury in fish tissue, PCBs in fish tissue, and dissolved oxygen are the top three causes of water quality impairments in lakes and reservoirs.

Recently the State has developed the 2012-2014 §303(d) List of Impaired Waters which will be available for a 45-day public comment period on December 15th. Updates for this list will focus on data collected during the 2009 Upper Rio Grande and Mimbres Basins Water Quality Surveys and during the 2010 Pecos Headwaters and San Juan River Basins Water Quality Surveys.



Turbidity and Stream Bottom Deposits Assessment Protocols

In developing the 2012-2014 §303(d) List of Impaired Waters, a focus was revised methods to evaluate New Mexico's narrative standards for turbidity and stream bottom deposits. These methods were based on a joint study between NMED and TetraTech which was funded by the U.S. EPA Region 6 (http://www.nmenv.state.nm.us/swqb/sedimentation/).

Analysis of multiple sediment indicators, their responsiveness to site disturbance, and their effects on benthic macroinvertebrates resulted in identification of potential benchmarks for the bedded sediment indicators percent sand & fines and Relative Bed Stability (LRBS_NOR) in three site classes, Mountains, Foothills, and Xeric areas. The site classes distinguish sediment expectations across the State and were identified through a principal components analysis (PCA) of environmental conditions and the sediment indicators. Percent sand & fines, described as sediment particles whose width is less than 2 millimeters, is easily measured and related strongly with biological metrics. LRBS_NOR is a formulation that considers site-specific hydraulic potential for moving stream bed sediments, so that the observed fine sediments are only considered imbalanced when the stream bed is more easily mobilized and transported than expected due to unstable conditions. Percent sand & fines and LRBS_NOR can be applied in a two-tiered assessment that first considers the simpler indicator of biological impairment, and then refines the assessment with the second indicator of geomorphic impairment, as needed.

Analysis of suspended sediment data (turbidity) was unable to identify a biologically-based low-flow or high-flow benchmark as a result of using only limited point turbidity data. As a result New Mexico developed an approach that relies on developed biotranslators from the published literature to set thresholds for the narrative turbidity criterion. Presently such information only exists for coldwater/clearwater species (i.e. salmonids) and provides a magnitude/duration relationship where impacts to fish health are observed (e.g. greater than 16 NTU for 6 days). As such, New Mexico's assessment approach allows for screening based on point data – that is to say if all point data are below 7 NTU then the stream is considered to meet the narrative criterion. However if some data exceeds this value then a deployment of sonde (continuous recording water quality monitor) and evaluation of the magnitude/duration of elevated turbidity levels is necessary in order to find that the stream does not meet the narrative criterion.

Special Project Spotlight: BLM's Erosion Control Through Riparian and Wetland Development

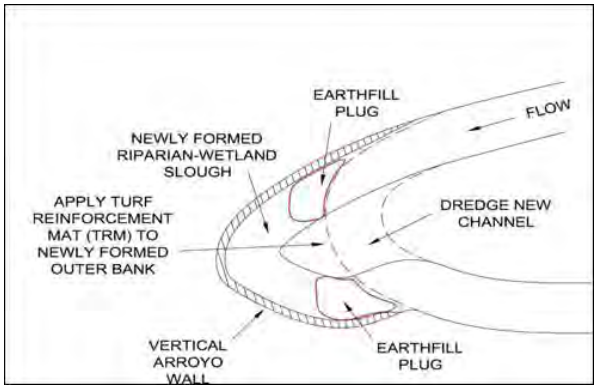
Background

Several 35-foot-high arroyo walls along bends of the Rio Puerco near Cabezon, NM were identified for stabilization efforts because they had continued to cut outward with no sign of stopping. They produced large sediment inputs to the river through mass failures and continued to erode private and public land adjacent to the town of Cabezon. Seasonal patterns had developed where the accumulated fallen soil and bank materials would be washed away by the Rio Puerco's considerable intermittent or ephemeral discharges. The flows further undercut the toes of the banks, setting the stage for subsequent bank collapses, the channel-clearing flows, and so on. Left un-stabilized, one of the bends was about to form a meander cutoff that would have bypassed about 2000 feet of river channel and its floodplain.

Eroding bank on a meander bend in the Rio Puerco.

Design

The primary design objective was to stop the retreat of the arroyo walls. To achieve this, the river was re-directed by dredging a new channel through the existing point bar while maintaining a meander of similar geometry, but shifting the radius point of the bend. With this design, a second objective was made possible: creating a riparian/wetland slough in the abandoned channel at the foot of the arroyo wall. Because the dredged material is divided and placed at the ends of the abandoned channel bend - forming two earthfill plugs with a surface elevation at floodplain level - the slough will be flooded when the river exceeds bankfull stage. With vegetation established in the abandoned channel (sloughs) and on the plugs, the design actually results in a net increase in the area of vegetated floodplain within the arroyo walls due to the slightly shorter length of the new channel.



Project design.

Results

The project was completed in March 2009 with the application of turf reinforcement mat (TRM) on the outside banks of the newly-excavated stream channels and earthfill plugs. Re-positioning the active channel away from the foot of the arroyo wall has resulted in eliminating the undercutting of the arroyo walls and the mass failures into the river.

After three growing seasons, the native willow root-

stock has colonized the TRM and has induced sediment deposition. The sloughs are colonizing with willows, and in two of the sloughs where the water table is highest, cattails have appeared. No planting was required due to the root sprouting of the native willow community in this reach of the river. Over the long term, the slough areas may or may not fill with overbank flood deposits to form vegetated floodplain benches.

Project under construction.

Funding and Partners

The project was funded by an EPA grant obtained by the Rio Puerco Management Committee (RPMC) in 2003. The grant program encouraged inventive projects for watershed stabilization and water quality improvement. In response, the grant application specified an objective for stabilizing a number of bends along the Rio Puerco near Cabezon, New Mexico. The project was subsequently designed and constructed by the Bureau of Land Management with assistance from Michael Coleman of NMED's Surface Water Quality Bureau. Project cooperators included several private landowners near Cabezon whose property encompassed three of the four project work sites. The project required a Clean Water Act Section 404 Individual Permit from the U.S. Army Corp of Engineers.

Healthy stand of willows growing on the new riverbank.

For further information, please contact project manager David Mattern at the Bureau of Land Management, (505) 761-8776.

Willows colonizing the wetland slough.

Projects Completed by Non-NMED Agencies

The following land management agencies completed various projects in New Mexico that ultimately contribute to the reduction of NPS pollutants in surface waters. The most common NPS issues being addressed are excessive erosion, sedimentation, encroachment of exotic vegetation, streambank stability, excessive nutrients, and excessive water temperature.

Bureau of Land Management Projects

Carlsbad Field Office

Watershed	Project Description	Watershed Benefits
Upper Pecos/Black 13060011 Delaware River 13070002	Treated 748 acres for control of salt cedar.	• Increase herbaceous ground cover. • Decrease sheet flow and erosion.
Upper Pecos/Black 13060011	Oil Field reclamation – reclamation and reseeding on 234 acres of drill pad/pit, borrow pit, and lease roads.	• Decrease erosion from road prism. • Increase herbaceous ground cover.
Upper Pecos/Black 130600111	Wildfire Stabilization – repaired one mile of pasture fence to exclude cattle from burned area of New Fire, provided materials for 2 miles of fence to repair fences damaged by Loop Fire.	• Increase herbaceous ground cover. • Decrease sheet flow and erosion.
Upper Pecos/Black 130600111	Vehicle access control– installed one parking area barrier to keep vehicular traffic out of riparian zone.	• Increase herbaceous ground cover. • Decrease erosion. • Allow bank recovery and stabilization.
Upper Pecos/Black 130600111	Prescribed Fire – treated 18,188 acres to remove brush and desert succulents.	• Decrease erosion. • Increase herbaceous ground cover.
Delaware River 130700021	Added two diversion fences and improved/extended gully plugs.	• Increase herbaceous ground cover. • Decrease erosion.

Las Cruces Field Office

Watershed	Project Description	Watershed Benefits
Salt Basin 13050004 (Timberon) (McGregor Range/Otero Mesa)	Prescribed burn on 60 acres of piñon/juniper and 150 acres of grassland. Mechanical treatment of 200 acres of piñon/juniper. Croesote bush control 7,798 acres	• Decrease risk of extreme wildfire and associated erosion. • Reduce invasive brush species, increase herbaceous ground cover, reduce surface runoff, erosion and sedimentation, and improve infiltration.

Las Cruces Field Office (continued)

Watershed	Project Description	Watershed Benefits
Mimbres 13030102	Creosote bush control 5,740 acres Pitchfork erosion control structures. Palomas Dam #8 Drop Structure Re-built breached dam into a rock-gabion drop structure.	• Reduce invasive brush species, increase herbaceous ground cover, reduce surface runoff, erosion and sedimentation, and improve infiltration. • Reduce overland flow and channel erosion, stabilize soils in draw bottoms, improve infiltration, increase herbaceous ground cover. • Provides water for livestock and wildlife.
Jornada Draw 13030103	Creosote bush control 9,778acres	• Reduce invasive brush species, increase herbaceous ground cover, reduce surface runoff, erosion and sedimentation, and improve infiltration.
Rio Grande – Caballo 13030101 Rio Grande - Elephant Butte 13020205 (Iron Mtn.)	Creosote bush control 5,524acres Mechanical control of piñon/juniper 50 ac.	• Reduce invasive brush species, increase herbaceous ground cover, reduce surface runoff, erosion and sedimentation, and improve infiltration. • Decrease risk of extreme wildfire and associated erosion.
El Paso-Las Cruces 13030102	Alameda Dam maintenance Deferred maintenance to the dam included clearing vegetation, re-surfacing dam, cleaning out basin and armoring the dam embankments.	• Reduce flooding • Decrease erosion and sedimentation • Increases function and life of structure • Preserves habitat upstream and flood protection downstream
Animas Valley 15040003	Creosote bush control 1,220 acres Pitchfork Ranch erosion control structures	• Reduce invasive brush species, increase herbaceous ground cover, reduce surface runoff, erosion and sedimentation, and improve infiltration. • Reduce overland flow and channel erosion, stabilize soils in draw bottoms, improve infiltration, increase herbaceous ground cover.

Farmington Field Office

Watershed	Brief Project Description	Watershed Benefits
Animas 14080104 Blanco Canyon 14080103	Reconstructed 12 miles of road to meet BMP standards. Maintained approximately 500 miles of road.	• Reduce erosion and sedimentation to waters in the San Juan Basin.
Blanco Canyon 14080103 Chaco 14080106	Thin sagebrush and young piñon/juniper trees with Dixie Harrow and seed 90 acres.	• Reduced runoff, soil erosion, and sedimentation. Increase in herbaceous vegetation growth and water infiltration.
Animas 14080104 Blanco Canyon 14080103 Upper San Juan 14080101	Approved approximately 170 Applications of Permit to Drill (APD) with Best Management Practices resulting in about 75 new silt traps constructed.	• Reduced runoff, soil erosion, sedimentation, and increased water infiltration.
Upper San Juan 14080101	Construct silt fences in La Manga Wash. Mowed and drilled approximately 100 acres of unhealthy sage/grassland. Conducted inventory well pad reclamation within the La Manga Watershed in preparation for drilling seed on pads determined to be unsuccessfully rehabilitated.	• Protection and restoration of riparian vegetation, and reduction in sediment transport. Reduced runoff, soil erosion, sedimentation, and increased water infiltration.

Rio Puerco Field Office

Watershed	Project Description	Watershed Benefits
Arroyo Chico (Arroyo Chico)	Treat 300 acres of saltcedar with herbicide in riparian stream corridors.	• Increase desirable herbaceous cover in riparian and upland zones.
(Arroyo Pelon)	Thin sagebrush with herbicide application on 909 acres.	• Increase herbaceous ground cover. • Decrease erosion
(Papers Wash, Encino Wash)	Stabilize headcuts and gullies with approximately 200 rock in-stream structures.	• Decrease erosion and sedimentation. • Increase herbaceous ground cover in channels.

Rio Puerco Field Office (continued)

Watershed	Project Description	Watershed Benefits
North Plains (Laguna Larga, Laguna Colorado) (Outlet Cebolla Creek) (Headwaters Cebolla Creek)	Prescribed fire on 4,000 acres of range and forest land. Construct 21 rock check dams in Cebolla Creek. Construct approximately 10 rock headcut control structures in Cebolla Creek.	• Increase herbaceous ground cover. • Decrease risk of extreme wildfire and associated erosion risk. • Trap sediment to restore channel bed. • Decrease erosion and sedimentation. • Decrease gully and channel erosion.
Rio Puerco (Outlet Arroyo Chijuilla) (Guadalupe Canon)	Stabilize a ½ mile-long gully by conversion to a grassed waterway. Thin 300 acres of piñon-juniper forest.	• Increase herbaceous ground cover. • Decrease gully erosion and sedimentation. • Increase herbaceous ground cover. • Decrease erosion.

Roswell Field Office

Watershed	Project Description	Watershed Benefits
Upper Pecos 13060003	Chemical treatment of 4,200 acres of mesquite.	• Increase herbaceous ground cover. • Decrease sheet flow and erosion.
Upper Pecos-Long Arroyo 13060007	Chemical treatment of 82 acres salt cedar Pecos River and its tributaries. Chemical treatment of 25,021 acres of mesquite.	• Increase herbaceous ground cover. • Decrease sheet flow and erosion.
Rio Hondo 13060008 (Rio Bonito)	Mechanical treatment of 143 acres of salt cedar, Russian Olive, and Siberian Elm trees along the Rio Bonito River. Planted 150 Rio Grande Cottonwood trees, 30 long stem wolfberry shrubs, and 20 apache plume shrubs along the Rio Bonito River post treatment. Mechanically thinned 500 acres of Pinyon/Juniper. Prescribed broadcast burn of 2,100 acres of pinyon-juniper, mixed desert shrub plant community. Installed 6 erosion control structures to mitigate headcuts.	• Increase herbaceous ground cover. • Decrease sheet flow and erosion. • Reduce brush over story. • Improve riparian veg. to reduce erosion.

Taos Field Office

Watershed	Project Description	Watershed Benefits
Conejos 13010005 (Rio de los Pinos)	149 acres seeding native vegetation.	• Increase herbaceous ground cover to reduce erosion and increase water infiltration.
Conejos 13010005 (Rio de los Pinos)	149 acres of sagebrush removal (mechanical).	• Increase herbaceous ground cover to reduce erosion and increase water infiltration.
Upper Rio Grande 13020101 (Rio Frijoles from Rio Medio to Pecos Wilderness)	250 acres thinned in piñon-juniper woodland.	• Increase herbaceous ground cover to reduce erosion and increase water infiltration.
Rio Grande – Santa Fe 13020201 (Santa Fe River in La Ceineguilla)	25 acres road rehabilitation	• Reduce sedimentation and turbidity caused by runoff from road.
Rio Chama 13020102 (Rio Ojo Caliente from Rio Chama to Rio Vallecitos)	25 acres planting native riparian vegetation	• Reduce sedimentation and turbidity from bank erosion.
Upper Rio Grande 13020101 (Rio Grande from CO to Rio Pueblo de Taos) (Rio Embudo between Chamisal Creek and Cañada Ojo Sarco) (Agua Caliente)	6 sites monitored on Rio Grande, Rio Embudo and Agua Caliente. Temperature is continuous hourly. pH, turbidity, conductivity, nitrate and phosphorus collected monthly or less.	• Monitor water quality.
Upper Rio Grande 13020101 (Rio Grande from CO to Red River)	3000 acres prescribed burn. 3 cattle tanks and ¾ mile pipeline installed.	• Increase herbaceous ground cover to reduce soil erosion and increase water infiltration.

New Mexico State Forestry Division

Watershed	Project Description	Watershed Benefits
Plains of San Augustin, (Point of Rocks Canyon)	Timber harvests (20 ac) in mixed conifer forests. Graded dips, waterbarring, lop & scattering of slash and seeding .	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover and waterbars. • Increase water infiltration.
Cimarron (Urraca Creek)	Timber harvests (110 ac) in ponderosa pine and mixed conifer forests. Waterbarring, lop & scattering of slash and seeding of critical areas.	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover and waterbars. • Increase water infiltration.
Canadian Headwaters (Gold Creek-Vermejo River)	Timber harvests (137 ac) Douglas-fir forests. Waterbarring, lop & scattering of slash and seeding of critical areas.	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover and waterbars. • Increase water infiltration.
Rio Chama. Colorado, New Mexico (Headwaters El Rito)	Timber harvests (250 ac) in spruce-fir forests. Waterbarring, lop & scattering of slash and seeding of critical areas.	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover. • Increase water infiltration.
Plains of San Augustin (Bear Canyon)	Timber harvests in piñon-juniper and ponderosa forests (61 acres). Waterbarring and seeding .	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover. • Increase water infiltration.
Rio Chama. Colorado, New Mexico. (Wolf Creek)	Timber harvests in mixed conifer forests/aspen (100 acres). Waterbarring, lop & scattering of slash and seeding of critical areas.	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover • Increase water infiltration.
Zuni. Arizona, New Mexico (Upper Rio Nutria)	Timber harvest (251 ac). in ponderosa pine forests. Waterbarring, lop & scattering of slash and seeding of critical areas.	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover and waterbars. • Increase water infiltration.
Mora (Santiago Creek)	Timber harvest (53 ac). In ponderosa pine forests. Waterbarring, lop & scattering of slash and seeding of critical areas.	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover and waterbars. • Increase water infiltration.
Cimarron (Cimarroncito Creek)	Timber harvest (270 ac). In Ponderosa Pine Forests. Waterbarring, lop & scattering of slash and seeding of critical areas	• Reduce runoff, erosion, sedimentation due to increased herbaceous ground cover and waterbars. • Increase water infiltration.

NM Soil and Water Conservation Districts (SWCD)

Grant SWCD

Watershed	Project Description	Watershed Benefits
Upper Gila 15040001	Restore ecological function of Black Canyon Creek.	• Restore in-stream habitat for the Gila trout & other aquatic species. • Reestablish riparian vegetation canopy cover. • Promote in-stream ecosystem function. • Enhance overall watershed health.
Upper Gila-Mangas 15040002 Mimbres 13030202	EMNRD Wildland Urban Interface Hazardous Fuels Reduction: Private landowners in Grant County thinned approximately 268 acres in 2011.	• Decrease risk of catastrophic wildfire and associated erosion.
Upper Gila 15040002 Upper Gila-Mangas 13030202	NMISC Paired Watershed Study: Two watersheds continue to be studied for soil moisture and alluvial groundwater response to tree and brush thinning treatments. 63 USFS acres thinned in 2011.	• Provide useful information for improvement of habitat and for estimation of water salvage that might contribute to stream flows to protect endangered species and for other purposes.

Tierra Y Montes SWCD

Watershed	Project Description	Watershed Benefits
Mora 11080004 Sapello River	5,215 ft. of stream restoration and enhancement work. (FWS Partners Project)	• Increased riparian/wetland area • Improved grassland • Improved wildlife habitat • Raised water table • Increased plant and animal diversity
Upper Pecos 13060001 Gallinas Watershed Tecolote watershed	286 acres forest thinning	• Reduce risk of catastrophic wildfire and associated erosion.
Upper Pecos 13060001	11 acres of forest thinning	• Reduce risk of catastrophic wildfire and associated erosion.
Sapello Watershed 11080004	147.2 acres of forest thinning	• Reduce risk of catastrophic wildfire and associated erosion.

US Forest Service Projects

Carson National Forest

Watershed	Project Description	Watershed Benefits
Upper Rio Grande 13020101 (Cabresto Creek)	2 mile road improvement – FR 134A Cabresto Lake Road.	• Decrease erosion. • Improve access to Cabresto Lake for future dam re-construction project.
Upper Rio Grande 13020101 (Rio Pueblo de Taos)	Aerial seed and straw mulch 173 acres in Osha Burned Area.	• Reduce soil erosion and sedimentation to Rio Pueblo de Taos due to wildfire effects.
Upper Rio Grande 13020101 (Rio Grande del Rancho)	Decommission 1 mile of native surface road. Block vehicle access to the creek at 437 Road wetland area. Installed root wads and rock in stream. Closed road to ATV use along FR 439.	• Decrease erosion from roads. • Stabilize stream banks to reduce erosion. • Improve herbaceous vegetation and groundcover to reduce erosion.
Upper Rio Grande 13020101 (Rio Pueblo) (Outlet Rio Santa Barbara)	Surface road and camp sites. Re-surface 1.7 miles of FR 116.	• Decrease erosion and sediment from road prism and campground sites.
Upper Rio Grande 13020101 (Rio Pueblo)	Replaced aging vault toilets: Replaced 1 toilet at Comales Campground and 3 toilets at Agua Piedra Campground.	• Protect groundwater and surface water resources from bacteria and nutrients.
Upper Rio Grande 13020101 (Rio Fernando de Taos)	Installed gate to minimize access to Capulin Canyon and Rio Fernando de Taos.	• Protect resource conditions. • Decrease erosion due to un-authorized vehicle use.
Upper Rio Grande Watershed 13020101 (Rio Pueblo)	Designed streambank stabilization project to be implemented in 2012.	• Improve vegetation ground cover and water holding capacity.
Upper Rio Grande HUC 13020101 (Rio Grande del Rancho)	Valle de Los Romeros riparian-wetland rehabilitation. Decommissioned 1 mile of ATV trails and road; relocate motorized trail; stabilize headcuts.	• Stabilize headcuts to reduce erosion. • Improve riparian veg. to reduce erosion. • Improve infiltration by reducing runoff from trail surfaces.

Carson National Forest (continued)

Watershed	Project Description	Water Quality Benefits
Upper Rio Grande HUC 13020101 (Rio Fernando de Taos)	Osha Pass riparian-wetland rehabilitation. Re-contour old contour trenches; block unauthorized motorized access to 75 acre meadow system.	• Increase herbaceous ground cover. • Decrease erosion from road surfaces. • Improve infiltration by reducing runoff from road surfaces.
Upper Rio Grande HUC 13020101 Cimarron HUC 11080002	Resurfaced 15 miles FR 1950 from Windy Gap to Valle Vidal western boundary and Ring Place Road.	• Decrease erosion and sediment load. • Improve road drainage. • Maintain ONRW water quality.
Upper Rio Grande 13020101	Alamitos Acequia Diversion and Fish Migration Barrier - begin repairs to structure damaged by flood in 2010.	• Stabilize stream to reduce erosion and sedimentation.
Upper Rio Grande 13020101 (Comanche Creek)	Close and reclaim 3 miles of road in headwaters of Foreman Creek.	• Decrease erosion and sediment load. • Maintain ONRW water quality.
Upper Rio Grande 13020101 (Outlet Rio Grande del Rancho)	Installed gate and repaired fence to eliminate ATV and other vehicle use in the Bear Wallow area.	• Decrease erosion from road surfaces. • Improve infiltration by reducing runoff from road surfaces.
Upper Rio Grande 13020101 (Rio Fernando de Taos)	Peñasco Youth Corps headcut stabilization project.	• Stabilize headcuts to reduce erosion. • Increase water storage and yield.
Upper Rio Grande 13020101 (Rio Fernando de Taos)	Apache Canyon - 0.6 miles. Peñasco Youth Corps streambank armoring.	• Reduce streambank erosion and sedimentation due to livestock trailing.
Upper Rio Grande 13020101	The R1 Gallatin Trail Crew re-routed and improved Wheeler Peak hiking trail from Williams Lake.	• Decrease erosion from trail surfaces. • Maintain ONRW water quality.
Upper Rio Grande 13020101 (Arroyo Hondo – Rio Grande)	Re-forested 220 acres within the Hondo burned area.	• Restore forest vegetation to increase herbaceous ground cover to reduce erosion.
Upper Rio Grande 13010101 (Upper Red River)	Continued CERCLA hazardous mine waste removal in Upper Bitter Creek.	• Improved water quality through removal of sources of lead and arsenic.
Upper Rio Grande 13020101 (Rio Trampas)	Final re-vegetation and stabilization of the Acequia Aguliar de El Valle.	• Stabilize streambanks to reduce erosion and sedimentation.

Carson National Forest (continued)

Watershed	Project Description	Watershed Benefits
Upper Rio Grande 13010101 Cimarron 11080002	Annual road maintenance of Level 3, 4, and 5 Forest roads – 125 miles.	• Decrease erosion from road prism. • Improve trail drainage and control discharge of sediment.
Rio Chama 13020102	1 mile construction – El Rito Lobato Allotment - Madera/Comanche Pasture.	• These projects are intended to improve grazing management in the El Rito Creek watershed.
Rio Chama 13020102 (Martinez Canyon-Canjilon Creek)	Brushhog and seed 300 acres in Mesa Juan Domingo.	• Reduce soil erosion and sedimentation. • Increase forage capacity.
Rio Chama 13020102	Cleaned 2 cattleguards.	• Minimize channelization of water and sediment transport.
Rio Chama 13020102	Thinning 540 acres in Ensenada Agua Caballos Project .	• Decrease risk of extreme wildfire and associated erosion.
Rio Chama 13020102	Prescribed Burning on 4,010 acres.	• Improve vegetation ground cover. • Decrease risk of extreme wildfire and associated erosion.
Conejos 13010005	Casias dam sediment cleanout and dam reconstruction.	• Improve sediment retention and reduce sedimentation within channel.
Conejos 13010005	Laguna exclosure maintenance - 3 acres.	• Stabilize lakeside banks; improve bank vegetative cover/density.
Upper Rio Grande 13020101	Vibora pipeline installation - 8 miles.	• reduce sedimentation/erosion within adjoining reservoir/drainages.
Upper Rio Grande 13020101	Sandlin pipeline installation - 2 miles.	• Reduce sedimentation/erosion within adjoining drainages.
Rio Chama 13020102	Biscara spring maintenance -0.1 mile.	• Decrease sedimentation/erosion surrounding spring seep.
Upper Rio Grande 13010101 Rio Chama 13020102	Annual road maintenance of Level 3, 4, and 5 Forest roads – 175 miles	• Decrease erosion from road surfaces. • Improve trail drainage and control discharge of sediment.

Carson National Forest (continued)

Watershed	Project Description	Watershed Benefits
San Juan 14080101	Annual road maintenance of Level 2 Forest roads – 130 miles (O&G service roads maintained by industry).	• Decrease erosion from road surfaces. • Improve trail drainage and control discharge of sediment.
Upper Rio Grande 13020101 Rio Chama 13020102 Conejos 13010005 San Juan 14080101	Completed NEPA analysis and signed decisions for implementation of the Travel Management Rule on the El Rito, Canjilon, Tres Piedras, and Jicarilla Ranger Districts. This rule will designate routes open to motor vehicle use (all classes). No use will be allowed on un-designated routes on the Forest.	• Decrease erosion from road surfaces. • Improve infiltration by reducing runoff from road surfaces. • Create enforcement framework to prohibit vehicular traffic to protect watershed resources.

Cibola National Forest

Watershed	Project Description	Watershed Benefits
Rio Grande - Albuquerque 13020203 (Cedro Creek)	Obliterate unauthorized motorized trail and conduct stream stabilization in Cedro Creek watershed (14 acres).	• Improve road drainage and decrease erosion. • Stabilize banks to decrease erosion.
Elephant Butte Reservoir 13020211 (Limestone Canyon)	Restore meadow and stabilize streambank (7 acres).	• Stabilize streambank and decrease erosion. • Improve herbaceous groundcover to decrease erosion.
Rio Grande - Albuquerque 13020203 (Upper Tijeras Arroyo)	Thinning Ponderosa and Piñon/Juniper.	• Increase herbaceous ground cover. • Decrease erosion. • Spring protection.
Rio Grande - Albuquerque 13020203 (Abo Arroyo)	Thinning Ponderosa and Piñon/Juniper.	• Increase herbaceous ground cover. • Decrease erosion.
Rio San Jose 13020207 (Bluewater Creek)	Thinning Ponderosa and Piñon/Juniper.	• Increase herbaceous ground cover. • Decrease erosion.

Coronado National Forest

Watershed	Project Description	Watershed Benefits
San Simon River 15040006 (Deer Creek-San Simon Valley)	Deer Creek Allotment – Monitored BMPs.	BMP's Used • Utilization of key upland herbaceous forage species in key areas will be managed to achieve the goal of light to moderate grazing as a pasture average. The objective is to protect plant vigor, increase herbaceous residue needed for soil protection and to increase herbage producing ability of forage plants. • Management practices will be used to achieve proper distribution or lessen the impact on sensitive areas. • No hay will be placed on Forest lands in order to minimize the introduction of weed seeds All allotments were grazed using adaptive management, which establishes limits for the timing, intensity, frequency, and duration of livestock grazing. Benefits to Water Quality- • Increase herbaceous ground cover to reduce erosion from upland Improve the management of the cattle distribution resulting in an increase of stabilized soils, reduction in runoff, erosion and sediment.
San Simon River 15040006 (Skeleton Canyon)	Peloncillo Allotment – Monitored BMPs.	
Animas Valley 15040003 (Horse Camp Draw-Animas Creek)	Juniper Basin Allotment – Annual Operating Instructions	
Animas Valley 15040003 (Whitmire Creek-Animas Creek)	Clanton/Cloverdale Allotment - Monitored BMPs	
Cloverdale 15080303 (Cloverdale Creek) (Diablo)	Peloncillo Allotment - Monitored BMPs	
Guadalupe 15080302 (Guadalupe)	Guadalupe Allotment – Annual Operating Instructions	

Gila National Forest

Watershed	Project Description	Watershed Benefits
San Fransisco 15040004 (Upper Negrito Creek)	Prescribed burn on 10,256 acres. Sheep Basin CFRP Grant project: 500 acres of ponderosa pine stand thinning Deer timber sale: 50 acres of ponderosa pine stand thinning.	• Reduce runoff, erosion and sedimentation • Reduce hazardous fuels. • Grassland restoration.

Gila National Forest (continued)

Watershed	Project Description	Watershed Benefits
San Francisco 15040004 (Upper San Francisco River) (Centerfire Creek) (Trout Creek)	Replacement/repair: 1.5 mile fence. Tank Maintenance and cleaning on four tanks. Prescribed fire on 102 acres. Replaced 10.5 miles pipeline and associated drinkers. Conducted rehab activities on approximately 42 miles of dozer line within the Wallow Fire burn area (water bars, seeding, straw mulch). Broadcast seeded approximately 1000 acres within areas of high intensity burning of the Wallow Fire. Install sediment catch and water bars.	• Improve livestock and wildlife distribution resulting in an increase of stabilized soils, reduction in runoff, erosion and sedimentation. • Stabilize soils and reduce sheet erosion in areas burned with high intensity or areas disturbed during suppression. • Slow runoff within Trout Creek and stabilization of the stream bank. • Stabilize soils and reduce sheet erosion in areas disturbed by Tucson Electric Power.
Plains of San Augustin 13020208	Grassland restoration on 100 acres. Maintain dirt stock tank.	• Reduce runoff, erosion and sedimentation • Grassland restoration.
Upper Gila 15040001 (Gilita Creek) (Willow Creek)	Install 2 miles new pasture fence. Replace/repair 2 miles of forest boundary fence. Replace 1500 ft. of pipeline for livestock drinkers. Willow Creek Categorical Exclusion implementation: a. ADA restroom install b. Corral install c. Low water crossing repaired/enhanced d. Decommissioning of old restrooms. e. Closure of Willow Creek island to overflow parking only and no livestock camping	• Improve the management of the cattle distribution resulting in an increase of stabilized soils, reduction in runoff, erosion and sedimentation. • Improve watershed and water quality on Willow Creek and Gilita Creek by locating toilet further from stream and removing recreation pressure adjacent to streams.
Upper Gila 15040001 (O Bar O Canyon)	Prescribed burn on approx. 97 acres of ponderosa pine and piñon-juniper.	• Improve watershed condition and herbaceous ground cover to reduce runoff, erosion and sedimentation. • Decrease risk of extreme wildfire and associated erosion.

Gila National Forest (continued)

Watershed	Project Description	Watershed Benefits
Upper Gila 15040001 (O Bar O Canyon)	Prescribed burn on approx. 97 acres of ponderosa pine and piñon-juniper.	• Improve watershed condition and herbaceous ground cover to reduce runoff, erosion and sedimentation. • Decrease risk of extreme wildfire and associated erosion.
Upper Gila 15040001 (Scales Canyon)	Prescribed burn on approx. 3,332 acres of ponderosa pine and piñon-juniper. Installed 0.75 miles of pipeline, 1 water trough and one storage tank to increase cattle distribution away from riparian areas.	• Decrease risk of extreme wildfire and associated erosion. • Improve the management of the cattle distribution resulting in an increase of stabilized soils, and subsequent reduction in runoff, erosion and sedimentation.
Carrizo Wash 15020003 (Upper Largo Creek) (Rito Creek) (Mangas Creek)	Thinned 650 acres and Prescribed burn on 1,036 acres in Slaughter Mesa Unit. Conducted 13 miles of trail maintenance/improvement.	• Increase herbaceous ground cover. • Decrease erosion from trail prism.
Carrizo Wash 15020003 (Agua Fria Creek)	Prescribed burn 60 acres of Gap II.	• Improve watershed condition and herbaceous ground cover to reduce runoff, erosion and sedimentation.
San Francisco 15040004 (Headwater Tularosa Creek) (Patterson Lake)	Continental Divide Trail trail construction.	• Decrease erosion from trail prism.
Caballo 13030101 (Cuchillo Negro Creek)	Dirt stock tank constructed. 1.5 miles fencing installed to improve cattle distribution.	• Improve the management of the cattle distribution resulting in an increase of stabilized soils, reduction in runoff, erosion and sedimentation.
Upper Gila 15040001 (Sapillo Creek)	Mill Scott prescribed burn: 2300 acres.	• Improve watershed condition and herbaceous ground cover to reduce runoff, erosion and sedimentation.
Upper Gila - Mangas 15040002 (Bear Creek)	Trail reconstruction and maintenance: 5.75 miles.	• Decrease erosion from trail prism, enhance drainage features.

Gila National Forest (continued)

Watershed	Project Description	Watershed Benefits
Mimbres 13030202 (Fort Bayard) (Little Walnut Creek) (Upper Mimbres River)	29.25 miles of trail reconstruction and maintenance.	• Decrease erosion from trail prism.
Upper Gila – Mangas 15040002 (Bar 6 Canyon)	Kelly Well construction	• Improve cattle distribution to increase stabilized soils, and to reduce runoff, erosion and sedimentation.

Lincoln National Forest

Watershed	Project Description	Watershed Benefits
Rio Hondo 13060008 Alamo Canyon	Donaldson Fire-Wildfire Natural Ignition managed for beneficial use. 5136 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Peñasco 13060010 Burnt Canyon	Thinning for Hazardous Fuels Reduction. 800 Acres	• Decrease risk of extreme wildfire and associated erosion
Upper Pecos –Black 13060011 Middle Last Chance Canyon	Bank stabilization around existing culvert.	• Stabilize stream banks to reduce erosion.
Rio Peñasco 13060010 Cox Canyon-Rio Peñasco	Broadcast burning. 21 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Peñasco 13060010 Cox Canyon	Closed 4.5 miles of unauthorized roads.	• Decrease erosion from road prism.
Rio Peñasco 13060010 Burnt Canyon – Rio Peñasco	Installed bank protection in 4 locations Installed 3 rolling dips (cross drains) Placed surface material on 0.10 miles of road. Dam Maintenance-rehabilitation.	• Decrease erosion from road prism. • Improve road drainage. • Reduce flooding. • Decrease erosion.

Lincoln National Forest (continued)

Watershed	Project Description	Watershed Benefits
Rio Peñasco 13060010 Burnt Canyon	Closed 0.76 miles of road. Installed 7 rolling dips (cross drains).	• Decrease erosion from road prism. • Improve road drainage.
Rio Hondo 13060008 Devils Canyon	Piling of Fuels. 949 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Hondo 13060008 Escondido	Captain Fire-Wildfire Natural Ignition managed with beneficial use. 51 Acres	• Decrease risk of extreme wildfire and associated erosion.
Tularosa Valley 13050003 Fresnal Canyon	Broadcast Burning	• Decrease risk of extreme wildfire and associated erosion.
Tularosa Valley 13050003 Fresnal Canyon	Bailey Wetland Creation – Created 13 wetlands and closed road access to mud bogging. 2 ACRES	• Decrease erosion. • Improve herbaceous Cover.
Rio Hondo 13060008 Gyp Spring Canyon	Piling of Fuels. 826 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Hondo 13060008 Headwater Salado Creek	Thinning for Hazardous Fuels. Reduction 40Acres	• Decrease risk of extreme wildfire and associated erosion.
Tularosa Valley 13050003 (Head Waters White Oaks)	Thinning for Hazardous Fuels Reduction. 392 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Peñasco 13060010 (James Canyon)	Removal of fuel pile.	• Decrease risk of extreme wildfire and associated erosion.
Rio Hondo 13060008 (Magado Canyon)	Thinning for Hazardous Fuels Reduction. 101 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Hondo 13060008 (Maverick Canyon)	Thinning for Hazardous Fuels Reduction. 500 Acres	• Decrease risk of extreme wildfire and associated erosion.

Lincoln National Forest (continued)

Watershed	Project Description	Watershed Benefits
Rio Hondo 13060008 (Middle Rio Bonito)	Removal of fuel pile. 531 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Hondo (Middle Rio Ruidoso)	Installed 17 rolling dips (cross drains). Installed bank protection in 2 locations. Constructed 2 large sediment traps.	• Decrease erosion from road prism • Reduce flooding impacts • Decrease erosion.
Tularosa Valley 13050003 (Mule Canyon)	Alamo Fire-Wildfire Natural Ignition managed with beneficial use. 70 Acres	• Decrease risk of extreme wildfire and associated erosion.
Tularosa Valley 13050003 (Nogal Canyon)	Removal of fuel piles. 12 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Hondo 13060008 (Outlet Solado Creek)	Broadcast Burning. 174 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Peñasco 13060010 (Perk Canyon)	Little Lewis Fire-Wildfire Natural Ignition managed with beneficial use. 1058 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Peñasco 13060010 (Perk Canyon-Perk Cuevo)	Broadcast Burning. 1230 Acres	• Decrease risk of extreme wildfire and associated erosion.
Upper Pecos-Black 13060011 (Turkey Canyon)	Broadcast Burning. 2500 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Peñasco 13060010 (Upper Rio Penasco)	Removal of fuel piles. 210 Acres	• Decrease risk of extreme wildfire and associated erosion.
Rio Peñasco 13060010 (James Canyon – Rio Penasco)	Installed drainage fords and placed surface material for 0.10 miles of road.	• Improve road drainage. • Decrease erosion from road prism.
Salt Basin 13050004 (Lick Canyon – Pinon Creek)	Road relocation out of drainage for 0.10 miles.	• Decrease erosion from road prism. • Improve road drainage.

Lincoln National Forest (continued)

Watershed	Project Description	Watershed Benefits
Tularosa Valley 13050003 Rio Hondo 13060008 Rio Felix 13060009 Rio Peñasco 13060010 Salt Basin 13050004	Road maintenance (222 miles).	• Decrease erosion from road prism. • Improve road drainage.

Santa Fe National Forest

Watershed	Project Description	Watershed Benefits
Rio Chama 13020102 (Rio Puerco de Chama)	Repair 0.25 mi. Riparian fence exclosure to limit livestock access.	• Improve cattle distribution to increase stabilized soils, reduce runoff, erosion and sedimentation.
Rio Chama 13020102 (Canones Creek)	Trail maintenance (5 miles) Forest Trail 97.	• Decrease erosion from trail prism.
Rio Chama 13020102 (Rio Gallina)	Refurbish spring developments with spring boxes, pipelines, hardware, drinking troughs and exclosures on 9 springs.	• Improve livestock and wildlife distribution resulting in an increase of stabilized soils, reduction in runoff, erosion and sedimentation.
Rio Chama 13020102 (Canones Creek) (Chihuahenos Creek)	Road maintenance FR 448 and FR 449 (11.2 mi.).	• Reduce erosion from road prism.
Rio Chama 13020102 (Polvadera Creek)	Repaired 3 miles of riparian fence.	• Remove vehicle use to improve riparian vegetation to reduce stream temperature.
Jemez 13020202	1196 Respect the Rio public contacts at dispersed recreation sites.	• Improved water quality as a result of increased knowledge & public stewardship.

Santa Fe National Forest (continued)

Watershed	Project Description	Watershed Benefits
Jemez 13020202	1196 Respect the Rio public contacts at dispersed recreation sites.	• Improved water quality as a result of increased knowledge & public stewardship.
Jemez 13020202	407 Respect the Rio public contacts at public events (NM Outdoor Expo, Santa Ana Environmental Fair, Jemez 4th of July; ABQ & Rio Rancho Water Festivals).	• Improved water quality as a result of increased knowledge & public stewardship.
Jemez 13020202	407 Respect the Rio public contacts at interpretive programs in developed campgrounds.	• Improved water quality as a result of increased knowledge & public stewardship.
Jemez 13020202 (Upper Rio Cebolla)	Thinned 5 acres to improve herbaceous groundcover.	• Increase herbaceous groundcover.
Jemez 13020202 (Rio Cebolla)	Volunteers from New Mexico Trout installed bollards and repaired buck & pole fencing along FR 376 to prevent vehicles from driving across the stream and along the stream bank.	• Increase herbaceous ground cover & infiltration. • Decrease erosion. • Decrease sedimentation into river.
Jemez 13020202 (Rio Cebolla)	Volunteers from New Mexico Trout repaired 3 miles of fencing to prevent cattle and vehicles from accessing riparian meadows.	• Increase herbaceous ground cover & infiltration. • Decrease erosion. • Decrease sedimentation into river.
Jemez 13020202 (Rio Guadalupe)	Volunteers from New Mexico Trout trash clean up on FR 376 and streamside areas.	• Reduce contaminated material entering the river.
Jemez 13020202 (Rio Guadalupe) (Rio Cebolla)	New interpretive panels were installed on FR376, and at a wet meadow.	• Improved water quality as a result of increased knowledge & public stewardship.
Jemez 13020202 (East Fork Jemez R.)	Boy Scout Troup #285 cleaned up trash and removed fire rings along 2 miles of river.	• Reduce contaminated material entering the river.
Jemez 13020202 (East Fork Jemez R.)	Completed a Closure Order for the East Fork Jemez Wild and Scenic River. New signs to inform the public of the closure order were installed.	• Reduce contaminated material entering the river and reduce erosion. • Improve the public's knowledge of watersheds and water quality issues.

Santa Fe National Forest (continued)

Watershed	Project Description	Watershed Benefits
Jemez 13020202 (San Antonio River)	District staff, volunteers, and a partnership (Trail Partners) replaced a foot bridge, built a new parking area, and rehabilitated a parking area on FR 376N.	• Improve road drainage. • Decrease erosion. • Decrease sedimentation into river.
Jemez 13020202 (Rio de las Vacas)	YCC and the Cuba Range crew added ¼ mi of new buck and pole fencing on FR 539 and repaired ½ mi on FR 20.	• Increase herbaceous ground cover & water infiltration by eliminating vehicular access. • Decrease erosion.
Pecos Headwaters 13060001	1773 public contacts at dispersed USFS recreation sites and State Game Commission properties.	• Improved water quality as a result of increased knowledge & public stewardship.
Pecos Headwaters 13060001	782 individual contacts at public events (NM Outdoor Expo, Pecos Middle School, Las Vegas Kiwanis Outdoor Rec Show, REI).	• Improved water quality as a result of increased knowledge & public stewardship.
Pecos Headwaters 13060001	173 individual contacts at interpretive programs in developed campgrounds.	• Improved water quality as a result of increased knowledge & public stewardship.
Pecos Headwaters 13060001	Active participant in Upper Pecos Watershed Group. Active participant in Pecos Collaboration Group (community partnership).	• Contributed to development of collaboration among State, Federal, local units of Government, NGOs, and local businesses to improve water quality.
Pecos Headwaters 13060001 Mora 11080004	Gallinas WUI thinning for fuel reduction (80 acres). Upper Mora Watershed thinning (CFRP) (70 acres).	• Increase of herbaceous ground cover & infiltration. • Reduce runoff, erosion, sedimentation. • Reduced risk of catastrophic wildfire.
Pecos Headwaters 13060001 Mora 11080004	Active participant in Sapello Watershed Group. Hermits Peak Watershed Alliance.	• Contributed to development of WRAS • Public outreach and involvement.
Pecos Headwaters 13060001 Mora 11080004	Road maintenance using Best Management Practices (20 miles).	• Reduce erosion from road prism.

Santa Fe National Forest (continued)

Watershed	Project Description	Watershed Benefits
Pecos Headwaters 13060001	Tecolote Fire Rehab- Re-enforced water bars, drainages, and barriers. Monitored approximately 17 miles of hand line & dozer line. 6 helispots seeded (3 ac). Road maintenance (5 mi).	• Increase of herbaceous ground cover & infiltration. • Reduce runoff, erosion, sedimentation.
Pecos Headwaters 13060001	Tecolote Fire Rehab- Monitored areas that were seeded, mulched and closed 4 Safety zones (16 ac)	• Increase of herbaceous ground cover & infiltration. • Reduce runoff, erosion, sedimentation.
Jemez 13020202 (Rio Guadalupe) (Rio Cebolla)	FS 376 Aggregate surface replacement (3.4 mi.).	• Reduce erosion from road prism.
Jemez 13020202 (Spence Hot Springs)	Improved trail and parking area.	• Reduce erosion parking area and trail.
Rio Puerco 13020204 (Headwaters Arroyo Chijuilla)	Thinned 23 Acres of piñon/juniper.	• Increase herbaceous ground cover. • Decrease erosion.
Rio Chama 13020102 (Headwaters Cañoncito de Las Lleguas)	Thinned 70 Acres of piñon/juniper.	• Increase herbaceous ground cover. • Decrease erosion.
Jemez (Rio de las Vacas)	Maintained 12 miles of riparian fence. Rebuilt 1.2 miles of riparian fence. 1.5 miles of new pasture fence.	• Decreased livestock access to riparian area to improve shade to reduce stream temperature over time.

Natural Resources Conservation Service:

With the mission of "Helping People Help the Land," the Natural Resources Conservation Service (NRCS) delivers voluntary programs, products and services that help local people protect and improve natural resources on non-federal lands.

The conservation provisions in the Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) are providing conservation opportunities for farmers, ranchers, private landowners and communities for years to come. The 2008 Farm Bill builds on the conservation gains made through the 1985, 1996 and 2002 Farm Bills. It simplifies existing programs and creates new programs to address high priority environmental goals.

More information about the USDA Natural Resources Conservation Service in New Mexico is available at www.nm.nrcs.usda.gov.

The Emergency Watershed Protection Program (EWP)

EWP was established by Congress to respond to emergencies created by disasters. It is designed to relieve imminent hazards to life and property caused by fires, floods, windstorms and other natural occurrences. Water Quality was also a major resource concern addressed by EWP in New Mexico in 2011. Critical Area Land Treatments Installed: Aerially applied seeding on 6,872 acres, Contour Tree Felling on 171 Acres , Waddles and Mulching installed on 307 acres and 7 Sediment Basin Dams were constructed.

Protection Programs

NRCS partners with private landowners, state and local governments, tribes, pueblos, American Indian nations, agricultural groups, non-profits and others to focus conservation assistance on local projects. Groups that address natural resource issues in New Mexico may be able to partner with NRCS to leverage dollars and expertise through the following programs:

- Agricultural Water Enhancement Program (AWEP)
- Cooperative Conservation Partnership Initiative (CCPI)
- Conservation Innovation Grants (CIG)
- Small Watershed Program
- NRCS Assistance for Acequia Associations

The 220,000-acre Cebolla-Nutrias Project is one example of a partnership under this program. The partnership that includes the Cebolla Livestock Association, U.S. Forest Service (Canjilon Ranger District), New Mexico Department of Game and Fish, NRCS, the Bureau of Land Management, New Mexico State Land Office, NewMexico Extension Service, and the Upper Chama Soil and Water Conservation District. The Cebolla-Nutrias Project has:

- Applied for 319 grant.
- Is applying for EQIP on Mesa De Las Viejas for water development.

- Is planning a corridor protection of roadway out of Canjilon through USFS.
- Is implementing Forest thinning – Fire protection on private land adjacent to Canjilon Corridor.
- Is planning a US – 84 Corridor project with USFS in planning phase (800 acres southeast of Cebolla).
- has applied for a Watershed Initiative in its UCSWCD EQIP proposal for 2012.

Cooperative Conservation Partnership Initiative

AZ-NM Borderlands Cooperative Conservation Partnership continues to address rangeland resource concerns in southeast Arizona and southwest New Mexico. Cooperating entities include NRCS, BLM, State Conservation District Associations, Black Range RC&D, various state land agencies and others.

Comprehensive Nutrient Management Plans

(1) Comprehensive Nutrient Management Plan was developed by the NRCS field office Chaves County and (1) in Roosevelt. (4) CNMPs were applied in Chaves County, (1) in Eddy and (1) in Roosevelt. Manure conveyance system(s) using structures, conduits, or other equipment were installed in Chavez,(33), Eddy (4), and Roosevelt (1). (4) Dairy waste storage facilities were installed in Chaves County. Funding was made available for manure management through the Farm Bill Environmental Quality Incentives Program for animal feeding operations.

Nutrient and Salinity Management

The certification program and training course on Nutrient and Pest Management have been in effect since 2001 for NRCS and CES employees, other agencies, private consultants, and producers. Over 200 participants have been trained since 2001. Nutrient management practices, including salinity management (in acres), were applied to utilize resources efficiently and reduce nutrient runoff and leaching from cropland in Catron (130), Chaves (5,170), Colfax (580), Curry (24,829), De Baca (344), Doña Ana (490), Eddy (1,327), Grant (44), Hidalgo (705), Lea (4,634), Lincoln (20), Luna (1,629), Otero (134), Quay (4,551), Rio Arriba (10), Roosevelt (2,263), Sandoval (25), Sierra (240), Socorro (1,049), Torrance (3,819), Union (1,421) counties. Integrated nutrient management guides were developed for planners and producers.

Conservation Buffers, Cover, and Crop Rotation

Conservation buffers cover, and crop rotations reduce sediment losses, runoff, and wind erosion. Stream bank and shoreline protection (1,020 ft), and windbreaks/shelterbelts (39,874 ft) were applied in New Mexico, in Curry, Doña Ana, Lea, Lincoln, Luna, McKinley, Quay, Rio Arriba, Roosevelt, San Miguel, Socorro and Union counties. Herbaceous wind barriers planned in New Mexico totaled 21,396 ft. Conservation Cover (in acres) was applied in Curry (22,096), De Baca (1,015), Guadalupe (2,104), Harding (1,108), Lea(8,118), Quay (45,919), and Roosevelt (3,446) counties. Conservation crop rotations were applied across the state on 90,719 acres.

Irrigation Water Management

Irrigation water management practices applied, which reduce runoff and leaching, included acres applied in the following counties: Catron (145), Chaves (5,369), Curry (15,286), De Baca (340), Doña Ana (596), Eddy (1,286), Grant (29), Guadalupe (53), Hidalgo (974), Lea (7,222), Lincoln (32), Luna (1,961),

Mora (10), Otero (142), Quay (4,298), Roosevelt (6,991), San Juan (2), Sandoval (78), Santa Fe (17), Sierra (384), Socorro (366), Torrance (3,901), Union (1,263) and Valencia (147) counties. Irrigation land leveling was applied on 2,579 acres. Micro Irrigation systems were installed on 4,384 acres.

Integrated Pest Management

Integrated Pest Management systems (in acres) were applied on cropland, pasture and rangeland to utilize resources efficiently and reduce pesticide runoff and leaching in the following counties: Catron (110), Chaves (5,369), Colfax (158), Curry (23,467), De Baca (338), Doña Ana (127), Eddy (1,286), Grant (16), Guadalupe (9), Harding (814), Hidalgo (730), Lea (7,115), Lincoln (120), Luna (1,580), McKinley (1), Otero (134), Quay (10,397), Rio Arriba (64), Roosevelt (1,543), San Miguel (2,169), Sandoval (25), Sierra (620), Socorro (1276), Torrance (3,819), Union (3,501), and Valencia (101) counties. Brush management practices were applied on 162,385 acres. Brush management and Prescribed Burning training was provided for planners and partners across the state. The Windows Pesticide Screening Tool was utilized to evaluate environmental risks of adsorbed runoff, solution runoff and leaching potential of soil-pesticide interactions. Appropriate integrated pest management alternatives were selected for implementation.

Prescribed Grazing

Prescribed grazing practices (in acres) were applied on rangeland in the following counties: Bernalillo (6,393), Catron (104,851), Chaves (397,007), Cibola (40,765), Colfax (28,721), Curry (67,680), De Baca (275,782), Doña Ana (70,596), Eddy (222,028), Grant (72,997), Guadalupe (4,205), Harding (15,252), Hidalgo (123,774), Lea (26,452), Lincoln (122,745), Luna (144,238), McKinley (18,796), Mora, (3,065), Otero (74,357), Quay (194,529), Rio Arriba (8,054), Roosevelt (84,389), San Miguel (27,801), Sandoval (187), Santa Fe (12,083), Sierra (365), Socorro (48,425), Taos (10,880), Torrance (31,730), Union (78,926), and Valencia(52,576) counties. 990,191 ft of fencing was installed to improve grazing management.

Residue Management

Conservation crop rotation (90,719 acres), cover crop (2,944 acres), mulch till (315 acres), no till (11,475 acres), seasonal residue management (77,031 acres) were applied to cropland to reduce sediment losses andrunoff and utilize resources efficiently in Bernalillo, Chaves, Colfax, Curry, De Baca, Doña Ana, Eddy, Grant, Guadalupe, Hidalgo, Lea, Lincoln, Luna, Otero, Quay, Roosevelt, San Juan, Sandoval, Sierra, Socorro, Torrance, Union, and Valencia counties.

Watershed Plans

Watershed plans were developed in Harding (1), Hidalgo (1), Lea (1), and Otero (1) counties.

NEW MEXICO ENVIRONMENT DEPARTMENT