

**Restoration Plan for
Groundwater Protection in the
Middle Rio Grande Valley, New Mexico**



New Mexico Office of Natural Resources Trustee
4910-A Alameda NE
Albuquerque, NM 87113

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1. Introduction, Purpose, and Authority

The *Restoration Plan for Groundwater Protection in the Middle Rio Grande Valley* (RP) has been prepared by the New Mexico Office of Natural Resources Trustee (ONRT)¹ to address the restoration actions arising from natural resource damage settlements for both the Sparton Technology Site and the South Valley Superfund Site located in the northwest and southwest quadrants, respectively, of Albuquerque, New Mexico.

Between 1998 and 2006, ONRT received settlement funds for use toward natural resource restoration. The State sought these settlements because contamination from the Sparton Technology and South Valley Superfund sites had injured groundwater resources under State trusteeship authority. The State Trustee is required to use the settlement money to plan and implement restoration actions designed to compensate the public for the groundwater resource injuries. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly known as the Federal “Superfund” law) designates natural resource Trustees, and requires that before settlement monies can be used for restoration activities, a Restoration Plan must be developed for which there must be adequate public notice and opportunity for public comment. This RP was developed in accordance with those requirements. Public notice comments and ONRT’s responses to these comments are presented in Section 4 of this plan.

CERCLA provides that the governor of each state is to designate responsible officials as Trustees for natural resources under the jurisdiction of state government. Accordingly, the Governor of New Mexico designated the State Natural Resources Trustee as Trustee for resources under the jurisdiction of the State of New Mexico. The Trustee is required to use money received in settlement to plan and implement restoration actions designed to compensate the public for natural resource injuries.

The RP identifies the restoration alternative selected by ONRT to compensate the public for the injuries to groundwater resources resulting from the release of hazardous substances at the sites. This RP expands the Supplemental Proposed Alternative identified in the *Natural Resources Restoration Plan for the South Valley Superfund Site, Albuquerque, New Mexico* (ONRT, 2007).

According to the guidance provided by Federal natural resource damage assessment (NRDA) regulations [43 CFR § 11.82(d)], the selected restoration action is to be feasible, safe, cost-effective, address injured natural resources, consider actual and anticipated conditions, have a reasonable likelihood of success, and be consistent with applicable laws and policies. The selected restoration actions also must not conflict with the ongoing cleanup projects.

¹ Under Section 107(f) of the CERCLA, 42 USC § 9607(f), Section 311 of the Clean Water Act (CWA), 33 USC § 1321, and other applicable law, including Subpart G of the National Contingency Plan (NCP), 40 CFR §§ 300.600-300.615, the governor of each state appoints a Trustee for natural resources. The New Mexico Natural Resources Trustee, acting through the New Mexico Office of Natural Resources Trustee (collectively, “ONRT”), is the designated natural resource Trustee for the State of New Mexico. ONRT derives additional authority from the New Mexico Natural Resources Trustee Act, NMSA 1978, §§ 75-7-1 to- 45 (1993).

The restoration actions identified in this document are based on conceptual plans that do not yet include full implementation design details. At this time the ONRT will commence planning and implementation of the selected restoration project.

1.1 Overview of the Sites

Sparton Technology Site

The Sparton Technology Site is located at 9621 Coors Road NW in Albuquerque, New Mexico. Sparton Technology is currently performing corrective action at the site to address the groundwater plume that has been contaminated with solvents. There are no drinking water wells impacted by the contaminant plume and a ground water recovery and treatment system has been successful in preventing any further expansion of the plume. Questions regarding the cleanup effort can be directed to the New Mexico Environment Department, Hazardous Waste Bureau, Brian Salem, Albuquerque, NM, telephone 505-222-9576.

On March 3, 2000, a \$1 million settlement was reached for the State's natural resource damages claim, providing funds for restoration. The ONRT has already implemented several successful restoration projects including removal of invasive, high-water use plants from the bosque in Bernalillo, Sandoval and Valencia counties, and development of municipal water conservation projects in Valencia County. The primary benefits of these projects are to conserve groundwater resources, improve groundwater quality and reduce regular, daily water use. The restoration plans and a description of the restoration projects for the Sparton Technology settlement can be found on the ONRT website at <http://onrt.state.nm.us>.

South Valley Superfund Site

The South Valley Superfund Site covers about 2 square miles in the South Valley of Albuquerque, New Mexico, near the Rio Grande in an industrial portion of the city. The groundwater at this site was contaminated with organic solvents, metals, pesticides, and volatile organic compounds (U.S. EPA, 1983, 2007a). Documentation concerning the remedial cleanup efforts is located in the repository at the Zimmerman Library, Government Information Department, University of New Mexico, Albuquerque. Questions regarding the cleanup effort can be directed to the New Mexico Environment Department, Ground Water Quality Bureau, Allan Pasteris, Santa Fe, NM, telephone 505-827-0039.

The State of New Mexico reached a \$135,000 settlement on August 20, 1998 with Van Waters & Rogers, Inc., one of the parties responsible for contributions to the groundwater contamination. On January 10, 2006 a partial settlement agreement was reached with several of the remaining responsible parties and \$4.8 million dollars became available for funding groundwater restoration projects.

ONRT is currently implementing two groundwater restoration projects located in the South Valley: the Mountain View Nitrate Plume Restoration Project (the Proposed Alternative) and the South Valley Sewer/Water Connection Project (the Supplemental Proposed Alternative). The objectives of the Mountain View Nitrate Plume Restoration Project are to prevent future groundwater contamination by removing contaminated soils, reduce the size and nitrate

concentration of the groundwater plume, and return the groundwater in the aquifer to usable conditions. The South Valley Sewer/Water Connection Project was identified as a supplemental project to be implemented with remaining monies. The objectives of this project are to protect groundwater from future contamination by decreasing the use of septic systems, and to decrease the demand for groundwater by switching users from private wells (which use groundwater) to a municipal supply (which uses a combination of surface water and groundwater). Given the importance of protecting groundwater in the middle Rio Grande, the ONRT decided to begin implementation of this supplemental project within Bernalillo County using groundwater restoration monies from another settlement. The restoration plans and a description of the restoration projects can be found on the ONRT website at <http://onrt.state.nm.us>.

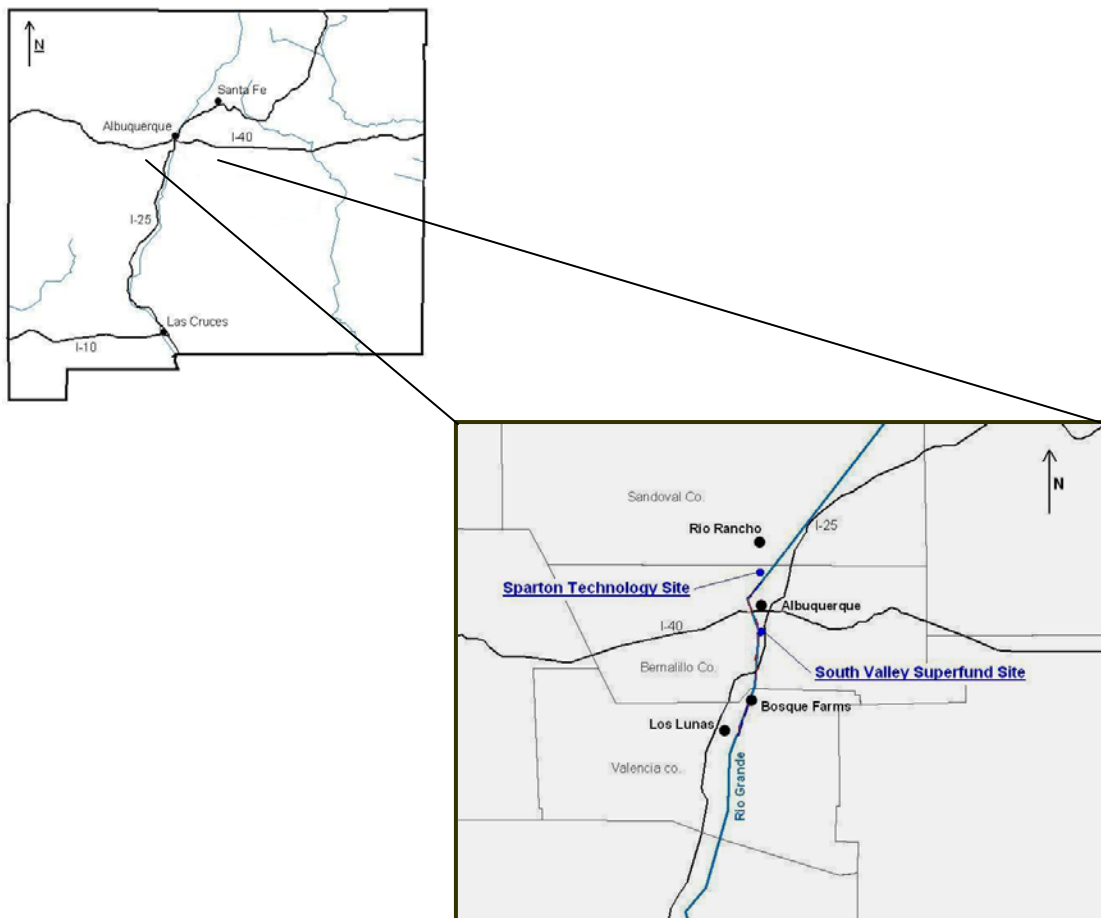


Figure 1. Location of the Sparton Technology and South Valley Superfund Sites

1.2 NRDA Restoration

NRDA is a process by which Trustees of natural resources determine what types of, and how many, restoration actions are necessary to compensate the public for injuries to natural resources. Restoration is the act of creating or improving natural resources and the services those resources provide to the public.

The money recovered in NRDA settlements can only be used to restore, rehabilitate, replace, or acquire the equivalent of the natural resources injured, destroyed, or lost as a result of the release of hazardous substances [42 USC § 11.33]. The amount of restoration required to compensate for the resource injuries depends on the size of the area, what types of resources are injured, the overall severity of the injuries, and the time period over which the resources are injured including any injury that remains after cleanup.

1.3 Public Participation

Public review of the restoration actions proposed in this RP was an integral part of ONRT's restoration planning process. The public comment period for the Draft RP and the proposed project was from September 1 through October 1, 2009. One comment was received in writing and was evaluated and incorporated into the finalization of this plan. Section 4 summarizes the comment received and ONRT's response.

ONRT conducted public outreach activities for restoration projects for both the Sparton Technology and the South Valley Superfund sites. The restoration project proposed in this RP is an expansion of the Supplemental Proposed Alternative identified in the *Natural Resources Restoration Plan for the South Valley Superfund Site*.

2. Goals for Restoration

The goal of ONRT is to restore, rehabilitate, replace, enhance, or acquire the equivalent of the natural resources and natural resource services that were injured as a result of groundwater contamination at sites. In accordance with both ONRT policy and CERCLA [USC 42 §9607 (f)(1)], restoration projects should have a strong relationship to the injured resources and the services they provide. In this particular case, the proposed restoration project described below has a strong linkage to groundwater resources and the services they provide to the ecosystem and humans in the Middle Rio Grande.

3. Proposed Restoration Project

In October 2007 ONRT released the *Natural Resources Restoration Plan for the South Valley Superfund Site, Albuquerque, New Mexico*, which identified both the Proposed Alternative and the Supplemental Proposed Alternative for the restoration of groundwater resources. In selecting these restoration alternatives, ONRT solicited restoration project ideas, and formulated additional alternatives, based primarily on three open houses and

numerous interviews with community members. The majority of the settlement monies were allocated to the implementation of the Proposed Alternative restoration project, the restoration of nitrate contaminated groundwater in the South Valley. Monies remaining from this project were to be used for Supplemental Proposed Alternative, the connection of households to municipal sanitary sewer and/or water systems. Aware of the immediate importance of protecting groundwater from further degradation, ONRT proceeded with implementation of the municipal sewer hookup within Bernalillo County by using monies from other groundwater restoration funds.

The New Mexico Water Quality Control Commission (NM WQCC), in its biennial reports to U.S. Congress on water quality from 1988 to present, has stated and provided evidence that “Household septic tanks and cesspools constitute the single largest source of ground water contamination in the state.” The New Mexico State Legislature recognized the importance of protecting the State’s groundwater and the direct relationship between groundwater quality and substandard septic systems and cesspools. The State Legislature passed legislation in both 2007² and 2009³ to this effect. The 2009 legislation created the Liquid Waste Disposal System Assistance Fund to provide assistance to indigent households that have substandard liquid waste systems.

The ONRT proposes to address this groundwater contamination issue with an expansion of the current sewer connection project to include the counties of Sandoval, Socorro and Valencia. All four counties in the Middle Rio Grande valley share the same groundwater aquifer system (see Section 3.1). The New Mexico Environment Department (NMED) estimates that there are approximately 5,300 indigent household with on-site septic systems in Sandoval, Socorro and Valencia counties. This expanded restoration project will be identified as the Liquid Waste Groundwater Protection Project.

Under the Liquid Waste Groundwater Protection Project, the ONRT will provide funding to assist qualified indigent homeowners with the elimination of real or threatened negative impacts to groundwater quality from on-site liquid waste disposal system effluent. The funding will be used to pay for the following actions, as appropriate:

- (1) Decommission and removal of a cesspool or other failed or improper on-site liquid waste disposal system;
- (2) Installation of a liquid waste disposal system to replace a cesspool or other failed or improper on-site liquid waste disposal system;
- (3) Installation of an advanced treatment system as required by the New Mexico Environmental Improvement Act or regulations issued pursuant to that act;

² In 2007, the New Mexico Legislature passed Senate Bill 827 which appropriated \$210,000 to the New Mexico Environment Department for a pilot sewer connection project in Dona Ana County.

³ In 2009, the New Mexico Legislature passed Senate Bill 30 that created a new “liquid waste disposal system assistance fund” in the State treasury and authorized the NMED to transfer money into the fund for assistance to indigent households statewide. Unfortunately, as of this report, no funds have been made available to implement this Bill.

- (4) Connection of a household to a centralized wastewater collection and treatment system.

Initially, ONRT will provide \$230,000 for the implementation of this restoration project. Additional money may be added in the future.

3.1 Affected Environment and Need for Proposed Restoration Project

Physical Setting

The Middle Rio Grande Basin (MRG Basin) is an area within central New Mexico extending from about Cochiti Lake to about San Acacia (Figure 2). The MRG Basin covers approximately 3,060 square miles along the Rio Grande valley largely within Bernalillo, Sandoval, Socorro and Valencia Counties. Geologic faults have uplifted blocks of earth creating the east and west sides of the MRG Basin, while the center blocks have been dropped downward (Figure 3). The Rio Grande and its tributaries have deposited up to 14,000-foot thick layer of sediment inside the MRG Basin, and these basin-fill deposits contain the Rio Grande aquifer system as depicted on Figure 4. The Rio Grande aquifer system is the principal aquifer in a 70,000-square-mile area of southern Colorado, central New Mexico, and western Texas. The aquifer system consists of a network of hydraulically interconnected aquifers in basin-fill deposits located along the Rio Grande valley and nearby valleys (Robson and Banta, 1995).

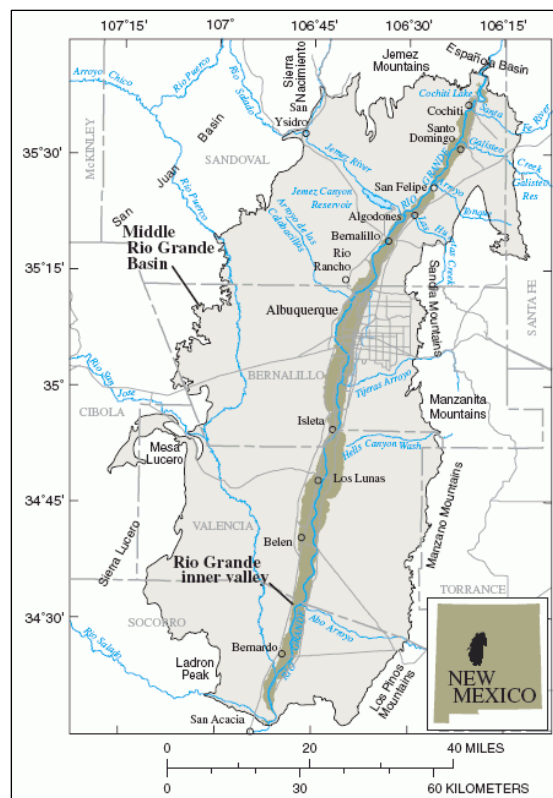


Figure 2. Major physiographic and hydrologic features of the Middle Rio Grande Basin (source: Bartolino and Cole, 2002)

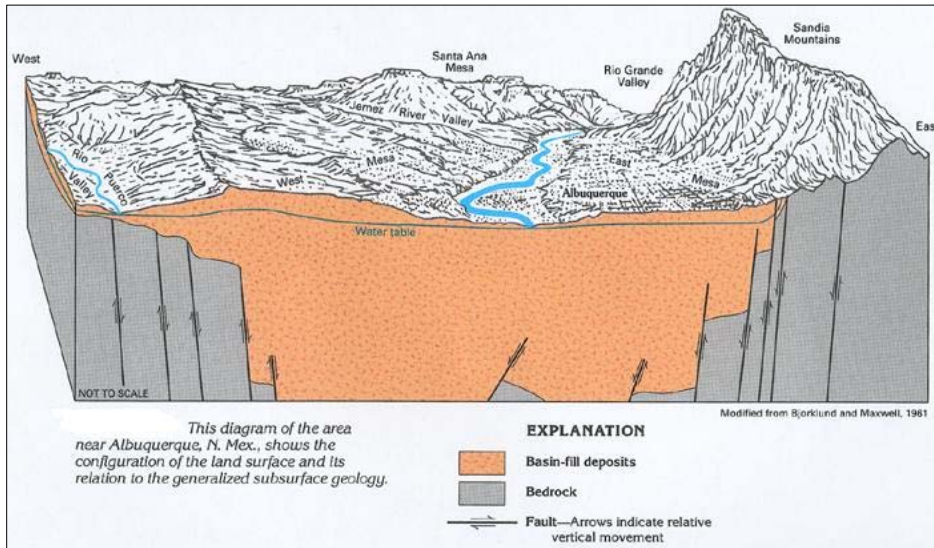


Figure 3. Block diagram of the Middle Rio Grande Basin in Albuquerque (source: Robson and Banta, 1995). (Note that this diagram is a simplified representation of the geology of the area. It is not intended to depict details of the complex geologic features found within the Middle Rio Grande Basin.)



Figure 4. The extent of the Rio Grande aquifer system (source: Robson and Banta, 1995)

Poverty Levels and Wastewater Infrastructure

Population and poverty levels within Bernalillo, Sandoval, Socorro and Valencia Counties are listed in Table 1, and sewage disposal infrastructure is summarized in Table 2. The largely urban Bernalillo County has the most housing units, but the lowest percentage of housing units served by an on-site wastewater system. Largely rural Valencia County has the highest percentage of households served by on-site wastewater systems (67.6 %). Applying the county poverty rates in Table 1 to the number of on-site wastewater systems in Table 2 creates an estimate of the number of households living in poverty and served by an on-site liquid waste system (Table 3).

Area	Population	% Population Below Poverty
New Mexico	1,984,356	17.9
Bernalillo County	635,139	14.9
Sandoval County	122,298	10.3
Socorro County	18,180	30.4
Valencia County	72,207	15.7

County	Housing Units	Public Sewer	Septic, Cesspool, Advanced System	Privy or Other	Total On-Site Systems
Bernalillo	259,500	235,950 (90.9%)	22,634 (8.7%)	916 (0.4%)	23,537 (9.1%)
Sandoval	38,631	24,389 (63.1%)	12,353 (32.0%)	1,889 (4.9%)	14,243 (36.9%)
Socorro	8,171	4,710 (57.6%)	3,161 (38.7%)	300 (3.7%)	3,461 (42.4%)
Valencia	26,159	8,461 (32.4%)	17,459 (66.7%)	239 (0.9%)	17,697 (67.6%)

County	Households
Bernalillo	3,507
Sandoval	1,467
Socorro	1,052
Valencia	2,778
Total	8,804

Of the estimated 8,804 on-site septic systems that serve indigent households in this region, it is unknown how many are in substandard condition. A community-wide survey in Willard, located in the east mountain area near the MRG Basin, determined that 40 percent of the households were served by illegal cesspools (McQuillan, 2006). Applying this percentage to the MRG Basin produces an estimated 3,522 indigent households served by substandard liquid waste systems. There is a well-established correlation between substandard on-site septic and cesspool systems and groundwater contamination (New Mexico WQCC, 2002 and McQuillan, 2004).

Public Health and Safety Hazards Caused by Substandard On-site Liquid Waste Systems

Cesspools and other substandard on-site liquid waste systems can pose serious public health and safety hazards. The most serious impact to groundwater is the contamination of public and private water supply wells.

Insufficient lot size or setback between water supply wells and septic systems has caused widespread groundwater contamination. In New Mexico, on-site septic systems have contaminated more acre-feet of groundwater and more public and private water supply wells than all other sources combined (McQuillan, 2004). Source-water assessments, conducted on approximately 1,250 public water supply systems in New Mexico, identified septic systems as the single greatest threat to wellhead areas. Within the MRG Basin areas of Sandoval, Bernalillo, Valencia and Socorro counties, on-site septic systems have contributed to the contamination of 6 public and 636 private domestic water supply wells with one or more constituents exceeding allowable standards (Table 4).

COUNTY	CASE	CONTAMINANT	PUBLIC WELLS CONTAMINATED	PRIVATE WELLS CONTAMINATED
BERNALILLO	ISLETA PUEBLO	ANOXIC	0	10
BERNALILLO	MOUNTAINVIEW	NITRATE	2	69
BERNALILLO	NORTH VALLEY ANOXIC	ANOXIC	0	58
BERNALILLO	SANDIA HEIGHTS	NITRATE	0	0
BERNALILLO	SOUTH VALLEY ANOXIC	ANOXIC	3	182
BERNALILLO	SOUTH VALLEY DCB	DCB	0	1

BERNALILLO	WEST MESA NITRATE	NITRATE	0	56
SANDOVAL	CORRALES	ANOXIC	1	79
SOCORRO	VEGUITA	NITRATE	0	30
VALENCIA	BELEN	ANOXIC	0	2
VALENCIA	BOSQUE FARMS	ANOXIC	0	102
VALENCIA	LOS LUNAS	ANOXIC	0	46
VALENCIA	LOS LUNAS	METH LAB	0	0
VALENCIA	TOME	ANOXIC	0	1
TOTAL WELLS CONTAMINATED			6	636

* Groundwater contamination is defined as a groundwater quality impact caused by septic system effluent, and includes multiple-source cases where septic systems have contributed to contamination from other sources such as fertilizers. Public and private water supply wells are deemed to be contaminated based on a chemical analysis that detected nitrate-N, iron, manganese or chloride at concentrations greater than 10 milligrams per liter (mg/L), 0.3 mg/L, 0.2 mg/L, or 250 mg/L respectively, or based on the detection of meth lab chemicals or dichlorobenzene at any concentration. Iron and manganese occur in anoxic ground-water contamination conditions.

In addition to health impacts to groundwater, cesspools and other substandard on-site liquid waste systems can pose other public health and safety hazards such as:

- Entrapment, asphyxiation and drowning inside illegal cesspools and improperly constructed septic tanks, and
- Human and domestic animal exposure to surfacing sewage.

Cesspools, categorically illegal since 1973, can pose hazards of entrapment, asphyxiation, and drowning. At least two children in New Mexico have died after falling inside illegal cesspools. As recently as in 2007 an adult in the state perished after falling head-first into a septic tank in which the manhole openings were larger than allowed by current standards (Santa Fe New Mexican, September 29, 2007).

Potential waterborne illness is diagnosed in approximately 300 New Mexicans each year (NM Department of Health, 2006). While the exact exposure leading to these infections is not always determined, potential exposures can include contact with surfacing sewage and ingestion of well water contaminated by sewage.

3.2 Purpose of the Project

The purpose of the Liquid Waste Groundwater Protection Project is the protection of groundwater from contamination resulting from substandard liquid waste disposal systems. Removing cesspools from the region and upgrading substandard septic systems will improve both groundwater quality and the quantity of useable groundwater in the middle Rio Grande region.

3.3 Probability of Success

The probability of success of this project is high. Any improvement, upgrade, replacement or elimination of a substandard or faulty on-site septic system will reduce the potential risk of groundwater contamination.

3.4 Performance Criteria

Success of this project will be measured by the number of households participating in the project.

3.5 Benefits and Environmental Impacts

The expected environmental benefit of this project is the prevention of groundwater contamination.

3.6 Evaluation of the Alternative

The restoration project is expected to benefit groundwater that is hydraulically connected to the injured groundwater at both sites. Removing cesspools and faulty septic systems from the region will help reduce the risk of groundwater contamination, continue providing a reliable source of clean drinking water and will improve both the quality and quantity of groundwater in the region.

3.7 Project Costs

The estimated cost of this project, in the form of financial assistance to each household, can vary significantly depending on on-site septic system needs. It can range from approximately \$3,000 for a typical municipal sewer hookup, to \$5,000 for a new septic system, to more than \$10,000 for an advanced treatment system.

4. Public Comment

The public comment period on the Draft RP was from September 1 to October 1, 2009. Only one written comment was received by the ONRT. The comment was submitted by Sandoval County, County Development Division, on September 14, 2009. In general, the comment detailed the complex geology found in the Rio Puerco valley [extreme west (left side) area on Figure 3] and that groundwater sources in that area should be separated from those groundwater sources commonly used by the cities of Rio Rancho and Albuquerque. The ONRT agrees with Sandoval County's comment and has added a statement in the caption of Figure 3 stating that the figure is a simplified representation of the geology of the area and it is not intended to depict details of the complex geologic features found within the Middle Rio Grande Basin. The intention of Figure 3 is to emphasize the large extent of the Rio Grande aquifer system and its hydraulically interconnected aquifers within the Rio Grande valley.

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