McKinley County
Small Water Systems
Regionalization Plan

Prepared for **Northwest New Mexico Council of Governments**

Gallup, New Mexico

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DePauli Engineering
& Surveying LLC

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

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1. Introduction

Small water systems in McKinley County are responsible for providing high-quality water to their customers under challenging circumstances. Adequate and sustainable water supplies are limited and many of the water suppliers are small, volunteer organizations. Understanding the challenges faced by these systems and identifying opportunities for these systems to work together and leverage resources will help ensure high-quality water supplies for individuals not connected to the Gallup Water System and who will not benefit directly from the proposed Navajo-Gallup Water Supply Project and the Gallup regional water system. Providing support to these systems is an important goal of McKinley County (the County) and the Northwest New Mexico Council of Governments (NWNMCOG). To implement this objective and create a starting point for regionalization projects, the County through the NWNMCOG retained Daniel B. Stephens & Associates, Inc. (DBS&A), teamed with DePauli Engineering and Surveying Co., to complete this small water systems regionalization plan.

This plan summarizes previously completed water planning efforts and studies for the McKinley-Cibola County area, tabulates baseline data from 22 small water systems in McKinley and Cibola Counties, outlines public participation throughout the project, identifies key issues for each system, proposes potential regionalization strategies locally and regionwide, outlines possible funding sources to pursue, and provides implementation plans.

Figure 1-1 shows the water systems included in this plan, which are as follow:

- Block A Well Co-op
- Bluewater Acres Domestic Water Users Association (WUA)
- Bluewater Lake Mutual Domestic Water Consumers Association (MDWCA)
- Caviggia's Trailer Park
- Cedar Ridge Trailer Park
- City of Gallup
- Coal Basin Water Association
- D&S Trailer Ranch
- Gamerco Water and Sanitation District (W&SD)

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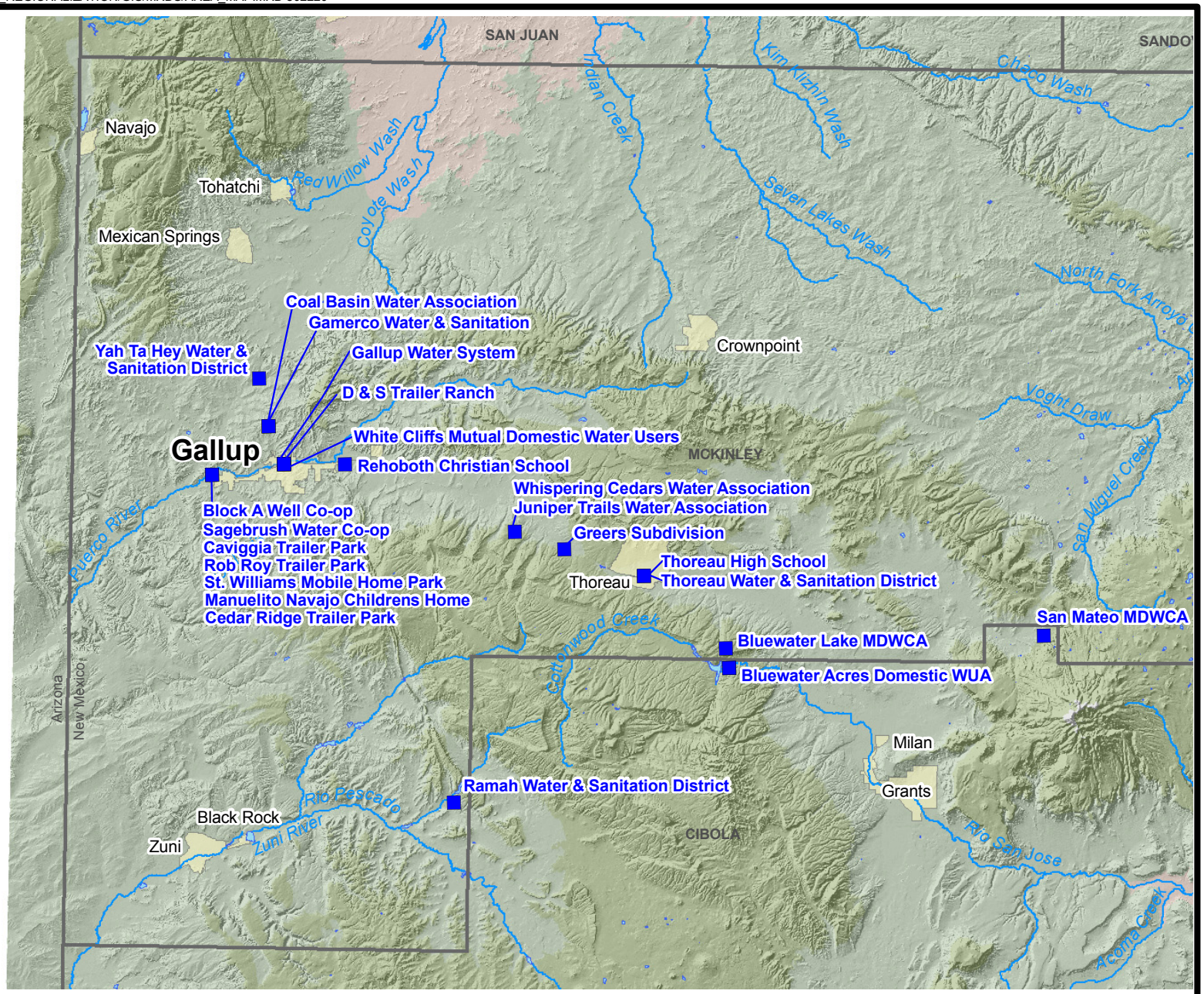

Explanation

- Water system
- Stream
- Town
- County

N

0 6 12 Miles

Figure 1-1

MCKINLEY COUNTY SMALL WATER SYSTEMS REGIONALIZATION

Participating Water Systems

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- Greer's Subdivision
- Juniper Trails Water Association
- Manuelito Navajo Children's Home
- Ramah W&SD
- Rehoboth Christian School
- Rob Roy Trailer Park
- Sagebrush Water Co-op
- San Mateo MDWCA
- St. Williams Mobile Home Park
- Thoreau High School
- Thoreau W&SD
- Whispering Cedars Water Association
- White Cliffs Mutual Domestic Water Users Association (MDWUA)
- Yah-ta-hey W&SD

A total of 19 McKinley County water systems are defined as "active", meaning that they serve at least 25 people or have at least 15 service connections for at least 60 days per year. Of these 19 systems, 18 were interviewed as part of this project (Whispering Cedars Water Association declined to be interviewed), although all 19 systems had some involvement in the project. An additional 4 water systems participated in the project, including 2 McKinley County water systems that serve fewer than 25 people and 2 active Cibola County water systems.

The 2 participating McKinley County water systems that serve fewer than 25 people include Caviggia's Trailer Park and Juniper Trails Water Association. Caviggia's Trailer Park is one of the Williams Acres W&SD member water systems (Williams Acres W&SD treats wastewater for 10 water systems, but does not supply water). This system has 6 residential connections and serves only 10 people, but was included in the project because of its proximity to the other Williams Acres W&SD affiliated water systems. Juniper Trails Water Association has 10 connections and serves 24 people, and was included in the project because of its proximity to Whispering Cedars Water Association.

The 2 Cibola County systems (Bluewater Acres Domestic WUA and San Mateo MDWCA) were included in the project because they are located very close to the McKinley-Cibola County line and serve customers on either side.

2. Public Participation Process

The focus of the regionalization planning effort was to ensure active participation from each of the water systems evaluated as a part of the planning process (identified in Section 1). A public participation plan was drafted at the beginning of the planning effort, and was revised later in the planning process, and includes each of the activities discussed below. A stakeholder list was compiled to include the system representatives that were contacted and all individuals who attended meetings. Letters announcing each meeting were sent out to the full list of stakeholders, along with copies of the notes from the previous meeting. Meeting sign-in sheets and meeting notes are provided in Appendix A.

A total of five project stakeholder meetings were held in Gallup on the following dates:

- September 19, 2007
- December 12, 2007
- February 27, 2008
- April 8, 2008
- June 11, 2008

Project fact sheets were prepared by NWNMCOG staff (detailing project goals and system issues), and by DBS&A (detailing the benefits and methods of regionalization). These fact sheets are provided in Appendix B.

Individual interviews were held with each of the participating systems between November 2007 and February 2008. Representatives from Whispering Cedars Water Association declined to be interviewed. The 22 water system surveys that resulted from these interviews are provided in Appendix C and are summarized in Section 5.

DBS&A worked with the NWNMCOG, McKinley County, 4 water systems (Coal Basin Water Association, Gamerco W&SD, Rehoboth Christian School, and White Cliffs MDWUA), and Williams Acres W&SD to prepare an application for Water Trust Board funding, which was

submitted in November 2007. As a result of this application, McKinley County was awarded $278,426 for continued regionalization planning in April 2008.

Representatives from Yah-ta-hey W&SD, Gamerco W&SD, White Cliffs MDWUA, Rehoboth Christian School, and Coal Basin Water Association began meeting separately to discuss the potential for entering into a regionalization agreement during the planning process; their first meeting was held on May 12, 2008. Representatives from Rural Community Assistance Corporation (RCAC), DBS&A, and NWNMCOG attended this meeting. Of these 5 systems, 4 have continued to meet, and an memorandum of agreement (MOA) has been drafted to create the Mariposa Domestic Water Alliance between 9 water systems (Coal Basin Water Association, Gamerco W&SD, Manuelito Navajo Children's Home, Ramah W&SD, Rob Roy Trailer Park, Sagebrush Water Co-op, Thoreau W&SD, White Cliffs MDWUA, and Yah-ta-hey W&SD) (MDWA, 2008). As of this report's printing, 3 water systems have signed the MOA (Gamerco W&SD, Rob Roy Trailer Park, and White Cliffs MDWUA), and the rest of the systems are expected to sign on (Daly, 2008).

3. McKinley County Description and Water Resources

McKinley County is located in western New Mexico, and is bordered by San Juan County to the north, Sandoval County to the east, Cibola County to the south, and the state of Arizona to the west. The County encompasses 5,449 square miles of the San Juan Plateau, an arid high plateau of grasses, shrubs, and scattered trees, and is bisected by the Continental Divide (McKinley County, 2005). Annual rainfall averages 12 inches, and the County receives 10 to 15 inches of snow per year (McKinley County, 2005).

In 2000, the U.S. Census counted a total of 74,798 people living in McKinley County, with 27 percent of the total population living in the City of Gallup, and an average county-wide population density of 14 people per square mile (U.S. Census, 2000). Gallup is the county seat, and the largest town in McKinley County. The area is mostly rural, with a highly dispersed, culturally diverse population. Land ownership and jurisdiction is extremely complex, with tribal, federal, state, and private land ownership (NWNMCOG, 1998). During the 20th century, the Cibola and McKinley County economies relied primarily on mineral extraction industries, in addition to significant farming and ranching sectors (NWNMCOG, 1998). These industries have recently declined, and the region is turning toward tourism, retail business, and light manufacturing (NWNMCOG, 1998).

The New Mexico Office of the State Engineer (OSE) Water Use and Conservation Bureau issues water use reports every five years that show the breakdown of water use by county and use category. The most current report details data from 2005 (Longworth et al., 2008). Not all of the systems that participated in this project were surveyed by the OSE; the OSE report includes data from Bluewater Lake MDWCA, Cedar Ridge Trailer Park, Coal Basin Water Association, Ft. Wingate Army Depot, Gallup Water System, Gamerco W&SD, Ramah W&SD, Rob Roy Trailer Park, Thoreau W&SD, Whispering Cedars Water Association, Williams Acres/Mentmore, and Zuni Pueblo Water Works, in addition to an estimate of use by self-supplied rural homes.

The OSE data have been plotted to show a breakdown of water use in McKinley County in 2005 (Figure 3-1). As shown on Figure 3-1, public water supply systems accounted for 27 percent

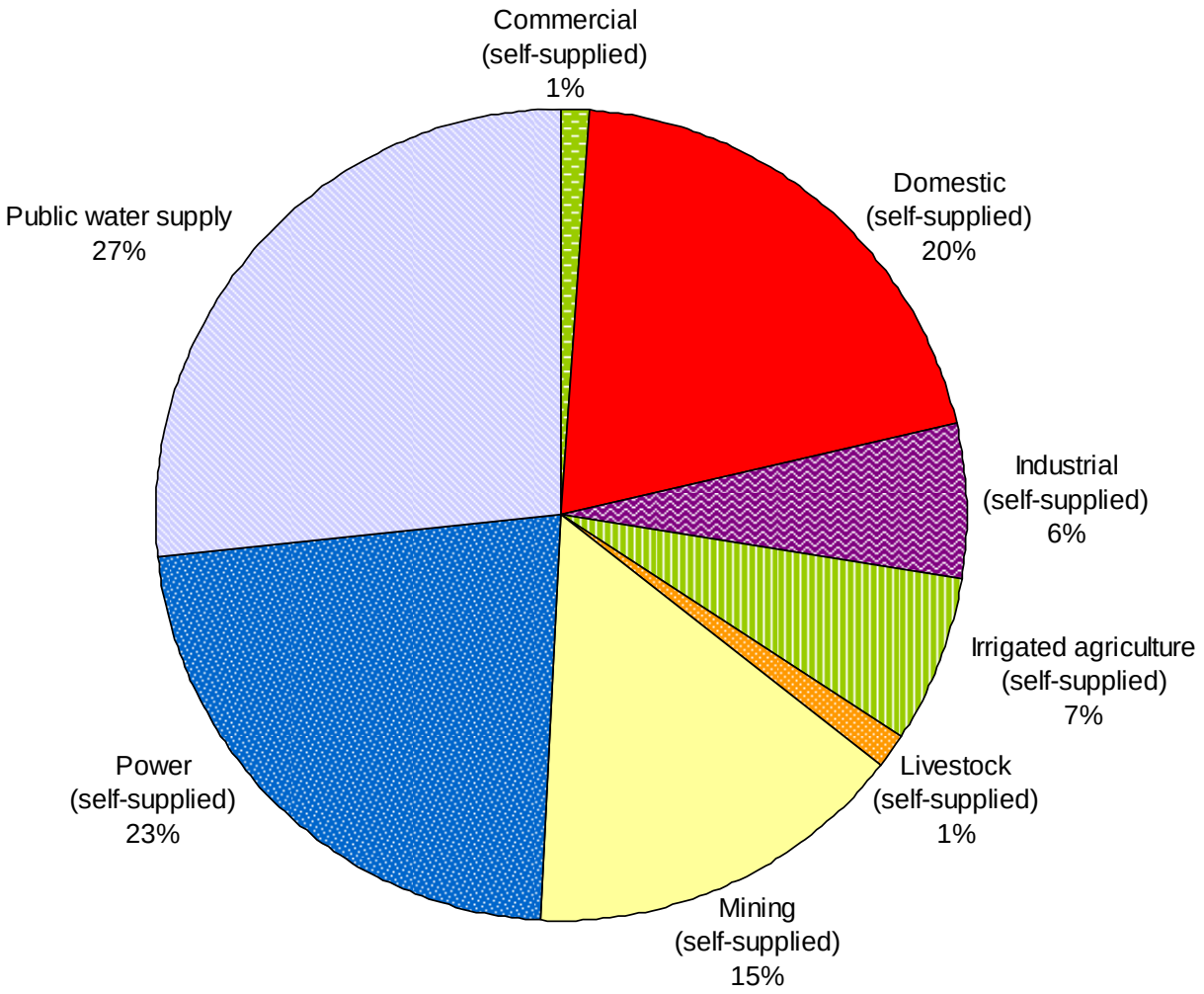

Figure 3-1

MCKINLEY COUNTY SMALL WATER SYSTEMS REGIONALIZATION

McKinley County Water Withdrawals in 2005

and domestic use accounted for an additional 20 percent of total McKinley County water withdrawals in 2005. All irrigated agriculture withdrawals and approximately 20 percent of the livestock withdrawals in 2005 were supplied by surface water, while all other withdrawals were supplied by groundwater. The Bluewater Acres Domestic WUA and San Mateo MDWCA systems are not included in this estimate because they are in Cibola County.

McKinley County water systems are supplied by groundwater from the San Juan, Gallup, Bluewater, and Rio Grande Underground Water Basins. With the exception of one City of Gallup well that is located in the San Juan Basin, wells for the participating water systems are within the Gallup and Bluewater Underground Water Basins.

Within the Gallup Basin, primary groundwater production is from the Gallup Sandstone aquifer, with smaller components of supply coming from the Dakota Sandstone and Westwater Canyon Member of the Morrison Formation (NWNMCOG, 1998). Table 3-1 provides the geologic age, thickness, and lithology for the water-bearing units found in McKinley County. Water occurs in both confined and unconfined conditions in the Gallup Sandstone in McKinley County, and unit thickness ranges from 180 to 526 feet. This formation yields small to large amounts of water near Gallup, and is a major source of supply for the City of Gallup (Kiely, 2003). Water also occurs in both confined and unconfined conditions in the Dakota Sandstone in McKinley County, with unit thickness ranging from 200 to 350 feet. This unit has a low well yield (Kiely, 2003). The Morrison Formation thickness ranges from 330 to 915 feet; the Westwater Canyon Member of the Morrison Formation contains most of the water available to wells from this formation, although it is not present south of Gallup (Kiely, 2003). Morrison Formation well yields vary from several to approximately 500 gallons per minute (gpm) (Kiely, 2003). Principal aquifers in the Bluewater Basin include the San Andres-Glorieta aquifers (NWNMCOG, 1998). Aquifer recharge rates are estimated to be less than 1 percent of mean annual precipitation (Kiely, 2003).

Portions of McKinley County are located within three different surface water basins: the Lower Colorado River Basin (western McKinley County), the San Juan River Basin (northern McKinley County), and the Rio Grande Basin (eastern McKinley County). Surface water is extremely limited, and the nearest potential source of sustainable surface water is the San Juan River

Table 3-1. Stratigraphy and Aquifer Characteristics

Geologic Age	Geologic Formation		Thickness (feet)	Lithology	Transmissivity (ft^2/d)	Well Yield (gpm)	Comments
Cretaceous	Mesa Verde Group	Gallup Sandstone	180–526 [a]	Sandstone at the base of the Mesa Verde Group	10–350	Small to large [a]	
	Mancos Shale		700+	Marine shale with thin sandstone interbeds	---	0–?	Poor well yield and water quality from shale units.
	Dakota Sandstone		200–350 [a]	Marine sandstones cemented by calcite and quartz	2,000	2–15	
Jurassic	Morrison Formation	Westwater Canyon	330–915 [a]	Fluvial mudstones and sandstones	20–490	5–50	
	San Rafael Group	Zuni and Bluff Sandstones	0–400	Fluvial sandstones	450	1–20	
		Summerville Formation	90–185	Interbedded sandy mudstone and sandstones	---	Unknown	Well-cemented sandstone is a poor water producer.
		Todilto Formation	0–85	Thinly bedded limestone and gypsum	---	Unknown	Water quality is poor due to gypsum beds resulting in elevated sulfate.
		Entrada Sandstone	0–265	Sandstone cemented by calcite	55	4–35	Water quality is generally adequate for domestic use; includes Wingate Sandstone.
Triassic	Chinle Group		1,500–2,000	Shale units with interbedded sandstone units	100	0–40	Sandstone units may produce upwards of 40 gpm.
	Moenkopi Formation		75–100	Sandstone and siltstone	---	Unknown	
Permian	San Andres Formation		250–300	Limestone and sandstone units with thick gypsum sequences	90 (up to 450,000 in karst zones)	15	Water quality is variable.
	Glorieta Sandstone		150–250	Siltsone interbedded with limestone, sandstone, and gypsum			San Andres and Glorieta are generally hydrologically connected and considered a single aquifer.

[a] Kiely, 2003 ft^2/d = Square feet per day gpm = Gallons per minute

(Kiely, 2003). Transitioning away from complete reliance on groundwater to the use of San Juan River surface water supplies has been discussed and studied over the last 40 years (Kiely, 2003), and was identified as the long-term solution to water supply issues in the regional water plan (NWNMCOG, 1998). The planned Navajo-Gallup Water Supply Project (NGWSP) will divert San Juan River water for use by the City of Gallup and multiple Navajo chapters (NWNMCOG, 1998), although full project funding has not yet been secured. Supply for the rest of the County's water systems, which are not designated beneficiaries of the project, will likely continue to be supplied by groundwater. However, once the NGWSP comes online, Gallup may have the capacity to potentially provide emergency and/or long-term supplies to some small water systems in the Gallup area.

4. Water Planning in McKinley County

The following sections discuss the development of regionalization efforts and water planning efforts in McKinley County.

4.1 Development of Regionalization Efforts in New Mexico and McKinley County

New Mexico experienced extensive drought in the summer of 2002, which coincided with water emergencies and shortages in more than 70 small water systems throughout the state (D'Antonio, 2006).

In response to these emergencies, staff from several state agencies began working together to address long-range sustainable water supplies for small water systems, eventually forming the Drinking Water Work Group. This group gave rise to the subsequent creation of the Water and Wastewater Technical Team, which was later formalized by Governor Bill Richardson as the Water Infrastructure Investment Team (New Mexico Office of the Governor, 2005). In 2003, the state legislature provided funding for the Environmental Finance Center (EFC) at the New Mexico Institute of Mining and Technology (New Mexico Tech) to begin developing guidelines for long-range water supplies to help communities plan more effectively for drought. This effort resulted in the *Area-Wide Planning for Long-Term Sustainability* guidance document (EFC/NMT, 2004).

One issue identified by the Drinking Water Work Group is that capital outlay requests and other funding sources do not have a process for ensuring that systems applying for and receiving state funds are conducting adequate planning to ensure the most efficient use of funds. In particular, the funding process does not require systems to identify opportunities to leverage resources at a local level. For example, two systems that are geographically close enough to be able to share resources might be independently requesting the exact same equipment such as a vehicle or storage tank. To address this issue, the OSE was directed to lead an effort with other state agencies to develop criteria for water system, planning, performance, and conservation as a condition of state funding (New Mexico Legislature, 2005).

The legislature also funded an effort to develop 10 collaborative working groups across New Mexico as the first step toward regional collaboration. McKinley County was not one of these working groups, but instead conducted the McKinley County Water Forum in 2003 (MWB, 2003) and the Small Water Systems Forum in 2005 (MWB, 2005). In 2004, the County created its own Water Board to continue a small system planning focus. In 2007, the County received a special appropriation to develop this small water systems regionalization plan to further develop water system data and identify regional collaboration opportunities.

4.2 Water Planning in McKinley County

With limited available water resources, McKinley County has a long history of planning to meet current and future water needs. The small water system regionalization study builds on the multiple McKinley County water supply, water system, development, and planning studies that have been completed over the last 40 years. As a planning document, this study focuses on the small rural water systems that have not been part of the City of Gallup water planning efforts. In developing this report, previously completed water planning studies were collected and reviewed. Existing studies include the Northwest New Mexico Regional Water Plan, McKinley County Comprehensive Plan, community water and wastewater master plans, infrastructure capital improvement plans, 40-year water plans, New Mexico Environment Department (NMED) sanitary surveys and Tier 2 assessments, technical memorandum and draft final project plan for the NGWSP, and the report from the 2005 Gallup Town Hall on Water.

Existing studies that provided the information most relevant to this planning study include the final and background documents for the 2003 Gallup Town Hall on Water (Kiely, 2003; Winn et al., 2003), the Region 6 regional water plan (NWNMCOG, 1998), and the system-specific sanitary surveys prepared by NMED.

Many of the smaller McKinley County water systems do not have any existing water resource and/or planning studies. However, knowledgeable individuals were interviewed from each system; the resulting summaries of each system follow in Section 5.

The following subsections provide slightly more detailed overviews of different water planning studies in an effort to create a context for the current small water system planning effort.

4.2.1 McKinley County Comprehensive Plan

The water segment of the comprehensive plan (NWNMCOG/ARC, 2005) is based on the Region 6 regional water plan (NWNMCOG, 1998), and incorporates by reference the recommendations from the regional plan. The plan lists the following three key goals for the County:

- Promote regional approach to water planning
- Develop a 40-year water plan
- Consider regionalization of County water districts

The comprehensive plan also identifies the need for county-wide planning and coordination of the water systems of water purveyors in the off-reservation unincorporated areas of the County.

The County has actively supported system-specific projects for many of the systems in this plan, including Gamerco W&SD Water Improvement Project, Thoreau W&SD Wastewater Projects, Williams Acres W&SD Wastewater Project, and Yah-ta-hey/White Cliffs Water Improvement Project (NMDFA, 2007g).

4.2.2 Northwest New Mexico Regional Water Plan

The regional plan, 1 of 16 completed in the state, provides a review of the region's background, climate, geology, water supply, water rights, water quality, water demand, current regional issues, and discussion of multiple potential alternatives and solutions to resolve water supply and management concerns (NWNMCOG, 1998). The NGWSP is the largest water infrastructure project featured in the plan, and has been designed to meet future demand for the City of Gallup and the Navajo chapters.

The plan documents county-wide water demand and water supply issues, with some small water system data. The plan does not address how small independent systems should address dwindling groundwater resources or how the other large water supply development alternatives reviewed in the plan will provide water for these systems.

4.2.3 Navajo-Gallup Water Supply Project

The NGWSP has been under development for the last 40 years as the major water supply development project in the County and a significant feature of the Navajo Nation Water Rights Settlement Agreement. The project will deliver San Juan River water via pipeline to the City of Gallup, the eastern portions of the Navajo reservation, and the southwestern portion of the Jicarilla Apache Reservation. The estimated total cost of the project is more than $800 million (NMWTB, 2008). Under the settlement, the City of Gallup will have the right to 7,500 acre-feet (ac-ft) of water. Small water systems discussed in this report are not project beneficiaries and have not been directly involved in project planning and development.

The Gallup/Rural Navajo Regional Water System is a short-term implementation phase of the NGWSP designed to establish infrastructure capacity in the Gallup area to ensure water delivery to rural Navajo residents in the short-term and to develop capacity in the Gallup system to convey water in the short- and long-term. The project involves developing water lines to connect with the Indian Health Service (IHS)/Navajo Tribal Utility Authority systems and includes installation of the Twin Lakes well north of Gallup near the Yah-ta-hey W&SD (City of Gallup, 2004).

4.2.4 Gallup Town Hall on Water

The Gallup Town Hall on Water was held May 29 through 31, 2003, and provided a forum for discussing the water supply and water management issues facing the City of Gallup. More than 80 Town Hall participants worked together, considering various management options. The group recognized the need and urgency for water planning, and reached a consensus on their vision for the City, in addition to making recommendations for how best to achieve it going forward.

Documents were prepared in preparation for the Gallup Town Hall on Water (Kiely, 2003) and upon its completion (Winn et al., 2003). These documents provide an overview of Gallup's water resources (source, quality, constraints, and planning), water management (issues, alternatives, and new technologies), the Gallup Town Hall on Water findings, and a summary of options going forward.

4.2.5 McKinley County Comprehensive Water Conservation Plan

A comprehensive McKinley County water conservation plan was prepared by the NWNMCOG, and defines the County's water conservation goals while aiming to encourage voluntary participation from County residents. The plan outlines various water conservation strategies, including public education, system water audits, plumbing retrofit rebates, conversion to xeriscape, modifying system water rate structures, developing and enforcing water conservation ordinances, and decreasing non-revenue water. Members of the Water Board participated in drafting the document and recommending it to the County Commission for approval.

Table 4-1 provides an annotated bibliography of the previously completed water planning studies that were collected and reviewed as part of this small water systems regionalization study.

Table 4-1. Annotated Bibliography for all Existing Water Supply, Water System, Development, and Planning Studies for Participating Systems

Citation	Annotation
Comprehensive Planning Documents	
CSC. 2003. McKinley County Comprehensive Plan. April 2003.	A comprehensive county plan addressing an overview of land use, transportation, water, intergovernmental relations, health, housing, education, tourism, economic development, and infrastructure issues, to be used as a reference document. This plan was meant to provide a framework for interjurisdictional cooperation.
NWNMCOG/ARC. 2005. McKinley County Comprehensive Plan, Phase 2. December 2005.	A Phase 2 county comprehensive plan that revises and expands on the 2003 comprehensive plan, defining actions and implementation steps to be delegated to county staff.
USBR. 2007. Navajo-Gallup Water Supply Project Planning Report and Draft Environmental Impact Statement and Technical Appendices. March 2007.	This document provides a discussion of various alternatives that will provide a long-term, sustainable municipal and industrial water supply to the City of Gallup, Navajo Nation, and Jicarilla Apache Nation, and the associated potential environmental impacts and costs of each proposed alternative. The preferred alternative proposes diverting San Juan River water downstream of Fruitland, New Mexico, treating it, and delivering it via pipeline. The document details previous studies, gives a background of applicable water rights issues, and outlines the necessary permits, approvals, and regulatory requirements that apply to the proposed project. It also includes the final technical memorandum, which details the project history, water demand and production information for the proposed service area, structural alternatives, discussion of the unit cost of water, a plan of approach, and project time line.
McKinley County Water Board (MWB). 2007. McKinley County Water Conservation Plan. October 2007.	A comprehensive county water conservation plan that defines the county's water conservation goals and aims to encourage voluntary participation from county residents. The plan outlines various water conservation strategies, including public education, system water audits, plumbing retrofit rebates, conversion to xeriscape, modifying system water rate structures, developing and enforcing water conservation ordinances, and decreasing non-revenue water.
Regional Planning Documents	
NWNMCOG. 1998. Region 6 Water Plan. The 40-year Regional Water Plan for Cibola County and the Portion of McKinley County not in the San Juan Basin. March 1998.	Review of the region's background, climate, geology, water supply, water rights, water quality, water demand, current regional issues, and discussion of multiple potential alternatives and solutions to be used to resolve water supply and management concerns.

Table 4-1. Annotated Bibliography for all Existing Water Supply, Water System, Development, and Planning Studies for Participating Systems
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Citation	Annotation
System-Specific Documents	
Block A Well Co-op	
NMED. 2002f. Block A Well Co-op/William Acres Sanitary Survey. November 6, 2002.	Sanitary survey for the Block A Well Co-op water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. One regulatory deficiency was identified as a part of this survey, and it is unclear whether or not any sanitary deficiencies were identified as a part of this survey. A new Block A Well Co-op sanitary survey was conducted on November 8, 2007, but the write-up for this new survey is not yet available.
Bluewater Lake Mutual Domestic Water Consumers Association (MDWCA)	
NMED. 2005b. Bluewater Lake MDWCA Capacity Tier 2 Assessment. September 26, 2005.	A capacity assessment evaluating the Bluewater Lake MDWCA's technical, managerial, and financial capacity to achieve, maintain, and plan for compliance with applicable drinking water quality standards.
NMED. 2007g. Bluewater Lake MDWCA Sanitary Survey. May 16, 2007.	Sanitary survey for the Bluewater Lake MDWCA water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. No regulatory deficiencies were identified, although several sanitary deficiencies are discussed.
NMDFA. 2007a. Fiscal year 2008-2012 Infrastructure Capital Improvement Plan (ICIP) for Bluewater Lake MDWCA. July 26, 2007.	Presents details for each Bluewater Lake MDWCA project included in the fiscal year 2008-2012 ICIP plan. Budgets for proposed Bluewater Lake MDWCA projects include $600,000 for water system improvements in 2008, 2009, and 2010. Bluewater Lake MDWCA projects identified as priorities for 2007 legislative funding include $600,000 for water system improvements.
Coal Basin Water Association	
NMED. 2006d. Coal Basin Water Association Capacity Tier 2 Assessment. December 13, 2006.	A capacity assessment evaluating the Coal Basin Water Association's technical, managerial, and financial capacity to achieve, maintain, and plan for compliance with applicable drinking water quality standards.
NMED. 2007i. Coal Basin Water Association Sanitary Survey. June 27, 2007.	Sanitary survey for the Coal Basin Water Association water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Three regulatory deficiencies were identified. It is unclear whether or not any sanitary deficiencies were identified as a part of this survey.

Table 4-1. Annotated Bibliography for all Existing Water Supply, Water System, Development, and Planning Studies for Participating Systems
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Citation	Annotation
D&S Trailer Ranch	
NMED. 2002d. D&S Trailer Ranch Sanitary Survey. October 22, 2002.	Sanitary survey for the D&S Trailer Ranch water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Four regulatory deficiencies were identified, and it is unclear whether or not any sanitary deficiencies were identified as a part of this survey. A new D&S Trailer Ranch sanitary survey was conducted on November 8, 2007, but the write-up for this new survey is not yet available.
City of Gallup	
Kiely, J.G. 2003. A Sustainable Water Supply for Gallup: How Do We Get There from Here? Final and Background Reports for the 2003 Gallup Town Hall on Water. May 2003.	Documents prepared in preparation for the Gallup Town Hall on Water, and upon its completion. These documents provide an overview of the Gallup Town Hall on Water findings, and of Gallup's water resources (source, quality, constraints, and planning), water management (issues, alternatives, and new technologies), and a summary of options going forward.
Winn, L., L. Allgood, B. Armijo, M.J. Christensen, M. Curley, J.G. Kiely, J. Austin-Manygoats, and R. Esquivel. 2003. A Sustainable Water Supply for Gallup: How Do We Get There from Here? Report from the 2003 Gallup Town Hall on Water. May 2003.	A summary of the 2003 Gallup Town Hall on Water, including a breakdown of the town hall process, vision, recommendations for actions to be used to achieve the vision, panel discussion questions, and town hall roster of participants.
NMED. 2003. Gallup Joint Utilities Water System Sanitary Survey. May 6, 2003.	Sanitary survey for the Gallup Joint Utilities water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Seven regulatory deficiencies were identified, and were to be responded to within 45 days of receiving the sanitary survey write-up. The regulatory deficiencies pertained to direct and indirect additives, protection of the public water system, cross-connections, and finished water storage facilities.

Table 4-1. Annotated Bibliography for all Existing Water Supply, Water System, Development, and Planning Studies for Participating Systems
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Citation	Annotation
USBR. 2007. Navajo-Gallup Water Supply Project Planning Report and Draft Environmental Impact Statement and Technical Appendices. March 2007.	This document provides a discussion of various alternatives that will provide a long-term, sustainable municipal and industrial water supply to the City of Gallup, Navajo Nation, and Jicarilla Apache Nation, and the associated potential environmental impacts and costs of each proposed alternative. The preferred alternative proposes diverting San Juan River water downstream of Fruitland, New Mexico, treating it, and delivering it via pipeline. The document details previous studies, gives a background of applicable water rights issues, and outlines the necessary permits, approvals, and regulatory requirements that apply to the proposed project. It also includes the final technical memorandum, which details the project history, water demand and production information for the proposed service area, structural alternatives, discussion of the unit cost of water, a plan of approach, and project time line.
Gamerco Water and Sanitation District (W&SD)	
NMED. 2007j. Gamerco Water and Sanitation District Sanitary Survey. October 6, 2007.	Sanitary survey for the Gamerco W&SD water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Ten regulatory deficiencies were identified as a part of this survey. It is unclear whether or not any sanitary deficiencies were identified as a part of this survey.
Greer's Subdivision	
NMED. 2007a. Greer's Subdivision Sanitary Survey. March 7, 2007.	Sanitary survey for the Greer's Subdivision water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Three regulatory deficiencies were identified, in addition to seven sanitary deficiencies.
Manuelito Navajo Children's Home	
NMED. 2007d. Manuelito Navajo Children's Home Sanitary Survey. April 24, 2007.	Sanitary survey for the Manuelito Navajo Children's Home water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. No regulatory or sanitary deficiencies were identified.

Table 4-1. Annotated Bibliography for all Existing Water Supply, Water System, Development, and Planning Studies for Participating Systems
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Citation	Annotation
Ramah W&SD	
NMED. 2005a. Ramah Water and Sanitation District Sanitary Survey. September 15, 2005.	Sanitary survey for the Ramah W&SD water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Five regulatory deficiencies were identified, in addition to three sanitary deficiencies.
NMED. 2005c. Ramah Water and Sanitation District Capacity Tier 2 Assessment. September 26, 2005.	A capacity assessment evaluating the Ramah W&SD's technical, managerial, and financial capacity to achieve, maintain, and plan for compliance with applicable drinking water quality standards.
NMDFA. 2007b. Fiscal year 2008-2012 Infrastructure Capital Improvement Plan for Ramah Water and Sanitation District. July 26, 2007.	Presents details for each Ramah W&SD project included in the fiscal year 2008-2012 ICIP plan. Budgets for proposed Ramah Water & Sanitation District projects include (1) $582,000 for water system improvements in 2008, 2009, and 2011, (2) $1,508,000 for street improvements in 2008, 2009, and 2011, (3) $315,000 for wastewater facility improvements in 2009, 2010, and 2012, (4) $25,000 for acequia maintenance in 2010, and (5) $210,000 for administrative and service facilities in 2008-2010. Ramah Water & Sanitation District projects identified as priorities for 2007 legislative funding include $278,000 for water system improvements and $1,288,000 for street improvements.
Rehoboth Christian School	
NMED. 2006b. Rehoboth Christian School Sanitary Survey. June 13, 2006.	Sanitary survey for the Rehoboth Christian School water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. No regulatory deficiencies were noted.
Rob Roy Trailer Park	
NMED. 2002a. Rob Roy Trailer Park Sanitary Survey. September 9, 2002.	Sanitary survey for the Rob Roy Trailer Park water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. One regulatory deficiency was identified as a part of this survey, although it is unclear whether or not any sanitary deficiencies were identified as a part of this survey.

Table 4-1. Annotated Bibliography for all Existing Water Supply, Water System, Development, and Planning Studies for Participating Systems
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Citation	Annotation
Sagebrush Water Co-op	
NMED. 2002c. Sagebrush Water Co-op Sanitary Survey. October 21, 2002.	Sanitary survey for the Sagebrush Water Co-op water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Three regulatory deficiencies were identified as a part of this survey, although it is unclear whether or not any sanitary deficiencies were identified as a part of this survey.
St. Williams Mobile Home Park	
NMED. 2002b. St. Williams Mobile Home Park Sanitary Survey. September 9, 2002.	Sanitary survey for the St. Williams Mobile Home Park water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Two regulatory deficiencies were identified as a part of this survey, although it is unclear whether or not any sanitary deficiencies were identified as a part of this survey.
Thoreau High School MDWCA	
NMED. 2007f. Thoreau High School MDWCA Sanitary Survey. May 14, 2007.	Sanitary survey for the Thoreau High School MDWCA water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Three regulatory deficiencies were identified, in addition to four sanitary deficiencies.
Thoreau W&SD	
Thoreau W&SD. 2004. Thoreau Water and Sanitation District 40-year water plan. June 2004.	40-year water plan for the Thoreau W&SD documenting existing water use, establishing the district water needs through 2044, and protecting district water rights.
NMED. 2007c. Thoreau Water and Sanitation District Sanitary Survey. April 17, 2007.	Sanitary survey for the Thoreau W&SD water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. One regulatory deficiency was identified, in addition to several sanitary deficiencies.
NMED. 2007h. Thoreau Water and Sanitation District Capacity Tier 2 Assessment. May 21, 2007.	A capacity assessment evaluating the Thoreau W&SD's technical, managerial, and financial capacity to achieve, maintain, and plan for compliance with applicable drinking water quality standards.

Table 4-1. Annotated Bibliography for all Existing Water Supply, Water System, Development, and Planning Studies for Participating Systems
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Citation	Annotation
NMDFA. 2007c. Fiscal year 2008-2012 Infrastructure Capital Improvement Plan for Thoreau Water and Sanitation District. July 26, 2007.	Presents details for each Thoreau W&SD project included in the fiscal year 2008-2012 ICIP plan. Budgets for proposed Thoreau Water & Sanitation District projects include $300,000 for wastewater lagoon improvements in 2008 and $404,500 for water system improvements in 2008 and 2009. Thoreau Water & Sanitation District projects identified as priorities for 2007 legislative funding include $300,000 for wastewater lagoon improvements and $404,500 for water system improvements.
Whispering Cedars Water Association	
NMED. 2002e. Whispering Cedars Water Association Sanitary Survey. November 5, 2002.	Sanitary survey for the Whispering Cedars water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Five regulatory deficiencies were identified as a part of this survey, although it is unclear whether or not any sanitary deficiencies were identified as a part of this survey.
White Cliffs Mutual Domestic Water Users Association (MDWUA)	
DePauli Engineering & Surveying, LLC (DePauli). 2005. White Cliffs Mutual Domestic Water Users' Association and Yah-ta-hey Water and Sanitation District Rural Water System Improvements Plan. November 2005.	A rural water system improvements plan for the White Cliffs MDWUA and Yah-ta-hey W&SD. This plan includes discussions of existing facilities, project need, project alternatives, and a recommendation for community development block grant funding to pay for proposed improvements to the systems over the next 40 years.
NMED. 2006a. White Cliffs Mutual Domestic Water Users' Association Capacity Tier 2 Assessment. March 21, 2006.	A capacity assessment evaluating the White Cliffs MDWUA's technical, managerial, and financial capacity to achieve, maintain, and plan for compliance with applicable drinking water quality standards.
NMED. 2006c. White Cliffs Mutual Domestic Water Users Sanitary Survey. June 13, 2006.	Sanitary survey for the White Cliffs MDWUA water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. No regulatory deficiencies were identified as a part of this survey. It is unclear whether or not any sanitary deficiencies were identified as a part of this survey.
NMED. 2007b. White Cliffs Mutual Domestic Water Users' Association Capacity Tier 2 Assessment. April 13, 2007.	A capacity assessment evaluating the White Cliffs MDWUA's technical, managerial, and financial capacity to achieve, maintain, and plan for compliance with applicable drinking water quality standards.

Table 4-1. Annotated Bibliography for all Existing Water Supply, Water System, Development, and Planning Studies for Participating Systems

Citation	Annotation
NMDFA. 2007d. Fiscal year 2008-2012 Infrastructure Capital Improvement Plan for White Cliffs MDWUA. July 26, 2007.	Presents details for each White Cliffs MDWUA project included in the fiscal year 2008-2012 ICIP plan. Budgets for proposed White Cliffs MDWUA projects include $1,320,000 for water system improvements in 2008-2011. White Cliffs MDWUA projects identified as priorities for 2007 legislative funding include $310,000 for water system improvements.
Williams Acres W&SD	
NMDFA. 2007e. Fiscal year 2008-2012 Infrastructure Capital Improvement Plan for Williams Acres Water & Sanitation District. July 26, 2007.	Presents details for each Williams Acres W&SD project included in the fiscal year 2008-2012 ICIP plan. Budgets for proposed Williams Acres W&SD projects include $814,030 for wastewater system improvements in 2008. Williams Acres W&SD projects identified as priorities for 2007 legislative funding include $814,030 for wastewater system improvements.
Yah-ta-hey W&SD	
DePauli Engineering & Surveying, LLC (DePauli). 2005. White Cliffs Mutual Domestic Water Users' Association and Yah-ta-hey Water and Sanitation District Rural Water System Improvements Plan. November 2005.	A rural water system improvements plan for the White Cliffs MDWUA and Yah-ta-hey W&SD. This plan includes discussions of existing facilities, project need, project alternatives, and a recommendation for community development block grant funding to pay for proposed improvements to the systems over the next 40 years.
NMED. 2006e. Yah-ta-hey Water and Sanitation District Capacity Tier 2 Assessment. December 14, 2006.	A capacity assessment evaluating the Yah-ta-hey W&SD's technical, managerial, and financial capacity to achieve, maintain, and plan for compliance with applicable drinking water quality standards.
NMED. 2007e. Yah-ta-hey Water and Sanitation District Sanitary Survey. April 24, 2007.	Sanitary survey for the Yah-ta-hey W&SD water system that evaluates the adequacy of the water system's source, treatment, distribution system, finished water storage, pump and pump facilities, monitoring, reporting and data verification, system operation and management, and operator compliance. Two regulatory deficiencies were identified as a part of this survey. It is unclear whether or not any sanitary deficiencies were identified as a part of this survey.
NMDFA. 2007f. Fiscal year 2008-2012 Infrastructure Capital Improvement Plan for Yah-ta-hey Water and Sanitation District. July 26, 2007.	Presents details for each Yah-ta-Hey W&SD project included in the fiscal year 2008-2012 ICIP plan. Budgets for proposed Yah-ta-Hey W&SD projects include (1) $823,896 for water system improvements in 2008-2012, (2) $400 for acequia accounting software in 2008, and (3) $73,800 for public safety equipment/buildings in 2008 and 2009. Yah-ta-Hey W&SD projects identified as priorities for 2007 legislative funding include $230,173 for water system improvements, $400 for acequia accounting software, and $73,800 for public safety equipment/buildings.

5. Water System Summaries

5.1 Water System Interviews

Individual interviews were held with each of the participating systems between November 2007 and February 2008. The 22 water system surveys that resulted from these interviews are presented in Appendix C (representatives from Whispering Cedars Water Association declined to be interviewed). Highlights of the water system surveys are summarized in Sections 5.1.1 through 5.1.9.

5.1.1 System Type and Legal Authorities

The legal authorities for participating systems are listed in Table 5-1. Legal authorities include multiple water and sanitation districts, mutual domestic associations, water cooperatives, and private systems, in addition to one municipality.

Copies of the bylaws and articles of incorporation for 9 systems were obtained from the New Mexico Public Regulation Commission (PRC), and are presented in Appendix D. An updated version of the Bluewater Lake MDWCA bylaws and articles of incorporation obtained from Tom Nelson is also included in Appendix D. Bylaws and articles of incorporation are not on file with the PRC for the other 14 water systems. Court decrees forming the Gamerco, Ramah, Thoreau, Williams Acres, and Yah-ta-hey Water and Sanitation Districts were obtained from Four Corners Title in Gallup, and are presented in Appendix E. Dates that each of the water and sanitation district decrees were filed in district court follow:

- Gamerco W&SD November 30, 1982
- Ramah W&SD June 21, 1983
- Thoreau W&SD October 11, 1977
- Williams Acres W&SD September 2, 1975
- Yah-ta-hey W&SD August 1, 1975

Table 5-1. Legal Authorities for Different Types of Water Systems Participating in the McKinley County Regionalization Project

Type of Water System	Participating Systems in This Category	Type	Creation of Entity	Covered by 40-Year Planning Statute [a]	Conservation Requirements under NMSA 72-14-3.2 [b]	Authorizing Statute	Require Connection Within Service Area; Prohibit Domestic Well Drilling Under NMSA 3-53-11	Ability to Protect Source Water Supplies	Political Subdivision of the State [c]	Consultation on Subdivisions [d]
Municipal water and sewer utilities	City of Gallup	Public	No specific process set out unless utility purchase is financed from revenue bonds which will require an election and PRC approval.	Yes	For those systems providing more than 500 acre-feet per year. Gallup has a conservation plan.	NMSA 3-23-1 to 3-23-10 NMSA 3-26-1 to 3-26-3 NMSA 3-27-1 to 3-21-8 NMSA 3-53-1 to 3-53-5	May restrict well drilling by ordinance if the well site is within 300 feet of the water utility, and cost is not prohibitive.	May compel connection to sewer.	Yes	Yes, within municipal boundaries and under municipal subdivision regulations.
Water and Sanitation Districts	Gamerco W&SD Ramah W&SD Thoreau W&SD Yah-ta-hey W&SD Williams Acres W&SD	Public	Petition by citizens or by county. Formalized by district court order.	Statute does not define W&SDs as eligible entities, but they could be considered quasi-municipal water suppliers.	None of these systems provide more than 500 acre-feet per year.	NMSA 73-21-1 to 73-21-55	Statute does not specify.	Statute does not specify; may compel property owners within the district to connect to the sewer system (NMSA 73-21-16(2)).	Yes	Statute does not specify, but likely if subdivision is within district boundaries.
Mutual domestic water consumer association under the Sanitary Projects Act	Bluewater Acres Domestic WUA Bluewater Lake MDWCA Juniper Trails Water Association San Mateo MDWCA Whispering Cedars Water Association White Cliffs MDWUA	Public	Community files articles of incor-poration with PRC.	Yes	None of these systems provide more than 500 acre-feet per year.	NMSA 3-29-1 to 3-29-20 Sanitary Projects Act	Statute does not specify.	Statute does not specify; however the association can write its by-laws to include provisions to protect source water.	Yes	Statute does not specify.
Water cooperative	Block A Well Co-op Sagebrush Water Co-op	Private	Five or more natural persons or two or more associations may incorporate.	Yes	None of these systems provide more than 500 acre-feet per year.	NMSA 53-4-1 to 53-4-45	Statute does not specify.	Statute does not specify.	Yes	Statute does not specify.
Non-profit corporation or privately owned public water systems that are not utilities	Caviggia's Trailer Park Cedar Ridge Trailer Park Coal Basin Water Association D&S Trailer Ranch Greer's Subdivision Manuelito Navajo Children's Home Rehoboth Christian School Rob Roy Trailer Park St. Williams Mobile Home Park Thoreau High School	Private	Articles of incor-poration filed with the PRC, or may depend on how each system was originally organ-ized.	Only member-owned community water systems are covered	None of the systems provide more than 500 acre-feet of water.	NMSA 53-8-1 to 53-8-99 Some of these systems may have been orga-nized under several different statutes.	Statute does not specify.	Statute does not specify.	No	Statute does not specify.

[a] Entities that may rely on the water year water planning statute (NMSA 72-1-9) include municipalities, counties, state universities, school districts, member-owned community water systems, special water users' associations, and public utilities supplying water to municipalities and counties.

[b] Entities supplying less than 500 acre-feet per year are not required to prepare a conservation plan under this provision. Nevertheless, all entities should have a conservation component in their 40-year plans.

[c] Any county, incorporated city, town, or village, drainage, conservancy, irrigation, water and sanitation or other district, mutual domestic association, public water cooperative association, or community ditch association are considered political subdivisions of the state, and may receive state funding (NMSA 11-6-3).

[d] McKinley County could address this issue through its subdivision regulations.

NMSA = New Mexico Statutes Annotated
PRC = Public Regulation Commission
W&SD = Water and sanitation district
WUA = Water users association
MDWCA = Mutual domestic water consumers association
MDWUA = Mutual domestic water users association

5.1.2 Water Production and Metering

All production and billing data that were collected as part of the water system surveys are provided in Appendix C. Table 5-2 provides an overview of water demand for each system, including the number of meters and/or population served. Of the 22 water systems that were surveyed, 16 have production meters, although not all systems collect production meter readings. A total of 8 of the participating water systems meter customer use. Per capita demand was calculated to be less than 100 gallons per day for 6 of the participating systems that collect production data, with higher per capita use by the City of Gallup and Coal Basin Water Association (124 and 158 gallons per capita per day [gpcd], respectively). For the systems that were not able to provide demand data as part of the water system surveys, Table 5-2 includes per capita demand numbers calculated either by the OSE as a part of their recent state-wide system surveys (Longworth et al., 2008) or from data presented in system sanitary surveys prepared by NMED.

5.1.3 Well Depths and Aquifer Completions

Water systems were asked about the depths and aquifer completions for each of their wells, as a part of the water system surveys, and the information received from the systems is summarized on Table 5-3. In many cases, aquifer information is unknown, while well depths are known in most cases.

5.1.4 Water Rights

As discussed in Section 3, water supply for the participating systems is supplied by groundwater from the Gallup and Bluewater Underground Water Basins (in addition to one City of Gallup well that is within the San Juan Underground Water Basin). Of the 23 participating water systems, 16 have declared their water right with the OSE, and 1 (Manuelito Navajo Children's Home) is in the process of declaring their water right (Table 5-4).

Table 5-2. Water System Demand Overview

System	Number of Meters/Population Served	Demand		
		ac-ft/yr	ac-ft/yr per connection	gpcd
Block A Well Co-op	17 residential connections (~22 people)	4.48 [a]	0.26 [a]	42 [a]
Bluewater Acres Domestic WUA	41 full-time and 84 part-time residential connections	17.52 [b]	0.14 [b]	---
Bluewater Lake MDWCA	109 connections (system serves ~400 people; 50% are seasonal)	19.20 [c]	0.18 [c]	43 [c]
Caviggia's Trailer Park	6 connections (3 spaces are currently rented; 3 are vacant)	---	---	---
Cedar Ridge Trailer Park	19 connections (~57 people)	7.0 [d]	0.37 [d]	89 [d]
City of Gallup	5,273 meters (20,209 people)	3,459.70 [b]	0.66 [b,e]	124 [b]
Coal Basin Water Association	27 connections (67 people)	11.8 [f]	0.43 [f]	158 [f]
D&S Trailer Ranch	33 connections	---	---	---
Gamerco W&SD	430 connections (1,540 people)	151.21 [b]	0.25 [b]	87 [b]
Greer's Subdivision	50 connections (~115 people)	---	---	---
Juniper Trails Water Assocation	10 connections (24 full-time residents)	---	---	---
Manuelito Navajo Children's Home	16 connections (30 full-time [in home] and 30 part-time [at school])	5.60 [a]	0.35 [a]	71 [a]
Ramah W&SD	105 connections	244.44 [d]	2.33 [d]	485 [d]
Rehoboth Christian School	School plus 30 residences (430 students and 72 residents; total 502)	11.5 [f]	---	20 [f]
Rob Roy Trailer Park	30 connections	13.77 [d]	0.46 [d]	137 [d]
Sagebrush Water Co-op	16 connections (16 families)	24.19 [a]	1.51 [a]	408 [a]
San Mateo MDWCA	54 connections (~150 people)	---	---	---
St. Williams Mobile Home Park	24 connections	2.95 [a]	0.12 [a]	31 [a]
Thoreau High School	1,000 students and teachers (teachers live on-site)	---	---	---
Thoreau W&SD	270 connections (1,200 people)	124.11 [b]	0.46 [b]	92 [b]
Whispering Cedars Water Association	---	22.58 [d]	---	70 [d]
White Cliffs MDWUA	50 connections (200 people)	7.8 [b]	0.15 [b]	35 [b]
Yah-ta-hey W&SD	121 to 128 connections (~450 to 480 people)	25.33 [b]	0.21 [b]	50 [b]

[a] Calculated based on data from the system's sanitary survey
[b] Based on 2006 data
[c] Based on 2007 data
[d] Longworth et al., 2008
[e] Based on total number of connections (includes meters for commercial accounts)
[f] Based on 2005 data

ac-ft/yr = Acre-feet per year
gpcd = Gallons per capita per day
--- = Not available
WUA = Water users association
MDWCA = Mutual domestic water consumers association
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-3. Well Depths and Aquifer Completions by System
Page 1 of 2

System Name	Depth of Well(s) (feet) [a]	Aquifer information [a]	Comments [a]
Block A Well Co-op	690	Unknown	
Bluewater Acres Domestic WUA	336 and 297	Unknown	
Bluewater Lake MDWCA	230 and 160	Unknown	
Caviggia's Trailer Park	Unknown	Unknown	
Cedar Ridge Trailer Park	286	Unknown	
City of Gallup	900 to 2,000	Gallup Sandstone	
	1,900 to 3,000	Dakota Westwater	
Coal Basin Water Association	1,350	Gallup Sandstone	
D&S Trailer Ranch	~740	Unknown	
Gamerco W&SD	2,200	Gallup Sandstone/Dakota Westwater	Dual completion
Greer's Subdivision	~800	San Andres	This is an artesian well.
Juniper Trails Water Association	640	Unknown	
Manuelito Navajo Children's Home	427	Unknown	The static water level in this well was 85 feet in September 1993.
Ramah W&SD	180, 110, and 160	Unknown	
Rehoboth Christian School	1,500	Shinarump/Glorieta Sandstone	
Rob Roy Trailer Park	650	Unknown	
Sagebrush Water Co-op	575	Unknown	
San Mateo MDWCA	325 and 703	Unknown	
St. Williams Mobile Home Park	860	Unknown	
Thoreau High School	1,242	Unknown	

[a] Data included in this table are from the water system surveys, and have not been verified.

WUA = Water users association
MDWCA = Mutual domestic water consumers association
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-3. Well Depths and Aquifer Completions by System
Page 2 of 2

System Name	Depth of Well(s) (feet) [a]	Aquifer information [a]	Comments [a]
Thoreau W&SD	1,150 and 1,370	Sonsela/Glorieta Sandstone	
Whispering Cedars Water Association	Unknown	Unknown	
White Cliffs MDWUA	360	Wingate Sandstone/Upper Chinle Formation	
	1,611	San Andres/Chinle Formations	
Yah-ta-hey W&SD	2,078	Gallup Sandstone	The static water level in this well was 750 feet in 2004.

[a] Data included in this table are from the water system surveys, and have not been verified.

WUA = Water users association
MDWCA = Mutual domestic water consumers association
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-4. Water Rights on File for McKinley County Regionalization Project Participants
Page 1 of 3

System Name	File Number(s)	Type of Use [a]	Water Right (ac-ft/yr) [b]	Priority Date	Comments
Block A Well Co-op	G-184	PMH	---	6/03/1989	WATERS does not list the diversion for this system.
Bluewater Acres Domestic WUA	B-1174	MDW	35	6/23/1972	
Bluewater Lake MDWCA	B-1017	MDW	30	12/31/1948	
Caviggia's Trailer Park	G-142	MUL	3	---	This is a 72-12-1 well with a June 5, 1985 file date, and no priority date is listed.
Cedar Ridge Trailer Park	Undeclared Gallup Basin system			NA	This system's well is undeclared, and the date it was drilled is unknown.
City of Gallup	G-96 G-97 SJ-113	MUN MUN MUN	6,900 492 847 421	12/31/1917 12/31/1917 9/23/1976 5/20/1981	
Coal Basin Water Association	G-129	MDW	52	6/14/1917	Declaration filed in 1984.
D&S Trailer Ranch	Undeclared Gallup Basin system			NA	This system's well is undeclared, although it is a pre-basin well. The well was drilled in 1967, and the Gallup Underground Water Basin was declared on March 5, 1980.
Gamerco W&SD	G-9	MUN	289.93	3/3/1922	Application to change location of well was approved June 25, 2005.
Greer's Subdivision	Undeclared Gallup Basin system			NA	This system's well is undeclared, although it is a pre-basin well. The well was drilled in ~1978, and the Gallup Underground Water Basin was declared on March 5, 1980.

[a] PMH = Non-72-12-1 multiple household use
MDW = Community type use (MDWCA, private, or commercial supplied)
MUL = 72-12-1 multiple domestic households
MUN = Municipal use
SCH = School use
MOB = Mobile home parks
SAN = 72-12-1 sanitary in conjunction with a commercial use
SUB = Subdivision

[b] Domestic, municipal, industrial, and commercial water rights are listed as consumptive use rights. Irrigation rights list the full diversion right.

ac-ft/yr = Acre-feet per year
--- = Not available
WATERS = Water Administration Technical Engineering Resource System
WUA = Water users association
MDWCA = Mutual domestic water consumers association
NA = Not applicable
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-4. Water Rights on File for McKinley County Regionalization Project Participants
Page 2 of 3

System Name	File Number(s)	Type of Use [a]	Water Right (ac-ft/yr) [b]	Priority Date	Comments
Juniper Trails Water Association	G-101	MDW	4	12/31/1976	
Manuelito Navajo Children's Home	This system is in the process of declaring their water right in the Gallup Basin			NA	This system is in the process of declaring their well, and it is a pre-basin well. The well was drilled in 1964, and the Gallup Underground Water Basin was declared on March 5, 1980.
Ramah W&SD	Groundwater undeclared in Bluewater Basin Surface water Zuni River Basin Adjudication Ramah Sub-area Subfile: ZRB-5-0057 17 ac-ft/yr for public water supply			NA	This system's wells are undeclared, and none of this system's wells are pre-basin wells. The wells were drilled in 1964, 1966, and 1973, and the Bluewater Underground Water Basin was declared on May 21, 1956.
Rehoboth Christian School	G-894 G-895	SCH SCH	48.38 32.26	12/31/1958 10/31/1929	Declarations originally filed in 1998. Amended declarations filed in 2005. Both wells are pre-basin.
Rob Roy Trailer Park	G-352	MOB	20	5/10/1964	
Sagebrush Water Co-op	Undeclared Gallup Basin system			NA	This system has a pre-basin undeclared water right. The well was drilled in 1967, and the Gallup Underground Water Basin was declared on March 5, 1980.
San Mateo MDWCA	B-428	MDW	26	12/31/1955	
St. Williams Mobile Home Park	G-412	SAN	3	NA	This is a 72-12-1 well with a July 7, 1996 file date.

[a] PMH = Non-72-12-1 multiple household use
MDW = Community type use (MDWCA, private, or commercial supplied)
MUL = 72-12-1 multiple domestic households
MUN = Municipal use
SCH = School use
MOB = Mobile home parks
SAN = 72-12-1 sanitary in conjunction with a commercial use
SUB = Subdivision

[b] Domestic, municipal, industrial, and commercial water rights are listed as consumptive use rights. Irrigation rights list the full diversion right.

ac-ft/yr = Acre-feet per year
--- = Not available
WATERS = Water Administration Technical Engineering Resource System
WUA = Water users association
MDWCA = Mutual domestic water consumers association
NA = Not applicable
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-4. Water Rights on File for McKinley County Regionalization Project Participants
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System Name	File Number(s)	Type of Use [a]	Water Right (ac-ft/yr) [b]	Priority Date	Comments
Thoreau High School	Undeclared Bluewater Basin system			NA	The Thoreau High School well was drilled in 1981, and is undeclared. The well does not pre-date the basin (the Bluewater Underground Water Basin was declared on May 21, 1956).
Thoreau W&SD	B-386 B-562	MDW MDW	76.5 124 68	11/7/1923 10/11/1966 4/14/1978	
Whispering Cedars Water Association	G-50	SUB	200	12/31/1963	
White Cliffs MDWUA	G-2390	MDW	44	1/1/1975	Declarations for four wells were filed in 2005.
Yah-ta-hey W&SD	G-13	MDW	364.37	9/20/1962	

[a] PMH = Non-72-12-1 multiple household use
MDW = Community type use (MDWCA, private, or commercial supplied)
MUL = 72-12-1 multiple domestic households
MUN = Municipal use
SCH = School use
MOB = Mobile home parks
SAN = 72-12-1 sanitary in conjunction with a commercial use
SUB = Subdivision

[b] Domestic, municipal, industrial, and commercial water rights are listed as consumptive use rights. Irrigation rights list the full diversion right.

ac-ft/yr = Acre-feet per year
--- = Not available
WATERS = Water Administration Technical Engineering Resource System
WUA = Water users association
MDWCA = Mutual domestic water consumers association
NA = Not applicable
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

The Bluewater Underground Water Basin was declared on May 21, 1956, and the Gallup Underground Water Basin was declared on March 5, 1980. Wells for 4 systems within the Gallup Underground Water Basin that have not declared their water rights were drilled before that basin was declared; therefore, water rights for these systems are pre-basin water rights. Wells for the 2 undeclared Bluewater Underground Water Basin systems do not pre-date that basin's declaration. The date that the well at Cedar Ridge Trailer Park (in the Gallup Underground Water Basin) was drilled is unknown.

5.1.5 Operator Certifications

As shown in Table 5-5, 14 of the 23 participating systems have certified operators, while 2 of the systems (Caviggia's Trailer Park and Juniper Trails Water Association) are not required to have certified operators because they are smaller than the minimum system size for being regulated by the Safe Drinking Water Act (SDWA) (regulated systems serve at least 25 people or have at least 15 service connections for at least 60 days per year). There are 7 systems that are required to have certified operators that do not (Block A Well Co-op, Bluewater Acres Domestic WUA, Cedar Ridge Trailer Park, Coal Basin Water Association, D&S Trailer Ranch, Greers Subdivision, and Sagebrush Water Co-op).

5.1.6 Water Rate Structures

Water rates for each of the participating systems are presented on Tables 5-6 through 5-8. Of the systems that bill customers for their water use, Greers Subdivision has the least expensive water rate ($10 per month flat fee). Coal Basin Water Association charges the highest flat rate for water service ($37.00 per month flat fee). Eight systems (Bluewater Acres Domestic WUA, Bluewater Lake MDWCA, City of Gallup, Gamerco W&SD, Ramah W&SD, Thoreau W&SD, White Cliffs MDWUA, and Yah-ta-hey W&SD) have inclining block rate structures (water rates that increase based on the volume of water used). A total of 4 water systems include water service as a part of their monthly trailer space and/or mobile home rental fee, although St. Williams Mobile Home Park is currently installing customer meters, and plans to begin charging separately for water service after the meters are in place.

Table 5-5. Water System Operation

Water System	Certified Operator?	Name of Operator/Comments
Block A Well Co-op	No	Pat Sanchez operates the system, but is not a certified operator.
Bluewater Acres Domestic WUA	No	The current board is looking to hire an operator. Tom Nelson and Alex Griego have been assisting with system operation.
Bluewater Lake MDWCA	Yes	Tom Nelson
Caviggia's Trailer Park	No	A certified operator is not required for this system because it is not regulated by the SDWA (it serves fewer than 25 people and has fewer than 15 connections).
Cedar Ridge Trailer Park	No	Kim Christiansen plans to become a certified operator.
City of Gallup	Yes	Ernie Thompson is employed as the City's water and wastewater superintendent.
Coal Basin Water Association	No	Jim Brown has taken certification courses and intends to become certified.
D&S Trailer Ranch	No	Shirley Cochrane's certification has expired, and she intends to become recertified.
Gamerco W&SD	Yes	John Leever (contract)
Greer's Subdivision	No	Carol Saunders' certification has expired, and she intends to become recertified.
Juniper Trails Water Association	No	A certified operator is not required for this system because it is not regulated by the SDWA (it serves fewer than 25 people and has fewer than 15 connections).
Manuelito Navajo Children's Home	Yes	Merle Roehr
Ramah W&SD	Yes	Jeff Theeke
Rehoboth Christian School	Yes	Pete Goudzwaard
Rob Roy Trailer Park	Yes	Greg Orphey
Sagebrush Water Co-op	No	Steve Mahnke is currently certified as a utility operator, and is working towards becoming a certified operator.
San Mateo MDWCA	Yes	Alex Griego
St. Williams Mobile Home Park	Yes	Walt Ishmael
Thoreau High School	Yes	Joe Armenta
Thoreau W&SD	Yes	Sherry Botkin
Whispering Cedars Water Association	Yes	Margy Shoemaker
White Cliffs MDWUA	Yes	Mike Daly
Yah-ta-hey W&SD	Yes	Loline Hathaway

WUA = Water users association
MDWCA = Mutual domestic water consumers association
SDWA = Safe Drinking Water Act
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-6. Water Rates by System

Water System	Water Rate
Block A Well Co-op	$20.00 per month per connection.
Bluewater Acres Domestic WUA	$26.25 per month per connection, plus $0.23 per gallon used over 2,000 gallons.
Bluewater Lake MDWCA	$23.00 per month per connection, plus $1.00 per 1,000 gallon commodity charge (base rate does not include any volume of use).
Caviggia's Trailer Park	Water service is included in the monthly trailer space rental fee.
Cedar Ridge Trailer Park	Water service is included with the mobile home rental fee.
City of Gallup	See Tables 5-7 and 5-8.
Coal Basin Water Association	$37.00 per month per connection.
D&S Trailer Ranch	Water service is included with the trailer rental fee.
Gamerco W&SD	Billed at City of Gallup rates (see Tables 5-7 and 5-8).
Greer's Subdivision	$10.00 per month per connection.
Juniper Trails Water Association	$300.00 per connection per year.
Manuelito Navajo Children's Home	Water rates were raised to $35.00 per month in January 2008 (and were $15.00 per month prior to this increase).
Ramah W&SD	Water rates include a base fee plus a fee per 1,000 gallons above a base volume (the actual fees were not provided for inclusion in this table).
Rehoboth Christian School	$25.00 per month per connection (excludes school).
Rob Roy Trailer Park	$35.00 per month per connection (billed quarterly).
Sagebrush Water Co-op	$20.00 per month per connection.
San Mateo MDWCA	$20.00 per month per connection.
St. Williams Mobile Home Park	Water service is included with the mobile home rental fee.
Thoreau High School	None of the connections are billed.
Thoreau W&SD	Water rates include an $11.08 base fee, plus $1.68 per 1,000 gallons used.
White Cliffs MDWUA	Increased water rates became effective in April 2008: $21.00 per month for less than 3,000 gallons $26.00 per month for 3,000-5,000 gallons $25.00 per month, plus $3.00 per 1,000 gallons for use of more than 5,000 gallons per month
Yah-ta-hey W&SD	$9.40 per month base rate, plus $0.20 per 100 gallons for use of more than 3,000 gallons. An additional $20.00 per month surcharge is currently billed for each connection, in order to help balance the budget.

WUA = Water users association
MDWCA = Mutual domestic water consumers association
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-7. City of Gallup Water Monthly Service Charges

Meter Size (inches)	Charge	
	Single-Family Residential Dwellings [a]	Nonresidential/Commercial Facilities [b]
⅝ – 2	$7.02	---
⅝	---	$7.02
1	---	$15.68
1½	---	$29.33
2	---	$43.27
3	---	$94.05
4	---	$150.48
6	---	$326.04
8	---	$581.86

Source: City of Gallup, 2007
[a] Applies where there is no more than one residence per meter of not more than 2-inches in size
[b] Also applies to residential dwellings with more than one meter
--- = Not applicable

Table 5-8. City of Gallup Current Water Commodity Charges

Range (cubic feet per month)	Fee per cubic foot ($)	
	Residential	Nonresidential/ Commercial
0 – 500	0.014830	---
501 – 1,000	0.022000	---
1,001 – 2,000	0.037000	---
2,001 – 5,000	0.059000	---
Over 5,000	0.068000	---
0 – 1,000	---	0.030686
1,001 – 2,000	---	0.031519
2,001 – 4,000	---	0.034714
4,001 – 100,000	---	0.037500
Over 100,000	---	0.037538
Separately metered irrigation	---	0.053286

Source: City of Gallup, 2007
--- = Not applicable

5.1.7 Financial Information

A summary of the financial information obtained from each of the participating systems is presented in Table 5-9. In addition, the water system survey for Thoreau W&SD includes a detailed financial statement for the 2006-2007 fiscal year.

5.1.8 Water Quality

Water quality data were obtained from the NMED Drinking Water Bureau, and were compared to national primary drinking water standards (primary standards) (U.S. EPA, 2007a), state of New Mexico human health standards (New Mexico Water Quality Control Commission [NMWQCC] standards) (NMWQCC, 2007), and national secondary drinking water standards (secondary standards) (U.S. EPA, 2007b). Secondary standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water (U.S. EPA, 2007b).

Water quality standard exceedances for the 19 participating systems that are regulated by NMED are shown on Table 5-10, and a summary of notable exceedances follows.

- White Cliffs MDWUA had two arsenic detections (in 1998 and 2001) at concentrations that are more than 3 times the new primary standard of 10 micrograms per liter (µg/L). However, these detections did not exceed the primary standard of 50 µg/L that was in effect at that time (the new standard went into effect on January 23, 2006).

- The cyanide concentration detected in a sample taken from Ramah W&SD's Well #3 in December 2003 was almost 4 times the primary and NMWQCC standards.

- The Thoreau High School well had an exceedance of the primary standard for di(2-ethylhexyl) phthalate in 2005. This analyte was not detected in the repeat sample that was collected or in any samples collected since (Armenta, 2008).

Table 5-9. Water System Financial Information
Page 1 of 2

Water System	Length of Billing Cycle	Billing Software Used	Estimated Number of Customers that Pay Their Bill Each Month	Description of the System's Annual Operating Budget	Does the System Have an Emergency Fund?	Has the System Secured any Grants or Other Funding?
Block A Well Co-op	One month	None	Most customers pay on time (non-payment is not a large issue).	No written budget is available, but expenses are addressed as they arise.	Yes. This system tries to keep $7,000 to $8,000 on hand in case of emergency.	No
Bluewater Acres Domestic WUA	One month	Microsoft Excel	Almost 100%	The board worked with Rural Community Assistance Corporation (RCAC) to come up with a new, workable budget this fall and plan to raise rates as a result of this work.	Yes. This system has two $10,000 certificates of deposit, and a savings of ~$6,000.	Yes, including $100,000 from the New Mexico Environment Department Construction Programs Bureau (NMED-CPB) in 2007, $50,000 from the NMED-CPB in 2005, and $75,000 from the state legislature in 2005.
Bluewater Lake MDWCA	One month	The system just purchased billing software from TAK Technology in Los Ojos, New Mexico.	One to two customers fail to pay each month, so 98 to 99% pay on time.	The system's annual operating budget is approximately $30,000 per year.	Yes. The system doesn't spend the membership fees that have been paid ($100 each for 109 customers), but can spend the interest that is earned on this money. They have savings, and address any issues as they arise.	Yes. The system received $500,000 in Community Development Block Grant (CDBG) funding in 1984, which was used to purchase the water system from the previous private owner and to upgrade the system.
Caviggia's Trailer Park	Not applicable. Water service is included in monthly rent paid by customers.	Not applicable	Not applicable	The water system is part of the trailer park business, and does not have a separate budget.	No	No
Cedar Ridge Trailer Park	Not applicable. Water service is included in monthly rent paid by customers.	Not applicable	Not applicable	The water system is part of the trailer park business, and does not have a separate budget.	No	No
City of Gallup	Averages 30 days	iSeries DB2 database and the HTE corporation integrated application software suite.	Information not available	Information not available	Information not available	Yes, including Water Trust Board grants in 2008 and 2007.
Coal Basin Water Association	One month	Microsoft Excel	95%	The system's annual operating budget is approximately $11,000.	Yes. The system has four certificates of deposit ($34,000).	No
D&S Trailer Ranch	Not applicable. Water service is included in monthly rent paid by customers.	Not applicable	Not applicable	The water system is part of the trailer park business, and does not have a separate budget.	No	No
Gamerco W&SD	City of Gallup handles billing.	Not applicable	Unknown	Not available	Unknown	Yes. Capital outlay of $230,000 between 2002 and 2007 for W&SD improvements.
Greer's Subdivision	One month	None	All	The monthly flat fee that customers pay goes into a maintenance fund, and there is no real budget (they pay for things as they go). They are saving money to replace the existing water lines now.	Yes, the system has a maintenance fund.	No
Juniper Trails Water Association	One year	None	All	System income is $3,000 per year, and expenses are covered as they arise.	Yes	No

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MDWCA = Mutual domestic water consumers association
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-9. Water System Financial Information
Page 2 of 2

Water System	Length of Billing Cycle	Billing Software Used	Estimated Number of Customers that Pay Their Bill Each Month	Description of the System's Annual Operating Budget	Does the System Have an Emergency Fund?	Has the System Secured any Grants or Other Funding?
Manuelito Navajo Children's Home	One month	None	100%	The Children's Home does not have a stand-alone budget for the water system, and cover expenses out of the general accounts, as needed.	No. Needs are taken care of as they arise.	No
Ramah W&SD	One month	Core Utilities	95% (5 to 6 customers fail to pay each month).	Information not available	Yes	No
Rehoboth Christian School	One month	None	100%	All utilities costs are part of the annual school budget.	Yes, but it is all for school emergencies.	No
Rob Roy Trailer Park	Quarterly	None	75% (water is turned off for non-payment, as needed).	Income is $180 per month (the system has 6 paying customers) or $2,000 per year. System expenses exceed income, and Greg Orphey makes up the difference.	Yes. The system has a $2,500 emergency fund.	No
Sagebrush Water Co-op	One month	None	90% (a few customers are slow to pay their bills).	The system does not have a budget, and just pays for things as needed.	Yes	No
San Mateo MDWCA	One month	None	95%	Expenses generally run $13,000 per year, and income covers expenses, in addition to providing a bit of money for an emergency reserve.	Yes	Yes. The system received a grant from the state legislature last year, to be used towards drilling the replacement well that is needed.
St. Williams Mobile Home Park	Not applicable. Water service is included in monthly rent paid by customers.	Not applicable	Not applicable	The water system is part of the mobile home park business, and does not have a separate budget.	The mobile home park has an emergency fund, and water system issues are addressed as they arise (paid for by the business as a whole).	No
Thoreau High School	Not applicable. Water service is unbilled (it is free to the school).	Not applicable	Not applicable	There is not a separate budget for the water system; it is just run as one part of the school.	The school has a large emergency fund, but it is not just for water.	No
Thoreau W&SD	30 days	Q&A Version 4.0	90%	The operating budget is submitted to the New Mexico Department of Finance (NMDFA) for approval each year. The district's fiscal year runs from July 1 through June 30. A detailed financial statement for the 2006-2007 fiscal year is included as a part of this system's water system survey.	Yes	Yes. The system received a capital outlay appropriation to be used for wastewater improvements.
White Cliffs MDWUA	30 days	Microsoft Excel	95%	The system's annual operations budget is $24,000.	Yes. 2007 reserve was $6,885.	Yes. $725,000 capital outlay to replace sewer system plus $100,000 for the water system.
Yah-ta-hey W&SD	One month	QuickWater	70 to 75% (30 to 40 connections are unpaid out of 121 to 128 connections total).	System keeps detailed accounting and budget records.	Yes. As of February 2007, the system had $8,000 in a certificate of deposit account.	Yes. The system received $100,000 from the state legislature in 2005, and owes approximately $5,400 on a New Mexico Finance Authority loan (due April 2008).

WUA = Water users association
MDWCA = Mutual domestic water consumers association
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-10. Water Quality Standard Exceedances
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Parameter	Applicable Water Quality Standards	Standard Exceedance	Sample Collection Date	System Name	City	Location of Sample
Arsenic	0.010 mg/L (10 µg/L) [a] 0.10 mg/L (100 µg/L) [b]	0.0111 mg/L 0.012 mg/L 0.011 mg/L 0.011 mg/L 0.032 mg/L 0.024 mg/L 0.011 mg/L 0.013 mg/L 0.021 mg/L 0.011 mg/L	3/14/2007 12/09/2004 6/14/1994 11/21/1996 9/19/2001 11/17/1998 2/06/1996 2/06/1996 2/06/1996 1/24/1994	Manuelito Navajo Children's Home Manuelito Navajo Children's Home Manuelito Navajo Children's Home Rob Roy Trailer Park White Cliffs MDWUA White Cliffs MDWUA White Cliffs MDWUA White Cliffs MDWUA White Cliffs MDWUA White Cliffs MDWUA	Gallup Gallup Gallup Mentmore Gallup Gallup Gallup Gallup Gallup Gallup	Well #1 Well #1 Well #1 Well #1 Well #3 Entry point #1 Well #1 Well #2 Well #3 Well #3
Beryllium, total	0.004 mg/L [a]	0.0054 mg/L	9/20/2006	Rehoboth Christian School	Gallup	Distribution system
Cadmium	0.005 mg/L [a] 0.01 mg/L [b]	0.011 mg/L	11/18/1998	Ramah W&SD	Ramah	Well #3 (Coffey)
Combined radium (Ra-226 and Ra-228)	5 pCi/L [a] 30 pCi/L [b]	5.71 pCi/L 5.53 pCi/L	11/11/2003 9/18/2003	Thoreau High School Thoreau High School	Thoreau Thoreau	Well #1 Well #1
Cyanide	0.2 mg/L [a,b]	0.792 mg/L	12/03/2003	Ramah W&SD	Ramah	Well #3 (Coffey)
Di(2-ethylhexyl) phthalate	0.006 mg/L (6 µg/L) [a]	10.4 µg/L	8/24/2005	Thoreau High School	Thoreau	Well #1
Fluoride	4.0 mg/L [a] 2.0 mg/L [c] 1.6 mg/L [b]	2.47 mg/L 2.42 mg/L 1.7 mg/L 2.6 mg/L 1.88 mg/L 1.77 mg/L	2/24/2005 3/19/2002 9/30/1997 9/24/1996 3/12/2001 11/16/1998	Gallup Water System Gallup Water System Gallup Water System Gallup Water System Manuelito Navajo Children's Home Manuelito Navajo Children's Home	Gallup Gallup Gallup Gallup Gallup Gallup	Colaianni Colaianni Colaianni Galanis Distribution system Well #1

[a] National Primary Drinking Water Standard (U.S. EPA, 2007a)
[b] State of New Mexico Human Health Standard (NMWQCC, 2007)
[c] National Secondary Drinking Water Standard (U.S. EPA, 2007b)
[d] For water systems that collect fewer than 40 routine samples per month, no more than one sample per month can be total coliform-positive.

mg/L = Milligrams per liter
µg/L = Micrograms per liter
MDWUA = Mutual domestic water users association
pCi/L = Picocuries per liter
W&SD = Water and sanitation district
MDWCA = Mutual domestic water consumers association
WUA = Water users association
cfu/100 mL = Colony-forming units per 100 milliliters
NTU = Nephelometric turbidity units

Table 5-10. Water Quality Standard Exceedances
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Parameter	Applicable Water Quality Standards	Standard Exceedance	Sample Collection Date	System Name	City	Location of Sample
Fluoride (cont.)	4.0 mg/L [a]	1.9 mg/L	11/21/1996	Manuelito Navajo Children's Home	Gallup	Well #1
	2.0 mg/L [c]	1.89 mg/L	5/27/1992	Manuelito Navajo Children's Home	Gallup	Distribution system
	1.6 mg/L [b]	1.81 mg/L	12/14/2004	Rob Roy Trailer Park	Mentmore	Well #1
		1.74 mg/L	3/13/2001	Rob Roy Trailer Park	Mentmore	Distribution system
		4.12 mg/L	01/11/2005	San Mateo MDWCA	San Mateo	Well #1
		4.93 mg/L	11/22/2004	San Mateo MDWCA	San Mateo	Well #1
		1.64 mg/L	12/14/2004	St. Williams Mobile Home Park	Mentmore	Well #1
		2 mg/L	3/17/1997	St. Williams Mobile Home Park	Mentmore	Well #1
		1.92 mg/L	11/06/2003	Whispering Cedars Water	Jamestown	Well #1
		2.6 mg/L	3/20/2000	Association	Gallup	Entry point #1
		2.6 mg/L	10/02/1997	White Cliffs MDWUA	Gallup	Entry point #1
		2.72 mg/L	1/25/1994	White Cliffs MDWUA	Gallup	Well #1
		1.67 mg/L	7/30/1992	White Cliffs MDWUA	Gallup	Distribution system
Iron	1.0 mg/L [b]	10.6 mg/L	10/02/1997	Block A Well Co-op/William Acres	Gallup	Well #1
	0.3 mg/L [c]	0.779 mg/L	10/02/1997	Coal Basin Water Association	Gallup	Well #1
Lead	0.015 mg/L [a]	0.019 mg/L	9/30/1997	Block A Well Co-op/William Acres	Gallup	Distribution system
	0.05 mg/L [b]	0.018 mg/L	10/11/2005	Bluewater Acres Domestic WUA	Thoreau	Distribution system
		0.02 mg/L	6/25/2001	Bluewater Acres Domestic WUA	Thoreau	Distribution system
		0.024 mg/L	6/25/2001	Bluewater Acres Domestic WUA	Thoreau	Distribution system
		0.02 mg/L	6/27/2001	Bluewater Lake MDWCA	Bluewater	Distribution system
		0.018 mg/L	9/30/1997	Cedar Ridge Trailer Park	Gallup	Distribution system
		0.023 mg/L	3/12/2001	Coal Basin Water Association	Gallup	Distribution system
		0.08 mg/L	9/24/2004	Ramah Water & Sanitation District	Ramah	Distribution system
		0.031 mg/L	10/08/2003	San Mateo MDWCA	San Mateo	Well #1
		0.018 mg/L	9/22/2005	St. Williams Mobile Home Park	Mentmore	Distribution system

[a] National Primary Drinking Water Standard (U.S. EPA, 2007a)
[b] State of New Mexico Human Health Standard (NMWQCC, 2007)
[c] National Secondary Drinking Water Standard (U.S. EPA, 2007b)
[d] For water systems that collect fewer than 40 routine samples per month, no more than one sample per month can be total coliform-positive.

mg/L = Milligrams per liter
µg/L = Micrograms per liter
MDWUA = Mutual domestic water users association
pCi/L = Picocuries per liter
W&SD = Water and sanitation district
MDWCA = Mutual domestic water consumers association
WUA = Water users association
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NTU = Nephelometric turbidity units

Table 5-10. Water Quality Standard Exceedances
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Parameter	Applicable Water Quality Standards	Standard Exceedance	Sample Collection Date	System Name	City	Location of Sample
Lead (cont.)	0.015 mg/L [a] 0.05 mg/L [b]	0.25 mg/L 0.031 mg/L	9/23/2004 9/26/2001	Thoreau High School Whispering Cedars Water Association	Thoueau Jamestown	Distribution system Distribution system
Manganese	0.2 mg/L [b] 0.05 mg/L [c]	0.624 mg/L 4.454676 mg/L 2.640916 mg/L 2.44 mg/L 0.448 mg/L 0.07 mg/L 1.3 mg/L 0.92 mg/L 0.81 mg/L 0.393 mg/L	10/02/1997 10/27/2003 10/27/2003 10/29/1997 9/18/2000 10/02/1997 12/03/2003 12/03/2003 11/05/1997 11/05/1997	Block A Well Co-op/William Acres Bluewater Lake MDWCA Bluewater Lake MDWCA Bluewater Lake MDWCA Cedar Ridge Trailer Park Coal Basin Water Association Ramah W&SD Ramah W&SD Ramah W&SD Ramah W&SD	Gallup Bluewater Bluewater Bluewater Gallup Gallup Ramah Ramah Ramah Ramah	Well #1 Well #1 Well #2 Well #2 Distribution system Well #1 Well #1 (Highway) Well #3 (Coffey) Well #3 (Coffey) Well #4 (Lambson)
pH	6.0 to 9.0 [b] 6.5 to 8.5 [c]	8.93 8.68 8.72 9.0 8.54 8.51 8.53 8.55 8.60 8.60 8.63 8.71	10/02/1997 10/02/1997 8/20/1997 3/28/2007 3/05/2001 9/30/1997 9/30/1997 9/30/1997 9/30/1997 9/30/1997 9/30/1997 9/30/1997	Block A Well Co-op/William Acres Coal Basin Water Association D&S Trailer Ranch Gallup Water System Gallup Water System Gallup Water System Gallup Water System Gallup Water System Gallup Water System Gallup Water System Gallup Water System Gallup Water System	Gallup Gallup Gallup Gallup Gallup Gallup Gallup Gallup Gallup Gallup Gallup Gallup	Well #1 Well #1 Well #1 Erwin Well #17 Junker #1 Well #16 Well #15 Junker #2 Ray #1 Colaianni Allen

[a] National Primary Drinking Water Standard (U.S. EPA, 2007a)
[b] State of New Mexico Human Health Standard (NMWQCC, 2007)
[c] National Secondary Drinking Water Standard (U.S. EPA, 2007b)
[d] For water systems that collect fewer than 40 routine samples per month, no more than one sample per month can be total coliform-positive.

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Table 5-10. Water Quality Standard Exceedances
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Parameter	Applicable Water Quality Standards	Standard Exceedance	Sample Collection Date	System Name	City	Location of Sample
pH (cont.)	6.0 to 9.0 [b]	8.72	9/30/1997	Gallup Water System	Gallup	Erwin
	6.5 to 8.5 [c]	8.80	9/30/1997	Gallup Water System	Gallup	Lewis #1
		8.63	8/20/1997	Manuelito Navajo Children's Home	Gallup	Well #1
		8.74	10/02/1997	Rob Roy Trailer Park	Mentmore	Well #1
		8.94	10/02/1997	Sagebrush Water Co-op		Well #2
		8.90	6/25/1997	St. Williams Mobile Home Park	Mentmore	Well #1
		8.52	10/02/1997	White Cliffs MDWUA	Gallup	Entry point #1
		8.97	11/16/1998	Yah Ta Hey W&SD	Ya-Ta-Hey	Well #2
Sulfate	600 mg/L [b]	260 mg/L	7/24/1997	Bluewater Acres Domestic WUA	Thoreau	Well #1
	250 mg/L [c]	261 mg/L	10/29/1997	Bluewater Lake MDWCA	Bluewater	Well #1
		257 mg/L	5/17/1994	Bluewater Lake MDWCA	Bluewater	Well #1
		251 mg/L	5/17/1994	Bluewater Lake MDWCA	Bluewater	Well #2
		283 mg/L	3/28/2007	Gallup Water System	Gallup	Erwin
		293 mg/L	3/28/2007	Gallup Water System	Gallup	Erwin
		419 mg/L	3/05/2001	Gallup Water System	Gallup	Well #17
		423 mg/L	3/05/2001	Gallup Water System	Gallup	Well #17
		436 mg/L	9/30/1997	Gallup Water System	Gallup	Junker #2
		298 mg/L	9/30/1997	Gallup Water System	Gallup	Erwin
		338 mg/L	9/30/1997	Gallup Water System	Gallup	Ray #1
		344 mg/L	9/30/1997	Gallup Water System	Gallup	Junker #1
		360 mg/L	9/30/1997	Gallup Water System	Gallup	Well #15
		256 mg/L	9/30/1997	Gallup Water System	Gallup	Well #11
		384 mg/L	9/30/1997	Gallup Water System	Gallup	Well #16
		397 mg/L	9/30/1997	Gallup Water System	Gallup	Munoz
		500 mg/L	9/30/1997	Gallup Water System	Gallup	Colaianni
		521 mg/L	9/30/1997	Gallup Water System	Gallup	Colaianni

[a] National Primary Drinking Water Standard (U.S. EPA, 2007a)
[b] State of New Mexico Human Health Standard (NMWQCC, 2007)
[c] National Secondary Drinking Water Standard (U.S. EPA, 2007b)
[d] For water systems that collect fewer than 40 routine samples per month, no more than one sample per month can be total coliform-positive.

mg/L = Milligrams per liter
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MDWUA = Mutual domestic water users association
pCi/L = Picocuries per liter
W&SD = Water and sanitation district
MDWCA = Mutual domestic water consumers association
WUA = Water users association
cfu/100 mL = Colony-forming units per 100 milliliters
NTU = Nephelometric turbidity units

Table 5-10. Water Quality Standard Exceedances
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Parameter	Applicable Water Quality Standards	Standard Exceedance	Sample Collection Date	System Name	City	Location of Sample
Sulfate (cont.)	600 mg/L [b]	486 mg/L	3/17/1997	Gallup Water System	Gallup	Galanis
	250 mg/L [c]	826 mg/L	9/24/1996	Gallup Water System	Gallup	Galanis
		277 mg/L	7/19/1994	Gallup Water System	Gallup	Erwin
		253 mg/L	6/14/1994	Gallup Water System	Gallup	Junker #2
		257 mg/L	6/14/1994	Gallup Water System	Gallup	Well #11
		379 mg/L	6/14/1994	Gallup Water System	Gallup	Well #15
		382 mg/L	6/14/1994	Gallup Water System	Gallup	Junker #1
		408 mg/L	6/14/1994	Gallup Water System	Gallup	Well #16
		421 mg/L	6/14/1994	Gallup Water System	Gallup	Munoz
		369 mg/L	5/17/1994	Gallup Water System	Gallup	Ray #1
		322 mg/L	11/05/1991	Gallup Water System	Gallup	Distribution System
		277 mg/L	8/20/1997	Manuelito Navajo Children's Home	Gallup	Well #1
		272 mg/L	11/21/1996	Manuelito Navajo Children's Home	Gallup	Well #1
		491 mg/L	3/14/2000	Rehoboth Christian School	Gallup	Entry point #1
		526 mg/L	8/19/1997	Rehoboth Christian School	Gallup	Entry point #1
		262 mg/L	3/17/1997	St. Williams Mobile Home Park	Mentmore	Well #1
		307 mg/L	10/02/1997	Whispering Cedars Water	Jamestown	Well #2
		635 mg/L	9/19/2001	Association	Gallup	Well #3
		1,210 mg/L	9/13/2000	White Cliffs MDWUA	Gallup	Entry point #1
		2,080 mg/L	3/20/2000	White Cliffs MDWUA	Gallup	Entry point #1
		1,830 mg/L	10/02/1997	White Cliffs MDWUA	Gallup	Entry point #1
		2,437 mg/L	1/25/1994	White Cliffs MDWUA	Gallup	Well #1
		2,066 mg/L	1/25/1994	White Cliffs MDWUA	Gallup	Well #2
		2,059 mg/L	1/25/1994	White Cliffs MDWUA	Gallup	Well #3
		357 mg/L	11/16/1998	White Cliffs MDWUA	Ya-ta-hey	Well #2

[a] National Primary Drinking Water Standard (U.S. EPA, 2007a)
[b] State of New Mexico Human Health Standard (NMWQCC, 2007)
[c] National Secondary Drinking Water Standard (U.S. EPA, 2007b)
[d] For water systems that collect fewer than 40 routine samples per month, no more than one sample per month can be total coliform-positive.

mg/L = Milligrams per liter
µg/L = Micrograms per liter
MDWUA = Mutual domestic water users association
pCi/L = Picocuries per liter
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Table 5-10. Water Quality Standard Exceedances
Page 6 of 6

Parameter	Applicable Water Quality Standards	Standard Exceedance	Sample Collection Date	System Name	City	Location of Sample
Total coliforms (including fecal coliform and *E. coli*)	No more than 5.0% samples total coliform-positive in a month [a,d]	1 cfu/100 mL	6/06/2006	Bluewater Acres Domestic WUA	Thoreau	Distribution System
		1 cfu/100 mL	6/08/2006	Bluewater Acres Domestic WUA	Thoreau	Distribution System
		1 cfu/100 mL	6/08/2006	Bluewater Acres Domestic WUA	Thoreau	Distribution System
		1 cfu/100 mL	7/18/2006	Gallup Water System	Gallup	Distribution System
		1 cfu/100 mL	7/18/2006	Gallup Water System	Gallup	Distribution System
		1 cfu/100 mL	2/17/2005	Gallup Water System	Gallup	Distribution System
		1 cfu/100 mL	2/15/2005	Gallup Water System	Gallup	Distribution System
Total dissolved solids	1,000 mg/L [b] 500 mg/L [c]	1,280 mg/L	3/05/2001	Gallup Water System	Gallup	Well #17
		544 mg/L	9/30/1997	Gallup Water System	Gallup	Well #12
		562 mg/L	9/30/1997	Gallup Water System	Gallup	Allen
		566 mg/L	9/30/1997	Gallup Water System	Gallup	Lewis #1
		634 mg/L	9/30/1997	Gallup Water System	Gallup	Well #10
		640 mg/L	9/30/1997	Gallup Water System	Gallup	Well #11
		814 mg/L	9/30/1997	Gallup Water System	Gallup	Well #15
		816 mg/L	9/30/1997	Gallup Water System	Gallup	Erwin
		816 mg/L	9/30/1997	Gallup Water System	Gallup	Junker #1
		822 mg/L	9/30/1997	Gallup Water System	Gallup	Ray #1
		822 mg/L	9/30/1997	Gallup Water System	Gallup	Well #16
		1,040 mg/L	9/30/1997	Gallup Water System	Gallup	Junker #2
		1,040 mg/L	9/30/1997	Gallup Water System	Gallup	Munoz
		1,210 mg/L	9/30/1997	Gallup Water System	Gallup	Colaianni
Turbidity	1 NTU [a]	17.2 NTU	3/05/2001	Gallup Water System	Gallup	Well #17
		0.72 NTU	11/05/1991	Gallup Water System	Gallup	Distribution System
		1.16 NTU	11/05/1997	Ramah W&SD	Ramah	Well #4 (Lambson)

[a] National Primary Drinking Water Standard (U.S. EPA, 2007a)
[b] State of New Mexico Human Health Standard (NMWQCC, 2007)
[c] National Secondary Drinking Water Standard (U.S. EPA, 2007b)
[d] For water systems that collect fewer than 40 routine samples per month, no more than one sample per month can be total coliform-positive.

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- Water samples from 3 water systems have exceeded the primary standard of 2.0 milligrams per liter (mg/L) for fluoride (Gallup Water System, St. Williams Mobile Home Park, and White Cliffs MDWUA). Water samples from 7 water systems have exceeded the NMWQCC standard of 1.6 mg/L (Gallup Water System, Manuelito Navajo Children's Home, Rob Roy Trailer Park, San Mateo MDWCA, St. Williams Mobile Home Park, Whispering Cedars Water Association, and White Cliffs MDWUA). Samples from San Mateo MDWCA's Well #1 are the only samples that have exceeded the primary standard of 4 mg/L. That well is no longer in service due to high fluoride concentration.

- A sample collected from the Thoreau High School distribution system in 2004 exceeded the primary and NMWQCC standards for lead. The sample collection method caused this exceedance, and lead was not detected in the repeat sample (Armenta, 2008).

- Multiple water samples from Bluewater Lake MDWCA and Ramah W&SD have exceeded the NMWQCC and secondary standards for manganese.

- Water samples from Gallup Water System and White Cliffs MDWUA have exceeded the NMWQCC standard of 600 mg/L for sulfate. Water samples from 9 water systems (Bluewater Acres Domestic WUA, Bluewater Lake MDWCA, Gallup Water System, Manuelito Navajo Children's Home, Rehoboth Christian School, St. Williams Mobile Home Park, Whispering Cedars Water Association, White Cliffs MDWUA, and Yah-ta-hey W&SD) have exceeded the secondary standard of 250 mg/L for sulfate.

5.1.9 Water Conservation

As part of the water system surveys, systems were asked about any water conservation measures currently in place. This information is summarized in Table 5-11. Almost all of the participating systems employ some conservation measures. Of the 22 interviewed systems, 8 discourage or prohibit outdoor water use, and 4 prohibit car washing. As discussed in Section 5.1.6, 8 systems have inclining block water rate structures.

Table 5-11. Water Conservation Measures by System
Page 1 of 2

Water System	Water Conservation Measures
Block A Well Co-op	System discourages car washing and lawn irrigation.
Bluewater Acres Domestic WUA	Customers conserve due to the cost of water, and sprinkler systems are not allowed. The system has an inclining block water rate structure.
Bluewater Lake MDWCA	System has an inclining block water rate structure, which encourages conservation.
Caviggia's Trailer Park	None.
Cedar Ridge Trailer Park	System has no outside taps; water is only used indoors.
City of Gallup	The City has an extensive water conservation program. Conservation measures include an inclining block water rate structure, xeriscape and plumbing retrofit rebates, customer meter replacement, wastewater reuse, public education, and water conservation enforcement. The City is also currently updating its water conservation and 40-year planning documents.
Coal Basin Water Association	System does not have a conservation plan in place, but is currently installing residential water meters, and plans to track water use once they are installed.
D&S Trailer Ranch	The trailer park has no lawns, and car washing is prohibited.
Gamerco W&SD	System receives water supply from the City of Gallup, and the City's inclining block water rate structure encourages conservation. System customers also receive information from Gallup about its conservation plan and program.
Greer's Subdivision	The system has very little outdoor water use.
Juniper Trails Water Association	No conservation measures are mandated, although water use is low. The covenants allow only one horse per acre.
Manuelito Navajo Children's Home	Water is sold strictly for household use (there is no outdoor watering).
Ramah W&SD	System has an inclining block water rate structure. Surface water from Ramah Lake is used for irrigation in Ramah, so little water is supplied for outdoor water use by the system.
Rehoboth Christian School	System has implemented numerous conservation measures, including xeriscaping existing landscaping and the installation of low-flow toilets in multiple school buildings. Water use has declined over time, even though the population being served has increased.
Rob Roy Trailer Park	Car washing and washing machines are prohibited. The system has plans to begin using graywater for landscaping and clothes washing. Water has been rationed in the past when the well was down.
Sagebrush Water Co-op	The system's customers are pretty conservative with their water use, although there are no actual water conservation measures in place.
San Mateo MDWCA	Water conservation measures have been used in the past when storage is getting low (customers are asked to conserve when necessary). Customers are pretty conservative in their water use.

WUA = Water users association
MDWCA = Mutual domestic water consumers association
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 5-11. Water Conservation Measures by System
Page 2 of 2

Water System	Water Conservation Measures
St. Williams Mobile Home Park	Car washing is prohibited, low-flow toilets are used, and the system does not allow lawns (decorative rocks are used instead). Water-efficient showerheads have been installed in the trailers owned by the system owners, and the system operates at low pressures. Customer meters are currently being installed.
Thoreau High School	None.
Thoreau W&SD	System provides public and in-school education, is working to reduce non-revenue water, and has an inclining block water rate structure.
White Cliffs MDWUA	System has a conservation plan, inclining block water rate structure, recently installed customer water meters, and has been working with customers to address leaks and excess use. These efforts have reduced water use by 38 percent.
Yah-ta-hey W&SD	System has an inclining block water rate structure. The meter reader has been trained to watch for leaks, and customers are contacted if there is a significant change in their water use patterns (water is shut off if necessary).

WUA = Water users association
MDWCA = Mutual domestic water consumers association
WS&D = Water and sanitation district
MDWUA = Mutual domestic water users association

5.2 Water System Issues Identified

This section summarizes water system issues and concerns and any potential regionalization opportunities, as identified through the interviews that were conducted. Distribution system maps were largely unavailable for the participating systems; maps that were obtained are presented in Appendix F. Water system infrastructure needs and management issues are summarized in Tables 5-12 and 5-13, respectively.

5.2.1 Block A Well Co-op

The Block A Well Co-op is concerned about the possibility of running out of water, as well as who will run the system after Pat Sanchez and Randy Martin are unable to do so. This system strongly supports the Williams Acres W&SD wastewater regionalization project, and would be interested in regionalizing the water system as well, either by regionalizing with the other Williams Acres W&SD affiliated systems or by hooking onto Gallup.

5.2.2 Bluewater Acres Domestic WUA

Bluewater Acres Domestic WUA does not have any major issues or concerns, although they do need to redrill their Well #1 and to build a building to use for system administration. This system is in favor of regionalization, especially of wastewater, but no regionalization opportunities are apparent at this time.

5.2.3 Bluewater Lake MDWCA

The Bluewater Lake MDWCA system is concerned about the 30 to 35 abandoned wells that are located in the community and their potential impact on groundwater quality. There is also concern over the adequacy of septic systems, specifically the lot size for these systems, as all wastewater is treated by septic systems in this community. The only regionalization opportunity that is obvious at this time would be with the New Mexico State Parks system at Bluewater Lake. Regionalization would allow this system to grow, but no priority projects are apparent.

Table 5-12. Water System Infrastructure Needs
Page 1 of 3

Water System	Well Problems	Storage Problems	Metering Issues	Other Issues
Block A Well Co-op	System is concerned over relying on one well for their source of supply.	None noted.	System needs to collect production meter readings.	None noted.
Bluewater Acres Domestic WUA	System needs to drill a replacement for Well #1 (due to its fluoride concentration).	This system needs to replace its 10,000-gallon poly storage tank.	None noted.	System needs to abandon and replace some of their distribution lines.
Bluewater Lake MDWCA	None noted.	None noted.	None noted.	System is concerned over the adequacy of the existing septic systems.
Caviggia's Trailer Park	None noted.	None noted.	None noted.	None noted.
Cedar Ridge Trailer Park	None noted.	None noted.	None noted.	System distribution lines need to be replaced.
City of Gallup	None noted.	None noted.	None noted.	None noted.
Coal Basin Water Association	None noted.	None noted	None noted	System is on septic and would like to have sanitation services.
D&S Trailer Ranch	None noted.	None noted.	None noted.	None noted.
Gamerco W&SD	Well is inoperable. Needs a new well.	Storage is inadequate; a new distribution storage tank is needed.	Many of the system's meters need to be repaired or replaced.	Inadequate fire protection, lack of isolation valves, and lines need replacement.
Greer's Subdivision	System is concerned over the potential impacts to their well from the City of Gallup's pumping.	None noted.	System needs to install a production meter.	System distribution lines need to be replaced. System is concerned over the adequacy of the existing septic systems.

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Table 5-12. Water System Infrastructure Needs
Page 2 of 3

Water System	Well Problems	Storage Problems	Metering Issues	Other Issues
Juniper Trails Water Association	System is concerned over the potential impacts to their well from the City of Gallup's pumping.	None noted.	System needs to collect production meter readings.	System is concerned about their water quality, and customers are not drinking this water as a result of this concern (drinking water is purchased).
Manuelito Navajo Children's Home	System is concerned over relying on one well for their source of supply.	None noted.	System needs to install a production meter.	System is concerned over the arsenic concentrations in their well, and will likely need a treatment system.
Ramah W&SD	The production meters on two of the three system wells are not functional and need to either be repaired or replaced.	None noted.	System needs to repair or replace the two production meters that are not operational.	System needs to replace their existing distribution system, and needs funding to do so. They also need to modify the existing system so that all produced water is pumped directly into the storage tank to be treated (not directly into the distribution system)
Rehoboth Christian School	None noted.	None noted.	None noted.	System upgrades are needed. Main distribution line should be replaced.
Rob Roy Trailer Park	System relies on one well, and has recurring problems with it.	System needs a new 2,500-gallon storage tank.	System has plans to install a production meter.	This system will need a reverse osmosis system for treating arsenic.
Sagebrush Water Co-op	None noted.	None noted.	System needs to install a production meter.	System needs an automatic chlorinator and needs to replace distribution lines.

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Table 5-12. Water System Infrastructure Needs
Page 3 of 3

Water System	Well Problems	Storage Problems	Metering Issues	Other Issues
San Mateo MDWCA	System needs to drill a replacement for Well #1 (due to its fluoride concentration).	None noted.	System needs to collect production meter readings.	The distribution system loop needs to be finished.
St. Williams Mobile Home Park	None noted.	None noted.	None noted.	System is concerned over issues it may face as it ages.
Thoreau High School	None noted.	None noted.	System needs to collect production meter readings.	None noted.
Thoreau W&SD	The district has recently purchased 2 acres of land to be used to locate a new well.	None noted.	Due to the age of the system, the water meters are in need of replacement.	Due to the age of the system, the water mains are in need of replacement.
White Cliffs MDWUA	None noted.	System needs a new storage tank.	None noted.	One well may need to be replaced.
Yah-ta-hey W&SD	None noted.	The 47,000-gallon tank is in need of rehabilitation, and the bottom of one of the 11,750-gallon tanks has rotted out (a new tank is needed).	None noted.	Major challenges include administrative hurdles and lack of money to upgrade the system.

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MDWUA = Mutual domestic water users association

Table 5-13. Water System Management Issues
Page 1 of 4

Water System	Regulatory Compliance Issues	Management Issues	Operations Issues	Source of Emergency Supply
Block A Well Co-op	None noted.	System is concerned about who will operate the system after Pat Sanchez and Randy Martin are no longer able to do so.	System needs a certified operator.	System is concerned about relying on one well for their source of supply. [a]
Bluewater Acres Domestic WUA	None noted.	The current board is new this year, and is working to address all system issues. Current board members do not anticipate having any managerial issues going forward.	System needs a certified operator, and would like to build a building to use for system administration.	This system has two wells, but only one is in use due to the fluoride concentration in the second well. There is no back-up source for water supply.
Bluewater Lake MDWCA	None noted.	None noted.	System is concerned over the adequacy of existing septic systems (lots are thought to be undersized for adequate treatment).	System has two wells, so has a back-up source of supply.
Caviggia's Trailer Park	None noted.	None noted.	None noted.	System has one well and no back-up source for water supply. [a]
Cedar Ridge Trailer Park	None noted.	None noted.	System needs a certified operator.	System has one well and no back-up source for water supply.
City of Gallup	None noted.	None noted.	None noted.	System has 17 supply wells and is pursuing the Navajo-Gallup Water Supply Project.

[a] An emergency connection could be established between the City of Gallup and the Williams Acres W&SD-affiliated systems, but this system does not currently have a back-up source of supply.
[b] An emergency connection could be established between the City of Gallup and this system, but this system does not currently have a back-up source of supply.
[c] An emergency connection could be established between the Navajo Tribal Utility Authority (NTUA) and this system, but this system does not currently have a back-up source of supply.

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Table 5-13. Water System Management Issues
Page 2 of 4

Water System	Regulatory Compliance Issues	Management Issues	Operations Issues	Source of Emergency Supply
Coal Basin Water Association	System has experienced some record keeping violations.	None noted.	System needs a certified operator.	None. [b]
D&S Trailer Ranch	None noted.	System will likely be interested in regionalizing wastewater after Don Cochrane is no longer running the system, and may also want to regionalize water service at that time. This system has recently been annexed into the City of Gallup, so the City could potentially provide water and wastewater service in the future.	System needs a certified operator.	System has no back-up source for water supply. [b]
Gamerco W&SD	None noted.	Water service is currently being provided by the City of Gallup, under court order.	The system's well is currently inoperable, and storage is inadequate.	System has an emergency connection with the City of Gallup.
Greer's Subdivision	None noted.	None noted.	System needs a certified operator.	None noted.
Juniper Trails Water Association	None noted.	None noted.	None noted.	System has one well and no back-up source for water supply. [c]
Manuelito Navajo Children's Home	Arsenic concentrations in the system's well exceed the U.S. EPA primary drinking water standard.	None noted.	The system owners are interested in having someone else (City of Gallup or other entity) operate this water system.	System has one well and no back-up source for water supply. [a]

[a] An emergency connection could be established between the City of Gallup and the Williams Acres W&SD-affiliated systems, but this system does not currently have a back-up source of supply.
[b] An emergency connection could be established between the City of Gallup and this system, but this system does not currently have a back-up source of supply.
[c] An emergency connection could be established between the Navajo Tribal Utility Authority (NTUA) and this system, but this system does not currently have a back-up source of supply.

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Table 5-13. Water System Management Issues
Page 3 of 4

Water System	Regulatory Compliance Issues	Management Issues	Operations Issues	Source of Emergency Supply
Ramah W&SD	None noted.	None noted.	None noted.	System has three wells, so has a back-up source of water supply.
Rehoboth Christian School	None noted.	System is concerned that the complexity and cost of operating and maintaining itself will likely increase over time.	None noted.	The school has an emergency water connection to the City of Gallup for fire protection.
Rob Roy Trailer Park	System is concerned over maintaining regulatory compliance relating to water quality going forward.	None noted.	System is concerned over water quality issues that are expected to require treatment in the future (arsenic).	System has one well and no back-up source for water supply. [a]
Sagebrush Water Co-op	None noted.	Current board members are concerned about who will operate this system when they are no longer able to do so.	System needs a certified operator.	System has one well and no back-up source for water supply. [a]
San Mateo MDWCA	None noted.	System finds it difficult to fill vacant board positions.	The system needs a new back-up well, and could benefit from an equipment sharing agreement.	This system has two wells, but only one is in use due to the fluoride concentration in the second well. There is no back-up source for water supply.
St. Williams Mobile Home Park	None noted.	None noted.	System is concerned over issues that may arise as the system ages (e.g., water quality).	System has one well and no back-up source for water supply. [a]

[a] An emergency connection could be established between the City of Gallup and the Williams Acres W&SD-affiliated systems, but this system does not currently have a back-up source of supply.
[b] An emergency connection could be established between the City of Gallup and this system, but this system does not currently have a back-up source of supply.
[c] An emergency connection could be established between the Navajo Tribal Utility Authority (NTUA) and this system, but this system does not currently have a back-up source of supply.

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Table 5-13. Water System Management Issues
Page 4 of 4

Water System	Regulatory Compliance Issues	Management Issues	Operations Issues	Source of Emergency Supply
Thoreau High School	None noted.	None noted.	None noted.	System has one well and no back-up source for water supply. [c]
Thoreau W&SD	None noted.	Finding certified public accountants to do the yearly audits at a reasonable cost is a concern for this system.	This system finds it difficult to find qualified electricians to work on their wells.	System has two wells, so has a back-up source of water supply. [c]
White Cliffs MDWUA	None noted.	This system is concerned with meeting the ever increasing managerial requirements (e.g., board training, chlorine reporting requirements) on such a small scale.	This system is concerned with the expense of managing a system on such a small scale.	None. [c]
Yah-ta-hey W&SD	System is concerned over the availability of qualified operators, the system's record keeping, and compliance with administrative requirements (e.g., audits, budget preparation).	The major challenges faced by this system include administrative hurdles and lack of funding needed to upgrade the system.	System is concerned over the availability of necessary supplies (e.g., chlorine and maintenance needs), need for back-up operator (allowing vacations), safety of lagoon sampling, and having the funds necessary to operate the system.	System has an emergency connection with the City of Gallup.

[a] An emergency connection could be established between the City of Gallup and the Williams Acres W&SD-affiliated systems, but this system does not currently have a back-up source of supply.
[b] An emergency connection could be established between the City of Gallup and this system, but this system does not currently have a back-up source of supply.
[c] An emergency connection could be established between the Navajo Tribal Utility Authority (NTUA) and this system, but this system does not currently have a back-up source of supply.

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5.2.4 Caviggia's Trailer Park

This trailer park is currently for sale, and there are no current issues or concerns. The current owner is in favor of regionalizing both water and wastewater in this area west of Gallup, at least among the Williams Acres W&SD affiliated systems.

5.2.5 Cedar Ridge Trailer Park

This system has no current issues or concerns, although they would be interested in regionalizing their wastewater along with the Williams Acres W&SD affiliated systems (this system is not affiliated with Williams Acres W&SD, and currently treats wastewater with septic systems).

5.2.6 City of Gallup

No issues or concerns were identified for the City of Gallup.

5.2.7 Coal Basin Water Association

Compliance with paperwork requirements is difficult for the Coal Basin Water Association's volunteer staff and the system has experienced some record keeping violations. Getting system customers to attend annual meetings has also been a challenge. The system needs a certified operator, and would like to transition off of the septic systems that are currently used to treat wastewater. Regionalizing wastewater with the City of Gallup is seen as one option to address this need. Working with other systems as a part of a regional collaborative could help the system to address their other issues.

5.2.8 D&S Trailer Ranch

D&S Trailer Ranch does not currently have any issues or concerns. This system currently treats wastewater in its own lagoon, and would be potentially interested in regionalizing wastewater with the City of Gallup (the trailer park is located in an area that was recently annexed by the City of Gallup). The system could also see the possibility of hooking onto City

of Gallup water in the distant future, but prefers to continue to supply the system with its own well for now.

5.2.9 Gamerco W&SD

The members of Gamerco W&SD's board have recently changed, and the new board is having difficulty organizing and understanding the system's financial data. The previous system manager had been in that position for over 20 years and no professional management policies and practices were in place when the new board members took office.

The district's well is currently inoperable, and storage is inadequate. Much of the distribution system and system meters need to be replaced, and the system has inadequate fire protection. Gamerco W&SD currently receives its water from the City of Gallup, who manages all billing under an existing court order.

The current board is working toward having a solid understanding of the system's issues. The system's long-term goal is to have its own water supply and to develop professional management practices, ensuring transparency and accountability. The district would benefit from technical and managerial support and working with other systems, and is interested in regionalization. Because of its senior water rights, Gamerco W&SD could potentially provide water service to other water systems (as an alternative to the City of Gallup) should funding become available to drill a new well. This water supply could also provide an emergency source of supply for the City of Gallup.

5.2.10 Greer's Subdivision

This system is concerned about groundwater pumping by the City of Gallup west of town, and the potential impact of that pumping on their well. This subdivision could use a sewer system; all lots treat wastewater using septic systems, but have lot sizes that are too small to provide adequate treatment. The potential for regionalization of wastewater seems low, as Whispering Cedars also uses septic systems to treat wastewater, and the nearest treatment facility is the wastewater lagoons in Thoreau.

5.2.11 Juniper Trails Water Association

This system has concerns over the City of Gallup's groundwater pumping west of town, and the potential impact of this pumping on their well. There is also concern over water quality, although water quality is not monitored, and system customers do not drink the water (drinking water is purchased). Aside from continuing to share equipment with Whispering Cedars Water Association, the system expressed limited interest in regionalization opportunities.

5.2.12 Manuelito Navajo Children's Home

Issues of concern for this system include arsenic concentrations and the system's reliance on one well for their source of supply. This system is in favor of the Williams Acres W&SD wastewater regionalization project, and would also be in favor of regionalizing their water system with the City of Gallup.

5.2.13 Ramah W&SD

The major issue of concern for this system is funding. Ramah W&SD needs to replace their distribution lines and to upgrade the current distribution system so that all production goes into the tank to be treated (not directly into the distribution system). However, the system does not have funding for these projects. The system sees installing an emergency tie-in to the Navajo Tribal Utility Authority as a possibility.

5.2.14 Rehoboth Christian School

Rehoboth Christian School is an institution focused on education, not on water management. Regulatory requirements and their associated costs are a concern for the school, as is long-term sustainability of the aquifer. System upgrades are needed, including replacement of the main system distribution line. The complexity and cost of operating and maintaining a water system is only likely to increase over time, and Rehoboth is interested in participating in a regional effort, working with neighboring systems to ensure an excellent water supply for students and faculty without having to manage and oversee a water system.

5.2.15 Rob Roy Trailer Park

System concerns include water quality and regulatory compliance. This system sees the potential for systems west of Gallup to work together to address regulatory issues, including water quality and the requirement for systems to have certified operators.

5.2.16 Sagebrush Water Co-op

Steve Mahnke with the Sagebrush Water Co-op system is currently working towards becoming a certified operator. This system is in favor of regionalizing Williams Acres W&SD wastewater with the City of Gallup, and is in favor of continuing to explore the possibility of water system regionalization with the other participating systems.

5.2.17 San Mateo MDWCA

The San Mateo MDWCA needs to drill a well to replace Well #1, which was taken offline due to elevated fluoride concentration. Getting this well drilled is their only concern. This system sees regionalization potential in working together, especially through the sharing of equipment.

5.2.18 St. Williams Mobile Home Park

There is concern over the issues that the system may face as it ages, although the system does not have any current issues. This system is in favor of the Williams Acres W&SD wastewater regionalization project, and in favor of regionalizing the water systems in this area west of Gallup.

5.2.19 Thoreau High School

This system has no current issues or concerns, and sees the benefit of potentially installing an emergency tie-in to Thoreau W&SD. The potential for emergency tie-ins and mutual emergency sharing agreements between systems is seen by Thoreau High School as the most favorable regionalization opportunity.

5.2.20 Thoreau W&SD

Finding certified public accountants to do the yearly audits at a reasonable cost is a concern for this system; escalating costs and increasing regulatory compliance requirements are taxing the District's resources. They also find it difficult to find qualified electricians to work on their wells. The regionalization opportunity that appeals most to this system is the ability to communicate with other systems, sharing information and troubleshooting issues that they have in common.

5.2.21 Whispering Cedars Water Association

A Whispering Cedars Water Association water system interview was not conducted.

5.2.22 White Cliffs MDWUA

White Cliffs MDWUA is working with other systems toward a long-term goal of creating a single water system with a larger customer base. Operating as one large system would allow the organization to hire qualified staff and run a water system like a professional organization. White Cliffs is very motivated to collaborate and will take an active role in working with other systems toward this goal.

Specific system needs include constructing and bringing a new sewage plant online, automating the water plant operations, installing a new 50,000-gallon water tank, installing new water distribution lines and fire hydrants, working with the Navajo Department of Water Resources to install a watering station, and installing a production meter on Well #3.

This system is concerned with the expense of managing a system on such a small scale (e.g., arsenic removal can cost $10 per month per customer, while costs are closer to $0.25 per month per customer for larger systems), and issuing the required consumer confidence reports with a small staff is a challenge. The proposed new reporting requirements for chlorine, the new board training requirements, disinfection by-products issues, and continued lead and copper sampling requirements pose additional managerial challenges for this system.

5.2.23 Yah-ta-hey W&SD

The major challenges faced by this system include administrative hurdles and lack of funding needed to upgrade the system. This system already has an emergency connection with the City of Gallup, and has purchased water from the City for emergency supply in the past. Further regionalization efforts could assist with the administrative requirements that face this system.

6. Regionalization Integration Strategies

As discussed in Section 5, many small systems in McKinley County face similar water management issues that could potentially be addressed through enhanced collaboration among systems. Common concerns and issues include:

- Uncertainty of the sustainability of drinking water supplies
- Deterioration or lack of adequate drinking water infrastructure and associated funding needs
- Potential water quality issues, including inability to meet the new arsenic standard and contamination due to septic systems
- Responsibility for the increasingly complex regulatory requirements falling on over-taxed volunteers
- Need for technical assistance, certified operators, and funding
- Higher operations costs for systems with few customers due to a lack of economies of scale
- Inability and lack of opportunity for small system boards to provide adequate input on new regulations (e.g., board training requirements)
- Difficulty in complying with financial requirements (meeting and paying for required audits)
- Need for long-term operations/system succession plans

Water systems may opt to pursue different strategies for addressing these water supply and system management issues. Looking at ways to collaborate with neighboring systems could offer advantages in some respects and disadvantages in others. Regional collaboration is not perceived as an option for some systems due to their remote location and lack of nearby systems and other systems may prefer to continue running their system independently. However, many systems may view regional collaboration as a logical solution that could alleviate ongoing problems. Benefits of regionalization include (1) having a much better chance

of being awarded funding as a regional collaborative, (2) taking advantage of economies of scale, reducing costs and increasing bargaining power for services and equipment, (3) needing fewer volunteers to operate regionally managed systems, and (4) no longer depending solely on the knowledge of one person for system operations and maintenance.

Potential avenues for regional collaboration among these diverse systems range from coordinating among water systems during emergencies to sharing equipment to merging or creating new water systems. A Strategic Planning Initiative by the OSE (Watkins, 2006) identifies the following levels of regional collaboration that can help address many of the problems facing small systems:

- Planning together
- Establishing emergency-only relationships
- Sharing equipment and inventory
- Sharing operators
- Sharing administrative tasks (e.g., billing)
- Sharing management
- Sharing water rights/resources
- Interconnecting systems for backup
- Interconnecting systems but operating individually
- Creating a new entity, joining systems to share sources and distribution

6.1 Existing Regionalization Models

The success of regionalization depends on the efforts by water systems to work together to resolve their mutual water supply concerns. No one regionalization model or program will guarantee successful integration of systems until the systems themselves have incentives to collaborate on a regional level. However, as discussed in Section 1, several factors play an important role in providing such incentives:

- A framework and forum for fostering communication among water systems

- Funding that awards more points to projects with a regional focus
- Technical support to give small water systems the tools they need to better manage their systems and work toward integrating with other systems

Sections 6.1.1 through 6.1.3 discuss regional projects and programs in New Mexico, the southwest, and the United States as a whole. These case studies serve as examples of different ways to approach regionalization. Certain common features of regionalization projects have emerged from these case studies. Successful projects often begin as part of a larger water planning process that brings systems together. When systems begin to meet and talk with each other over a period of years to discuss mutual water management issues and concerns, regionalization and mutual assistance often ensues. In some cases, the groups have formally organized to create an organization and then have pursued funding to evaluate the feasibility and best engineering options for regional integration. In other cases, the systems have remained separate while working jointly to obtain funding to begin working together on small projects and to improve water system operation and management, for example by jointly funding an operator and a staff person to support all the systems. The key components in each case have been recognition by the systems that they would benefit from regionalization, availability of funding to support the process, and progress toward implementation.

6.1.1 New Mexico Regionalization Models

The state of New Mexico has completed regional water plans to evaluate water supplies, predict future demand, and identify strategies for meeting this demand. Public water supply needs and issues are part of all regional water plans, and some plans include large numbers of small water systems who have participated in developing the plan. In addition to this statewide water planning effort, the state legislature and agencies and organizations that work with small water systems have identified many issues facing these systems and recognize that ensuring safe drinking water supplies in rural parts of the state is a daunting challenge in the face of limited public funds and increasing costs. Regionalization or collaboration among small systems at the regional level is perceived as having the potential to leverage state water funds going to small, relatively close water systems that have similar needs. For example, if three closely located

systems independently seek legislative appropriations for a new well or storage tank, they end up competing against each other when it might be feasible to develop these projects jointly.

The state of New Mexico funded 10 regional pilot projects in 2005 and 2006, and since that time has funded several regionalization studies, notably in Eddy and Valencia Counties (Eddy County Commission, 2008; CDM, 2008). RCAC staff who participated in the 10 pilot studies are actively supporting multiple regionalization projects in New Mexico. The progress and successes of several of these projects is discussed in Sections 6.1.1.1 through 6.1.1.6.

6.1.1.1 Jemez Valley Corridor Public Water System Regionalization Project, Sandoval County

The Sandoval County Commission has allocated funds for evaluating the potential benefits of regionalization of water systems in New Mexico's Jemez Valley Corridor (including the Village of San Ysidro, Jemez Pueblo, Cañon, Jemez Springs, and Ponderosa), and RCAC and Souder Miller & Associates are under contract to work on the project (Surgeon, 2008). The group began regionalization discussions at the beginning of 2007, and the first community meeting was held in April 2007 (Bralley, 2008). Preliminary engineering reports have been completed for each of the five water systems (Bralley, 2008), and the first draft of the regional mission statement is complete (Surgeon, 2008).

The Jemez Valley Corridor water systems do not plan to regionalize their distribution systems, but will share services (e.g., billing, administration, and operators) (Bralley, 2008). A memorandum of understanding to create the Jemez Valley Domestic Water Alliance has been drafted, although it has not yet been signed; the group is currently working to finalize this agreement (Bralley, 2008). An asset management software demonstration is planned for April 2008, and the group hopes to have a signed agreement by then (Bralley, 2008). These systems expect that this regional approach will make it easier to obtain funding, complete projects, and comply with applicable regulations (Surgeon, 2008).

6.1.1.2 El Rito Regional MDWCA, Rio Arriba County

El Rito Regional MDWCA was formed by three previously existing MDWCAs and a local college in the vicinity of El Rito, in Rio Arriba County, New Mexico. This regional effort began when board members from the three MDWCAs began meeting to discuss regional planning (Surgeon,

2008). One of the water systems used community development block grant (CDBG) funds to hire an engineer to complete a preliminary engineering report, and after inviting the local college to participate, the four systems entered into a memorandum of understanding to work together. RCAC assisted the group in creating a formal committee and in writing committee bylaws (Surgeon, 2008). The committee decided to dissolve the existing MDWCAs and to form one regional MWDCA, and RCAC assisted in developing articles of incorporation, bylaws, rules, budgets, and a rate structure for the regional system. The regional system was formed in order to regionally address issues of compliance, funding, management, reliability, and fire protection, and to help maintain local control of the area's water resources (Surgeon, 2008). To date, the El Rito Regional MDWCA has received approximately $2.8 million in funding from federal and state sources (Surgeon, 2008).

6.1.1.3 El Valle Water Alliance MDWCA, San Miguel County

RCAC assisted a group of 12 MDWCAs in forming an umbrella MDWCA in San Miguel County, New Mexico. Working together as El Valle Water Alliance, these systems have established a part-time business office and have issued a procurement for part-time contract bookkeeping and billing services (Surgeon, 2008). El Valle Water Alliance has established criteria to identify critical infrastructure needs, has completed an infrastructure capital improvement plan (ICIP), and is currently working to bring each of the affiliated associations into administrative and regulatory compliance (Surgeon, 2008). Funding obtained so far includes $100,000 from the New Mexico Finance Authority (NMFA) to complete preliminary engineering reports for four of the affiliated associations and $904,000 from the state legislature for infrastructure improvements (Surgeon, 2008). El Valle Water Alliance recently completed an application requesting $2.7 million in Water Trust Board funding and is working on strategic and business plans. The El Valle Water Alliance plans to continue supporting individual associations that are interested in joining the Alliance, and plans to continue upgrading the infrastructure of existing participants (Surgeon, 2008).

6.1.1.4 Sangre de Cristo Mutual Domestic Water Consumer's and Mutual Sewage Works Association, Guadalupe County

The Sangre de Cristo Regional Mutual Domestic Water Consumer's and Mutual Sewage Works Association (MDWC/MSWA) is a consortium of seven MDWCAs in Guadalupe County, New

Mexico, in partnership with Guadalupe County. The seven individual associations came together to address their common goal of replacing aging infrastructure and improving water service delivery and system management, and RCAC assisted them in incorporating as a regional entity (Surgeon, 2008). The regional MDWC/MSWA divides tasks into five groupings (planning, water rights compliance, funding, construction management, and systems regionalization through mergers) and has received more than $2.1 million in state and federal funding, in addition to $2.7 million from the Water Trust Board in 2007 (Surgeon, 2008).

6.1.1.5 Lower Rio Grande Mutual Domestic Water Consumers Association, Doña Ana County

The Lower Rio Grande MDWCA is an umbrella entity that includes 5 separate mutual domestic associations. A total of $1.8 million in legislative funding has been received by this umbrella entity over the past two years. The group has no plans to dissolve the individual systems, but is installing emergency connections between some of the systems (Surgeon, 2008).

6.1.1.6 Española Area Regional Collaborative, Rio Arriba County

Several regional drinking water associations are being formed in Rio Arriba County, including Agua Sana MDWCA, which serves 7 communities located between Española and Abiquiu. The Agua Sana MDWCA has received multi-million dollar funding from U.S. Department of Agriculture (USDA) Rural Development and from state agencies. They have the infrastructure to serve the 7 participating communities and to provide water to the City of Española and other communities (Surgeon, 2008).

The Greater Chimayo MDWCA was formed to serve the area that extends from Española to Chimayo, including currently underserved communities in Chimayo and two existing water associations that are dissolving and merging into the Greater Chimayo MDWCA. This regional system has multi-million dollar funding from the federal government (through the U.S. Bureau of Reclamation [USBR]) and from the state (Surgeon, 2008).

South of the Greater Chimayo MDWCA, Cuatro Villas MDWCA has been formed to serve four communities. They also have multi-million dollar funding from the state, and the system is currently being designed (Surgeon, 2008).

The Agua Sana MDWCA, Greater Chimayo MDWCA, and Cuatro Villas MDWCA are drafting an agreement with the City of Española to develop a source of water together, purchase water from the City, or convey water through City pipes (Surgeon, 2008).

6.1.2 Southwest Regionalization Models

6.1.2.1 Arizona

The state of Arizona does not have a statewide regionalization program in place. However, in the last several years the state has been working with rural water groups to address water resource management, including small system supply. This effort arose in response to Arizona's unique regulatory environment, which places groundwater management under the control of Active Groundwater Management Areas that are concentrated in the urban areas of the state (Ariz. Rev. Stat. Ann. 45-401 to -704). The majority of the state, however, lies outside of these areas (Gelt, 2002). In a report issued in 2002, the Governor's Water Management Commission concluded that water suppliers in rural areas are largely "left to their own resources for future planning." The result has been a lack of regional management for rural water systems. The state provides some technical support to these water resource management groups, but the focus in not on regionalizing rural water suppliers (Gelt, 2002). However, the state has linked its funding sources to regionalization through the Water Infrastructure Finance Authority of Arizona by awarding more points to projects with regional focus for state water funding [Ariz. Admin. Code § R18-15-305(A)(2b)].

In the border area of southwestern Arizona, the cities of San Luis, Somerton, and Yuma, Yuma County, and the Cocopah Indian Tribe are participating in a feasibility study for the creation of a regional water and wastewater system in Yuma County. The impetus for this study was the realization by these geographically close small communities that increasing costs of providing water and wastewater services make it more and more difficult to provide adequate services. These communities have worked together to obtain a grant to conduct a feasibility study that identifies and evaluates potential regional water and wastewater system(s). The engineering study is currently being funded by the North American Development Bank.

6.1.2.2 Colorado

Colorado statutes mandate regionalization for wastewater systems, but do not have a similar requirement for water systems (Cress, 2008; C.R.S. 25-8-503). Nevertheless, water system consolidation is encouraged by the state, and funding agencies award additional points to projects that include a regionalization component. The focus tends to be on physical interconnection of the systems (Cress, 2008).

Two Colorado regionalization examples are discussed below. The first consists of a well funded group of existing large water systems and communities working together initially to leverage resources and gain access to additional water supplies, rather than a need to address system management issues or achieve economies of scale. The second project is an example of two small communities with similar needs for a water system working together to obtain funding and construct the system they need.

6.1.2.2.1 Pikes Peak Regional Water Authority, El Paso County, Colorado. Several water suppliers in and around Colorado Springs in El Paso County, Colorado have joined together to form the Pikes Peak Regional Water Authority. For the communities of Triview, Monument, Woodmoor, Palmer Lake, and others, along with the Donala W&SD, regionalization has been part of the water planning efforts of El Paso County and these communities for several years (JCHA and Knight Piésold, 2002). The smaller communities first participated in the Palmer Divide Water Group with the common goal of securing a renewable source of water. These groups determined through years of meeting that a regional effort made the most sense and created the Pikes Peak Regional Water Authority in January 2007 through an intergovernmental agreement. Upon the signing the resolution that created the Authority, the Palmer Divide was dissolved. Member systems of the Pikes Peak Regional Water Authority include the following:

- Academy W&SD
- Cherokee Metropolitan District
- Donala W&SD
- Triview Metropolitan District
- Town of Monument
- Town of Palmer Lake

- Woodmoor W&SD

The systems are currently jointly funding an extensive engineering study to determine the best way to integrate the systems and facilities to optimize existing infrastructure and supply. Water authority meetings are advertised and open to the public.

6.1.2.2.2 Mustang Water Authority. The Mustang Water Authority provides water to the southwestern Colorado communities of Nucla and Naturita. The two towns needed a water system to serve the combined population of 1,200 residents. To facilitate the process, the towns created the Mustang Water Authority, a separate entity, to oversee and manage water supply to residents. Leaders from both communities worked together over several years to implement the project and establish the Authority in 2003.

6.1.3 U.S. Regionalization Models

The United States does not mandate regionalization of water systems, and no nationwide regionalization model exists. As part of implementing the Safe Drinking Water Act and providing technical assistance to regulated water systems, however, the U.S. Environmental Protection Agency (EPA) has developed many tools and initiatives to help small systems, and as early as the 1980s, the EPA documented the benefits of regionalization for small water systems (U.S. EPA, 1983). At that time cooperation and collaboration between small systems was rare, and the issues and difficulties of meeting rural water supply and ensuring compliance with drinking water regulations was the focus of another study on small water systems in the mid-1990s (CGER, 1997).

The EPA has continued to develop technical assistance materials, fund technical assistance for small water systems, and focus on partnerships among systems. But during this same time, regulatory requirements for small systems have greatly increased, with the implementation of 17 new drinking water regulations since 1998 (U.S. EPA, 2003).

The most recent regionalization efforts have been captured in EPA studies published in 2002 and 2006 (U.S. EPA, 2002 and 2006). Both of these studies document numerous

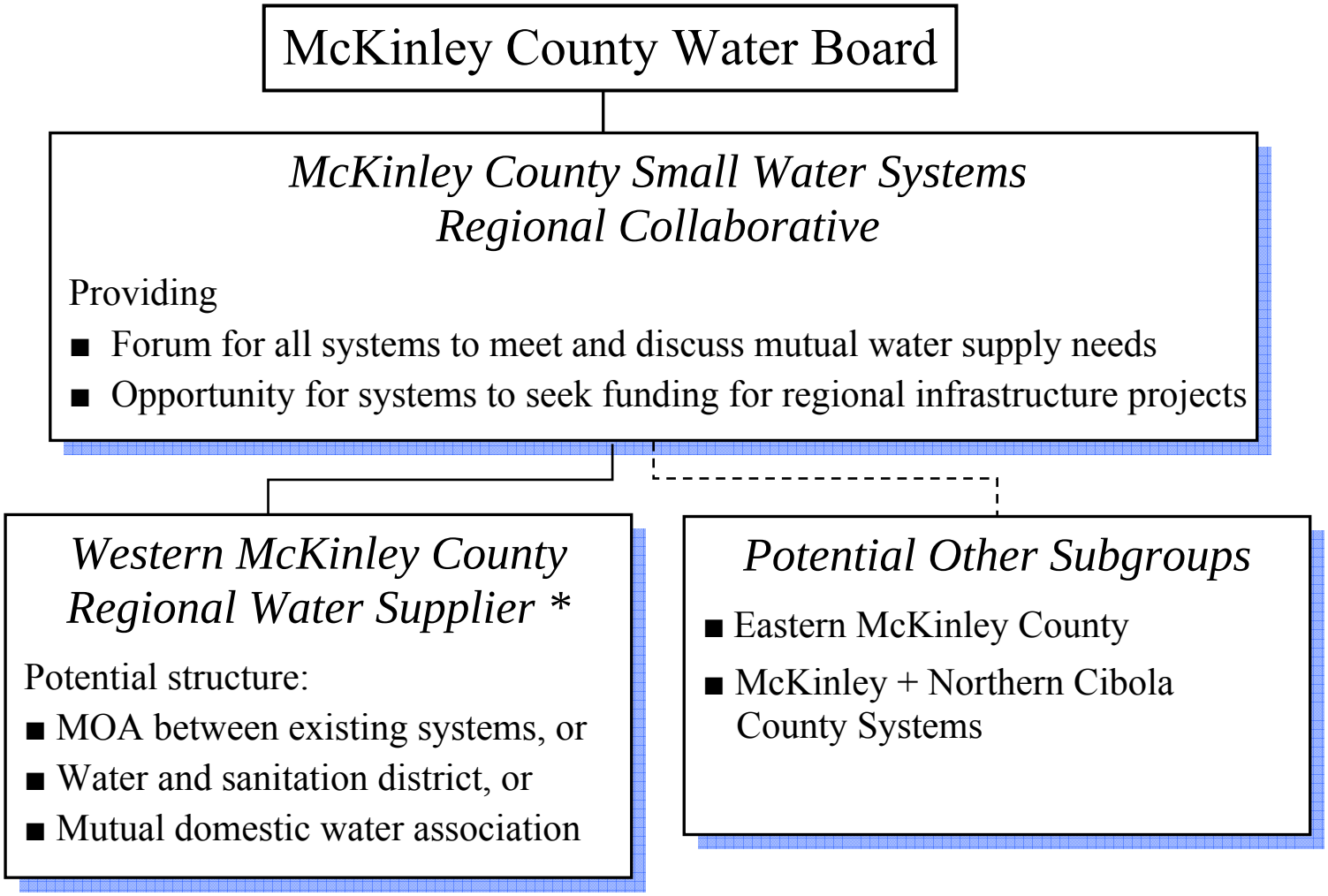
regionalization projects across the United States. Of particular interest is the state of Kansas, which allows water systems to create public wholesale water supply districts where member systems buy water at wholesale rates from the district while retaining autonomy of their own systems. Representatives of each member system provide input to the district board regarding decisions for the district (Public Wholesale Water Supply District Act, K.S.A. 19-3545 to 19-3556).

6.2 Regional Collaboration among McKinley County Water Systems

Figures 6-1 and 6-2 outline the structure and process for regional cooperation developed during the project. Informal regional collaboration already exists among some neighboring systems in McKinley County. System managers, board members, and operators know one another and may communicate regarding operations and management questions. These systems may also share inventory and in certain emergencies will try to lend assistance. Emergency water supplies are also available to certain systems that have connected to the City of Gallup (no one has connected to the Navajo Tribal Utility Authority [NTUA] yet). Examples of existing regional collaboration between participating systems include the following:

- Several emergency connections exist:
  - Between the Gamerco W&SD and the City of Gallup
  - Between the Yah-ta-hey W&SD and the City of Gallup
  - Between Rehoboth Christian School and the City of Gallup (for fire protection at the athletic complex only)

- Other potential emergency connections that could be installed in the future include:
  - Coal Basin Water Association and the City of Gallup
  - Williams Acres W&SD-affiliated water systems and the City of Gallup
  - Cedar Ridge Trailer Park and the Williams Acres W&SD-affiliated water systems (and/or the City of Gallup)
  - White Cliffs MDWUA and NTUA
  - Whispering Cedars Water Association and NTUA
  - Juniper Trails Water Association and NTUA



* Mariposa Domestic Water Alliance has been created to fulfill this role (July 31, 2008), with nine systems participating.

Figure 6-1

MCKINLEY COUNTY SMALL WATER SYSTEMS REGIONALIZATION

Regionalization Structure

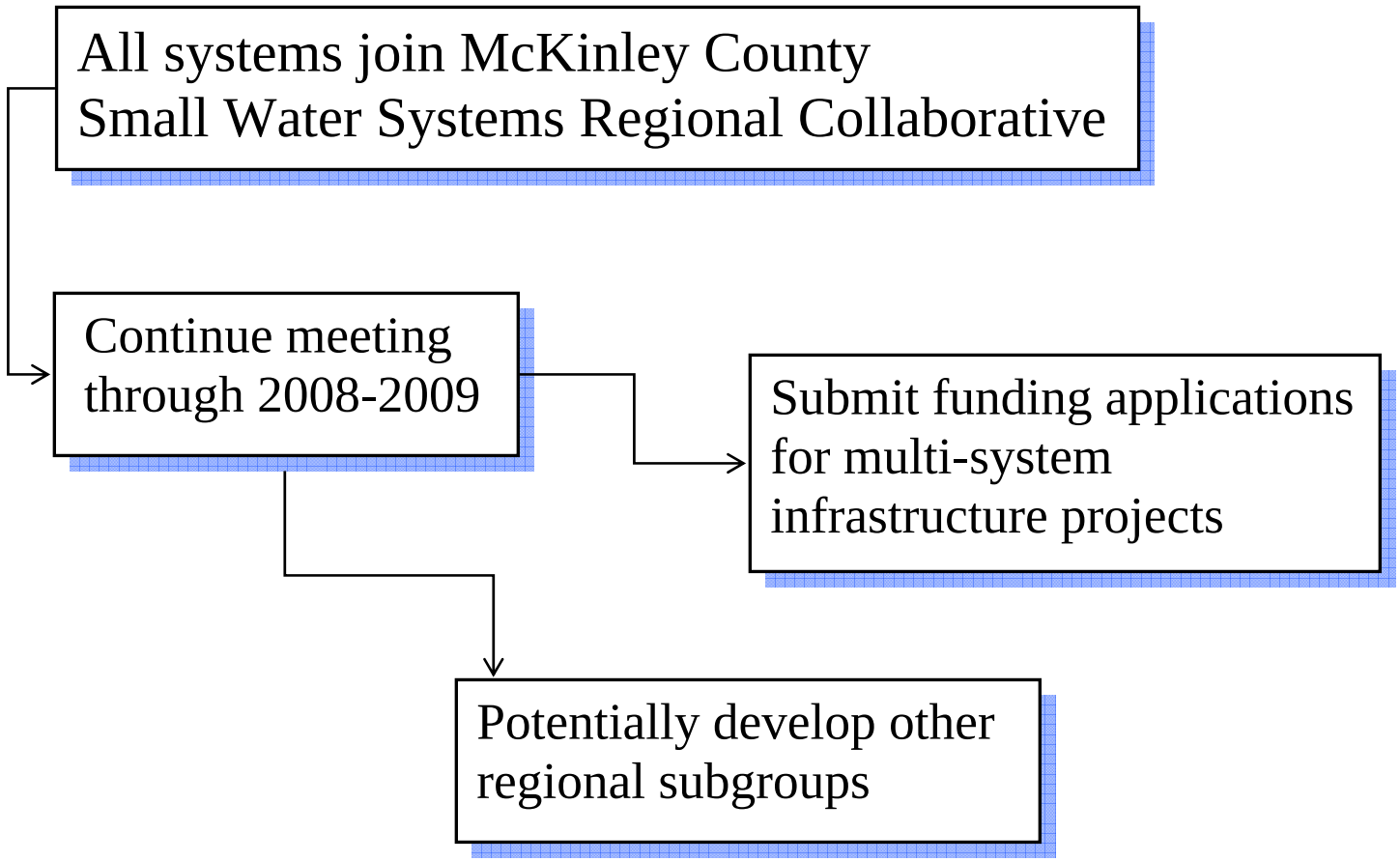


Figure 6-2

MCKINLEY COUNTY SMALL WATER SYSTEMS REGIONALIZATION

Regionalization Process

- Ramah W&SD and NTUA
- Thoreau W&SD and NTUA

- The Gamerco W&SD system billing and water supply are currently being provided by the City of Gallup.

- The Thoreau W&SD treats wastewater from Thoreau High School in its lagoons.

- Technical support has been provided to Bluewater Acres Domestic WUA by Bluewater Lake MDWCA, San Mateo MDWCA, and Thoreau W&SD.

- Equipment is shared between Whispering Cedars Water Association and Juniper Trails Water Association.

Table 6-1 details existing regional cooperation and agreements and potential regionalization opportunities for each of the participating systems.

6.3 McKinley County Regionalization Integration Strategies

As part of the regionalization planning process, several potential regionalization integration strategies—including infrastructure projects with the potential for water system integration and management strategies to maximize efficiency—were identified, evaluated, and discussed. These strategies are discussed in Sections 6.3.1 through 6.3.5.

6.3.1 McKinley County Small Water Systems Regional Collaborative

The purpose of the McKinley County Small Water Systems Regional Collaborative is to create a broad forum for all water systems in McKinley County to (1) meet and discuss common needs, issues, or concerns, (2) exchange knowledge and provide informal technical support, (3) communicate with the County Water Board, (4) develop joint applications for funding, and (5) potentially develop specific regionalization projects.

Table 6-1. McKinley County Water System Opportunities for Regional Collaboration
Page 1 of 8

Water System	Existing Regional Cooperation	Existing Agreements	Existing Solution to Short-Term Water Supply Problems	Impediments to Regional Collaboration	Regional Collaboration Opportunities/Potential Partners
Block A Well Co-op	None	None	None	Status as a private system makes system ineligible for certain types of funding.	Williams Acres W&SD wastewater regionalization project; water regionalization with Williams Acres W&SD affiliated or other systems (including the possibility of installing an emergency water connection with the City of Gallup).
Bluewater Acres Domestic WUA	System has received technical support from Bluewater Lake MDWCA, San Mateo MDWCA, and Thoreau W&SD.	None	None	System location is removed from other project participants.	None
Bluewater Lake MDWCA	System has provided technical support to Bluewater Acres Domestic WUA.	None	None	System location is removed from other project participants.	Potential for regionalization with the New Mexico State Parks Bluewater Lake water system.
Caviggia's Trailer Park	None	None	None	Status as a private system makes system ineligible for certain types of funding.	Williams Acres W&SD wastewater regionalization project; water regionalization with Williams Acres W&SD affiliated or other systems (including the possibility of installing an emergency water connection with the City of Gallup).

W&SD = Water and sanitation district
WUA = Water users association
MDWCA = Mutual domestic water consumers association
MOA = Memorandum of agreement
NTUA = Navajo Tribal Utility Authority
MDWUA = Mutual domestic water users association

Table 6-1. McKinley County Water System Opportunities for Regional Collaboration
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Water System	Existing Regional Cooperation	Existing Agreements	Existing Solution to Short-Term Water Supply Problems	Impediments to Regional Collaboration	Regional Collaboration Opportunities/Potential Partners
Cedar Ridge Trailer Park	None	None	None	Status as a private system makes system ineligible for certain types of funding.	System is not affiliated with Williams Acres W&SD, but could potentially regionalize water and/or wastewater with the Williams Acres W&SD affiliated or other systems (including the possibility for installing an emergency water connection with the City of Gallup).
City of Gallup	Currently providing emergency service to Gamerco W&SD; has provided emergency service to Yah-ta-hey W&SD.	An agreement is currently in place with Gamerco W&SD for providing water supply.	None	None	Navajo-Gallup Water Supply Project, Gallup Regional System.
Coal Basin Water Association	None	System will be a signatory on the Mariposa Domestic Water Alliance MOA. System has an existing agreement with the City of Gallup for emergency supply.	Emergency supplies are available.	System is small and does not want to lose control of its assets, but will participate in an umbrella organization.	System plans to be a member of the Mariposa Domestic Water Alliance (there are currently 9 systems named in the Alliance agreement). There is the potential for installing an emergency connection with the City of Gallup.

W&SD = Water and sanitation district
WUA = Water users association
MDWCA = Mutual domestic water consumers association
MOA = Memorandum of agreement
NTUA = Navajo Tribal Utility Authority
MDWUA = Mutual domestic water users association

Table 6-1. McKinley County Water System Opportunities for Regional Collaboration
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Water System	Existing Regional Cooperation	Existing Agreements	Existing Solution to Short-Term Water Supply Problems	Impediments to Regional Collaboration	Regional Collaboration Opportunities/Potential Partners
D&S Trailer Ranch	None	None	None	Status as a private system makes system ineligible for certain types of funding.	Due to recent annexation into the City of Gallup, water and wastewater service for this system could be supplied by the City in the future.
Gamerco W&SD	Gamerco receives its water from City of Gallup, who manages all billing under existing court order.	Court order sets terms for current water supply arrangement. System is a signatory on the Mariposa Domestic Water Alliance MOA.	System has an emergency connection with the City of Gallup.	High cost of water from Gallup. System would like to develop a new well to have control over its water supply.	Gamerco is participating in the Mariposa Domestic Water Alliance. One long-term project would be to develop a new well at the Gamerco Townsite to provide supply to Alliance members. This well could also provide supply to Gallup since the systems are already connected.
Greer's Subdivision	None	None	None	Status as a private system makes system ineligible for certain types of funding. System location is removed from other project participants.	None

W&SD = Water and sanitation district
WUA = Water users association
MDWCA = Mutual domestic water consumers association
MOA = Memorandum of agreement
NTUA = Navajo Tribal Utility Authority
MDWUA = Mutual domestic water users association

Table 6-1. McKinley County Water System Opportunities for Regional Collaboration
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Water System	Existing Regional Cooperation	Existing Agreements	Existing Solution to Short-Term Water Supply Problems	Impediments to Regional Collaboration	Regional Collaboration Opportunities/Potential Partners
Juniper Trails Water Association	System has borrowed equipment from Whispering Cedars Water Association in the past.	None	None	None	There is potential for regionalizing water and wastewater with Whispering Cedars Water Association, and for installing an emergency connection with the NTUA.
Manuelito Navajo Children's Home	None	System will be a signatory on the Mariposa Domestic Water Alliance MOA.	None	Status as a private system makes system ineligible for certain types of funding.	Williams Acres W&SD wastewater regionalization project; water regionalization with Williams Acres W&SD affiliated or other systems (including the possibility of installing an emergency water connection with the City of Gallup). System plans to be a member of the Mariposa Domestic Water Alliance (there are currently 9 systems named in the Alliance agreement).
Ramah W&SD	None	System will be a signatory on the Mariposa Domestic Water Alliance MOA.	None	System location is removed from other project participants.	System plans to be a member of the Mariposa Domestic Water Alliance (there are currently 9 systems named in the Alliance agreement). The potential for installing an emergency connection with NTUA also exists.

W&SD = Water and sanitation district
WUA = Water users association
MDWCA = Mutual domestic water consumers association
MOA = Memorandum of agreement
NTUA = Navajo Tribal Utility Authority
MDWUA = Mutual domestic water users association

Table 6-1. McKinley County Water System Opportunities for Regional Collaboration
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Water System	Existing Regional Cooperation	Existing Agreements	Existing Solution to Short-Term Water Supply Problems	Impediments to Regional Collaboration	Regional Collaboration Opportunities/Potential Partners
Rehoboth Christian School	System has an emergency connection to City of Gallup for fire protection.	An agreement is in place for this existing water line.	None	High cost of hooking up to the City of Gallup. Status as a private system makes system ineligible for certain types of funding.	System could receive back up supplies from the Mariposa Domestic Water Alliance once an alternate water supply is in place. System is interested in participating McKinley County Collaborative and following regionalization efforts in the county.
Rob Roy Trailer Park	None	System is a signatory on the Mariposa Domestic Water Alliance MOA.	Ration water use.	Status as a private system makes system ineligible for certain types of funding.	System plans to be a member of the Mariposa Domestic Water Alliance. Other regionalization opportunities include the Williams Acres W&SD wastewater regionalization project, and water regionalization with Williams Acres W&SD affiliated or other systems (including the possibility of installing an emergency water connection with the City of Gallup).

W&SD = Water and sanitation district
WUA = Water users association
MDWCA = Mutual domestic water consumers association
MOA = Memorandum of agreement
NTUA = Navajo Tribal Utility Authority
MDWUA = Mutual domestic water users association

Table 6-1. McKinley County Water System Opportunities for Regional Collaboration
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Water System	Existing Regional Cooperation	Existing Agreements	Existing Solution to Short-Term Water Supply Problems	Impediments to Regional Collaboration	Regional Collaboration Opportunities/Potential Partners
Sagebrush Water Co-op	None	System will be a signatory on the Mariposa Domestic Water Alliance MOA.	None	Status as a private system makes system ineligible for certain types of funding.	Williams Acres W&SD wastewater regionalization project; water regionalization with Williams Acres W&SD affiliated or other systems (including the potential for installing an emergency water connection with the City of Gallup). System plans to be a member of the Mariposa Domestic Water Alliance (there are currently 9 systems named in the Alliance agreement)
San Mateo MDWCA	System has provided technical support to Bluewater Acres Domestic WUA.	None	None	System location is removed from other project participants.	There is potential for sharing equipment with Bluewater Acres Domestic WUA, Bluewater Lake MDWCA, and Thoreau W&SD.
St. Williams Mobile Home Park	None	None	None	Status as a private system makes system ineligible for certain types of funding.	Williams Acres W&SD wastewater regionalization project; water regionalization with Williams Acres W&SD affiliated or other systems (including the possibility of installing an emergency water connection with the City of Gallup).

W&SD = Water and sanitation district
WUA = Water users association
MDWCA = Mutual domestic water consumers association
MOA = Memorandum of agreement
NTUA = Navajo Tribal Utility Authority
MDWUA = Mutual domestic water users association

Table 6-1. McKinley County Water System Opportunities for Regional Collaboration
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Water System	Existing Regional Cooperation	Existing Agreements	Existing Solution to Short-Term Water Supply Problems	Impediments to Regional Collaboration	Regional Collaboration Opportunities/Potential Partners
Thoreau High School	Wastewater is treated by Thoreau W&SD.	Agreement is currently in place with Thoreau W&SD for wastewater treatment.	Haul water in.	None	There is the potential for either installing an emergency connection or regionalizing water service with Thoreau W&SD.
Thoreau W&SD	Treats wastewater from Thoreau High School. System has provided technical support to Bluewater Acres Domestic WUA.	System plans to be a signatory on the Mariposa Domestic Water Alliance MOA. An agreement is currently in place with Gallup McKinley County Schools for treatment of Thoreau High School wastewater.	None	None	System plans to be a member of the Mariposa Domestic Water Alliance. There is also the potential for either installing an emergency connection or regionalizing water service with Thoreau High School, and for possibly installing an emergency connection with NTUA.
Whispering Cedars Water Association	System has lent equipment to the Juniper Trails Water Association in the past.	None	None	System is not interested in regionalization at this time.	There is potential for regionalizing water and wastewater with Juniper Trails Water Association, and for installing an emergency water connection with the NTUA.

W&SD = Water and sanitation district
WUA = Water users association
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MOA = Memorandum of agreement
NTUA = Navajo Tribal Utility Authority
MDWUA = Mutual domestic water users association

Table 6-1. McKinley County Water System Opportunities for Regional Collaboration
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Water System	Existing Regional Cooperation	Existing Agreements	Existing Solution to Short-Term Water Supply Problems	Impediments to Regional Collaboration	Regional Collaboration Opportunities/Potential Partners
White Cliffs MDWUA	White Cliffs has shared an operator with Yah-ta-hey W&SD, and also received a used tank from Thoreau W&SD.	System is a signatory on the Mariposa Domestic Water Alliance MOA.	System has 3 drinking water wells and 1 well for commercial use. Production is limited so additional back up is needed.	System has been working toward regional cooperation for years. Small systems have been reticent to move beyond discussion of common issues.	System has led the effort to establish the Mariposa Domestic Water Alliance. Installation of an emergency connection with NTUA is another potential project.
Yah-ta-hey W&SD	System has purchased water for emergency supply from the City of Gallup in the past.	System will be a signatory on the Mariposa Domestic Water Alliance MOA.	System has an emergency connection with the City of Gallup.	None	System plans to be a member of the Mariposa Domestic Water Alliance (there are currently 9 systems named in the Alliance agreement).

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Over the course of two project meetings, participants reviewed and approved the content of the resolution establishing the collaborative, which several systems later signed (Table 6-2). Copies of the signed resolutions are provided in Appendix G. The Collaborative creates a mechanism for continuing general public meetings and reaching out to systems that have not actively participated in the regionalization project up to this point. Many of the most active systems in the group have already created a separate entity with the objective of providing services to the member systems.

6.3.2 Williams Acres W&SD

Williams Acres W&SD could elect to provide water service to its 10 affiliated water system members and potentially to non-members (e.g., Cedar Ridge Trailer Park). This change would necessitate board approval, rate setting, funding for infrastructure, and water service agreements. The district board could potentially seek funding for completing a preliminary engineering report for this water supply project and could either hook into City of Gallup water service as its source of supply or supply members with its own wells. Finalizing the wastewater regionalization project is also a district priority (replacing the existing wastewater lagoons with treatment by the City of Gallup).

Regionalization efforts for the Williams Acres W&SD affiliated water systems (and Cedar Ridge Trailer Park) could also proceed separately from the W&SD. The existing water systems could work together by entering into formal sharing agreements or could join together to create a new mutual domestic association (the Williams Acres W&SD affiliated water systems and Cedar Ridge Trailer Park are all private systems). At one of the public meetings, concern was raised over adding water supply to the services offered by Williams Acres W&SD. The majority of the affiliated systems did not actively participate in the regionalization discussions and do not appear to be ready to move forward with regionalization.

6.3.3 Mariposa Domestic Water Alliance

Three Williams Acres W&SD member systems (Rob Roy Trailer Park, Sagebrush Water Co-op, and Manuelito Navajo Children's Home), however, are participating in the Mariposa Domestic

Table 6-2. Status of Signed Resolutions in Support of Regionalization
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Water System	Signed Resolution in Support of Regionalization?	Comments
Block A Well Co-op		System representatives support regionalization, but have not signed the resolution.
Bluewater Acres Domestic WUA		System representatives support regionalization, but are reluctant to sign any agreements at this time.
Bluewater Lake MDWCA	✓	
Caviggia's Trailer Park		System representatives support regionalization, but have not signed the resolution.
Cedar Ridge Trailer Park	✓	
City of Gallup		
Coal Basin Water Association		The board has expressed support for regionalization, but wants to wait to present the resolution at the annual member meeting. This system is participating in the Mariposa Domestic Water Alliance regional entity.
D&S Trailer Ranch		System representatives are not ready to sign the resolution.
Gamerco W&SD		The board is incomplete, with the president having recently resigned. Current board members have expressed support of the resolution. This system is participating in the Mariposa Domestic Water Alliance regional entity.
Greer's Subdivision		System representatives are not against regionalization, although no regionalization opportunities have been identified for this system. System representatives have not signed the resolution.
Juniper Trails Water Association		System representatives are not against regionalization, although no regionalization opportunities have been identified for this system. System representatives have not signed the resolution.
Manuelito Navajo Children's Home		System representatives support regionalization, but have not signed the resolution. This system is participating in the Mariposa Domestic Water Alliance regional entity.
Ramah W&SD		System representatives support regionalization, but have not signed the resolution. This system is participating in the Mariposa Domestic Water Alliance regional entity.
Rehoboth Christian School	✓	

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W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Table 6-2. Status of Signed Resolutions in Support of Regionalization
Page 2 of 2

Water System	Signed Resolution in Support of Regionalization?	Comments
Rob Roy Trailer Park		System representatives support regionalization, but have not signed the resolution. This system is participating in the Mariposa Domestic Water Alliance.
Sagebrush Water Co-op	✓	This system is participating in the Mariposa Domestic Water Alliance regional entity.
San Mateo MDWCA		System representatives support regionalization, but have not signed the resolution.
St. Williams Mobile Home Park		System representatives support regionalization, but have not signed the resolution.
Thoreau High School		System representatives are not ready to sign the resolution.
Thoreau W&SD		System representatives support regionalization, but have not signed the resolution. This system is participating in the Mariposa Domestic Water Alliance.
Whispering Cedars Water Association		System is not interested in being involved with a regionalization effort at this time.
White Cliffs MDWUA	✓	This system is participating in the Mariposa Domestic Water Alliance regional entity.
Yah-ta-hey W&SD	✓	The system board signed the resolution at their last meeting, but will need to do so again at the next meeting, as the signed resolution has been misplaced. This system is participating in the Mariposa Domestic Water Alliance regional entity.

WUA = Water users association
MDWCA = Mutual domestic water consumers association
W&SD = Water and sanitation district
MDWUA = Mutual domestic water users association

Water Alliance, along with Coal Basin Water Association, Gamerco W&SD, Ramah W&SD, Thoreau W&SD, White Cliffs MDWUA, and Yah-ta-hey W&SD. This group began meeting in May 2008, and also held two meetings in July 2008. The participating systems are forming an umbrella entity by signing an MOA; three systems have already signed this agreement (Gamerco W&SD, Rob Roy Trailer Park, and White Cliffs MDWUA) (Daly, 2008). Under the MOA, the participating systems plan to remain autonomous, but will seek funding together. The purpose of their agreement is to jointly address system drinking water and sanitation issues and to collectively develop sound management structures and the necessary infrastructure improvements that will sustain the health of their communities for future generations. After all participating water systems have signed the agreement, the Mariposa Domestic Water Alliance should evaluate the need for any additional emergency connections between participating systems and should explore the possibility of drilling a regionally owned well (Section 6.3.5).

6.3.4 Eastern McKinley County and McKinley County-Northern Cibola County Systems

Thoreau W&SD currently treats wastewater from Thoreau High School and needs funding to complete improvements to the existing wastewater lagoons. These two systems could consider installing an emergency water connection between the two systems and could also evaluate the potential for installing an emergency connection with the NTUA (existing NTUA lines run close to Thoreau).

Further potential for regionalization in this area could involve establishing connections between any of the Thoreau W&SD, Thoreau High School, Bluewater Acres Domestic WUA, Bluewater Lake MDWCA, and/or San Mateo MDWCA systems. On a larger scale, the linked systems could install a connection to NTUA. A regional system in this area could be supplied by a well(s) owned by an umbrella entity or by hooking into the City of Gallup system through NTUA lines. Funding could be sought to complete a preliminary engineering report evaluating a large-scale, regional project for this area.

6.3.5 Regional Water Supply Well

Another potential regionalization strategy is to drill a water supply well to serve the systems participating in the Mariposa Domestic Water Alliance, in addition to other small systems that will not receive NGWSP water. An additional water supply well would benefit all the systems, especially those lacking in emergency supplies.

While small systems in McKinley County could potentially buy NGWSP water from the City of Gallup, the high cost of purchasing water from Gallup is problematic for these systems. The City of Gallup could also benefit from the drilling of a regional supply well, and could potentially receive a portion of its supply. A mutually beneficial arrangement could help facilitate negotiations between the systems and the City of Gallup. Potential locations for the regional supply well include Gamerco and Yah-ta-hey. Gamerco W&SD already has permitted water rights in a suitable location with the right to pump from the Dakota/Westwater aquifer. Yah-ta-hey is seen as another potential drilling location, although an application for a permit has not yet been filed for this location and might be protested if filed. If a regional supply well were drilled in Gamerco, existing City of Gallup and/or NTUA infrastructure would be needed to deliver this water to participating water systems.

7. Regionalization Implementation

The following sections discuss the legal agreements that can be used to implement regionalization, in addition to potential funding sources.

7.1 Legal Agreements to Implement Regionalization

This section outlines the tools that McKinley County systems may use to formalize regional collaborative efforts.

Once water systems decide to pursue a regional approach, the types and structures of regional organizations to be created are determined by the goals and objectives of the participants. Regional agreements can be made to address multiple goals, including providing backup in case of emergencies, providing informal technical support, or carrying out day-to-day operations.

Before entering into a regional agreement, each entity must determine whether they have the legal or organizational structure to participate in a regional entity and whether their decision makers or board members are ready to enter into a formal agreement. They also need to define how much autonomy they want to retain.

Within the limits of their authority and existing applicable bylaws, different water systems have the ability to enter into different types of agreements to pursue various options for regional collaboration.

Appendix H provides sample agreements that systems could use as guidance in creating an umbrella entity allowing systems to collaborate, and in crafting mutual assistance agreements, emergency interconnection agreements, and joint powers agreements, should consolidation be envisioned. These examples, discussed in Sections 7.1.1.1 through 7.1.1.3, include:

- Memorandum of agreement or understanding
- Mission statement and resolution for regional collaboration

- Joint powers agreement (JPA)

7.1.1.1 Memoranda of Understanding, Resolutions, and Other Types of Agreements

Agreements are one mechanism to allow systems to remain legally separate, while collaborating more closely on specific objectives, such as applying for funding for a specific project or contracting for services (e.g., billing or hiring an operator). Most of the water systems in McKinley County have the ability to enter into agreements or contracts for various purposes. Agreements are generally non-binding and reflect an intent to work together toward a mutually beneficial goal. No financial obligations are included and systems do not promise to perform tasks or provide services to each other in exchange for payment. These types of agreements work as long as all the parties' interests remain aligned and the momentum that led to the creation of the agreement can be sustained.

Systems working together under a memorandum of understanding or agreement decide to what degree they wish to commit to specific goals and objectives. In the case of the Jemez Valley Domestic Water Alliance (Section 6.1.1.1), the draft agreement creates the Alliance, sets up the structure, specifies the number of officers, details the powers and duties and conditions for withdrawal, and makes it clear that the Alliance is not responsible for the legal obligations held by the individual systems (Appendix H). Systems may pool resources to contract for billing or operator services through an alliance. Legal representatives for each of the systems reviewed and approved the agreement and its provisions (Bralley, 2008).

A more formal arrangement between systems would be governed by contract law. Agreements of this nature would be binding, would involve payment or other consideration for services, and would have liability implications. These agreements may thus be more difficult to finalize and could require a longer process to complete, involving review by legal representatives.

A contract would be necessary if one system were to lend an employee to another system for technical assistance or help with accounting or system management. Many systems who may occasionally work together informally would not want to formalize these arrangements because of liability implications. Most operators understand the liability implications of working on another system and will not perform such services; however, lending equipment from one

system's inventory and providing help over the phone sometimes take place and no formal agreement to do so would be needed. In fact, the process of creating an alliance would hopefully facilitate these types of exchanges.

Depending on the nature of the agreement and the complexity of the arrangement, varying levels of review and guidance would be required in developing the contract.

7.1.1.2 Entity Created Under a Joint Powers Agreement

Eligible entities that wish to join together could also do so through the Joint Powers Agreement Act, which allows certain water suppliers to create an entity structured for the purposes of providing regional water supply and wastewater services. "If authorized by their legislative or other governing bodies, two or more public agencies by agreement may jointly exercise any power common to the contracting parties" (NMSA 11-1-3). The State Secretary of Finance and Administration must approve the JPA (NMSA 11-1-3).

The agency provided by the agreement to administer or execute the JPA may be either one of the parties to the agreement or a commission or board constituted pursuant to the agreement between the entities, but separate from the parties to the JPA (NMSA 11-1-2).

The entities developing the JPA can only confer powers and functions already held by contracting parties. Private entities cannot enter into JPAs and are not eligible for state funding. Whatever agency or entity the group creates will have ". . . the common power specified in the agreement and may exercise it in the manner or according to the method provided in the agreement, subject to any of the restrictions imposed upon the manner of exercising such power of one of the contracting public agencies or such restrictions of any public agency participating which may be designated or incorporated in the agreement" (NMSA 11-1-5C).

The statute also allows the JPA entity to issue revenue bonds. "In addition to other powers, any agency, commission or board provided for by a JPA pursuant to the Joint Powers Agreements Act (NMSA 1978 11-1-1 to 11-1-7) may issue revenue bonds to pay the costs and expenses of acquiring or constructing any structures, facilities, or equipment necessary to effectuate the purposes of the agreement; provided, however, such authority shall be subject to the provisions

of the Joint Powers Agreements Act and the constitutional provisions of this state" (NMSA 11-1-7).

The recently created Albuquerque Bernalillo County Water Utility Authority is an example of a regional water and wastewater entity. In accordance with Section 72-1-10 of the New Mexico Statutes Annotated (NMSA 72-1-10), the City of Albuquerque and County of Bernalillo entered into a JPA to set up a jointly managed water authority and issue revenue bonds.

The JPA is one potential arrangement for McKinley County regional water providers. Under a JPA, the parties can set up any type of arrangement in terms of structuring the agency and setting up decision-making authority within the agency, whether through a board or a commission. The only limitation is that all parties to the agreement must already possess, through state or other law, the powers and duties created for the agency.

7.2 Merging Water Systems

Systems may ultimately decide to merge into one entity and no longer function as separate systems. New Mexico law provides clear guidance for this process for certain types of water systems under the New Mexico Sanitary Projects Act (Appendix I). System merger involving W&SDs is more complex and is not clearly defined in the Water and Sanitation Districts Act (Appendix I).

7.2.1 Water Associations and Mutual Domestic Water Consumers Associations

The New Mexico Sanitary Projects Act specifically outlines the process for merger of associations defined as "an association or mutual domestic water consumers association" (NMSA 3-29-2). The merger clause states that "upon approval by vote of a majority of a quorum of each membership, two or more associations may merge into one association pursuant to a plan of merger" (NMSA 3-29-20.1). This simple process requires only that the merger plan specify the names of the associations proposing to merge and the name of the new association [NMSA 3-29-20.1(A)]. The plan must set out the terms and conditions of the merger, make provisions for transfer of assets and liabilities, and define the process for

converting the associations' obligation or other securities to the new association [NMSA 3-29-20.1(B and C)]. Finally, if the new organization's certificate of association is affected by the merger, this, and any other provisions the associations wish to include in the plan, must be stated specifically.

7.2.2 Water and Sanitation Districts

W&SDs are governmental organizations that have broad powers and duties, including taxation and bonding authority, eminent domain, the ability to compel connection of residences to sewer lines, and general powers "necessary to carry out the powers specified in the statute." Given these powers, W&SDs in some ways resemble municipalities (NMSA 73-21-16).

The statute does not address mergers between W&SDs and other types of entities. The Act allows district boards to decide to include additional property, thereby expanding the district, and sets out a clear process (NMSA 72-21-23):

- Landowners file a petition with the W&SD board asking that their property be included in the district.

- The board district issues a notice describing the petition and identifying a time and place to hear comments or objections to the petition.

- If the Board decides to grant the petition, then an order is filed with the clerk of the local district court.

The process by which a water system would petition to be included in a district is not clear. The individual landowners served by a water system could petition for inclusion within district but may not wish to go through the effort, and so even if the water system and the W&SD are in agreement, it could be very difficult to implement and would require a lot of time and effort to meet with and educate landowners.

An additional complexity regards the boundaries of W&SDs, as the Water and Sanitation District Act is unclear about the contiguity requirement for district boundaries. In defining the term "district", Section 73-21-4 makes it clear that districts with lands in two counties must be contiguous. However, the language addressing a district located in one county alone lists no contiguity requirement [NMSA 73-21-4(B)]. Case law provides no direct clarification on the issue, although a New Mexico attorney who was consulted on the matter confirmed his understanding that contiguous boundaries were not a requirement (Coppler, 2008). This is an important fact for McKinley County W&SDs should consolidation of systems be envisioned, as the district could include the water systems located at some distance from the existing W&SDs.

Even if W&SDs could not physically include other systems within their boundaries, an existing W&SD could nevertheless take over the water system and provide water outside district boundaries. The separate water system could sell its facilities to the district, with system customers becoming customers of the W&SD. This approach would be much easier than going through the process of petitioning for including additional lands within a district. Several New Mexico W&SDs provide water outside district boundaries. One potential drawback to this approach is that the water system would lose any formal role in overseeing and controlling water service because it would not have a seat on the board.

7.2.3 Creating a Regional Water Supplier through Legislation

Creating a regional entity through special legislation is another potential method for merging systems into a regional water supplier. One precedent in New Mexico is the Albuquerque Bernalillo County Water Authority (ABCWUA), which was created by statute (NMSA 72-1-10). The City of Albuquerque municipal system merged with the Bernalillo County system to form the ABCWUA; its governance is now directed by board members from each entity, with the Mayor of Albuquerque having the tie-breaking vote. Significant political effort would be required to implement this approach in McKinley County; this effort is not necessary given the willingness of systems to work together through an alliance.

7.3 Funding Sources for Small Water Systems

As discussed above, multiple regionalization strategies have been discussed by the participating water systems as a part of this project. Successful implementation of these strategies will depend on both the ongoing commitment of stakeholders within the County and the procurement of funding to support the projects. Funding for projects is expected to be most successful if funding requests involve multiple systems and/or the County takes advantage of project funding mechanisms such as Clean Water Act grants, Water Trust Board grants, and others. Potential funding sources for strategy implementation are included in Table 7-1.

The process for obtaining state of New Mexico funding for water system projects has changed as a result of a recent restructuring of the funding process within state administrative agencies. On October 31, 2007, Governor Richardson signed Executive Order 2007-050 establishing a Water Cabinet. The Water Cabinet will unify all state agencies with responsibilities for water and align the state water plan with water, wastewater infrastructure development, and environmental regulations and with existing state planning documents. The Water Cabinet includes representatives from the following agencies:

- Interstate Stream Commission
- Office of the State Engineer
- Environment Department
- Department of Agriculture
- Department of Game and Fish
- Energy, Minerals, and Natural Resources Department
- Department of Finance and Administration
- Finance Authority
- Governor's Office

The Water Cabinet will ensure interagency coordination of funding for water and wastewater infrastructure, and the order establishes a new division within NMED for Water and Wastewater Infrastructure Development that will include the existing Construction Programs Bureau.

Table 7-1. State and Federal Funding Sources
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Program Title	Agency	Web Site or Contact	Funding Availability	Description
General Information				
Catalog of Federal Domestic Assistance	General Services Administration	http://www.cfda.gov/	Depends on funding level.	Information about funding sources, grant writing, etc.
Federal Drought Programs	Various Government Agencies	http://govinfo.library.unt.edu/drought/finalreport/fileg/summary_federal_programs.htm	Depends on funding level.	Summary of federal funding sources available for drought programs.
Links to private funding sources	U.S. EPA	http://www.epa.gov/owow/nps/capacity/funding.htm#private	Depends on funding level.	List of links for private funding sources for nonpoint source pollution.
Federal Funding Sources for Water Quality Activities	Natural Resources Conservation Service	http://www.nm.nrcs.usda.gov/technical/water/fund.html	Depends on funding level.	Summary of federal, state, and private funding sources available for water quality programs.
Funding Sources	New Mexico Rural Water Association	http://www.nmrwa.org/funding.php	Depends on funding level.	List of funding sources related to water and wastewater systems.
Funding Programs				
State Programs				
New Mexico Clean Water State Revolving Fund	NMED Construction Programs Bureau	Santa Fe: 505-827-2806 http://www.nmenv.state.nm.us/cpb/cwsrf.html	Low-interest loans ranging from $215,000 to $22,000,000.	Eligible projects include water supply development, conservation, watershed management, infrastructure, and water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management.

[a] Web site address as of December 2007; address and information found there is subject to change.

U.S. EPA = U.S. Environmental Protection Agency
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Table 7-1. State and Federal Funding Sources
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Program Title	Agency	Web Site or Contact	Funding Availability	Description
New Mexico Clean Water State Revolving Fund	New Mexico Water Trust Board Contact New Mexico Finance Authority U.S. EPA	http://www.epa.gov/owm/cwfinance/cwsrf/index.htm	$5 billion available annually through this program through low-interest loans.	Eligible water conservation measures may include meter installation/replacement, plumbing fixture retrofits/ replacements, efficient land-scape irrigation equipment, gray water recycling, wastewater reuse, water use ordinances or regulations, and public education programs.
New Mexico Rural Water Association Technical Assistance	New Mexico Rural Water Association (NMRWA)	Albuquerque: 1-800-819-9893 http://www.nmrwa.org/techassistance.php	Free training and technical assistance to water and wastewater systems.	Example services include: rate structures, leak detection, operator accreditation, wellhead and source water protection planning, regulatory assistance, sustainable development.
Public Project Revolving Fund	New Mexico Finance Authority	Santa Fe: (877) ASK-NMFA http://www.nmfa.net/Funding/PPRF.htm	The program has an estimated capacity of $1.2 billion; there is no maximum or minimum amount that may be awarded.	Funds can be used for infrastructure projects such as water, water rights, and municipal utilities.
Federal Programs				
Community Facilities (CF) Direct Loans and Grants	U.S. Department of Agriculture	http://www.rurdev.usda.gov/rhs/cf/cp_dir_grant.htm	No set maximum award.	Provides loans for the development of essential community facilities for public use in rural areas and towns with a population of 20,000 or less.

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Table 7-1. State and Federal Funding Sources
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Program Title	Agency	Web Site or Contact	Funding Availability	Description
Planning Assistance to States	U.S. Army Corps of Engineers	Albuquerque: (505) 342-3109 http://www.federalgrantswire.com/planning_assistance_to_states.html	Federal program funds are limited to $10,000,000 annually, and no more than $500,000 in Federal funds shall be expended in any one year in any one State.	Assists in planning for the development, utilization, and conservation of water and related land resources and ecosystems.
Economic Development Administration's Public Works and Economic Development Facilities Grants Program	Economic Development Administration, U.S. Department of Commerce	National Contact: (212) 482-5265 http://www.eda.gov/InvestmentsGrants/FFON.xml http://www.eda.gov/NewsEvents/NewInvestments.xml	Funds of over $250 million were appropriated for this program in Fiscal Year 2007.	Eligible water conservation measures include metering, leak detection, gray water recycling, plumbing fixture retrofits/replacements, commercial/institutional conservation measures, industrial reuse or recycling, and wastewater reclamation and reuse.
Water Conservation Field Services Program/Efficiency Incentives Program	U.S. Bureau of Reclamation	El Paso Field Office: David Allen, (915) 534-6316 http://www.usbr.gov/waterconservation/	Depends on funding level.	The WCFSP assists water agencies in the development of water conservation plans and management practices, provides funds for implementation, sponsors conservation demonstration projects and activities, coordinates financial assistance for joint projects and partnerships with other agencies
Reclamation States Emergency Drought Relief Act of 1991 - Title II	U.S. Bureau of Reclamation	Albuquerque Area Office: 505-248-5323 http://www.usbr.gov/uc/progact/waterconsv http://www.usbr.gov/uc/albuq/index.html	Depends on funding level.	Assistance in the construction and planning of projects that mitigate effects of drought.

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Table 7-1. State and Federal Funding Sources
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Program Title	Agency	Web Site or Contact	Funding Availability	Description
Reclamation Wastewater and Groundwater Study Program	U.S. Bureau of Reclamation	Albuquerque: 505-248-5323 http://www.mnisose.org/guidebook/bor-all.pdf	Depends on funding level.	Appraisal and feasibility studies on water reclamation and reuse projects.
Reclamation Rural Water Supply Act of 2006	U.S. Bureau of Reclamation	Albuquerque: 505-248-5323	Up to $200,000 for an appraisal study ($1,000,000 will be split between projects in 17 states in 2008).	Funding available for rural water supply projects designed to serve a community or group of communities, each of which has a population of not more than 50,000 inhabitants, which may include Indian tribes and tribal organizations. Project funding criteria will take into account whether the proposed project promotes or applies a regional or watershed perspective to water resources management.
Community Development Block Grants	U.S. Department of Housing and Urban Development	National contact: (202) 708-1322 ext. 4378 http://www.hud.gov http://www.hud.gov/offices/cpd/communitydevelopment/programs/index.cfm	Grants and loans.	Eligible water conservation measures include meters, leak detection, plumbing fixture retrofits/replacements, water-efficient appliances and landscaping/irrigation equip-ment, gray water recycling, commercial/institutional conservation measures, industrial reuse or recycling, wastewater reclamation and reuse, development of water rate structures and water use regulations or wastewater ordinances.

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Table 7-1. State and Federal Funding Sources
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Program Title	Agency	Web Site or Contact	Funding Availability	Description
Emergency Conservation Program	USDA Farm Services	Albuquerque: 505-761-4407 800-410-2067 http://disaster.fsa.usda.gov http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=ecp	Cost-share assistance up to 75 percent of the cost to implement approved emergency conservation practices, as determined by county Farm Services Agency committees. Individual or cumulative cost-sharing of $50,000 or less per person. Cost-sharing from $50,001 to $100,000 is approved at the state committee level. Cost-sharing over $100,000 is approved by FSA's national office.	Rehabilitation of farm lands and conservation facilities. To rehabilitate farmland, ECP program participants may implement emergency conservation practices, such as removing debris, restoring fences and conservation structures, and providing water for livestock in drought situations. Other conservation measures may be authorized by county FSA committees, with approval from state FSA committees and FSA's national office.

[a] Web site address as of December 2007; address and information found there is subject to change.

U.S. EPA = U.S. Environmental Protection Agency
NMED = New Mexico Environment Department
USDA = U.S. Department of Agriculture

In an effort to reduce the amount of time spent and expenses incurred when applying to multiple agencies for funding, the NMED Construction Program Bureau (NMED CPB), NMFA, New Mexico Department of Finance and Administration/Local Government Division (DFA-Local Government Division), and USDA Rural Development have developed a new uniform funding application, process for funding applications for multiple funding agencies (including the Water Trust Board). Systems must verify their water rights with the OSE before they can submit a uniform funding application; therefore, McKinley County small water systems that have not yet declared their water rights with the OSE will need to do so before they can apply for any funds. Once they have a preliminary scope of work and cost estimate for the proposed project, systems may complete the uniform funding application and submit it to the DFA-Local Government Division. If the system is interested in multiple funding sources, a cover letter expressing this interest should be sent along with the application. The application guide also suggests that a copy of the funding application be sent to the appropriate state senator and/or legislator in an effort to seek a legislative appropriation for the proposed project.

Although regional collaboration is not discussed within the uniform funding application, regional projects have received significant amounts of funding from the Water Trust Board and other funding sources in the past and are expected to continue to be seen favorably by the funding agencies. The new uniform funding application process should help to streamline funding applications and could potentially increase the chance that the small systems in McKinley County receive funding for regional efforts, since one application will be reviewed by multiple funding agencies.

Some of the actions identified in this plan can be carried out by individual water systems, while other strategies are best pursued on a County level. The ongoing cooperation of the systems and municipalities with the County will be necessary to oversee implementation of these strategies and will be key to successfully obtaining funds to move forward with their plans.

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Appendices


DBS&A
engineering
geoscience
hydrology
Daniel B. Stephens
& Associates, Inc.
Albuquerque • Los Alamos
Austin • Lubbock • Dallas
Boulder • Santa Barbara
1-505-822-9400
www.dbstephens.com
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