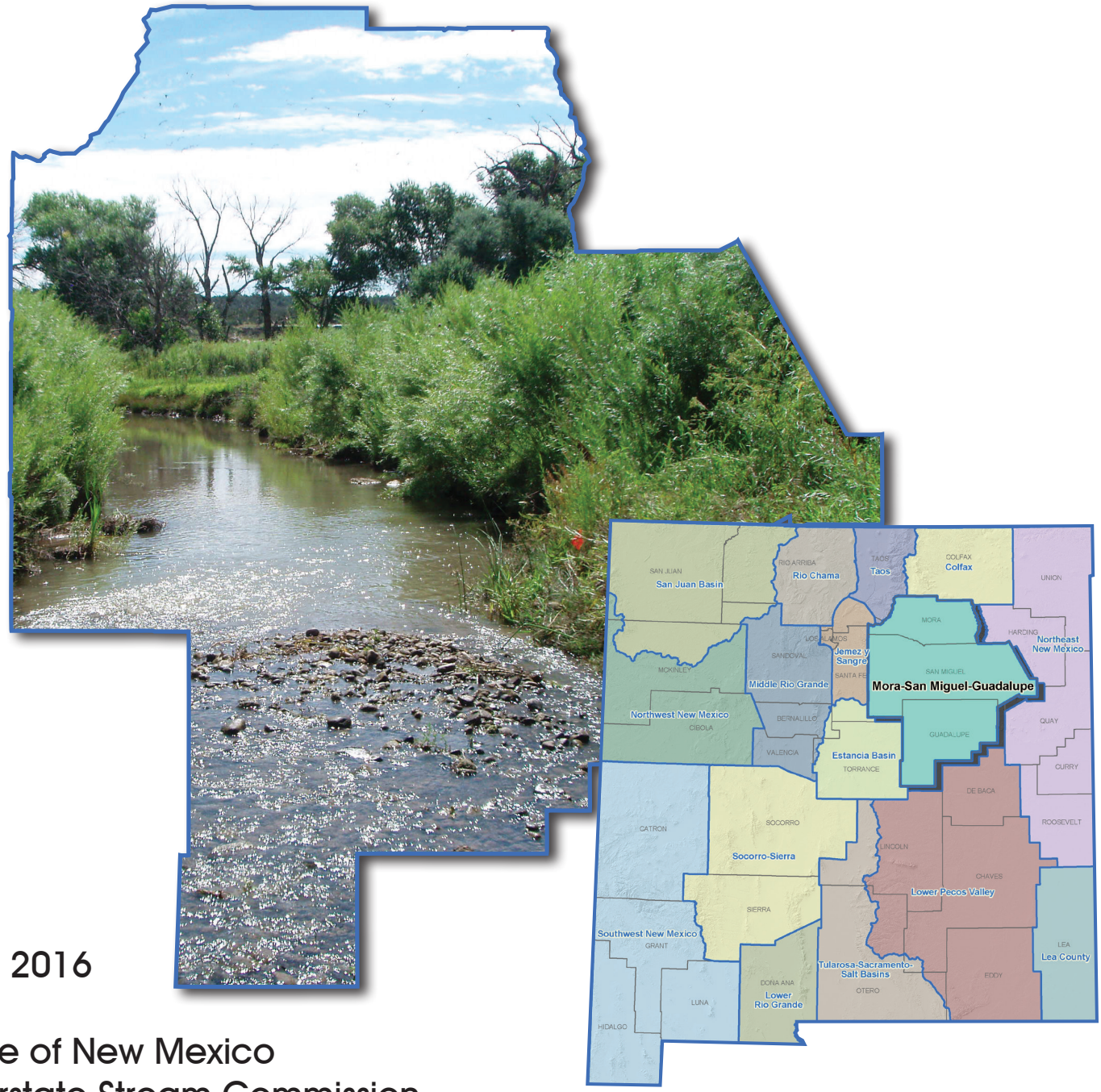
Mora-San Miguel-Guadalupe Regional Water Plan



July 2016

State of New Mexico
Interstate Stream Commission
Office of the State Engineer

Cover photograph: Sapello River near Watrous, Mora County

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Note: Appendix designations indicate corresponding section in plan

List of Acronyms

°F	degrees Fahrenheit
ac-ft/yr	acre-feet per year
AMO	Atlantic multidecadal oscillation
ASR	aquifer storage and recovery
AWRM	Active Water Resource Management
BBER	Bureau of Business and Economic Research
BLM	Bureau of Land Management
BMP	best management practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CID	Carlsbad Irrigation District
CWA	Clean Water Act
DBS&A	Daniel B. Stephens & Associates, Inc.
DWS	Domestic Well Statute
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
ft amsl	feet above mean sea level
ft bgs	feet below ground surface
FY	fiscal year
GIS	geographic information system
gpcd	gallons per capita per day
gpm	gallons per minute
GWQB	Ground Water Quality Bureau [New Mexico Environment Department]
ICIP	Infrastructure Capital Improvement Plan
in/yr	inches per year
IPCC	Intergovernmental Panel on Climate Change
LQ	location quotient
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MDWA	mutual domestic water association
MDWCA	mutual domestic water consumers association

NASS	National Agricultural Statistics Service
NCDC	National Climatic Data Center
NEPA	National Environmental Policy Act
NMAC	New Mexico Administrative Code
NMBGMR	New Mexico Bureau of Geology & Mineral Resources
NMED	New Mexico Environment Department
NMG&F	New Mexico Department of Game and Fish
NMISC	New Mexico Interstate Stream Commission
NMOSE	New Mexico Office of the State Engineer
NMSA	New Mexico Statutes Annotated
NMSU	New Mexico State University
NMWQCC	New Mexico Water Quality Control Commission
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
PCB	polychlorinated biphenyl
PDO	Pacific decadal oscillation
PDSI	Palmer Drought Severity Index
PER	preliminary engineering report
PPP	project, program, and policy
PSTB	Petroleum Storage Tank Bureau (NMED)
PVACD	Pecos Valley Artesian Conservancy District
RWP	regional water plan
SCADA	supervisory control and data acquisition system
SDWA	Safe Drinking Water Act
SNOTEL	snowpack telemetry
SWCD	soil and water conservation district
SWEPI	Shell Western E & P Inc.
TDS	total dissolved solids
TMDL	total maximum daily load
U.S. EPA	U.S. Environmental Protection Agency
UNM	University of New Mexico
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture

USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UWB	underground water basin
WBP	watershed based plan
WQA	Water Quality Act [New Mexico]
WSD	water and sanitation district
WUA	water users association
WUI	Wildland Urban Interface
WWTP	wastewater treatment plant

Executive Summary

The Mora-San Miguel-Guadalupe Water Planning Region, which includes Mora, San Miguel, and Guadalupe counties (Figure ES-1), is one of 16 water planning regions in the State of New Mexico. Regional water planning was initiated in New Mexico in 1987, its primary purpose being to protect New Mexico water resources and to ensure that each region is prepared to meet future water demands. Between 1987 and 2008, each of the 16 planning regions, with funding and oversight from the New Mexico Interstate Stream Commission (NMISC), developed a plan to meet regional water needs over the ensuing 40 years. The Mora-San Miguel-Guadalupe Regional Water Plan was completed and accepted by the NMISC in 2005.

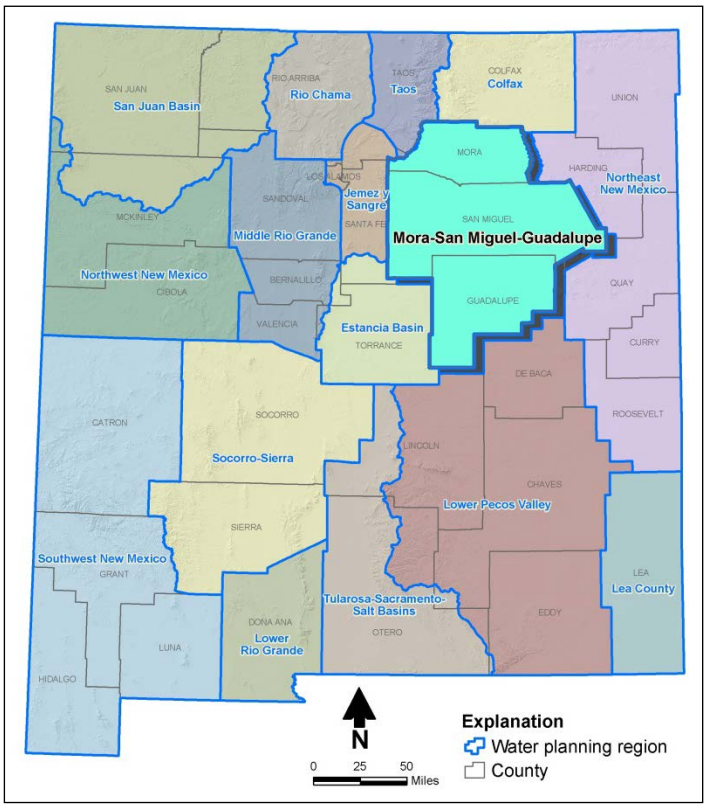


Figure ES-1. Mora-San Miguel-Guadalupe Water Planning Region

The purpose of this document is to provide new and changed information related to water planning in the Mora-San Miguel-Guadalupe region and to evaluate projections of future water supply and demand for the region using a common technical approach applied to all 16 planning regions statewide. Accordingly, this regional water plan (RWP) update summarizes key information in the 2005 plan and provides updated information regarding changed conditions and additional data that have become available.

Based on the updated water demand (Figure ES-2) data, Figure ES-3 illustrates the total projected regional water demand under high and low demand scenarios, and also shows the administrative water supply and the drought-adjusted water supply. The administrative water supply is based on 2010 withdrawals of water and is an estimate of future water supplies that considers both physical availability and compliance with water rights policies. Due to an anticipated slow economy, future water demand projections range from slight declines to slight growth. However, the region is very vulnerable to drought, as surface water supplies agriculture and livestock users as well as the City of Las Vegas, making up about 93 percent of the total supply in 2010. Even without significant growth in demand, the estimated shortage in drought years is expected to range from 98,000 to 100,000 acre-feet (Figure ES-3). Strategies that the region identified to address drought shortages included compiling geohydrology information,

aquifer mapping and exploring additional groundwater supplies, developing additional storage, and conducting watershed restoration, education, and economic development planning. The region also identified acequia and drinking water infrastructure, dam safety, and funding for an implementation team as key implementation issues.

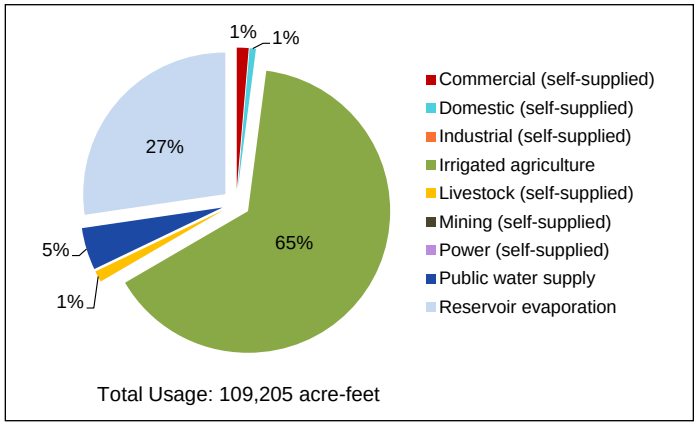


Figure ES-2. Total Regional Water Demand, 2010

Note: Tribes and Pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

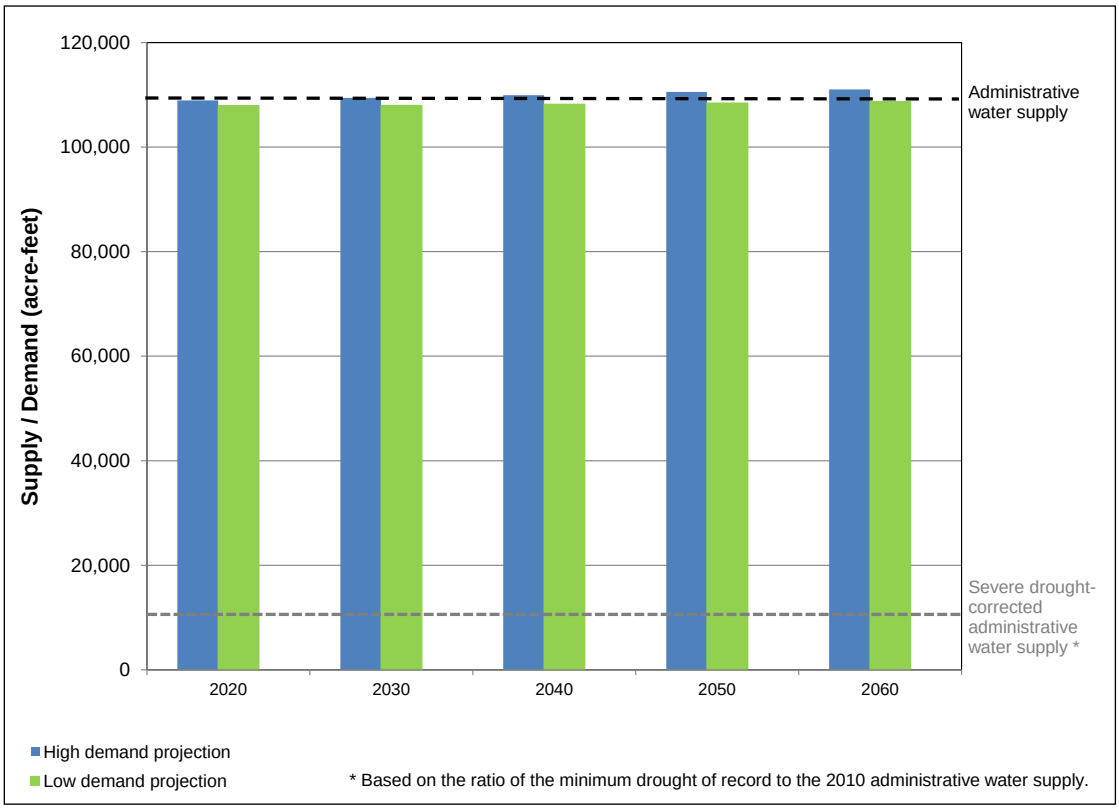


Figure ES-3. Available Supply and Projected Demand

Note: Tribes and Pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

Planning Method

For this RWP update, water supply and demand information was assessed in accordance with a common technical approach, as identified in the *Updated Regional Water Planning Handbook: Guidelines to Preparing Updates to New Mexico Regional Water Plans* (where it is referred to as a common technical *platform)* (Handbook). This common technical approach outlines the basis for defining the available water supply and specifies methods for estimating future demand in all categories of water use:

Common Technical Approach

To prepare both the regional water plans and the state water plan, the State has developed a set of methods for assessing the available supply and projected demand that can be used consistently in all 16 planning regions in New Mexico. The objective of applying this common technical approach is to be able to efficiently develop a statewide overview of the balance between supply and demand in both normal and drought conditions, so that the State can move forward with planning and funding water projects and programs that will address the State's pressing water issues.

- The method to estimate supply (referred to as the *administrative water supply* in the Handbook) is based on withdrawals of water as reported in the *New Mexico Water Use by Categories 2010* report prepared by the New Mexico Office of the State Engineer (NMOSE). Use of the 2010 data provides a measure of supply that considers both physical supply and legal restrictions (i.e., the water is physically available for withdrawal, and its use is in compliance with water rights policies) and thus reflects the amount of water available for use by a region.

- An estimate of supply during future droughts is also developed by adjusting the 2010 withdrawal data based on physical supplies available during historical droughts.

- Projections of future demand in nine water use categories are based on demographic and economic trends and population projections. Consistent methods and assumptions for each category of water use are applied across all planning regions.

Public Involvement

The updated Handbook specifies that the RWP update process "shall be guided by participation of a representative group of stakeholders," referred to as the steering committee. Steering committee members provided direction for the public involvement process and relayed information about the planning effort to the water user groups they represent and other concerned or interested individuals.

In addition to the steering committee, the water planning effort included developing a master stakeholder list of organizations and individuals interested in the water planning update. This list was developed from the previous round of water planning and then expanded through efforts to

identify representatives from water user groups and other stakeholders. Organizations and individuals on the master stakeholder list were sent announcements of meetings and the RWP update process and progress.

Over the two-year update process, nine meetings were held in the Mora-San Miguel-Guadalupe region. These meetings identified the program objectives, presented draft supply and demand calculations for discussion and to guide strategy development, and provided an opportunity for stakeholders to provide input on the strategies that they would like to see implemented. All steering committee meetings were open to the public and interested stakeholders, and participation from all meeting attendees was encouraged.

Key Water Issues

The key water supply updates and issues currently impacting the Mora-San Miguel-Guadalupe region include the following:

- For the climate divisions within the planning region, several recent years exhibited severe to extreme drought conditions. Drought preparedness is important for each community and acequia in the region and is of particular concern for the Las Vegas municipal supply, for agricultural users that are dependent on surface water, and for recreational users of Storrie Lake, the Maxwell Wildlife Refuge, Morphy Lake, Santa Rosa Lake, and other facilities that contribute to the economy of the region.

- There are hundreds of acequias in the region. Addressing infrastructure and maintenance needs and developing shortage sharing agreements or other drought preparedness measures are key issues in the region.

- Due to the large amount of forested land in the region, coupled with the recent drought conditions, the threat of wildfire and subsequent flooding and sedimentation impacts on streams and reservoirs remains a key planning issue. Continued and expanded efforts to reduce catastrophic fire risk through forest management are needed. River, riparian, and floodplain conditions need to be restored to mitigate upland erosion and loss of wetlands and to improve ecosystem services and resilience to fire.

- In 2011 the City of Las Vegas completed work on a Water Supply Master Plan Preliminary Engineering Report (PER). The PER evaluated and ranked numerous alternatives for providing reliable water supplies to the City, including measures to improve surface water yields, groundwater yields, and storage capacity. Key among the alternatives identified as having the highest priority were increased surface reservoir storage capacity, increased use of treated effluent for irrigation, and increased groundwater production capacity in the Taylor well field and surrounding area, primarily as a drought contingency water supply.

- Other actions that the City of Las Vegas has taken to plan for drought include developing a Drought Contingency and Emergency Response Plan outlining several responses to shortages of surface water supply on the Gallinas River. The City also submitted an application to conduct aquifer storage and recovery (ASR) in the Taylor well field. During periods of sufficient surface water supply on the Gallinas River, ASR could be used to replenish the aquifer in preparation for the next drought.

- The community of Ojitos Frios, located south of the City of Las Vegas's Taylor well field, has experienced declines in water levels in domestic wells that may be linked to drought conditions and/or increased production from the well field. In 2013, the El Creston Mutual Domestic Water Consumers Association (MDWCA), which serves Ojitos Frios, completed a water supply PER and subsequently obtained funding to drill and construct a deep groundwater well and distribution system. It is hoped that the new well will help centralize the groundwater production for the community and allow residents with shallower wells to obtain a safe water supply.

- A U.S. Geological Survey (USGS) study of hydrologic resources of San Miguel County found that most current development of groundwater resources is occurring in western San Miguel County, where USGS groundwater monitoring indicates declining groundwater levels. The report suggested that the County could benefit from additional mapping, monitoring, and seepage studies.

- The Federal Emergency Management Administration (FEMA) released new floodplain maps of San Miguel County in 2012. The new maps define hazard areas and indicated flood insurance rate boundaries. There is a need for improved communication and coordination between multiple users regarding flood preparation planning.

- Portions of San Miguel and Guadalupe counties were declared disaster areas due to 2013 monsoon flooding. This designation allows the areas to be eligible to receive funding from FEMA to help local governments and nonprofits repair and replace damaged infrastructure. The steering committee has identified improved communication and preparedness for flooding as an issue important to the region.

- In Guadalupe County, both the Vaughn and Santa Rosa water systems have adequate groundwater supplies, but are faced with infrastructure and delivery issues. The Vaughn system also faces problems with aging infrastructure, different sized delivery lines, and debt from previous expenditures. A PER is currently being completed with Guadalupe County as the fiscal agent.

- The City of Santa Rosa currently has two wells in operation. The wells must pump about 80 percent of the time to meet the community water needs, resulting in the system having minimal backup for maintenance or emergency situations. The City has installed a third

well, which is being permitted. The City is also working on securing funding for an updated PER to address various infrastructure needs, including an updated SCADA system.

- The Village of Pecos has a reliable and good quality source of groundwater, but has ongoing infrastructure needs. New meters are currently being installed.

- The community of Mora, through the Mora MDWCA, also has reliable groundwater from three wells, but is concerned about the need to obtain monitoring data, due to other pumping in the area. The system also has infrastructure upgrade needs.

- The Village of Wagon Mound receives its water by gravity flow from a spring. The spring has been reliable and there have not been any water quality concerns, but the Village is concerned about the lack of backup supply in the event that ongoing drought affects the spring flow. Some infrastructure upgrades in the distribution system are also needed.

- The accepted water plan identified potential contamination of shallow groundwater and domestic wells due to septic tanks as a potential water quality concern. This issue is still of concern, as many areas in the region have no access to wastewater treatment infrastructure and continue to be served by domestic wells and septic tanks.

- There are 58 small drinking water systems with reported water use in the region. Though the source water for these systems is generally good quality groundwater, the maintenance, upgrades, training, operation, and monitoring that is required to ensure delivery of water that meets drinking water quality standards is a financial and logistical challenge for these small systems.

- The region's vulnerability to drought has led to interest in potential development of poor-quality (saline) groundwater resources in the region, if it is economically viable.

- The potential for adverse water quality impacts resulting from improperly managed surface or casing operations associated with hydraulic fracturing for oil and gas extraction has been of concern in the region; as a result, Mora County passed a moratorium on the method in 2013. The Mora County ordinance was challenged in court and is being revised.

- San Miguel County passed an ordinance that creates an oil and gas development approval process in 2014. The ordinance sets requirements for water availability assessments and geohydrological reports, establishes natural resource zoning districts, and establishes authority to regulate environmental health and safety.

- The New Mexico Environment Department (NMED) periodically tests fish in New Mexico lakes and reservoirs for mercury, which in the form of methylmercury can be very toxic at low levels. Due to mercury detected in some fish at concentrations that could lead to significant adverse human health effects, fish consumption advisories have been issued for Charrette, Storrie, Santa Rosa, and Conchas lakes. The source of the mercury is most likely atmospheric deposition from sources outside the planning region.
- Groundwater obtained from units stratigraphically lower than the Santa Rosa Formation has contained elevated total dissolved solids due to sulfates originating from gypsum beds. The water quality issues are site dependent. Little can be done to predict water quality prior to exploratory drilling.

Strategies to Meet Future Water Demand

An important focus of the RWP update process is to both identify strategies for meeting future water demand and support their implementation. To help address the implementation of new strategies, a review of the implementation of previous strategies was first completed.

The 2005 Mora-San Miguel-Guadalupe Regional Water Plan recommended the following strategies for meeting future water demand:

- Municipal conservation, including education, rate structures, and graywater use, to reduce the demand in public water supplies
- Agricultural conservation, including on-farm improvements such as drip irrigation and delivery system efficiencies such as ditch lining, to reduce demands for agricultural use
- Watershed management, which focuses primarily on thinning in upland areas to reduce evapotranspiration and potentially increase water yields
- Non-native vegetation replacement, focusing on removal of salt cedar and re-establishment of lower-water-use native vegetation
- Water quality protection, including development of septic tank monitoring and maintenance or replacement programs
- Development of additional groundwater to provide supplies that are less vulnerable to drought conditions
- Development of additional storage through aquifer storage and recovery, raising the height of existing dams, building new dams, or removing accrued sediment
- Transferring water rights to create a permanent pool of water in Santa Rosa Lake

- Water rights protection, including adoption of acequia bylaws to prevent out-of-acequia transfers without the approval of the acequia
- Water banking, including mechanisms for short-term leasing of water rights within acequias or within larger geographic areas within the region
- Requiring proof of water availability to ensure that new subdivisions or other growth only occurs when reliable supplies have been secured prior to development
- Completion of 40-year water plans for municipalities and counties within the planning region
- Data collection, metering, measuring, monitoring and management to provide more reliable information for water resources planning

The steering committee reviewed each of the strategies and indicated that they are all still relevant, though some are being refocused as new recommended strategies.

During the two-year update process the Mora-San Miguel-Guadalupe Steering Committee and stakeholders identified projects, programs, and policies (PPPs) to address their water issues. Some water projects were already identified through the State of New Mexico Infrastructure Capital Improvement Plan, Water Trust Board, Capital Outlay, and NMED funding processes; these projects are also included in a comprehensive table of PPP needs. The information was not ranked or prioritized; it is an inclusive table of all of the PPPs that regional stakeholders are interested in pursuing. In the Mora-San Miguel-Guadalupe region, projects identified on the PPP table are primarily associated with acequias/agriculture, drinking water system infrastructure, watershed restoration, and planning and data collection projects.

At steering committee meetings held in 2015 and 2016, the group discussed projects that would have a larger regional or sub-regional impact and for which there is interest in collaboration to seek funding and for implementation. The following key collaborative projects were identified by the steering committee and Mora-San Miguel-Guadalupe stakeholders:

- *Development of a regional water plan implementation team to coordinate projects.* Establish a permanent regional group with limited authority to distribute project funds, provide advice, and conduct ongoing water planning processes. Coordinating proposals and resources would be an important goal. The team could set up a way to fund development of ideas to a point where they either become shovel-ready or are discarded.
- *Integrated water plan.* Define water sources and uses, and determine how better management can be used to mitigate environmental, water supply, flooding, and risks. The goal is to maximize the use of each drop of water.

- *Watershed restoration and fire protection.* Minimize fire and flooding damage through implementation of forest management practices to protect watersheds and riparian areas within these watersheds. Mitigation measures include thinning, prescribed burns, riparian and floodplain restoration, and other management practices designed on a site-specific basis.

- *Education on watershed best management practices.* Provide education on best management practices (BMPs) for fire prevention, livestock grazing, and road construction and maintenance. Topics could include:
  - Forest Service grazing (duration, timing)
  - Road maintenance, including cleaning culverts
  - Wildland Urban Interface (WUI) projects: $33,000,000 for rural fire and mutual domestics have been completed.
  - Hermits Peak Watershed efforts, watershed alliances within each area (state, county, federal)
  - Understanding the benefits of BMPs and living in the watersheds
  - Tying the youth to the land
  - Cattle causing problems downstream (perception problem)
  - Forest problem
  - Elk problem

- *Economic development planning linked with water / watershed issues.* Focus on economic development that is consistent with watershed health including:
  - Greenhouses
  - Fuel reduction and sale (firewood, lumber, pellets)
  - Farm-to-table-production and marketing (including cattle)
  - Acequias projects
  - Thinning projects

- *Additional storage capacity.* Develop storage capacity that benefits acequias, mutual domestic water associations (MDWAs), municipalities, irrigation districts, and land grants. Small upland storage (watershed sponge) can address drought resilience and flood prevention. Rainwater harvesting is a component of the overall strategy.

- *Water disaster recovery (flood preparation and mitigation).* Review regional mapping and data related to the potential for flooding in the region, and develop and implement a regional flood mitigation plan.
- *Dam safety.* Rehabilitate highest-priority dams based on risk / loss-of-life potential.
- *Geohydrology database, aquifer mapping and groundwater exploration (drilling).* To reduce drought vulnerability and provide more reliable groundwater supplies, this project would:
  - Compile existing reports and information
  - Develop an understanding of the region's groundwater resources, including quantity, quality, and age of the groundwater, and sustainability of groundwater resources.
  - Conduct geohydrology studies in strategic areas. A second phase could include exploration of new groundwater resources.
- *Regionalization of MDWCAs.* Provide opportunities to improve small system efficiency and capacity by looking for ways to share resources for:
  - Technical management
  - Financial management
  - Safe Drinking Water Act compliance in some locations
  - Infrastructure improvement

The 2016 Regional Water Plan characterizes supply and demand issues and identifies strategies to meet the projected gaps between water supply and demand. This plan should be added to, updated, and revised to reflect implementation of strategies, address changing conditions, and continue to inform water managers and other stakeholders of important water issues affecting the region.

1. Introduction

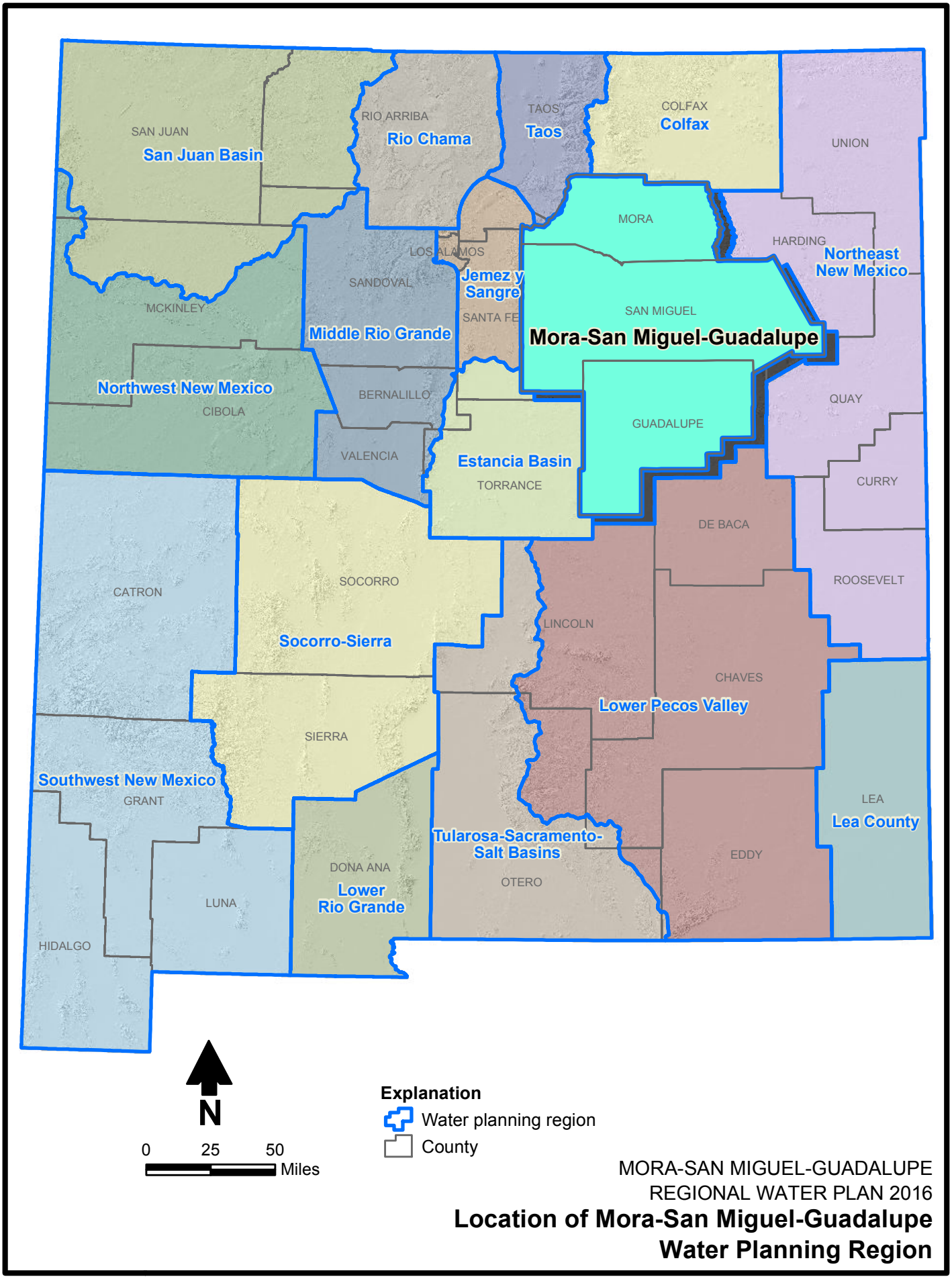
The Mora-San Miguel-Guadalupe Water Planning Region, which includes all of Mora, San Miguel, and Guadalupe counties (Figure 1-1), is one of 16 water planning regions in the State of New Mexico. Regional water planning was initiated in New Mexico in 1987, its primary purpose being to protect New Mexico water resources and to ensure that each region is prepared to meet future water demands. Between 1987 and 2008, each of the 16 planning regions, with funding and oversight from the New Mexico Interstate Stream Commission (NMISC), developed a plan to meet regional water needs over the ensuing 40 years. The Mora-San Miguel-Guadalupe Regional Water Plan was completed and accepted by NMISC in June 2005 (DBS&A, 2005).

The purpose of this document is to provide new and changed information related to water planning in the Mora-San Miguel-Guadalupe region, as listed in the bullets below, and to evaluate projections of future water supply and demand for the region using a common technical approach applied to all 16 planning regions statewide. Accordingly, the following sections summarize key information in the 2005 plan and provide updated information regarding changed conditions and additional data that have become available. Specifically, this update:

- Identifies significant new research or data that provide a better understanding of current water supplies and demands in the Mora-San Miguel-Guadalupe region.
- Presents recent water use information and develops updated projections of future water demand using the common technical approach developed by the NMISC, in order to facilitate incorporation into the New Mexico State Water Plan.
- Identifies strategies, including infrastructure projects, conservation programs, watershed management policies, or other types of strategies that will help to balance supplies and projected demands and address the Mora-San Miguel-Guadalupe region's future water management needs and goals.
- Discusses other goals or priorities as identified by stakeholders in the region.

The water supply and demand information in this regional water plan (RWP) is based on current published studies and data and information supplied by water stakeholders in the region. Tribes and pueblos in New Mexico are not required to provide water use data to the State, and so tribal water use data are not necessarily reflected in this RWP update.

The organization of this update follows the template provided in the *Updated Regional Water Planning Handbook: Guidelines to Preparing Updates to New Mexico Regional Water Plans* (NMISC, 2013) (referred to herein as the Handbook):



MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Location of Mora-San Miguel-Guadalupe Water Planning Region

Figure 1-1

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- Information regarding the public involvement process followed during development of this RWP update and entities involved in the planning process is provided in Section 2.
- Section 3 provides background information regarding the characteristics of the Mora-San Miguel-Guadalupe planning region, including an overview of updated population and economic data.
- The legal framework and constraints that affect the availability of water are briefly summarized in Section 4, with recent developments and any new issues discussed in more detail.
- The physical availability of surface water and groundwater and water quality constraints was discussed in detail in the 2005 RWP; key information from that plan is summarized in Section 5, with new information that has become available since 2005 incorporated as applicable. In addition, Section 5 presents updated monitoring data for temperature, precipitation, drought indices, streamflow, groundwater levels, and water quality, and an estimate of the administrative water supply including an estimate of drought supply.
- The information regarding historical water demand in the planning region, projected population and economic growth, and projected future water demand was discussed in detail in the 2005 RWP. Section 6 provides updated population and water use data, which are then used to develop updated projections of future water demand.

Common Technical Approach

To prepare both the regional water plans and the state water plan, the State has developed a set of methods for assessing the available supply and projected demand that can be used consistently in all 16 planning regions in New Mexico. This *common technical approach* outlines the basis for defining the available water supply and specifies methods for estimating future demand in all categories of water use:

- The method to estimate the available supply (referred to as the *administrative water supply* in the Handbook) is based on withdrawals of water as reported in the *NMOSE Water Use by Categories 2010* report,* which provide a measure of supply that considers both physical supply and legal restrictions (i.e., the diversion is physically available for withdrawal, and its use is in compliance with water rights policies) and thus reflects the amount of water available for use by a region. An estimate of supply during future droughts is also developed by adjusting the 2010 withdrawal data based on physical supplies available during historical droughts.
- Projections of future demands in nine categories of water use are based on demographic and economic trends and population projections. Consistent methods and assumptions for each category of water use are applied across all planning regions.

The objective of applying this common technical approach is to be able to efficiently develop a statewide overview of the balance between supply and demand in both normal and drought conditions, so that the State can move forward with planning and funding water projects and programs that will address the State's pressing water issues.

* *Tribes and Pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this plan.*

- Based on the current water supply and demand information discussed in Sections 5 and 6, Section 7 updates the projected gap between supply and demand of the planning region.

- Section 8 outlines new strategies (water programs, projects, or policies) identified by the region as part of this update, including additional water conservation measures.

Water supply and demand information (Sections 5 through 7) is assessed in accordance with a common technical approach, as identified in the Handbook (NMISC, 2013) (where it is referred to as a common technical *platform*). This common technical approach is a simple methodology that can be used consistently across all regions to assess supply and demand, with the objective of efficiently developing a statewide overview of the balance between supply and demand for planning purposes.

Four terms frequently used when discussing water throughout this plan have specific definitions related to this RWP:

- *Water use* is water withdrawn from a surface or groundwater source for a specific use. In New Mexico water is accounted for as one of the nine categories of use in the *New Mexico Water Use by Categories 2010* report prepared by the New Mexico Office of the State Engineer (NMOSE).

- *Water withdrawal* is water diverted or removed from a surface or groundwater source for use.

- *Administrative water supply* is based on the amount of water withdrawals in 2010 as outlined in the *New Mexico Water Use by Categories 2010* report.

- *Water demand* is the amount of water needed at a specified time.

2. Public Involvement in the Planning Process

During the past two years, the regional water planning steering committees, interested stakeholders, NMISC, and consultants to the NMISC have worked together to develop regional water plan updates. The purpose of this section is to describe public involvement activities during the regional water plan update process, guided by the Handbook, which outlined a public involvement process that allowed for broad general public participation combined with leadership from key water user groups.

2.1 The New Mexico Interstate Stream Commission's Role in Public Involvement in the Regional Water Plan Update Process

The NMISC participated in the public involvement process through a team of contractors and NMISC staff that assisted the regions in conducting public outreach. The NMISC's role in this process consisted of certain key elements:

- Setting up and facilitating meetings to carry out the regional water plan update process.
- Working with local representatives to encourage broad public involvement and participation in the planning process.
- Working to re-establish steering committees in regions that no longer had active steering committees.
- Supporting the steering committees once they were established.
- Facilitating input from the stakeholders and steering committees in the form of compiling comments to the technical sections drafted by the State and developing draft lists of projects, programs, and policies (PPPs) based on meeting input, with an emphasis on projects that could be implemented.
- Finalizing Section 8, Implementation of Strategies to Meet Future Water Demand, by writing a narrative that describes the key collaborative strategies based on steering committee direction.

This approach represents a change in the State's role from the initial round of regional water planning, beginning in the1990s through 2008, when the original regional water plans were developed. During that phase of planning, the NMISC granted regions funding to form their own regional steering committees and hire consultants to write the regional water plans, but NMISC staff were not directly involved in the process. Over time and due to lack of resources, many of the regional steering committees established for the purpose of developing a region's water plan disbanded. Funding for regional planning decreased significantly, and regions were not meeting to keep their plans current.

In accordance with the updated Handbook (NMISC, 2013), the NMISC re-established the regional planning effort in 2014 by working with existing local and regional stakeholders and organizations, such as regional councils of government, water providers, water user organizations, and elected officials. The NMISC initiated the process by hosting and facilitating meetings in all 16 regions between February and August of 2014. During these first months, through its team of consultants and working with contacts in the regions, the NMISC prepared "master stakeholder" lists, comprised of water providers and managers, local government

representatives, and members of the public with a general interest in water, and assisted in developing updated steering committees based on criteria from the Handbook and recommendations from the stakeholders. (The steering committee and master stakeholder lists for the Mora-San Miguel-Guadalupe region are provided in Section 2.2.1 and Appendix 2-A, respectively.) These individuals were identified through research, communication with other water user group representatives in the region, contacting local organizations and entities, and making phone calls. Steering committee members represent the different water users groups identified in the Handbook and have water management expertise and responsibilities.

The steering committee was tasked with four main responsibilities:

- Provide input to the water user groups they represent and ensure that other concerned or interested individuals receive information about the water planning process and meetings.
- Provide direction on the public involvement process, including setting meeting times and locations and promoting outreach.
- Identify water-related PPPs needed to address water management challenges in the region and future water needs.
- Comment on the draft *Mora San Miguel Guadalupe Regional Water Plan 2016*, as well as gather public comments.
- In 2016, the NMISC continued to support regional steering committees by facilitating three additional steering committee meetings open to the public in each of the 16 regions. The purpose of these meetings was to provide the regions with their draft technical sections that the NMISC had developed and for the regions to further refine their strategies for meeting future water challenges.

Throughout the regional water planning process all meetings were open to the public. Members of the public who have an interest in water were invited directly or indirectly through a steering committee member to participate in the regional water planning process.

Section 2.2 provides additional detail regarding the public involvement process for the Mora-San Miguel-Guadalupe 2016 regional water plan.

2.2 Public Involvement in the Mora-San Miguel-Guadalupe Planning Process

This section documents the steering committee and public involvement process used in updating the plan and documenting ideas generated by the region for future public involvement in the implementation of the plan.

2.2.1 Identification of Regional Steering Committee Members

The Handbook (NMISC, 2013) specifies that the steering committee membership include representatives from multiple water user groups. Some of the categories may not be applicable to a specific region, and the regions could add other categories as appropriate to their specific region. The steering committee representation listed in the Handbook includes:

- Agricultural – surface water user (includes acequias)
- Agricultural – groundwater user
- Municipal government
- Rural water provider
- Extractive industry
- Environmental interest
- County government
- Local (retail) business
- Tribal entity
- Watershed interest
- Federal agency
- Other groups as identified by the steering committee

Steering committee members were identified and asked to participate through interviews, public meetings, recommendations, and outreach to specific interests. Through this outreach, the Mora-San Miguel-Guadalupe Water Planning Region established a representative steering committee, the members of which are listed in Table 2-1. The process included filling gaps throughout the process and/or changing representatives as notified and or appropriate. As in other regions, some of the changes occurred because of employment, elections, or changes in availability to donate time to this effort.

The steering committee includes several state and federal agency representatives who participate as technical resources to the region. These individuals are generally knowledgeable about water issues in the region and are involved with many of the PPPs related to water management in the region. The list also includes non-profit groups who are involved in and/or have expertise with local water-related initiatives such as watershed restoration or mutual domestic concerns and issues. The steering committee identified Les Montoya (San Miguel County Manager), Tim Dodge (Santa Rosa City Manager), and John Olivas (New Mexico Wilderness Alliance) as Chairs.

Table 2-1. Steering Committee Members, Mora-San Miguel-Guadalupe Water Planning Region

Water User Group	Name	Organization / Representation
Agricultural – surface water user	Paula Garcia	New Mexico Acequia Association Mora County Commissioner
	Harold Trujillo	New Mexico Acequia Association
	Robert Quintana	Storrie Project Water Users Association
	Werner Muller	Storrie Project Water Users Association
Agricultural – groundwater user	NA	
Agricultural – acequias	Ralph Vigil	New Mexico Acequia Commissioner Pecos Farmer
Agricultural – livestock	Michael Bain	General Manager, Twin Willows Ranch
County government	Les Montoya Alex Tafoya (Alternate)	County Manager, San Miguel County North East Economic Development Organization (NEEDO)
	Ben Sanchez	Mora County Manager
	Mike Chavez	Guadalupe County
Municipal government	Tim Dodge Mark Micelli (Alternate)	City Manager, City of Santa Rosa
	Richard Trujillo	City Manager, City of Las Vegas
	Maria Gilvarry	City of Las Vegas
	Roman Garcia	Mayor, Village of Vaughn
	Tony Roybal, Mayor	Mayor, Village of Pecos
Environmental interest	John Olivas	New Mexico Wilderness Alliance
	Toner Mitchell Art Vollmer (Alternate)	Trout Unlimited
Federal agency (technical support to the region)	Kenneth Alcon	U.S. Department of Agriculture-Natural Resources Conservation Service
	Steve Romero	U.S. Forest Service
	Rob Laranaga	National Wildlife Refuge
State agency (technical support to the region)	Carmen Austin	New Mexico State Forestry
	Hannah Risely-White	New Mexico Interstate Stream Commission
	Don Cole	New Mexico Office of the State Engineer, District 7 Water Master
	Candelaria Gallegos	New Mexico Environment Department
	Neal Schaeffer	New Mexico Environment Department
	Mark Meyers	New Mexico State Land Office

Table 2-1. Steering Committee Members, Mora-San Miguel-Guadalupe Water Planning Region

Water User Group	Name	Organization / Representation
Local business	Bill Hendrickson	Executive Director, Las Vegas-San Miguel Economic Development Corporation
Other groups as identified by the steering committee	Eric Ghahate	Northern New Mexico Economic Development District
Educational/Watershed	Kent Reid	New Mexico Forest and Watershed Restoration Institute
Sustainability	Bob Wessley	Las Vegas Community Water Board
Educational Institution	Ken Bentson	New Mexico Highlands University
Rural water provider	Ramon Lucero	El Valle Water Alliance
	Pearl Maestas	Sangre de Cristo Mutual Domestic Water Consumers Association (MDWCA)
	Claude Hayward	Tecolotito MDWCA
	Clarence Aragon	Mora Mutual Domestic Sewer & Water
	Joe Zebrowski	El Creston MDWCA
Watershed interest	Ernest Quintana	Sapello Watershed
	Lea Knutson	Hermits Peak Watershed Alliance
	Doug Jeffords	Upper Pecos Watershed Association
	Marianna Lands	Mora Watershed Alliance
Watershed interest - Soil and Water Conservation District	Frances Martinez Steve Reichert (Alternate)	Tierra y Montes Soil and Water Conservation District

The steering committee discussed the value of developing subcommittees and determined that Watershed, Mutual Domestic, and Acequia subcommittees would be useful means of enhancing the planning effort and ensuring implementation of the RWP while addressing major areas of concern. These subcommittees were formed with the following chairs:

- Watershed Subcommittee: Lea Knutson, of the Hermit's Peak Watershed Alliance
- Mutual Domestic Subcommittee: Ramon Lucero of El Valle Mutual Domestic Water Association (MDWCA)
- Acequia Subcommittee: Paula Garcia and Harold Trujillo of the New Mexico Acequia Association and Ralph Vigil of the New Mexico Acequia Commission

The Acequia Subcommittee had two meetings, one in Las Vegas and one in Mora. Interest continues and it is anticipated this subcommittee will be more active during implementation of the plan. The Watershed Subcommittee and Mutual Domestic Subcommittee met and developed strategies that were incorporated into the regional strategies and developed ideas for immediate funding.

In addition, municipal leaders discussed the importance of a Government/Municipality/Land Management Subcommittee that could meet and discuss their own priorities, with emphasis on planning and coordinated implementation, operations, and maintenance. This subcommittee will be chaired by the steering committee co-chairs. It did not meet during the 2014-2016 planning effort but will be important during the implementation phase of the RWP.

2.2.2 Regional Water Plan Update Meetings

All steering committee meetings and NMISC-facilitated water planning meetings were open to the public and interested stakeholders. Meetings were announced to the master stakeholder list by e-mail, and participation from all meeting attendees was encouraged. Steering committee members served as a conduit of information to others and, through their own organizational communications with other agencies, encouraged participation in the process, and steering committee members were asked to share information about the process with other stakeholders in the region. Generally, steering committee members ensured that other concerned or interested individuals received the announcements and recommended key contacts to add to the master stakeholder list throughout the planning process.

The steering committee discussed and made the following recommendations regarding meeting times and locations that would maximize public involvement. The group decided that Las Vegas was the best location to hold meetings, because it is central to the region and it was felt that participation would be maximized by not requiring anyone to drive to the further reaches of the region. In general, daytime/weekdays were thought to work best for the group. Both the agricultural sector and those involved in water-related work are better able to attend during the work day than in evenings.

Over the two-year update process, nine meetings were held in the Mora-San Miguel-Guadalupe region. A summary of each of the meetings is provided in Table 2-2.

2.2.3 Current and Future Ideas for Public Outreach during Implementation of the Regional Water Plan Update

The steering committee identified the following process for additional public outreach:

- The Chair of the Watershed Subcommittee will continue to organize meetings with subcommittee members. These meetings will not be facilitated by the NMISC contractors. Steering committee members will continue to assist with outreach.
- Information about the plan and meetings should be included in watershed newsletters, the Acequia Noticias newsletter, and municipal websites such as San Miguel County, City of Las Vegas, City of Santa Rosa, and rural electric cooperatives.
- The steering committee will conduct outreach through KFUN, a Las Vegas-based radio station that has a large local following and hosts a regular talk show about water issues in the area.

3. Description of the Planning Region

This section provides a general overview of the Mora-San Miguel-Guadalupe Water Planning Region. Detailed information, including maps illustrating the land use and general features of the region, was provided in the 2005 RWP; that information is briefly summarized and updated as appropriate here. Additional detail on the climate, water resources, and demographics of the region is provided in Sections 5 and 6.

3.1 General Description of the Planning Region

The Mora-San Miguel-Guadalupe Water Planning Region is located in north-central New Mexico. The region is bounded on the north by Colfax County (Colfax planning region), on the west by Santa Fe and Torrance counties (Jemez y Sangre and Estancia planning regions) and small portions of Rio Arriba and Taos counties (Taos planning region), on the south by Lincoln and De Baca counties (Lower Pecos Valley planning region), and on the east by Harding and Quay counties (Northeast planning region) (Figure 1-1). The planning region encompasses varied terrain, from the Sangre de Cristo Mountains in the west, with elevations over 13,000 feet above mean sea level (ft amsl), to the eastern plains with elevations of about 3,800 ft amsl.

The total area of the planning region is 9,693 square miles, distributed among the three counties as follows:

Table 2-2. Mora-San Miguel-Guadalupe Region Public Meetings

Date	Location	Purpose	Meeting Summary
FY 2014			
2/27/2014	Las Vegas City Council Chambers Las Vegas, NM	Kickoff meeting: Present the regional water planning update process to the region and continue to conduct outreach to begin building the steering committee.	Representatives from many of the water user groups attended the meeting and were instrumental in identifying other individuals as potential representatives for a particular group. Many of the meeting attendees were not on the master stakeholder list, and those individuals were added to the list.
FY 2015			
9/15/14	San Miguel County Commission Chambers Las Vegas, NM.	Present the technical data compiled and synthesized for the region.	Data presented included population and economic trends through a series of tables, the administrative water supply, the projected future water demand, and the gap between supply and demand for both normal and drought years. In addition, the presentation reaffirmed the development of a steering committee to guide the process as outlined in the Handbook.
3/17/2015	Highlands University Las Vegas, NM	Review projects completed since submission of the accepted plan and provide additional input. Discuss potential collaborative projects.	The group reviewed projects completed since submission of the accepted plan and provided additional input. The Watershed Subcommittee chair reported on ideas generated relative to projects, programs, and policies (PPPs) or other issues. The group further discussed potential collaborative projects such as water system regionalization/ cooperation, monitoring/data collection, watershed restoration, drought contingency planning, local and state water policy recommendations, and water quality protection.

Table 2-2. Mora-San Miguel-Guadalupe Region Public Meetings

Date	Location	Purpose	Meeting Summary
4/28/2015	Highlands University Las Vegas, NM	Discuss elements that would be included in the public involvement chapter and ideas for FY 2015-2016 outreach. Review and discuss future project checklist discussed at previous meeting and sent to stakeholders.	The Watershed Subcommittee presented information. The future project checklist was reviewed and discussed, and a deadline for sending information to the consultants was confirmed. The group participated in a brainstorming activity that helped to identify regional projects that held the potential for the greatest collaboration and effort, ranking the level of interest, although it was noted that there is no official ranking of projects for funding priority as part of the regional water plan (RWP) update process. The consultants affirmed the next steps for the RWP update effort and a general idea for meeting again in FY 2015-2016. The group indicated that the Watershed Subcommittee would continue to meet as needed to work on the PPPs that pertain to their area of interest, though NMISC contractors will not facilitate these meetings. The subcommittee will provide the NMISC contractors additional information as needed on the PPPs.
5/19/2015	NM Highlands University Las Vegas, NM	Review project goals and timeline, Public Involvement Plan, subcommittee reports, future projects checklist, priority regional projects.	The group reviewed the steering committee membership and affirmed leadership; agreed with the summary of the public involvement process. Subcommittees reported on their meetings and gave brief overviews of ideas generated thus far to include for future projects and ideas for collaborative projects.
FY 2016			
12/10/2015	NM Highlands University Las Vegas, NM	Refine the key collaborative PPP recommendations specific to Section 8.	The group identified a number of projects that would potentially have greater interest and benefit multiple stakeholders, and added additional information in a small group format using worksheets.

Table 2-2. Mora-San Miguel-Guadalupe Region Public Meetings

Page 3 of 3

Date	Location	Purpose	Meeting Summary
3/3/2016	NM Highlands University Las Vegas, NM	Refine PPP list/process for updates. Identify key program and policy recommendations. Review and refine previous recommendations and add new ones. Refine key collaborative projects in small groups.	The PPP list/process was reviewed for updates, and key program and policy recommendations were identified. Previous recommendations were reviewed and refined and new ones added. The meeting attendees broke into small groups to further refine key collaborative projects, with each group reporting key findings to the full group. The group discussed how comments will be incorporated into the draft plan.
4/27/2016	San Miguel County Commission Chambers Las Vegas, NM	Refine key collaborative projects.	A smaller subsection of the steering committee met to refine key collaborative projects.
6/2/2016	Highlands University Las Vegas, NM	Review the Public Involvement section (2) and the Section 8 key PPP list; review executive summary and comments.	The group reviewed the Executive Summary, Public Involvement section (2), Section 8 key strategies, consolidated comments, and PPP list. Edits were made to some of the documents presented. The group decided on representatives to present the plan to the NMISC and developed ideas for implementation of their RWP. Eric Ghahate of the North Central New Mexico Economic Development District gave a presentation on La Ristra Project, a statewide user-friendly database of project information from multiple sectors.

- Mora County: 1,932 square miles
- San Miguel County: 4,732 square miles
- Guadalupe County: 3,029 square miles

Natural resources in the Mora-San Miguel-Guadalupe region include national forest land in the Sangre de Cristo Mountains and several state parks, including Coyote Creek and Morphy Lake in Mora County, Storrie Lake, Conchas Lake, and Villanueva state parks in San Miguel County, and Santa Rosa Lake in Guadalupe County. In addition to the state parks, there are other lakes and reservoirs used for recreational as well as water supply purposes. Mining has not been a major economic contributor to the region; there has recently been an interest in oil and gas operations using hydraulic fracturing, though there has been considerable opposition in the region.

3.2 Climate

The varied terrain of the planning region results in significant climate variations. For example, temperatures range from lows that are well below 0 degrees Fahrenheit (°F) in the mountains to highs of more than 100°F on the plains. The average annual temperatures in the region range between about 44°F in the higher elevations and 59°F near Conchas Dam on the plains.

Precipitation is also influenced by location and elevation. Average annual precipitation, including both snowmelt and rainfall, ranges from about 12 inches in the lower elevations to more than 40 inches in the higher elevations of the Sangre de Cristo Mountains. Much of the region receives 15 to 18 inches of precipitation annually.

As noted in the 2005 RWP, drought is an important factor in water planning in the region. During the past century, severe droughts have occurred in the early 1900s, the 1950s, the early 2000s, and in 2011 through 2013. Conversely, the wet period of the 1980s into the 1990s was just as anomalous as the severe droughts (Gutzler, 2003) and should not be used as a "normal" standard in terms of precipitation expectations.

3.3 Major Surface Water and Groundwater Sources

Approximately 93 percent of the water currently used in the planning region is supplied by surface water, which is primarily used for irrigated agriculture. Flows are highly varied from year to year, and the streams are typically characterized by short-duration high flows, with prolonged durations of low flows. The dominant waterways flowing in the region (Figure 3-1) are the Canadian River and its tributary the Mora River, and the Pecos River and its tributary the Gallinas River. The Gallinas River and the Petersen and Bradner reservoirs are important

Explanation

- Stream (dashed where intermittent)
- Lake
- City
- County
- Water planning region

Elevation (ft msl)

- < 4,000
- 4,000 - 6,000
- 6,000 - 8,000
- 8,000 - 10,000
- >10,000

N

0 10 20 Miles

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Regional Map

Figure 3-1

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sources for the City of Las Vegas. Other important surface impoundments are Storrie Lake—which stores water for irrigators along the Gallinas River, the U.S. Fish and Wildlife Service (USFWS), and the City of Las Vegas—and Lake Isabella, which stores water from the Sapello River for irrigation. Santa Rosa and Conchas reservoirs are important resources in the southern and eastern parts of the region.

The Canadian River and tributaries are shared with the Colfax water planning region to the north and the Northeast region to the east. The Pecos River is shared with the Lower Pecos Valley region to the south and with Texas as specified in the Pecos River Compact.

Groundwater in the region supplies several communities and numerous small mutual domestic water user associations and supplements the City of Las Vegas water supply. Numerous stock and domestic wells are also located throughout the region. Groundwater is found primarily in sedimentary rocks and alluvial valleys within the Sangre de Cristo Mountains, with varying yield and quality. The most abundant groundwater resources in the region are located in Guadalupe County. The primary aquifer supplying Santa Rosa and other Guadalupe County users is the San Andres Limestone.

The Mora-San Miguel-Guadalupe Water Planning Region overlies parts of the Canadian River, Upper Pecos, Tucumcari, Fort Sumner, and Roswell Declared Underground Water Basins (UWBs), the most important of which are the Canadian River and Upper Pecos. (A declared UWB is an area of the state proclaimed by the State Engineer to be underlain by a groundwater source having reasonably ascertainable boundaries. By such proclamation the State Engineer assumes jurisdiction over the appropriation and use of groundwater from the source.) These basins are shared with the following water planning regions:

- Colfax (Canadian River and Tucumcari)
- Northeast New Mexico (Tucumcari, Fort Sumner, and smaller portions of the Canadian River and Roswell)
- Estancia Basin (Upper Pecos, Fort Sumner, and Roswell)
- Lower Pecos Valley (Fort Sumner and Roswell)

Very small portions of the Middle Rio Grande and Estancia groundwater basins also extend into the Mora-San Miguel-Guadalupe region, but do not supply meaningful quantities of water to the region. A map showing the UWBs in the region is provided in Section 4.7.2.

Additional information on administrative basins and surface and groundwater resources of the region is included in Section 4 and Sections 5.2 and 5.3, respectively.

3.4 Demographics, Economic Overview and Land Use

The 2013 populations of Mora, San Miguel, and Guadalupe counties were 4,704, 28,541, and 4,551, respectively (U.S. Census Bureau, 2014a) (Table 3-1). As shown in Table 3-1, from 2000 to 2013 the population declined in all three counties. The number of business establishments also declined (from the 2001 number shown in the 2005 plan [DBS&A, 2005, Table 3-1]), but per capita income increased in actual dollar amounts, substantially so in Mora County, although still below the state average.

The economies of Mora and San Miguel counties have traditionally been driven by the ranching sector, which has been hit hard by recent drought. The economy of Guadalupe County outside of Santa Rosa is also heavily dependent on ranching, but the economy of Santa Rosa, which accounts for 55 percent of the county population, is more dependent on recreational tourism and Interstate 40 travelers. The largest employment categories across the region are generally health care/social services, government (local, state, and federal), and retail trade. Agriculture is the largest water user in the region.

Most of the land in the Mora-San Miguel-Guadalupe water planning region is privately owned, although there is some federal and state land (no tribal lands are present in the region). Land ownership in the region is illustrated on Figure 3-2 and outlined below:

- Federal agencies: 895 square miles
- State agencies: 674 square miles
- Private entities: 8,124 square miles

Current statistics on the economy and land use in each county, compiled from the U.S. Census Bureau and the New Mexico Department of Workforce Solutions, are summarized in Table 3-1. Additional detail on demographics and economics within the region is provided in Section 6.

Table 3-1. Summary of Demographic and Economic Statistics for the Mora-San Miguel-Guadalupe Water Planning Region

a. Population

County	2000	2010	2013
Mora	5,180	4,881	4,704
San Miguel	30,126	29,393	28,541
Guadalupe	4,680	4,687	4,551
Total Region	39,986	38,961	37,796

Source: U.S. Census Bureau, 2014a

b. Income and Employment

County	2008-2012 Income [a]		Labor Force Annual Average 2013 [b]		
	Per Capita ($)	Percentage of State Average	Number of Workers	Number Employed	Unemployment Rate (%)
Mora	22,561	95	1,884	1,621	14.0
San Miguel	18,576	79	13,041	12,150	6.8
Guadalupe	14,189	62	1,749	1,597	8.7
Total Region	—	—	16,674	15,368	7.8

[a] U.S. Census Bureau, 2014c
[b] NM Department of Workforce Solutions, 2014

c. Business Environment

County	Industry	Number Employed	Number of Businesses
	2008-2012 [a]		*2012*
Mora	Education/Healthcare	892	45
	Construction	288	
	Retail trade	200	
	Agriculture	192	
	Professional/Scientific	105	
	Government	95	
San Miguel	Education/Healthcare	3,380	444
	Government	1,524	
	Retail trade	1,298	
	Professional/Scientific	981	
	Transportation/Utilities	699	
	Construction	644	

Table 3-1. Summary of Demographic and Economic Statistics for the Mora-San Miguel-Guadalupe Water Planning Region
Page 2 of 2

c. Business Environment

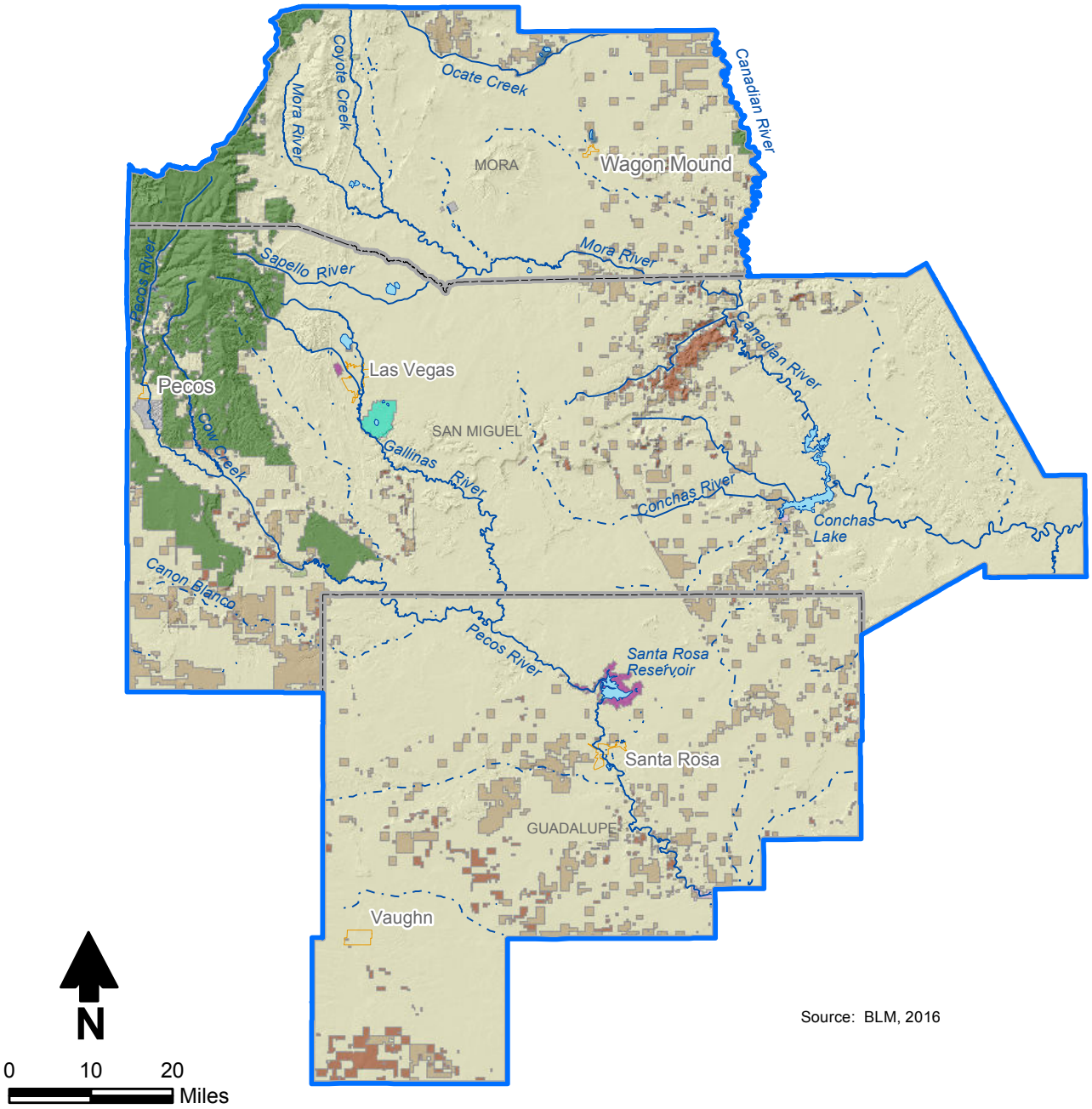
County	Industry	Number Employed	Number of Businesses
	2008-2012 [a]		*2012*
Guadalupe	Education/Healthcare	262	100
	Retail trade	216	
	Recreation/Hospitality	199	
	Government	178	
	Construction	91	
	Professional/Scientific	91	

[a] U.S. Census Bureau, 2014b

d. Agriculture

County	Farms / Ranches [a]			Most Valuable Agricultural Commodities[b]
	Number	Acreage		
		Total	Average	
Mora	597	778,031	1,303	Cattle, calves Hay, other crops Nursery/greenhouse Fruits and tree nuts
San Miguel	877	2,350,432	2,680	Cattle, calves Hay, other crops Horses, ponies, mules Fruits, tree nuts, berries Vegetables, potatoes, melons
Guadalupe	372	1,643,213	4,417	Cattle, calves Vegetables, potatoes, melons Horse, ponies, mules
Total Region	1,846	4,771,676	2,585	—

[a] USDA NASS, 2014, Table 1
[b] USDA NASS, 2014, Table 2



Explanation

- Stream (dashed where intermittent)
- Lake
- City
- County
- Water planning region

Land surface ownership

- Bureau of Land Management
- Bureau of Reclamation
- Department of Defense
- National Forest Service
- Fish and Wildlife Service
- National Park Service
- Private
- State
- State Game and Fish
- State Park

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Land Ownership

Figure 3-2

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4. Legal Issues

4.1 Relevant Water Law

4.1.1 State of New Mexico Law

Since the accepted regional water plan for the Mora-San Miguel-Guadalupe Water Planning Region was published in 2005, there have been significant changes in New Mexico water law through case law, statutes, and regulations. These changes address statewide issues including, but not limited to, domestic well permitting, the State Engineer's authority to regulate water rights, administrative and legal review of water rights matters, use of settlements to allocate water resources, the rights appurtenant to a water right, and acequia water rights. New law has also been enacted to address water project financing and establish a new strategic water reserve. These general state law changes are addressed by topic area below. State law more specific to the Mora-San Miguel-Guadalupe region is discussed in Section 4.1.2.

4.1.1.1 Regulatory Powers of the NMOSE

In 2003, the New Mexico Legislature enacted NMSA 1978, § 72-2-9.1, relating to the administration of water rights by priority date. The legislature recognized that "the adjudication process is slow, the need for water administration is urgent, compliance with interstate compacts is imperative and the state engineer has authority to administer water allocations in accordance with the water right priorities recorded with or declared or otherwise available to the state engineer." Section 72-2-9.1(A). The statute authorized the State Engineer to adopt rules for priority administration in a manner that does not interfere with future or pending adjudications, creates no impairment of water rights other than what is required to enforce priorities, and creates no increased depletions.

Based on Section 72-2-9.1, the State Engineer promulgated the Active Water Resource Management (AWRM) regulations in December 2004. The regulation's stated purpose is to establish the framework for the State Engineer "to carry out his responsibility to supervise the physical distribution of water to protect senior water right owners, to assure compliance with interstate stream compacts and to prevent waste by administration of water rights." 19.25. 13.6 NMAC. In order to carry out this purpose, the AWRM regulations provide the framework for the promulgation of specific water master district rules and regulations. No district-specific AWRM regulations have been promulgated in the Mora-San Miguel-Guadalupe region at the time of writing.

The general AWRM regulations set forth the duties of a water master to administer water rights in the specific district under the water master's control. Before the water master can take steps to manage the district, AWRM requires the NMOSE to determine the "administrable water rights" for purposes of priority administration. The State Engineer determines the elements, including

priority date, of each user's administrable water right using a hierarchy of the best available evidence, in the following order: (A) a final decree or partial final decree from an adjudication, (B) a subfile order from an adjudication, (C) an offer of judgment from an adjudication, (D) a hydrographic survey, (E) a license issued by the State Engineer, (F) a permit issued by the State Engineer along with proof of beneficial use, and (G) a determination by the State Engineer using "the best available evidence" of historical, beneficial use. Once determined, this list of administrable water rights is published and subject to appeal, 19.25.13.27 NMAC, and once the list is finalized, the water master may evaluate the available water supply in the district and manage that supply according to users' priority dates.

The general AWRM regulations also allow for the use of replacement plans to offset the depletions caused by out-of-priority water use. The development, review, and approval of replacement plans will be based on a generalized hydrologic analysis developed by the State Engineer.

The general AWRM regulations were unsuccessfully challenged in court in *Tri-State Generation and Transmission Ass'n, Inc. v. D'Antonio,* 2012-NMSC-039. In this case, the New Mexico Supreme Court analyzed whether Section 72–2–9.1 provided the State Engineer with the authority to adopt regulations allowing it to administer water rights according to interim priority determinations developed by the NMOSE.

In *Tri-State* the Court held that (1) the Legislature delegated lawful authority to the State Engineer to promulgate the AWRM regulations, and (2) the regulations are not unconstitutional on separation of powers, due process, or vagueness grounds. Specifically, the Court found that establishing such regulations does not violate the constitutional separation of powers because AWRM regulations do not go beyond the broad powers vested in the State Engineer, including the authority vested by Section 72–2–9.1. The Court further found that the AWRM regulations did not violate the separation of powers between the executive and the judiciary despite the fact that the regulations allow priorities to be administered prior to an *inter se* adjudication of priority. Rather, the Legislature chose to grant quasi-judicial authority in administering priorities prior to final adjudication to the NMOSE, which was well within its discretion to do.

The Court further held that the AWRM regulations do not violate constitutional due process because they do not deprive the party challenging the regulations of a property right. As explained by the Court, a water right is a limited, usufructuary right providing only a right to use a certain amount of water established through beneficial use. As such, based on the long-standing principle that a water right entitles its holder to the use of water according to priority, regulation of that use by the State does not amount to a deprivation of a property right.

In addition to *Tri-State*, several cases that address other aspects of the regulatory powers of the NMOSE have been decided recently. Priority administration was addressed in a case concerning

the settlement agreement entered into by the United States, New Mexico (State), the Carlsbad Irrigation District (CID), and the Pecos Valley Artesian Conservancy District (PVACD) related to the use of the waters of the Pecos River. *State ex rel. Office of the State Engineer v. Lewis*, 2007-NMCA-008, 140 N.M. 1. The issues in the case revolved around (1) the competing claims of downstream, senior surface water users in the Carlsbad area and upstream, junior groundwater users in the Roswell Artesian Basin and (2) the competing claims of New Mexico and Texas users. Through the settlement agreement, the parties sought to resolve these issues through public funding, without offending the doctrine of prior appropriation and without resorting to a priority call. The settlement agreement was, in essence, a water conservation plan designed to augment the surface flows of the lower Pecos River in order to (1) secure the delivery of water within the CID, (2) meet the State's obligations to Texas under the Pecos River Compact (Compact), and (3) limit the circumstances under which the United States and CID would be entitled to make a call for the administration of water right priorities. The agreement included the development of a well field to facilitate the physical delivery of groundwater directly into the Pecos River under certain conditions, the purchase and transfer to the well field of existing groundwater rights in the Roswell UWB by the State, and the purchase and retirement of irrigated land within PVACD and CID.

The Court of Appeals framed the issue as whether the priority call procedure is the exclusive means under the doctrine of prior appropriation to resolve existing and projected future water shortage issues. The Court held that Article XVI, Section 2 of the Constitution, which states that "[p]riority of appropriation shall give the better right," and Article IX of the Compact, which states that "[i]n maintaining the flows at the New Mexico-Texas state line required by this compact, New Mexico shall in all instances apply the principle of prior appropriation within New Mexico," do not require a priority call as the sole response to water shortage concerns. The Court found it reasonable to construe these provisions to permit flexibility within the prior appropriation doctrine in attempting to resolve longstanding water issues. Thus, the more flexible approach pursued by the settling parties through the settlement agreement was not ruled out in the Constitution, the Compact, or case precedent.

In relation to the NMOSE's regulatory authority over supplemental wells, in *Herrington v. State of New Mexico ex rel. State Engineer*, 2006-NMSC-014, 139 N.M. 368, the New Mexico Supreme Court clarified certain aspects of the *Templeton* doctrine. The *Templeton* doctrine allows senior surface water appropriators impaired by junior wells to drill a supplemental well to offset the impact to their water right. *See Templeton v. Pecos Valley Artesian Conservancy District*, 1958-NMSC-131, 65 N.M. 59. According to *Templeton*, drilling the supplemental well allows the senior surface right owner to keep their surface water right whole by drawing upon groundwater that originally fed the surface water supply. Although the New Mexico prior appropriation doctrine theoretically does not allow for sharing of water shortages, the *Templeton* doctrine permits both the aggrieved senior surface appropriator and the junior user to divert their

full share of water. The requirements for a successful *Templeton* supplemental well include (1) a valid surface water right, (2) surface water fed in part by groundwater (baseflow), (3) junior appropriators intercepting that groundwater by pumping, and (4) a proposed well that taps the same groundwater source of the applicant's original appropriation.

In *Herrington* the Court clarified that the well at issue would meet the *Templeton* requirements if it was dug into the same aquifer that fed the surface water. The Court also clarified whether a *Templeton* well could be drilled upstream of the surface point of diversion. The Court determined that the proper placement of a *Templeton* well must be considered on a case-by-case basis, and that these supplemental wells are not necessarily required to be upstream in all cases.

Lastly, the Court addressed the difference between a *Templeton* supplemental well and a statutory supplemental well drilled under NMSA 1978, §§ 72–5–23, -24 (1985). The Court found that a statutory transfer must occur within a continuous hydrologic unit, which differs from the narrow *Templeton* same-source requirement. Although surface to groundwater transfers require a hydrologic connection, this may be a more general determination than the *Templeton* baseflow source requirement. Further, *Templeton* supplemental wells service the original parcel, while statutory transfers may apply to new uses of the water, over significant distances.

Also related to the NMOSE's regulatory authority, the Court of Appeals addressed unperfected water rights in *Hanson v. Turney*, 2004-NMCA-069, 136 N.M. 1. In *Hanson*, a water rights permit holder who had not yet applied the water to beneficial use sought to transfer her unperfected water right from irrigation to subdivision use. The State Engineer denied the application because the water had not been put to beneficial use. The permit holder argued that pursuant to NMSA 1978, § 72-12-7(A) (1985), which allows the owner of a "water right" to change the use of the water upon application to the State Engineer, the State Engineer had wrongly rejected her application. The Court upheld the denial of the application, finding that under western water law the term "water right" does not include a permit to appropriate water when no water has been put to beneficial use. Accordingly, as used in Section 72-12-7(A) the term "water right" requires the perfection of a water right through beneficial use before a transfer can be allowed.

4.1.1.2 Legal Review of NMOSE Determinations

In *Lion's Gate Water v. D'Antonio*, 2009-NMSC-057, 147 N.M. 523, the Supreme Court addressed the scope of the district court's review of the State Engineer's determination that no water is available for appropriation. In *Lion's Gate*, the applicant filed a water rights application, which the State Engineer rejected without publishing notice of the application or holding a hearing, finding that that no water was available for appropriation. The rejected application was subsequently reviewed in an administrative proceeding before the State Engineer's hearing examiner. The hearing examiner upheld the State Engineer's decision on the grounds that there was no unappropriated water available for appropriation.

This ruling was appealed to the district court, which determined that it had jurisdiction to hear all matters either presented or that might have been presented to the State Engineer, as well as new evidence developed since the administrative hearing. The NMOSE disagreed, arguing that only the issue of whether there was water available for appropriation was properly before the district court. The Supreme Court agreed with the NMOSE. The Court found that the comprehensive nature of the water code's administrative process, its mandate that a hearing must be held prior to any appeal to district court, and the broad powers granted to the State Engineer clearly express the Legislature's intent that the water code provide a complete and exclusive means to acquire water rights. Accordingly, the NMOSE was correct that the district court's *de novo* review of the application was limited to what the State Engineer had already addressed administratively, in this case whether unappropriated water was available.

The Court also held that the water code does not require publication of an application for a permit to appropriate if the State Engineer determines no water is available for appropriation, because no third-party rights are implicated unless water is available. If water is deemed to be available, the State Engineer must order notice by publication in the appropriate form.

Based in large part on the holding in *Lion's Gate*, the New Mexico Court of Appeals in *Headon v. D'Antonio,* 2011-NMCA-058, 149 N.M. 667, held that a water rights applicant is required to proceed through the administrative process when challenging a decision of the State Engineer. In *Headon* the applicant challenged the NMOSE's determination that his water rights were forfeited. To do so, he filed a petition seeking declaratory judgment as to the validity of his water rights in district court, circumventing the NMOSE administrative hearing process. 2011-NMCA-058, ¶¶ 2-3. The Court held that the applicant must proceed with the administrative hearing, along with its *de novo* review in district court, to challenge the findings of the NMOSE.

Legal review of NMOSE determinations was also an issue in *D'Antonio v. Garcia*, 2008-NMCA-139,145 N.M. 95, where the Court of Appeals made several findings related to NMOSE administrative review of water rights matters. *Garcia* involved an NMOSE petition to the district court for enforcement of a compliance order after the NMOSE hearing examiner had granted a motion for summary judgment affirming the compliance order. 2008-NMCA-139, ¶¶ 2-5. The Court first found that the right to a hearing granted in NMSA 1978, § 72-2-16 (1973), did not create an absolute right to an administrative hearing. Rather, the NMOSE hearing contemplated in Section 72-2-16 could be waived if a party did not timely request such a hearing. *Id*. ¶ 9. In *Garcia* the defendant had not made such a timely request and therefore was not entitled to a full administrative hearing prior to issuance of an order by the district court.

The Court also examined the regulatory powers of the NMOSE hearings examiner, specifically, whether 19.25.2.32 NMAC allows the hearing examiner to issue a final order without the express written consent of the State Engineer. *Id*. ¶¶ 11-15. The Court held that the regulation allowed the hearing examiner to dismiss a case without the express approval of the State Engineer.

Id. ¶ 14. Finally, the Court held that the NMOSE hearing examiner may dismiss a case without full hearing when a party willfully fails to comply with the hearing examiner's orders. *Id*. ¶¶ 17-18. Accordingly, the Court in *Garcia* upheld the NMOSE hearing examiner's action to issue a compliance order without a full administrative hearing or final approval by the State Engineer. As such, the district court had the authority to enforce that compliance order.

4.1.1.3 Beneficial Use of Water – Non-Consumptive Use

Carangelo v. Albuquerque-Bernalillo County Water Utility Authority, 2014-NMCA-032, addressed whether a non-consumptive use of water qualifies as a beneficial use under New Mexico law and, accordingly, can be the basis for an appropriation of such water. In *Carangelo*, the NMOSE granted the Albuquerque-Bernalillo County Water Utility Authority's (Authority) application to divert approximately 45,000 acre-feet per year of Rio Grande surface water, to which the Authority had no appropriative right. The Authority intended to use the water for the non-consumptive purpose of "carrying" the Authority's own San Juan-Chama Project water, Colorado River Basin water to which the Authority had contracted for use of, to a water treatment plant for drinking water purposes. The Court of Appeals found the NMOSE erred in granting the application because the application failed to seek a new appropriation. The Authority's application sought to divert water, to which the Authority asserted no prior appropriative right, which required a new appropriation. Moreover, the Authority affirmatively asserted no beneficial use of the water. The Court remanded the matter to the NMOSE to issue a corrected permit.

The Court's decision included the following legal conclusions:

- A new non-consumptive use of surface water in a fully appropriated system requires a new appropriation of water. A "non-consumptive use" is a type of water use where either there is no diversion from a source body or there is no diminishment of the source. Neither the New Mexico Constitution nor statutes governing the appropriation of water distinguish between diversion of water for consumptive and non-consumptive uses. Because both can be beneficial uses, New Mexico's water law applies equally to either.

- The Authority did not need to file for a change in place or purpose of use for the diversion of its San Juan-Chama Project water. The Court stated that the San Juan-Chama Project water does not come from the Rio Grande Basin, and the Authority's entitlement to its beneficial use is not within the administrative scope of the Rio Grande Basin. Accordingly, the Authority already had an appropriative right to that water and did not need to file an application with the NMOSE for its use.

4.1.1.4 Impairment

Montgomery v. Lomos Altos, Inc., 2007-NMSC-002, 141 N.M. 21, involved applications to transfer surface water rights to groundwater points of diversion in the fully appropriated Rio

Grande stream system. In order for a transfer to be approved, an applicant must show, among other factors, that the transfer will not impair existing water uses at the move-to location. In *Lomos Altos*, several parties protested the NMOSE's granting of the applications, arguing that surface depletions at the move-to location caused by the applications should be considered *per se* impairment of existing rights. The Court found that questions of impairment are factual and cannot be decided as a matter of law, but must be determined on a case-by-case basis. In doing so, the Court held that surface depletions in a fully appropriated stream system do not result in *per se* impairment, but the Court noted that under some circumstances, even *de minimis* depletions can lead to a finding of impairment. The Court further found that in order to determine impairment, all existing water rights at the "move-to" location must be considered.

4.1.1.5 Rights Appurtenant to Water Rights

The New Mexico Supreme Court has issued three recent opinions dealing with appurtenancy. *Hydro Resources Corp. v. Gray*, 2007-NMSC-061, 143 N.M. 142, involved a dispute over ownership of water rights developed by a mining lessee in connection with certain mining claims owned by the lessor. The Supreme Court held that under most circumstances, including mining, water rights are not considered appurtenant to land under a lease. The sole exception to the general rule that water rights are separate and distinct from the land is water used for irrigation. Therefore, a lessee can acquire water rights on leased land by appropriating water and placing it to beneficial use. Those developed rights remain the property of the lessee, not the lessor, unless stipulated otherwise in an agreement.

In a case examining whether irrigation water rights were conveyed with the sale of land or severed prior to the sale (*Turner v. Bassett*, 2005-NMSC-009, 137 N.M. 381), the Supreme Court examined New Mexico's transfer statute, NMSA 1978, § 72-5-23 (1941), along with the NMOSE regulations addressing the change of place or purpose of use of a water right, 19.26.2.11(B) NMAC. The Court found that the statute, coupled with the applicable regulations and NMOSE practice, requires consent of the landowner and approval of the transfer application by the State Engineer for severance to occur. The issuance of a permit gives rise to a presumption that the water rights are no longer appurtenant to the land. A landowner who holds water rights and follows the statutory and administrative procedures to effect a severance and initiate a transfer may convey the land severed from its former water rights, without necessarily reserving those water rights in the conveyance documents.

In *Walker v. United States*, 2007-NMSC-038, 142 N.M. 45, the New Mexico Supreme Court examined the issue of whether a water right includes an implicit right to graze. After the U.S. Forest Service canceled the Walkers' grazing permits, the Walkers filed a complaint arguing that the United States had taken their property without just compensation in violation of the Fifth Amendment to the United States Constitution. The Walkers asserted a property right to the allotments under New Mexico state law. Specifically, the Walkers argued that the revocation of

the federal permit resulted in the loss of "water, forage, and grazing" rights based on New Mexico state law and deprived them of all economically viable use of their cattle ranch.

The Court found that a stock watering right does not include an appurtenant grazing right. In doing so, the Court addressed in depth the long understood principle in western water law that water rights, unless utilized for irrigation, are not appurtenant to the land on which they are used. The Court also clarified that the beneficial use for which a water right is established does not guarantee the water right owner an interminable right to continue that same beneficial use. The Walkers could have transferred their water right to another location or another use if they could not continue with the original uses. For these reasons, the Court rejected the Walkers attempt to make an interest in land incident or appurtenant to a water right.

4.1.1.6 Deep, Non-Potable Aquifers

In 2009 the New Mexico Legislature amended NMSA 1978, § 72-12-25 (2009), to provide for administrative regulation of deep, non-potable aquifers. These groundwater basins are greater than 2,500 deep and contain greater than 1,000 parts per million of total dissolved solids. Drilling wells into such basins had previously been unregulated. The amendment requires the NMOSE to conduct hydrologic analysis on well drilling in these basins. The type of analysis required by the NMOSE depends on the use for the water.

4.1.1.7 Domestic Wells

New Mexico courts have recently decided several significant cases addressing domestic well permitting, and the NMOSE also recently amended its regulations governing domestic wells.

In *Bounds v. State ex. rel D'Antonio*, 2013-NMSC-037, the New Mexico Supreme Court upheld the constitutionality of New Mexico's Domestic Well Statute (DWS), NMSA 1978, § 72–12–1.1 (2003). Bounds, a rancher and farmer in the fully appropriated and adjudicated Mimbres basin, and the New Mexico Farm and Livestock Bureau (Petitioners), argued that the DWS was facially unconstitutional. The DWS states that the NMOSE "shall issue" domestic well permits, without determining the availability of unappropriated water or providing other water rights owners in the area the ability to protest the well. The Petitioners argued that this practice violated the New Mexico constitutional doctrine of prior appropriation to the detriment of senior water users, as well as due process of law. The Court held that the DWS does not violate the doctrine of prior appropriation set forth in the New Mexico Constitution. The Court also held that Petitioners failed to adequately demonstrate any violation of their due process rights.

In addressing the facial constitutional challenge, the Court rejected the Petitioners' argument that the New Mexico Constitution mandates that the statutory requirements of notice, opportunity to be heard, and a prior determination of unappropriated waters or lack of impairment be applied to the domestic well application and permitting process. The Court reasoned that the DWS creates a different and more expedient permitting procedure for domestic wells and the constitution does

not require a particular permitting process, or identical permitting procedures, for all appropriations. While holding that the DWS was valid in not requiring the same notice, protest, and water availability requirements as other water rights applications, the court confirmed that domestic well permits can be administered in the same way as all other water rights. In other words, domestic wells do not require the same rigors as other water rights when permitted but, when domestic wells are administered, constitutionally mandated priority administration still applies. Thus the DWS, which deals solely with permitting and not with administration, does not conflict with the priority administration provisions of the New Mexico Constitution.

The Court also found that the Petitioners failed to prove a due process violation because they did not demonstrate how the DWS deprived them of their water rights. Specifically, Bounds failed to show any actual impairment, or imminent future impairment, of his water rights. Bounds asserted that any new appropriations must necessarily cause impairment in a closed and fully appropriated basin, and therefore, granting any domestic well permit had the potential to impair his rights. The Court rejected this argument, finding that impairment must be proven using scientific analysis, not simply conclusory statements based on a bright line rule that impairment always occurs when new water rights are permitted in fully appropriated basins.

Two other significant domestic well decisions addressed domestic well use within municipalities. In *Smith v. City of Santa Fe*, 2007-NMSC-055, 142 N.M. 786, the Supreme Court examined the authority of the City of Santa Fe to enact an ordinance restricting the drilling of domestic wells. The Court held that under the City's home rule powers, it had authority to prohibit the drilling of a domestic well within the municipal boundaries and that this authority was not preempted by existing state law.

Then in *Stennis v. City of Santa Fe*, 2008-NMSC-008, 143 N.M. 320, Santa Fe's domestic well ordinance was tested when a homeowner (Stennis) applied for a domestic well permit with the NMOSE, but did not apply for a permit from the City. In examining the statute allowing municipalities to restrict the drilling of domestic wells, the Court found that municipalities must strictly comply with NMSA 1978, § 3–53–1.1(D) (2001), which requires cities to file their ordinances restricting the drilling of domestic water wells with the NMOSE. On remand, the Court of Appeals held that Section 3-53-1.1(D) does not allow for *substantial* compliance. *Stennis v. City of Santa Fe*, 2010-NMCA-108, 149 N.M. 92. Rather, strict compliance is required and the City must have actually filed a copy of the ordinance with the NMOSE.

In addition to the cases addressing domestic wells, the regulations governing the use of groundwater for domestic use were substantially amended in 2006 to clarify domestic well use pursuant to NMSA 1978, § 72-12-1.1. 19.27.5.1 et seq. NMAC. The regulations:

1. Limit the amount of water that can be used pursuant to a domestic well permit to:

    - 1.0 acre-feet per year (ac-ft/yr) for a single household use (can be increased to up to 3.0 ac-ft/yr if the applicant can show that the combined diversion from domestic wells will not impair existing water rights).

    - 1.0 ac-ft/yr for each household served by a well serving more than one household, with a cap of 3.0 ac-ft/yr if the well serves three or more households.

    - 1.0 ac-ft/yr for drinking and sanitary purposes incidental to the operations of a governmental, commercial, or non-profit facility as long as no other water source is available. The amount of water so permitted is subject to further limitations imposed by a court or a municipal or county ordinance.

    The amount of water that can be diverted from a domestic well can also be increased by transferring an existing water right to the well. 19.27.5.9 NMAC.

2. Require mandatory metering of all new domestic wells under certain conditions, such as when wells are permitted within a domestic well management area, when a court imposes a metering requirement, when the water use is incidental to the operations of a governmental, commercial, or non-profit facility, and when the well serves multiple households. 19.27.5.13(C) NMAC.

3. Allow for the declaration of domestic well management areas when hydrologic conditions require added protections to prevent impairment to valid, existing surface water rights. In such areas, the maximum diversion from a new domestic well cannot exceed, and may be less than, 0.25 ac-ft/yr for a single household and up to 3.0 ac-ft/yr for a multiple household well, with each household limited to 0.25 ac-ft/yr. The State Engineer has not declared any domestic well management areas in the planning region.

4.1.1.8 Water Project Financing

The Water Project Finance Act, Chapter 72, Article 4A NMSA 1978, outlines different mechanisms for funding water projects in water planning regions. The purpose of the Act is to provide for water use efficiency, resource conservation, and the protection, fair distribution, and allocation of New Mexico's scarce water resources for beneficial purposes of use within the state. The Water Project Finance Act creates two funds: the Water Project Fund, NMSA 1978, § 72-4A-9 (2005), and the Acequia Project Fund, NMSA 1978, § 72-4A-9.1 (2004). Both funds are administered by the New Mexico Finance Authority. The Water Trust Board recommends projects to the Legislature to be funded from the Water Project Fund.

The Water Project Fund may be used to make loans or grants to qualified entities (broadly defined to include public entities and Indian tribes and pueblos). To qualify for funding, the

project must be approved by the Water Trust Board for one of the following purposes: (1) storage, conveyance or delivery of water to end users, (2) implementation of federal Endangered Species Act of 1973 collaborative programs, (3) restoration and management of watersheds, (4) flood prevention, or (5) water conservation or recycling, treatment, or reuse of water as provided by law. NMSA 1978, § 72-4A-5(B) (2011). The Water Trust Board must give priority to projects that (1) have been identified as being urgent to meet the needs of a regional water planning area that has a completed regional water plan accepted by the NMISC, (2) have matching contributions from federal or local funding sources, and (3) have obtained all requisite state and federal permits and authorizations necessary to initiate the project. NMSA 1978, § 72-4A-5.

The Acequia Project Fund may be used to make grants to acequias for any project approved by the Legislature.

The Water Project Finance Act directed the Water Trust Board to adopt regulations governing the terms and conditions of grants and loans recommended by the Board for appropriation by the Legislature from the Water Project Fund. The Board promulgated implementing regulations, 19.25.10.1 et seq. NMAC, in 2008. The regulations set forth the procedures to be followed by the Board and New Mexico Finance Authority for identifying projects to recommend to the Legislature for funding. The regulations also require that financial assistance be made only to entities that agree to certain conditions set forth in the regulations.

4.1.1.9 The Strategic Water Reserve

In 2005, the New Mexico Legislature enacted legislation to establish a Strategic Water Reserve, NMSA 1978, § 72-14-3.3 (2007). Regulations implementing the Strategic Water Reserve statute were also implemented in 2005. 19.25.14.1 et seq. NMAC.

The statute authorizes the Commission to acquire water rights or storage rights to compose the reserve. Section 72-14-3.3(A). Water in the Strategic Water Reserve can be used for two purposes: (1) to comply with interstate stream compacts and (2) to manage water for the benefit of endangered or threatened species or to avoid additional listing of species. Section 72-14-3.3(B). The NMISC may only acquire water rights that have sufficient seniority and consistent, historical beneficial use to effectively contribute to the purpose of the Reserve. The NMISC must annually develop river reach or groundwater basin priorities for the acquisition of water rights for the Strategic Water Reserve. The Canadian River basin has been designated as a priority basin, but the NMISC's stated prioritization addresses the Canadian River below Ute Reservoir, not the Upper Canadian River that lies in the planning region. Similarly, the Lower Pecos River basin has been designated as a priority basin, but not the Upper Pecos River basin, which, again, is a major surface water source in this region.

4.1.1.10 Acequia Water Use

Two recent cases by New Mexico courts address the issue of acequia water use. *Storm Ditch v. D'Antonio,* 2011-NMCA-104, 150 N.M. 590, examined the process for transferring a landowner's water rights from a community acequia to a municipality. The Court found that actual notice of the transfer application to the acequia was not mandated by statute; instead, publication of the landowner's transfer application provided sufficient notice to the acequia to inform it of the proposed transfer. Further, the statute requiring that the transfer applicant file an affidavit stating that no rules or bylaws for a transfer approval had been adopted by the acequia was not intended to prove notice. Rather, the statute was directed at providing the State Engineer with assurance that the applicant had met all requirements imposed by acequia bylaws before action was taken on the application, not in providing notice.

Pena Blanca Partnership v. San Jose Community Ditch, 2009-NMCA-016, 145 N.M. 555, involved attempts to transfer water rights from agricultural uses appurtenant to lands served by two acequias to non-agricultural uses away from the acequias. The acequias denied the water rights owners' (Owners) requests to make these changes pursuant to their authority under NMSA 1978, § 73-2-21(E) (2003). The Owners appealed the acequias decision to district court, where the standard of review listed in Section 73–2–21(E) allowed reversal of the acequia commissioners on appeal only if the court found they had acted fraudulently, arbitrarily or capriciously, or not in accordance with law.

The Owners challenged this deferential standard of review in the Court of Appeals based on two grounds. First, the Owners argued that the *de novo* review standard in Article XVI, Section 5 of the New Mexico Constitution applied to the proposed transfers at issue, not the more deferential standard found in Section 73-2-21(E). The Court disagreed and found that the legislature provided for another review procedure for the decisions of acequia commissioners by enacting Section 73–2–21(E).

The Owners second assertion was that the deferential standard of review in Section 73-2-21(E) violated the equal protection clause of Article II, Section 18 of the New Mexico Constitution. The Owners argued that their equal protection guarantees were violated because water rights transfers out of acequias were treated differently than other water rights transfers. The court again disagreed, finding that although other determinations of water rights are afforded a *de novo* hearing in the district court, since the Owners still had access to the courts and the right of appeal, there were no equal protection violations.

4.1.1.11 Water Conservation

Guidelines for drafting and implementing water conservation plans are set forth in NMSA 1978, § 72-14-3.2 (2003). By statute, neither the Water Trust Board nor the New Mexico Finance Authority may accept an application from a covered entity (defined as municipalities, counties,

and any other entities that supply at least 500 acre-feet per annum of water to its customers, but excluding tribes and pueblos) for financial assistance to construct any water diversion, storage, conveyance, water treatment, or wastewater treatment facility unless the entity includes a copy of its water conservation plan.

The water conservation statute primarily supplies guidance to covered entities, as opposed to mandating any particular action. For example, the statute provides that the covered entity determines the manner in which it will develop, adopt, and implement a water conservation plan. The statute further states that a covered entity "shall consider" either adopting ordinances or codes to encourage conservation, or otherwise "shall consider" incentives to encourage voluntary compliance with conservation guidelines. The statute then states that covered entities "shall consider, and incorporate in its plan if appropriate, . . . a variety of conservation measures," including, in part, water-efficient fixtures and appliances, water reuse, leak repairs, and water rate structures encouraging efficiency and reuse. Section 72-14-3.2(D). Also, pursuant to NMSA 1978, §§ 72-5-28(G) (2002) and 72-12-8(D) (2002), when water rights are placed in a State Engineer-approved water conservation program, periods of nonuse of the rights covered in the plan do not count toward the four-year forfeiture period.

4.1.1.12 Municipal Condemnation

NMSA 1978, § 3-27-2 (2009) was amended in 2009 to prohibit municipalities from condemning water sources used by, water stored for use by, or water rights owned or served by an acequia, community ditch, irrigation district, conservancy district, or political subdivision of the state.

4.1.1.13 Subdivision Act

The Subdivision Act, NMSA 1978, § 47-6-11.2 (2013), was amended in 2013 to require proof of water availability prior to final approval of a subdivision plat. Specifically, the subdivider must (1) present the county with NMOSE-issued water use permits for the subdivision or (2) prove that the development will hook up to a water provider along with an opinion from the State Engineer that the subdivider can fulfill the water use requirements of the Subdivision Act. Previously the county had discretion to approve subdivision plats without such proof that the water rights needed for the subdivision were readily available. These water use requirements apply to all subdivisions of ten or more lots. The Act was also amended to prohibit approval of a subdivision permit if the water source for the subdivision is domestic wells.

4.1.2 State Water Laws and Administrative Policies Affecting the Region

In New Mexico, water is administered generally by the State Engineer, who has the "general supervision of waters of the state and of the measurement, appropriation, distribution thereof and such other duties as required." NMSA 1978, § 72-2-1 (1982). To administer water throughout the state the State Engineer has several tools at its disposal, including designation of water

masters, declaration of UWBs, and use of the AWRM rules, all of which are discussed below, along with other tools used to manage water within regions.

4.1.2.1 Pecos River Augmentation

Two statutes enacted in 2006 deal specifically with the acquisition of water rights to meet the State's compact obligations on the Pecos River. The Pecos River Basin Land Management Fund, NMSA 1978, § 72-1-2.5, was created to manage land purchases made pursuant to NMSA 1978, § 72-1-2.4 (allowing the NMISC to purchase land with appurtenant water rights to augment the flows of the Pecos River for compact compliance) and to manage augmentation well fields in the lower Pecos River basin. Similarly, NMSA 1978, § 72-1-2.6 allows the NMISC to purchase water rights without appurtenant land, again to help meet the State's compact obligations on the Pecos River. The Pecos River Land Management Fund regulations were enacted for implementation of the fund. 19.25.15.1 NMAC.

4.1.2.2 Water Masters

The State Engineer has the power to create water master districts or sub-districts by drainage area or stream system and to appoint water masters for such districts or sub-districts. NMSA 1978, § 72-3-1 (1919). Water masters have the power to apportion the waters in the water master's district under the general supervision of the State Engineer and to appropriate, regulate, and control the waters of the district to prevent waste. NMSA 1978, § 72-3-2 (2007). Currently, there is a water master assigned to the Pecos River and the Gallinas River. The boundaries of the Pecos River Water Master's district include only a small portion of Guadalupe County in the Mora-San Miguel-Guadalupe planning region.

4.1.2.3 Groundwater Basin Guidelines

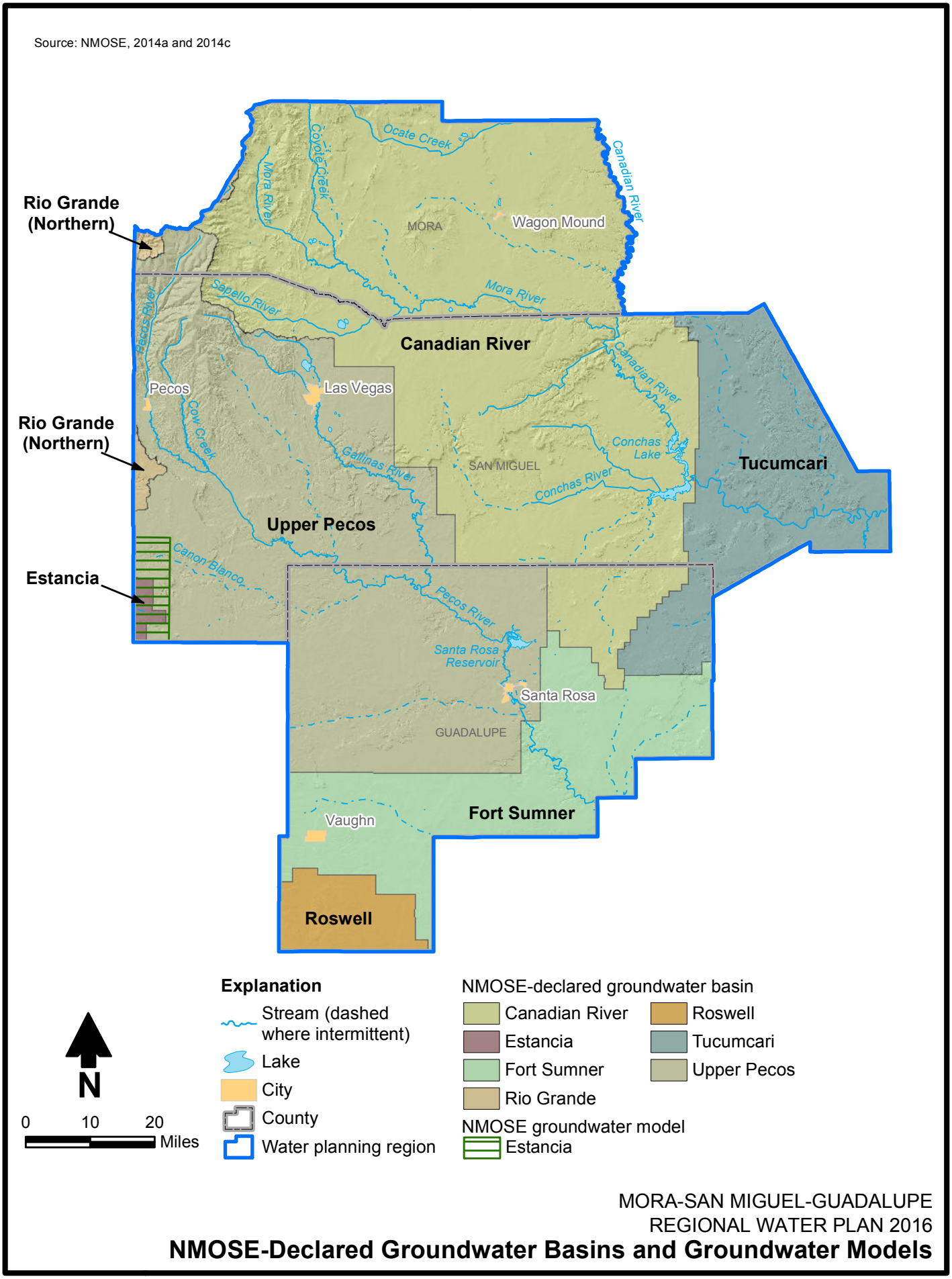
The NMOSE has declared UWBs and implements guidelines in those basins for the purpose of carrying out the provisions of the statutes governing underground waters. *See* NMAC 19.27.48.6. There are seven declared UWBs in the region: the Upper Pecos, Canadian, Tucumcari, and Fort Sumner UWBs as well as small portions of the Roswell, Rio Grande, and Estancia UWBs (Figure 4-1). Administration of these basins is discussed in depth in Section 4.5.3 of the 2005 RWP.

4.1.2.4 AWRM Implementation in the Basin

Although the Rio Gallinas Basin has been designated a priority basin for AWRM, AWRM regulations have not yet been issued for the basin.

4.1.2.5 Special Districts in the Basin

As discussed in depth in the 2005 RWP, there are numerous acequias in the region. Other special districts in the Mora-San Miguel-Guadalupe region include soil and water conservation districts, which are governed by NMSA 1978, Sections 73-20-25 through 48.



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MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

NMOSE-Declared Groundwater Basins and Groundwater Models

Figure 4-1

4.1.2.6 State Court Adjudications in the Basin

The Pecos River adjudication is still ongoing in the planning region. Adjudication work is ongoing or pending on the Gallinas River and Cow Creek. Litigation is also pending in the City of Las Vegas remand proceeding. According to the New Mexico Office of the State Engineer/Interstate Stream Commission 2009-2011 Annual Report, as updated by the State of New Mexico's FY 2015 Rule 71.3 Report for the Pecos Adjudication Bureau (July 25, 2014) and personal communications with NMOSE staff, the current status of the portion of the Pecos River Stream System adjudication applicable to the region is outlined in the following subsections.

4.1.2.6.1 Upper Pecos Underground Water Basin

The adjudication of the Upper Pecos UWB began with the filing of the Hydrographic Survey Report in 1977. Consent orders between the State and water users for most of the groundwater rights have been entered.

4.1.2.6.2 Gallinas River Section

The Gallinas subfile adjudication is nearing completion. All 1,694 subfiles have been served, and approximately 35 subfiles remain to be adjudicated and are in the process of mediation, being defaulted, or preparing for trial. The water rights within the Storrie Lake Irrigation Project and the water rights of the City of Las Vegas have been adjudicated. Besides the litigation of contested subfiles, the State's Gallinas River priorities for fiscal year 2015 include work toward completing the *inter se* and partial final decree. See State of New Mexico's FY 2015 Rule 71.3 Report for the Pecos Adjudication Bureau (July 25, 2014).

4.1.2.6.3 City of Las Vegas Remand Proceeding

The City of Las Vegas Remand proceeding arose out of the New Mexico Supreme Court decision in *State ex rel. Martinez v. City of Las Vegas*, 2004-NMSC-009, 135 N.M. 375, discussed at length in the 2005 RWP. In that case, the court rejected the city's claim to a water right under the pueblo rights doctrine and remanded the case back to the district court to fashion a remedy to compensate the city for its reliance on a 1958 New Mexico Supreme Court decision recognizing a pueblo water right. Although the State and city entered into a Consent Order in an attempt to resolve all of the city's water right claims, the city's claims are still unresolved. Extensive negotiations and litigation have occurred involving the city, the State, the United States, numerous acequias, and the Storrie Project in order to determine the extent of the city's reliance on a pueblo water right. Storrie Project and the United States settled with the city in 2010 and the city entered into protracted negotiations with the community acequias.

Negotiations broke down at the beginning in 2011 and litigation has resumed. The Special Master overseeing the matter has scheduled proceedings to address the issue of possible detrimental impacts to the acequias of the city's proposed water claims.

4.1.2.6.4 Cow Creek Section

The Cow Creek watershed is located in San Miguel County. The State's 2015 fiscal year priorities for this section include the hydrographic survey of surface water uses in the Cow Creek section, the preparation of a hydrographic survey report, and commencement of legal proceedings. See State of New Mexico's FY 2015 Rule 71.3 Report for the Pecos Adjudication Bureau (July 25, 2014).

4.1.3 Federal Water Laws

The law of water appropriation has been developed primarily through decisions made by state courts. Since the accepted plan was published in 2003 several federal cases have been decided examining various water law questions. These cases are too voluminous to include here, and many of the issues in the cases will not apply directly to the region. However, New Mexico is a party to one original jurisdiction case in the U.S. Supreme Court involving the Rio Grande Compact and waters of the Lower Rio Grande. Because of its importance to the entire state it is included here.

In *Texas v. New Mexico and Colorado*, No. 141 Original (U.S. Supreme Court, 2014), Texas alleges that New Mexico has violated the Rio Grande Compact by intercepting water Texas is entitled to under the Compact through groundwater pumping and surface diversions downstream of Elephant Butte Reservoir but upstream of the New Mexico-Texas state line. Colorado is also a defendant in the lawsuit as it is a signatory to the Rio Grande Compact. The United States has intervened as a Plaintiff in the case. Elephant Butte Irrigation District and El Paso County Water Improvement District Number One have both sought to intervene in the case as well, claiming that their interests are not fully represented by the named parties. The motions to intervene along with a motion to dismiss filed by New Mexico are currently pending.

4.1.3.1 Federal Reservations

The doctrine of federally reserved water rights was developed over the course of the 20th Century. Simply stated, federally reserved rights are created when the United States sets aside land for specific purposes, thereby withdrawing the land from the general public domain. In doing so, there is an implied, if not expressed, intent to reserve an amount of water necessary to fulfill the purpose for which the land was set aside. Federally reserved water rights are not created, or limited, by state law.

On federal lands (e.g., Forest Service, Park Service), water rights are reserved by the United States for use on those lands. The priority date of federally reserved water rights is the date the United States reserved the land for the particular use. In some cases, the United States may have State law rights under the prior appropriation system, for instance, if the United States acquires lands with existing water rights. Federally reserved lands with the Mora-San Miguel-Guadalupe planning region include the following:

- Santa Fe National Forest
- Las Vegas National Wildlife Refuge
- Pecos National Historic Park
- Fort Union National Monument
- Bureau of Land Management managed lands

4.1.3.2 Interstate Stream Compacts

Interstate compacts become federal law once ratified by Congress. In the Mora-San Miguel-Guadalupe region, the Pecos Compact plays a large role in water allocation. The Canadian River Compact is also applicable in the region. Both compacts are discussed in depth in Section 4.5 of the 2005 RWP.

4.1.3.3 Treaties

Not applicable.

4.1.3.4 Federal Water Projects

The Pecos River Basin Water Salvage Project is a U.S. Bureau of Reclamation-funded project to control salt cedar growth from the Sumner Dam area to the New Mexico-Texas state line. Sumner Dam is located in the Mora-San Miguel- Guadalupe region.

4.1.3.5 Federal Adjudications in the Basin

Not applicable.

4.1.4 Tribal Law

Not applicable.

4.1.5 Local Law

Local laws addressing water use have been implemented by both municipalities and counties within the planning region.

4.1.5.1 San Miguel County

Water use in San Miguel County is guided by the S*an Miguel County Comprehensive Plan 2004-2014* (June 8, 2004). In Part Two, the plan identifies a number of water issues facing the county, including drought vulnerability, efficiency of water delivery for irrigation, impairment of groundwater users, threats to groundwater quality, and lack of metering acequias. In Part Four, the plan makes various policy statements for the protection and conservation of water, which include working with the State Engineer to protect senior water rights, spring flows, and instream

flows, encouraging developers to acquire water rights and to limit individual domestic wells by providing community water systems, supporting development that allows agricultural water rights and uses to remain in place, discouraging new consumptive uses of high volumes of water, seeking State technical assistance and funds to monitor and reduce contamination from septic tanks, seeking funds for hydrological zone mapping, assisting water districts in efforts to detect and repair leaks in storage and delivery systems, supporting acequias in obtaining State assistance, and seeking funds and tax incentives to encourage water conservation.

4.1.5.2 City of Las Vegas

The City of Las Vegas has enacted a comprehensive water conservation ordinance set forth in the City of Las Vegas Municipal Code, § 440-26. The expressed purpose of the ordinance is "to provide the City the means to reduce per capita water demands by requiring its government, citizens and businesses to comply with prescribed water conservation regulations and by establishing financial and other incentives for water conservation." *Id.* § 440-26(B). The ordinance states the City's policy that "water conservation is an effective and low cost means to balance water demands with available supply and production capabilities," and that reduction in water use benefits the City and its citizens by reducing bills, allowing the City to use only its allotted water rights, reducing peak summer demands, and enhancing the local and global environment. *Id.* § 440-26(D).

The water conservation ordinance requires the dissemination of information on water conservation through signs in public restrooms, notices, and education materials made available by the City Utilities Department and private landscapers, nurseries, and realtors. *Id.* § 440- 26(D). It prohibits the wasting of water. *Id.* § 440-26(F)(9). It places restrictions on the outdoor use of water, such as limiting irrigation to certain days and certain hours, prohibiting certain types of irrigation systems, requiring the repair of leaks, prohibiting the watering of impervious surfaces, and mandating, when feasible, the use of private wells or acequias prior to the use of City water. *Id.* § 440-26(F). It also places restrictions on the indoor use of water, such as mandating low-flow plumbing fixtures for new construction, remodeling, and replacements, mandating water audits for institutional entities, city facilities and city parks, and mandating water limitations at restaurants and hotels. *Id.* § 440-26(G). The ordinance also establishes four stages of water shortage, each subject to increasingly stringent water use restrictions. *Id.* § 440-26(I).

In addition, the Municipal Code establishes a progressive rate structure for residential customers. Thus, the greater the volume of water a customer uses per month, the higher the rate charged to that customer per gallon of water used. *Id.* § 440-6.

Lastly, the Municipal Code provides that any new residence, business, or other water user locating outside the City limits seeking water service must either transfer adequate water rights into the City or provide a water supply payment in exchange for service. *Id.* § 440-25.

4.1.5.3 Mora County

Water use in Mora County follows the *Mora County Comprehensive Land Use Plan* (July 2009). The plan emphasizes the protection of agriculture, acequias, and water rights. The declaration of public policy set forth in the plan states in part:

> *The allocation of our limited water resources must recognize traditional subsistence agricultural and grazing activities as a priority over other types of more profitable land uses. Water is not just a commodity to be bought and sold or exploited for short-term gains. Water is the life blood of Mora County's traditions, culture and land use. A sustainable future for Mora County requires protection of the most valuable resource for our communities—the water!*

Section V of the plan addresses water and agriculture, and it lists several goals, as well as policies and strategies to meet those goals. One of the goals is that the "water resources of Mora County should be protected and preserved for our agriculturally-based communities." The plan lists several policies to meet this goal, including the following: land use decisions should take into account effects on water quality and water quantity, water rights should not be severed from the land, acequias should be protected and empowered, future growth or development should not deplete or degrade water supplies necessary for agriculture and traditional water uses, and the County should adopt a standard of non-degradation of surface water and groundwater quality.

Additional goals include the management of wastewater in an environmentally sound manner to protect water quality and the protection of drinking water supplies from degradation and contamination.

One very significant water issue in Mora County has been the County's efforts to limit oil and gas drilling, especially the practice of hydraulic fracturing. Oil and gas companies have negotiated oil and gas leases on an estimated 100,000 acres of land, mostly in the eastern half of Mora County. In 2013, to protect its water resources from any damage that may be related to the extraction of oil, natural gas, or other hydrocarbons, Mora County enacted the Mora County Community Water Rights and Local Self-Government Ordinance, No. 2013-01 (Apr. 29, 2013). The stated purpose of the ordinance is as follows:

> *The people of the County of Mora are a cohesive community of diverse elements, united by common culture, social bonds and a common destiny, and are represented politically in various aspects by the Mora County Government, numerous Acequias, Land Grants, and Mutual Domestic Water Consumer's Associations. The People of Mora County recognize that water is essential for the life, prosperity, sustainability, and health of their community and that damage to natural groundwater and surface water sources imposes great tangible loss, to the People, natural communities and ecosystems of Mora County, not just for today, but for future generations. The People of Mora County recognize that they may be forced, without their consent, to endure or attempt to repair harm inflicted on their environment and their vital water supply, which they have no equivalent governing authority to prevent under current state and federal law. The governing body of Mora County adopts this Mora County Community Water Rights and Local Self-Government Ordinance to overcome that liability, to provide for community health and safety, to promote a sustainable lifestyle, and to secure the comfort and convenience of the people.*
> Mora County Ordinance 2013-01 § 1.2.

Although the ordinance is intended to prohibit hydraulic fracturing (commonly known as fracking) in Mora County, it also expresses the importance of water to the citizens of the county. For example, the ordinance states that "[a]ll residents, natural communities and ecosystems in Mora County possess a fundamental and inalienable right to sustainably access, use, consume and preserve water drawn from natural water cycles that provide water necessary to sustain life within the County." *Id.* § 4.1. The ordinance further states that "[a]ll Mora County residents possess the fundamental and inalienable right to unpolluted natural water to produce healthy food, to nourish our bodies, livestock and land and to continue 'La Querencia de la Tierra,' Love of the Land." *Id.* § 4.2.

This ordinance was challenged in several actions filed against Mora County in federal court. Shell Western E & P Inc. (SWEPI), an oil and gas exploration company that held a lease with the State, brought one action, seeking an injunction prohibiting the County from enforcing the ordinance. SWEPI challenged the ordinance on an assortment of grounds as violative of the United States Constitution. The district court ruled that the ordinance violated the Supremacy Clause of the Constitution and held the ordinance invalid. *SWEPI, LP v. Mora County*, 81 F. Supp 3d 1075 (2015).

In light of the lawsuits challenging the ordinance, some County officials made an effort to repeal the ordinance. The Mora County Commissioners affirmed the ordinance in October 2014. In March 2015, during a special meeting following the district court decision finding the ordinance unconstitutional, the Mora County Commission voted to repeal the Community Rights Ordinance.

4.1.5.4 Guadalupe County

The Guadalupe County Land Use Plan (draft 2012), which is still in development, will guide water use in Guadalupe County. Drafts of the plan list several goals related to water:

1. The County supports conservation of water for long-range sustainability of the County and its communities.

2. The County will support the purchase of water rights, improvement of water quality, and enhancement of existing water systems.

3. Communities should use treated sewage water effluent where practical for irrigation of parks and for any potential industrial uses.

4. Mining activities, rock quarrying, and sand and gravel operations should be conducted in a way that creates minimum adverse impacts during operations, with full reclamation of the land included in the overall project.

5. The County will support continuing improvements to the water and sewer systems in the Anton Chico area.

6. The County will work with the City of Santa Rosa to encourage high quality growth in the Santa Rosa area to the extent that there is an adequate water supply to support such growth.

7. The County will involve ditch and domestic water associations in drought planning.

8. The County will implement flood protection and drainage improvements.

4.2 Relevant Environmental Law

4.2.1 Species Protection Laws

4.2.1.1 Federal Endangered Species Act

The Endangered Species Act (ESA) can have a tremendous influence on the allocation of water, especially of stream and river flows. 16 U.S. C.§§ 1531 to 1544. The ESA was enacted in 1973 and, with limited exceptions, has remained in its current form since then. The goal of the Act is to protect threatened and endangered species and the habitat on which they depend. 16 U.S.C. § 1531(b). The Act's ultimate goal is to "recover" species so that they no longer need protection under the Act.

The ESA provides several mechanisms for accomplishing these goals. It authorizes the U.S. Fish and Wildlife Service (USFWS) to list "threatened" or "endangered" species, which are then protected under the Act, and to designate "critical habitat" for those species. The Act makes it unlawful for anyone to "take" a listed species unless an "incidental take" permit or statement is first obtained from the Department of the Interior. 16 U.S.C. §§ 1538, 1539. To "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19).

In addition, federal agencies must use their authority to conserve listed species. 16 U.S.C. § 1536(a)(1). They must make sure, in consultation with USFWS, that their actions do not jeopardize the continued existence of listed species or destroy or harm habitat that has been designated as critical for such species. 16 U.S.C. § 1536(a)(2). This requirement applies whenever a private or public entity undertakes an action that is "authorized, funded, or carried out," wholly or in part by a federal agency. *Id.* As part of the consultation process, federal agencies must usually prepare a biological assessment to identify endangered or threatened species and determine the likely effect of the federal action on those species and their critical habitat. 16 U.S.C. § 1536(c). At the end of the consultation process, the USFWS prepares a biological opinion stating whether the proposed action will jeopardize the species or destroy or

adversely modify its critical habitat. 16 U.S.C. § 1536(c)(4). USFWS may also recommend reasonable alternatives that do not jeopardize the species. *Id.*

Only one animal species subject to protection under the ESA is found in the planning region (in Mora County), the southwestern willow flycatcher (*Empidonax traillii extimus*), which was listed as endangered in 1995. 60 Fed. Reg. 10694 (Feb. 27, 1995). In 2000, the USFWS published a revised critical habitat designation for the flycatcher consisting of 1,227 stream miles. 78 Fed. Reg. 344 (Jan. 3, 2013). The critical habitat is located on a combination of federal, state, tribal, and private lands, and includes lands in Mora County. Management of the critical habitat area in Mora County could impact water use in the planning region.

Worth noting here is that two other threatened animal species are found in rivers downstream of the planning region, the Pecos bluntnose shiner (*Notropis simus pecosensis*) in the Pecos River and the Arkansas River shiner (*Notropis girardi*) in the Canadian River. These species are addressed in greater detail in the Lower Pecos and Northeast New Mexico RWPs.

There is also a threatened riparian plant species with critical habitat in the planning region, the Pecos sunflower (*Helianthus paradoxus*). Again, management of the critical habitat area for the sunflower may impact water use in the planning region.

4.2.1.2 New Mexico Wildlife Conservation Act

The New Mexico Wildlife Conservation Act, enacted in 1974, provides for the listing and protection of threatened and endangered wildlife species in the state. NMSA 1978, §§ 17-2-37 to 17-2-46. In enacting the law, the Legislature found that indigenous New Mexico species that are threatened or endangered "should be managed to maintain and, to the extent possible, enhance their numbers within the carrying capacity of the habitat." NMSA 1978, § 17-2-39(A).

The Act authorizes the New Mexico Department of Game and Fish to conduct investigations of indigenous New Mexico wildlife species suspected of being threatened or endangered to determine if they should be listed. NMSA 1978, § 17-2-40(A). Based on the investigation, the director then makes listing recommendations to the Game and Fish Commission. *Id.* The Act authorizes the Commission to issue regulations listing wildlife species as threatened or endangered based on the investigation and recommendations of the Department. NMSA 1978, § 17-2-41(A). Once a species is listed, the Department of Game and Fish, "to the extent practicable," is to develop a recovery plan for that species. NMSA 1978, § 17-2-40.1. The Act makes it illegal to "take, possess, transport, export, process, sell or offer for sale[,] or ship" any listed endangered wildlife species. NMSA 1978, § 17-2-41(C). However, enforcement of this provision of the Act is very limited.

Pursuant to the Act, the Commission has listed over 100 wildlife species—mammals, birds, fish, reptiles, amphibians, crustaceans, and mollusks—as endangered or threatened. 19.33.6.8 NMAC.

As of August 2014, 62 species were listed as threatened, and 56 species were listed as endangered. *Id.* Among the listed endangered species that inhabit the planning region is the southwestern willow flycatcher (*Empidonax traillii extimus*), whose protection will impact water planning.

4.2.2 Water Quality Laws

4.2.2.1 Clean Water Act

The most significant federal law addressing water quality is the Clean Water Act (CWA), 33 U.S.C. §§ 1251 to 1387, which Congress enacted in its modern form in 1972, overriding President Nixon's veto. The stated objective of the CWA is to "restore and maintain the chemical, physical and biological integrity" of the waters of the United States. 33 U.S.C. § 1251(a).

4.2.2.1.1 NPDES Permit Program (Section 402)

The CWA makes it unlawful for any person to discharge any pollutant into waters of the United States without a permit. 33 U.S.C. § 1311(a). Generally, a "water of the United States" is a navigable water, a tributary to a navigable water, or an adjacent wetland, although the scope of the term has been the subject of considerable controversy as described below.

The heart of the CWA regulatory regime is the National Pollutant Discharge Elimination System (NPDES) permitting program under Section 402 of the Act. Any person—including a corporation, partnership, state, municipality, or other entity—that discharges a pollutant into waters of the United States from a point source must obtain an NPDES permit from EPA or a delegated state. 33 U.S.C. § 1342. A point source is defined as "any discernible, confined, and discrete conveyance," such as a pipe, ditch, or conduit. 33 U.S.C. § 1362(14). NPDES permits include conditions setting effluent limitations based on available technology and, if needed, effluent limitations based on water quality.

The CWA provides that each NPDES permit issued for a point source must impose effluent limitations based on application of the best practicable, and in some cases the best available, pollution control technology. 33 U.S.C. § 1311(b). The Act also requires more stringent effluent limitations for newly constructed point sources, called new source performance standards. 33 U.S.C. § 1316(b). EPA has promulgated technology-based effluent limitations for dozens of categories of new and existing industrial point source dischargers. 40 C.F.R. pts. 405-471. These regulations set limits on the amount of specific pollutants that a permittee may discharge from a point source.

The CWA requires the states to develop water quality standards for individual segments of surface waters. 33 U.S.C. § 1313. Water quality standards have three components. First, states must specify designated uses for each body of water, such as public recreation, wildlife habitat,

water supply, fish propagation, or agriculture. 40 C.F.R. § 131.10. Second, they must establish water quality criteria for each body of water, which set a limit on the level of various pollutants that may be present without impairing the designated use of the water body. *Id.* § 131.11. And third, states must adopt an antidegradation policy designed to prevent the water body from becoming impaired such that it cannot sustain its designated use. *Id.* § 131.12.

Surface water segments that do not meet the water quality criteria for the designated uses must be listed as "impaired waters." 33 U.S.C. § 1313(d)(l)(C). For each impaired water segment, states must establish "total maximum daily loads" (TMDLs) for those pollutants causing the water to be impaired, allowing a margin of safety. 33 U.S.C. § 1313(d)(1). The states must submit to EPA for approval the list of impaired waters and associated TMDLs. 33 U.S.C. § 1313(d)(2). The TMDL process, in effect, establishes a basin-wide budget for pollutant influx to a surface water. The states must then develop a continuing planning process to attain the standards, including effluent limitations for individual point sources. 33 U.S.C. § 1313(e).

New Mexico has taken steps to implement these CWA requirements. As discussed in Section 4.2.2.3, the New Mexico Water Quality Control Commission has adopted water quality standards for surface waters. The standards include designated uses for specific bodies of water, water quality criteria, and an antidegradation policy. 20.6.4 NMAC. The New Mexico Environment Department (NMED) has prepared a report listing impaired surface waters throughout the state. *State of New Mexico Clean Water Act Section 303(d)/Section 305(b) Integrated Report – 2014-2016* (Nov. 18, 2014). Several segments of the Pecos River in the planning region are on the impaired list.

EPA can delegate the administration of the NPDES program to individual states. 33 U.S.C. § 1251(b). New Mexico is one of only a handful of states that has neither sought nor received delegation to administer the NPDES permit program. Accordingly, EPA administers the NPDES program in New Mexico.

4.2.2.1.2 Dredge and Fill Permit Program (Section 404)

The CWA establishes a second important permitting program under Section 404, regulating discharges of "dredged or fill material" into waters of the United States. 33 U.S.C. § 1344. Although the permit requirement applies to discharges of such material into all waters of the United States, most permits are issued for the filling of wetlands. The program is administered primarily by the Army Corps of Engineers, although EPA has the authority to veto permits and it shares enforcement authority with the Corps.

Like the Section 402 NPDES permit program, the CWA allows the Section 404 permit program to be delegated to states. 33 U.S.C. § 1344(g). Again, New Mexico has not received such delegation, and the program is implemented in New Mexico by the Corps and EPA.

4.2.2.1.3 Waters of the United States

The term "waters of the United States" delineates the scope of CWA jurisdiction, both for the Section 402 NPDES permit program, and for the Section 404 dredge and fill permit program. The term is not defined in the CWA, but is derived from the definition of "navigable waters," which means "waters of the United States including the territorial seas." 33 U.S.C. § 1362(7). In 1979, EPA promulgated regulations defining the term "waters of the United States." *See* 40 C.F.R. § 230.3(s) (2014) (between 1979 and 2014, the term remained substantially the same). This definition, interpreted and implemented by both EPA and the Corps, remained settled for many years.

In 2001, however, the Supreme Court began to cast doubt on the validity of the definition as interpreted by EPA and the Corps. The Court took up a case in which the Corps had asserted CWA jurisdiction over an isolated wetland used by migratory birds, applying the Migratory Bird Rule. The Court ruled that the Corps had no jurisdiction under the CWA, emphasizing that the CWA refers to "navigable waters," and that the isolated wetland had no nexus to any navigable-in-fact water. *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S.159 (2001).

The Court muddied the waters further in its 2006 decision in *Rapanos v. United States*, 547 U.S. 715 (2006) (consolidated with *Carabell v. U.S. Army Corps of Engineers*). Both these cases challenged the Corps' assertion of CWA jurisdiction over wetlands separated from traditional navigable waters by a man-made ditch. In a fractured 4-1-4 decision, the Court ruled that the Corps did not have CWA authority to regulate these wetlands. The plurality opinion, authored by Justice Scalia, held that CWA jurisdiction extends only to relatively permanent standing or flowing bodies of water that constitute rivers, streams, oceans, and lakes. *Id.* at 739. Nevertheless, jurisdiction extends to streams or lakes that occasionally dry up, and to streams that flow only seasonally. *Id.* at 732, n.3. And jurisdiction extends to wetlands with a continuous surface connection to such water bodies. *Id.* at 742. The concurring opinion, written by Justice Kennedy, stated that CWA jurisdiction extends to waters having a "significant nexus" to a navigable water, but the Corps had failed to show such nexus in either case. *Id.* at 779-80. In dissent, Justice Stevens would have found CWA jurisdiction in both cases. *Id.* at 787.

There has been considerable confusion over the proper application of these opinions. Based on this confusion, EPA and the Corps recently amended the regulatory definition of "waters of the United States" to conform to the *Northern Cook County* and *Rapanos* decisions. Final Rule, 80 Fed. Reg. 37054 (June 29, 2015) codified at 33 C.F.R. pt 328; 40 C.F.R. pts 110, 112, 116, 117, 122, 230, 232, 300, 302, and 401. The new definition covers (1) waters used for interstate or foreign commerce, (2) interstate waters, (3) the territorial seas, (4) impounded waters otherwise meeting the definition, (5) tributaries of the foregoing waters, (6) waters, including wetlands, adjacent to the foregoing waters, (7) certain specified wetlands having a significant nexus to the

foregoing waters, and (8) waters in the 100-year floodplain of the foregoing waters. 40 C.F.R. § 302.3.

Several states and industry groups have challenged the new definition in federal district courts and courts of appeal. In one such challenge, the district court granted a preliminary injunction temporarily staying the rule. *North Dakota v. EPA*, 127 F. Supp. 3d 1047 (D.N.D. 2015). Because the NMED and the NMOSE are plaintiffs in this case, the stay is effective—and the new definition does not now apply—in New Mexico. The United States has filed a motion asking the district court to dissolve the injunction and dismiss the case. This case is likely to be appealed.

4.2.2.2 Federal Safe Drinking Water Act

Enacted in 1974, the Safe Drinking Water Act (SDWA) regulates the provision of drinking water in the United States. 42 U.S.C. §§ 300f to 300j-26. The act's overriding purpose is "to insure the quality of publicly supplied water." *Arco Oil & Gas Co. v. EPA*, 14 F.3d 1431, 1436 (10th Cir. 1993). The SDWA requires EPA to promulgate national primary drinking water standards for protection of public health and national secondary drinking water standards for protection of public welfare. 42 U.S.C. § 300g-1. To provide this protection, the SDWA requires EPA, as part of the national primary drinking water regulations, to establish maximum contaminant level goals (MCLGs) and maximum contaminant levels (MCLs) for drinking water contaminants. 42 U.S.C. § 300g-1(b)(1). The regulations apply to all "public water systems." 42 U.S.C. § 300g.

EPA has promulgated primary and secondary drinking water regulations. 40 C.F.R. pts. 141, 143. Most significantly, the agency has set MCLGs and MCLs for a number of drinking water contaminants, including 16 inorganic chemicals, 53 organic chemicals, turbidity, 6 microorganisms, 7 disinfectants and disinfection byproducts, and 4 radionuclides. *Id.*§§ 141.11, 141.13, 141.61-66. As noted above, New Mexico has incorporated these primary and secondary regulations into the State regulations. 20.7.10.100 NMAC, 20.7.10.101 NMAC.

4.2.2.3 Federal Comprehensive Environmental Response, Compensation, and Liability Act

Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or the "Superfund" law, in 1980 to address the burgeoning problem of uncontrolled hazardous waste sites. 42 U.S.C. §§ 9601 to 9675. CERCLA authorizes EPA to prioritize hazardous waste sites according to the degree of threat they pose to human health and the environment, including surface water and groundwater. EPA places the most serious sites on the National Priorities List (NPL). 42 U.S.C. § 9605. Sites on the NPL are eligible for federal funds for long-term remediation, which most often includes groundwater remediation.

4.2.2.4 New Mexico Water Quality Act

The most important New Mexico law addressing water quality is the New Mexico Water Quality Act (WQA), NMSA 1978, §§ 74-6-1 to 74-6-17. The New Mexico Legislature enacted the WQA in 1967. The purpose of the WQA is "to abate and prevent water pollution." *Bokum Res. Corp. v. N.M. Water Quality Control Comm'n*, 93 N.M. 546, 555, 603 P.2d 285, 294 (1979).

The WQA created the Water Quality Control Commission to implement many of its provisions. NMSA 1978, § 74-6-3. The WQA authorizes the Commission to adopt state water quality standards for surface and groundwaters and to adopt regulations to prevent or abate water pollution. NMSA 1978, § 74-6-4(C) and (D). The WQA also authorizes the Commission to adopt regulations requiring persons to obtain from the NMED a permit for the discharge into groundwater of any water contaminant. NMSA 1978, § 74-6-5(A). The Department must deny a discharge permit if the discharge would cause or contribute to contaminant levels in excess of water quality standards "at any place of withdrawal of water for present or reasonably foreseeable future use." NMSA 1978, § 74-6-5(E)(3). The WQA also authorizes the Commission to adopt regulations relating to monitoring and sampling, record keeping, and Department notification regarding the permit. NMSA 1978, § 74-6-5(I). Permit terms are generally limited to five years. NMSA 1978, § 74-6-5(H).

Accordingly, the Commission has adopted groundwater quality standards, regulations requiring discharge permits, and regulations requiring abatement of groundwater contamination. 20.6.2 NMAC. The water quality standards for groundwater are published at Sections 20.6.2.3100 through 3114 NMAC, and the regulations for discharge permits are published at Sections 20.6.2.3100 through 3114 NMAC, and the regulations for discharge permits are published at Sections 20.6.2.3101 to 3114 NMAC.

An important part of these regulations are those addressing abatement. 20.6.2.4101 - .4115 NMAC. The purpose of the abatement regulations is to "[a]bate pollution of subsurface water so that all groundwater of the State of New Mexico which has a background concentration of 10,000 milligrams per liter or less total dissolved solids is either remediated or protected for use as domestic or agricultural water supply." 20.6.2.4101.A(1) NMAC. The regulations require that groundwater pollution must be abated to conform to the water quality standards. 20.6.2.4103.B NMAC. Abatement must be conducted pursuant to an abatement plan approved by the Department, 20.6.2.4104.A NMAC, or pursuant to a discharge permit, 20.6.2.3109.E NMAC.

In addition, the Commission has adopted standards for surface water. 20.6.1 NMAC. The objective of these standards, consistent with the federal Clean Water Act (Section 4.2.2.1) is "to establish water quality standards that consist of the designated use or uses of surface waters of the [S]tate, the water quality criteria necessary to protect the use or uses[,] and an antidegradation policy." 20.6.4.6.A NMAC. The standards include designated uses for specific bodies of water within the state, 20.6.4.50 to 20.6.4.806 NMAC; general water quality criteria,

20.6.4.13 NMAC; water quality criteria for specific designated uses, 20.6.4.900 NMAC; and water quality criteria for specific bodies of water, 20.6.4.50 to 20.6.4.806 NMAC. The standards also include an antidegradation policy, applicable to all surface waters of the state, to protect and maintain water quality. 20.6.4.8 NMAC. The antidegradation policy sets three levels of protection, closely matched to the federal regulations.

Lastly, the Commission has also adopted regulations limiting the discharge of pollutants into surface waters. 20.6.2.2100 to 2202 NMAC.

4.2.2.5 New Mexico Drinking Water Standards

The New Mexico Environmental Improvement Act created an Environmental Improvement Board, and it authorizes the Board to promulgate rules and standards for water supply. NMSA 1978, § 74-1-8(A)(2). The Board has accordingly adopted State drinking water standards for all public water systems. 20.7.10 NMAC. The State regulations incorporate by reference the federal primary and secondary drinking water standards, 40 C.F.R. parts 141 and 143, established by the EPA under the Safe Drinking Water Act (Section 4.2.2.2). 20.7.10.100 NMAC, 20.7.10.101 NMAC.

4.2.2.6 Tribal Law

Not applicable.

4.3 Legal Issues Unique to the Region and Local Conflicts Needing Resolution

4.3.1 Ongoing or Threatened Litigation that May Affect Water Management

See discussion of litigation surrounding the Mora County Community Rights Ordinance in Section 4.1.5.3.

4.3.2 Local Conflicts Needing Resolution

Key issues including conflicts in the region identified by the region are listed in Section 5.

5. Water Supply

This section provides an overview of the water supply in the Mora-San Miguel-Guadalupe Water Planning Region, including climate conditions (Section 5.1), surface water and groundwater resources (Sections 5.2 and 5.3), water quality (Section 5.4), and the administrative water supply used for planning purposes in this regional water plan update (Section 5.5). Additional quantitative assessment of water supplies is included in Section 7, Identified Gaps between Supply and Demand.

The Handbook specifies that each of the 16 regional water plans briefly summarize water supply information from the previously accepted plan and provide key new or revised information that has become available since submittal of the accepted regional water plan. The information in this section regarding surface and groundwater supply and water quality is thus drawn largely from the accepted *Mora-San Miguel-Guadalupe Regional Water Plan* (DBS&A, 2005) and where appropriate, updated with more recent information and data from a number of sources, as referenced throughout this section.

Currently some of the key water supply updates and issues impacting the Mora-San Miguel-Guadalupe region are:

- For the climate divisions within the planning region, several recent years exhibited severe to extreme drought conditions (NCDC, 2014), and the winter snowpack for 2014 was also very low. Drought preparedness is important for each community and acequia in the region and is of particular concern for the Las Vegas municipal supply, for agricultural users that are dependent on surface water, and for recreational users of Storrie Lake, the Maxwell Wildlife Refuge, Morphy Lake, Santa Rosa Lake, and other facilities that contribute to the economy of the region.

- There are hundreds of acequias in the region. Addressing infrastructure and maintenance needs and developing shortage sharing agreements or other drought preparedness measures are key issues in the region.

- Due to the large amount of forested land in the region, coupled with the recent drought conditions, the threat of wildfire and subsequent flooding and sedimentation impacts on streams and reservoirs remains a key planning issue. Continued and expanded efforts to reduce catastrophic fire risk through forest management, as well as additional information on the quantitative benefits of various management techniques, are needed. In particular, quantification of the effectiveness of riparian vegetation removal, upland conifer thinning, and other potential water salvage methods needs further study to support well-informed decisions. In addition, river, riparian, and floodplain conditions need to be restored to mitigate upland erosion and loss of wetlands and to improve ecosystem services and resilience to fire.

- In 2011 the City of Las Vegas completed work on a Water Supply Master Plan Preliminary Engineering Report (PER). The PER evaluated and ranked numerous alternatives for providing reliable water supplies to the City, which included measures to improve surface water yields, groundwater yields, and storage capacity. Key among the alternatives identified as having the highest priority were increased surface reservoir storage capacity, increased use of treated effluent for irrigation, and increased groundwater production capacity in the Taylor well field and surrounding area.

- The City of Las Vegas is pursuing opportunities for increased storage.
- During 2012 and 2013, Las Vegas expanded the production capacity of the Taylor well field and conducted a well field sustainability study, the preliminary results of which indicate that the best use of the Taylor well field is as a drought contingency water supply, alternating between periods of high pumpage (which will likely result in aquifer depletion) and periods of low production (to allow aquifer recovery).

- Other actions that the City of Las Vegas has taken to plan for drought include developing a Drought Contingency and Emergency Response Plan (City of Las Vegas, Undated) outlining several responses to shortages of surface water supply on the Gallinas River. The City also submitted an application to conduct aquifer storage and recovery (ASR) in the Taylor well field. During periods of sufficient surface water supply on the Gallinas River, ASR could be used to replenish the aquifer in preparation for the next drought.

- The community of Ojitos Frios, located south of the City of Las Vegas's Taylor well field, has experienced declines in water levels in domestic wells that may be linked to drought conditions and/or increased production from the well field. The El Creston Mutual Domestic Water Consumers Association (MDWCA) was formed in 2004 and reorganized in 2009 to provide an alternative for the loss of domestic wells in the area (El Creston MDWCA, 2014). In 2013, the El Creston MDWCA, which serves Ojitos Frios, completed a water supply PER and subsequently obtained funding to drill and construct a deep groundwater well and distribution system. It is hoped that the new well will help centralize the groundwater production for the community and allow residents with shallower wells to obtain a safe water supply. The new well will be completed in formations below the Santa Rosa Formation, where it is hoped there will not be interferences with the Taylor well field.

- A U.S. Geological Survey (USGS) study of hydrologic resources of San Miguel County found that most current development of groundwater resources is occurring in western San Miguel County, where USGS groundwater monitoring indicates declining groundwater levels (Matherne and Stewart, 2011). The report suggested that the County could benefit from additional mapping, monitoring, and seepage studies.

- The Federal Emergency Management Administration (FEMA) released new floodplain maps of San Miguel County in 2012 (FEMA, 2010). The new maps define hazard areas and indicated flood insurance rate boundaries. There is a need for improved communication and coordination between multiple users regarding flood preparation planning.

- Portions of San Miguel and Guadalupe counties were declared disaster areas due to 2013 monsoon flooding. This designation allows the areas to be eligible to receive funding

from FEMA to help local governments and nonprofits repair and replace damaged infrastructure (Miller, 2014). The steering committee has identified improved communication and preparedness for flooding as an issue important to the region.

- In Guadalupe County, both the Vaughn and Santa Rosa water systems have adequate groundwater supplies, but are faced with infrastructure and delivery issues. The Vaughn system also serves Encino and Duran. When a water line broke due to a railroad repair issue in 2014, the National Guard had to deliver water, because the shutoff valve was located on the opposite side of the storage tank from Vaughn. The system also faces problems with aging infrastructure, different sized delivery lines, and debt from previous expenditures. A PER is currently being completed with Guadalupe County as the fiscal agent.

- The City of Santa Rosa currently has two wells in operation. The wells must pump about 80 percent of the time to meet the community water needs, resulting in the system having minimal backup for maintenance or emergency situations. The City has installed a third well, which is being permitted. The City is also working on securing funding for an updated PER to address various infrastructure needs, including an updated SCADA system.

- The Village of Pecos has a reliable and good quality source of groundwater, but has ongoing infrastructure needs. New meters are currently being installed.

- The community of Mora, through the Mora MDWCA, also has reliable groundwater from three wells, but is concerned about the need to obtain monitoring data, due to other pumping in the area. Some infrastructure upgrades in the distribution system are also needed.

- The Village of Wagon Mound receives its water by gravity flow from a spring. The spring has been reliable and there have not been any water quality concerns, but the Village is concerned about the lack of backup supply in the event that ongoing drought affects the spring flow. There are also some infrastructure upgrade needs in the distribution system.

- The accepted water plan identified potential contamination of shallow groundwater and domestic wells due to septic tanks as a potential water quality concern. This issue is still of concern, as many areas in the region have no access to wastewater treatment infrastructure and continue to be served by domestic wells and septic tanks.

- There are 58 small drinking water systems with reported water use in the region (19 in Mora County, 32 in San Miguel County, and 7 in Guadalupe County) (Longworth et al., 2013, Appendix B, Table 7). Though the source water for these systems is generally

good quality groundwater, the maintenance, upgrades, training, operation, and monitoring that is required to ensure delivery of water that meets drinking water quality standards is a financial and logistical challenge for these small systems.

- The region's vulnerability to drought has led to interest in potential development of poor-quality (saline) groundwater resources in the region, if it is economically viable.
- The potential for adverse water quality impacts resulting from improperly managed surface or casing operations associated with hydraulic fracturing for oil and gas extraction has been of concern in the region; as a result, Mora County passed a moratorium on the method in 2013. The Mora County ordinance was challenged in court and is being revised.
- San Miguel County passed an ordinance that creates an oil and gas development approval process in 2014 (San Miguel County, 2014). The ordinance sets requirements for water availability assessment and geohydrological reports, establishes natural resource zoning districts, and establishes authority to regulate environmental health and safety.
- The New Mexico Environment Department (NMED) periodically tests fish in New Mexico lakes and reservoirs for mercury, which in the form of methylmercury can be very toxic at low levels. Due to mercury detected in some fish at concentrations that could lead to significant adverse human health effects, fish consumption advisories have been issued for Charrette, Storrie, Santa Rosa, and Conchas lakes (NMG&F et al., 2012). The source of the mercury is most likely atmospheric deposition from sources outside the planning region.
- Groundwater obtained from units stratigraphically lower than the Santa Rosa Formation has contained elevated total dissolved solids (TDS) due to sulfates originating from gypsum beds. The water quality issues are site dependent; TW-7 in the Taylor well field is completed in the Glorieta Formation and has a TDS of approximately 2,000 ppm, while a well completed in the Glorieta Formation on the Milliken ranch, approximately 1 mile away, has a TDS of 400 ppm and another Milliken ranch well located approximately 2 miles south of the well field has a TDS of approximately 3,000 ppm. There is little that can be done to predict water quality prior to exploratory drilling.

5.1 Summary of Climate Conditions

The accepted regional water plan (DBS&A, 2005) included an analysis of historical temperature and precipitation in the region. This section provides an updated summary of temperature, precipitation, snowpack conditions, and drought indices pertinent to the region (Section 5.1.1). Studies relevant to climate change and its potential impacts to water resources in New Mexico and the Mora-San Miguel-Guadalupe region are discussed in Section 5.1.2.

5.1.1 Temperature, Precipitation, and Drought Indices

Table 5-1 lists the periods of record for weather stations in Mora, San Miguel, and Guadalupe counties and identifies four stations that were used for analysis of weather trends. These four stations were selected based on location, how well they represented conditions in their respective counties, and completeness of their historical records. In addition to the climate stations, data were available from three Snow Course or snowpack telemetry (SNOTEL) stations and were used to document snowfall in the Sangre de Cristo Mountains (Table 5-1). The locations of the climate stations for which additional data were analyzed are shown in Figure 5-1.

Long-term minimum, maximum, and average temperatures for the four climate stations are detailed in Table 5-2, and average summer and winter temperatures for each year of record are shown on Figures 5-2a and 5-2b.

Precipitation varies considerably across the planning region and is influenced by both location and elevation. The average precipitation distribution across the entire region is shown on Figure 5-3, and Table 5-2 lists the minimum, maximum, and long-term average annual precipitation (rainfall and snowmelt) at the four representative stations in the planning region. The long-term averages do not reflect the considerable variability of precipitation, which creates a direct challenge for water supply planning. The variability in total annual precipitation for the four selected climate stations is shown in Figures 5-4a and 5-4b and is also reflected in the snow data and drought indices discussed below. In addition to annual variability, monthly variability in precipitation and resulting streamflow also presents a challenge: snowmelt and/or monsoon flows may not occur at times when water is most needed for agriculture or other uses.

The Natural Resources Conservation Service (NRCS) operates one SNOTEL (Snow Telemetry) station and two Snow Course stations in the planning region; all three stations provide snow depth and snow water equivalent data (Figure 5-5) (NRCS, 2014a).

- The Alamitos Snow Course site is located at 9,320 ft amsl near the headwaters of the Pecos River and has been operational since 1971.
- The Panchuela Snow Course site is located at 8,400 ft amsl slightly south and east of the Alamitos station, just north of Cowles, New Mexico, and has been operational since 1937.
- The Wesner Springs SNOTEL site, located at 11,120 ft amsl on the eastern flank of the Sangre de Cristo Mountains, measures snowpack above the headwaters of the Gallinas River. At Wesner Springs, snow water equivalent data have been collected since 1989 and snow depth has been measured since 2002.

Table 5-1. Mora-San Miguel-Guadalupe Climate Stations

Climate Stations [a]	Latitude	Longitude	Elevation	Precipitation		Temperature	
				Data Start	Data End	Data Start	Data End
Mora County							
Chacon	36.17	–105.38	8,502	8/1/1909	8/31/1985	4/1/1913	5/31/1968
Chacon 2 S	36.12	–105.38	8,053	10/1/1985	1/31/2010	—	—
Gascon	35.89	–105.45	8,250	12/1/1953	Present	12/1/1953	Present
Levy	36.08	–104.68	6,253	11/1/1908	3/31/1961	11/1/1908	3/31/1961
Ocate 1 N	36.18	–105.05	7,665	1/1/1897	Present	1/1/1897	Present
Ojo Rico Ranch	36.02	–104.47	6,004	6/1/1940	3/31/1956	—	—
Optimo	35.90	–104.72	6,404	6/1/1910	6/30/1959	8/1/1910	9/30/1910
Valmora	35.82	–104.92	6,325	9/1/1893	Present	3/1/1917	Present
San Miguel County							
Bell Ranch	35.53	–104.09	4,500	5/1/1899	9/30/2010	10/1/1904	9/30/2010
Campana	35.52	–103.85	4,493	7/1/1909	9/30/1928	7/1/1912	2/28/1928
Conchas Dam	35.41	–104.19	4,244	11/1/1936	Present	11/1/1936	Present
Harveys Upper Ranch	35.75	–105.47	8,957	7/1/1912	2/1/1924	7/1/1912	2/1/1924
Holy Ghost Canyon	35.77	–105.70	7,605	7/1/1946	9/30/1956	—	—
Irvins Ranch	35.78	–105.60	9,708	10/1/1935	7/31/1945	11/1/1938	7/31/1945
Las Vegas 2 NW	35.62	–105.27	6,604	12/1/1892	5/31/1983	12/1/1892	5/31/1983
Las Vegas Exp Plot	35.58	–105.18	6,506	11/1/1908	12/31/1944	6/1/1938	2/28/1945
Las Vegas Municipal Airport	35.65	–105.14	6,866	11/1/1940	Present	11/1/1940	Present
Las Vegas Sewage Plant	35.57	–105.21	6,349	6/17/1983	Present	6/17/1983	Present
Mosquero 1	35.78	–103.97	5,584	5/1/1915	7/31/1943	11/1/1927	3/31/1942
Onava	35.70	–105.12	6,706	5/1/1929	11/30/1943	—	—
Parks Spring Rch	35.27	–104.93	5,100	5/1/1905	9/30/1978	—	—

Source: WRCC, 2014

— = Information not available

[a] Stations in **bold** type were selected for detailed analysis

NR = Temperature is not recorded at SNOTEL stations.

Table 5-1. Mora-San Miguel-Guadalupe Climate Stations

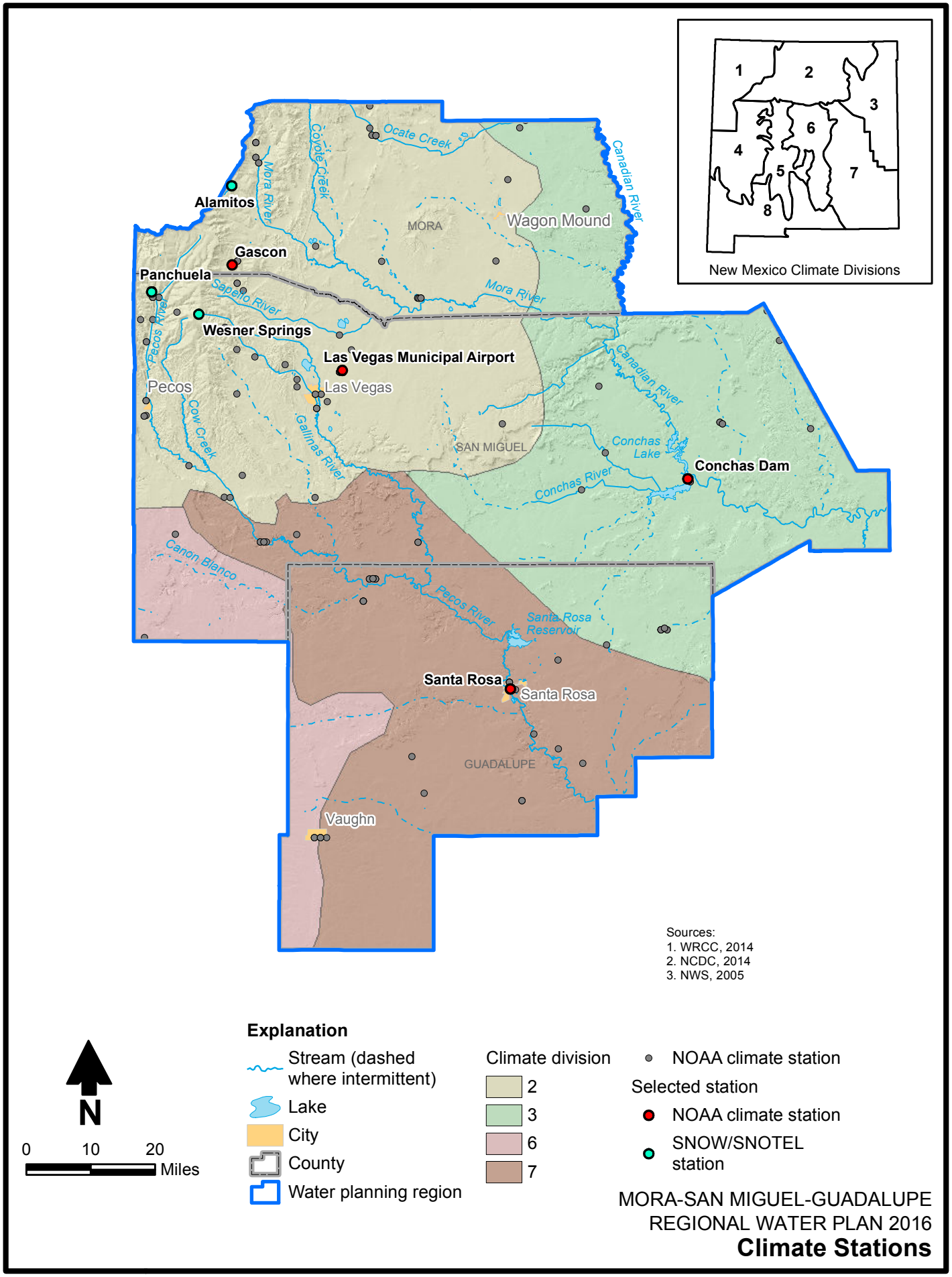
Climate Stations [a]	Latitude	Longitude	Elevation	Precipitation		Temperature	
				Data Start	Data End	Data Start	Data End
Pecos Ranger Stn	35.58	–105.68	6,940	1/1/1916	Present	4/1/1919	Present
Rencona	35.28	–105.60	7,005	1/1/1924	8/31/1962	12/1/1934	8/31/1962
Ribera	35.37	–105.45	6,106	4/1/1950	7/31/1964	—	—
Sanchez	35.62	–104.43	4,905	7/1/1940	12/31/1959	—	—
Tererro	35.77	–105.67	7,507	5/1/1946	5/31/1961	5/1/1946	5/31/1961
Trujillo	35.53	–104.70	6,463	6/1/1915	4/30/1957	—	—
Variadero	35.38	–104.48	4,573	7/1/1940	4/30/1957	—	—
Villanueva	35.27	–105.36	5,765	1/1/1942	Present	1/1/2006	Present
Winsors	35.83	–105.67	8,205	7/1/1894	10/31/1964	3/1/1897	10/31/1964
Guadalupe County							
Cuervo	35.03	–104.42	4,843	7/1/1909	4/30/1952	—	—
Dilia 1 SSE	35.18	–105.05	5,144	11/1/1941	Present	3/1/1944	Present
Newkirk	35.07	–104.26	4,564	3/1/1926	5/31/2009	2/1/1966	2/28/2009
Pastura 6 SSE	34.70	–104.92	5,413	7/1/1909	10/31/1956	5/1/1910	10/31/1956
Powell Ranch	34.68	–104.65	5,003	1/1/1953	1/31/1974	—	—
Santa Rosa	34.94	–104.68	4,610	1/1/1908	9/30/2012	2/1/1908	9/30/2012
Vaughn	34.60	–105.20	5,974	7/1/1909	8/31/1981	10/1/1923	8/31/1981
SNOTEL Stations							
Alamitos – Snow	36.07	–105.45	9,320	1971	Present	NR	NR
Panchuela	35.83	–105.67	8,400	1937	Present	NR	NR
Wesner Springs	35.78	–105.54	11,120	9/27/1989	Present	NR	NR

Source: WRCC, 2014

[a] Stations in **bold** type were selected for detailed analysis

— = Information not available

NR = Temperature is not recorded at SNOTEL stations.



MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Climate Stations

Figure 5-1

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Table 5-2. Temperature and Precipitation for Selected Climate Stations Mora-San Miguel-Guadalupe Water Planning Region

Station Name	Elevation (ft amsl)	Precipitation (inches)				Temperature			
		Average Annual [a]	Minimum [b]	Maximum [b]	% of Possible Observations [c]	Average (°F)			% of Possible Observations [c]
						Annual [d]	Minimum [e]	Maximum [e]	
Gascon	8,247	23.84	9.77	32.94	99.6	44.2	29.0	59.4	99.6
Conchas Dam	4,244	14.20	6.35	29.56	100	59.3	45.0	73.5	84.4
Las Vegas Municipal Airport	6,864	16.18	5.41	28.21	99.5	49.7	35.2	64.3	92.9
Santa Rosa	4,610	14.31	6.63	34.97	99	57.9	42.5	73.3	83.9

Source: Statistics computed by Western Regional Climate Center (2014)

ft amsl = Feet above mean sea level

°F = Degrees Fahrenheit

[a] Average of annual precipitation totals for the period of record at each station.

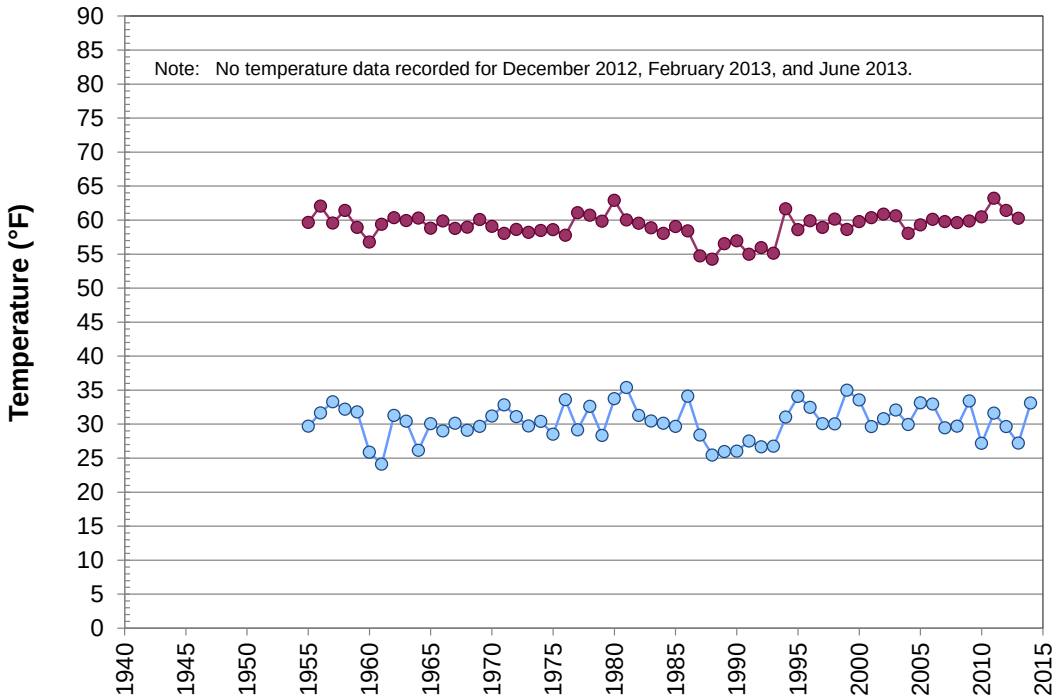
[b] Minimum and maximum recorded annual precipitation amounts for each station.

[c] Amount of completeness in the daily data set that was recorded at each station (e.g., 99% complete means there is a 1% data gap).

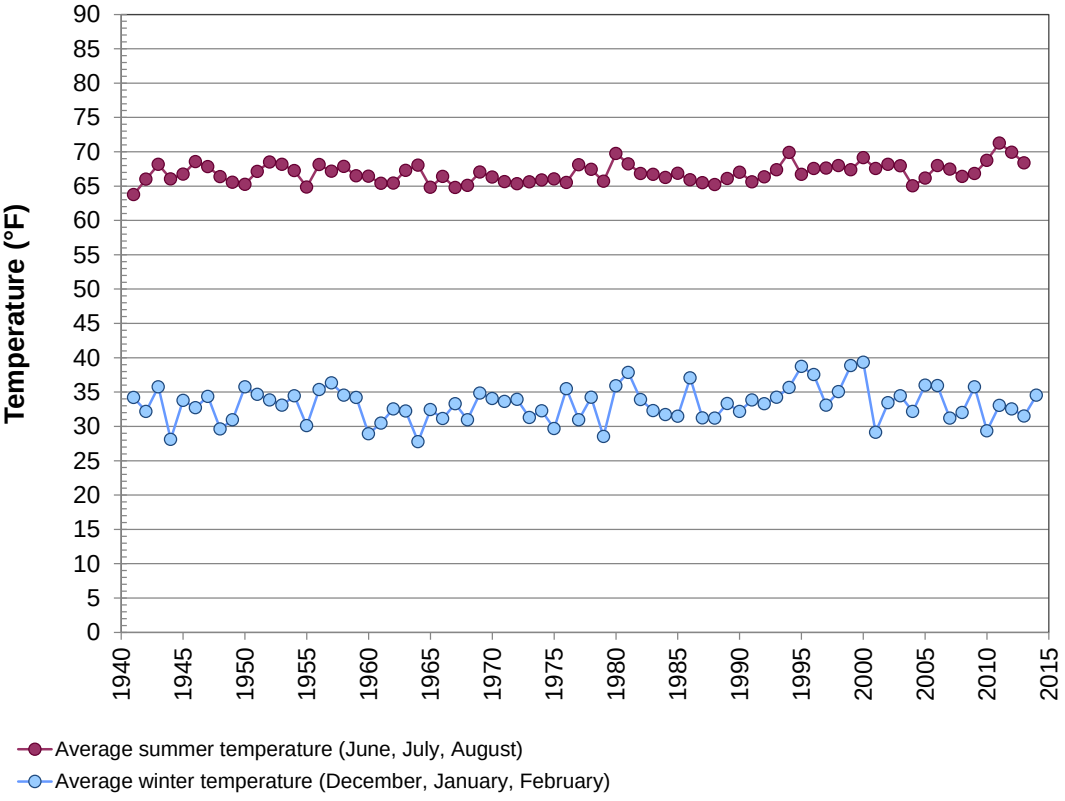
[d] Average of the daily average temperatures calculated for each station.

[e] Average of the daily minimum (or maximum) temperature recorded daily for each station.

Gascon, NM



Las Vegas Municipal Airport



MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Average Temperature, Gascon and Las Vegas Municipal Airport Climate Stations

Figure 5-2a

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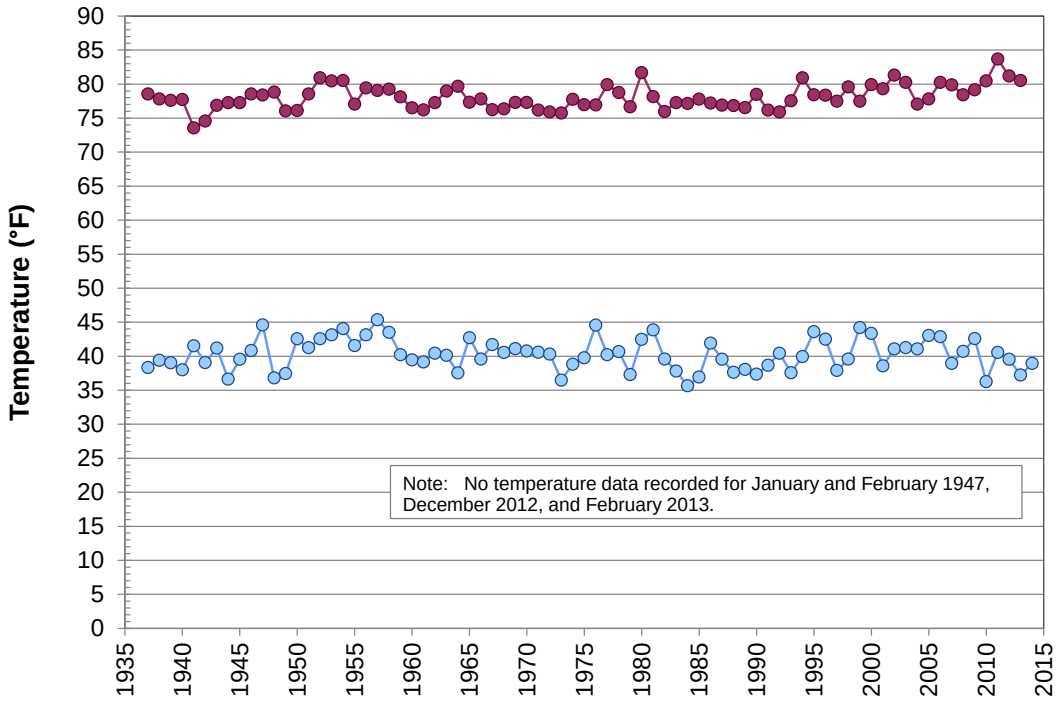
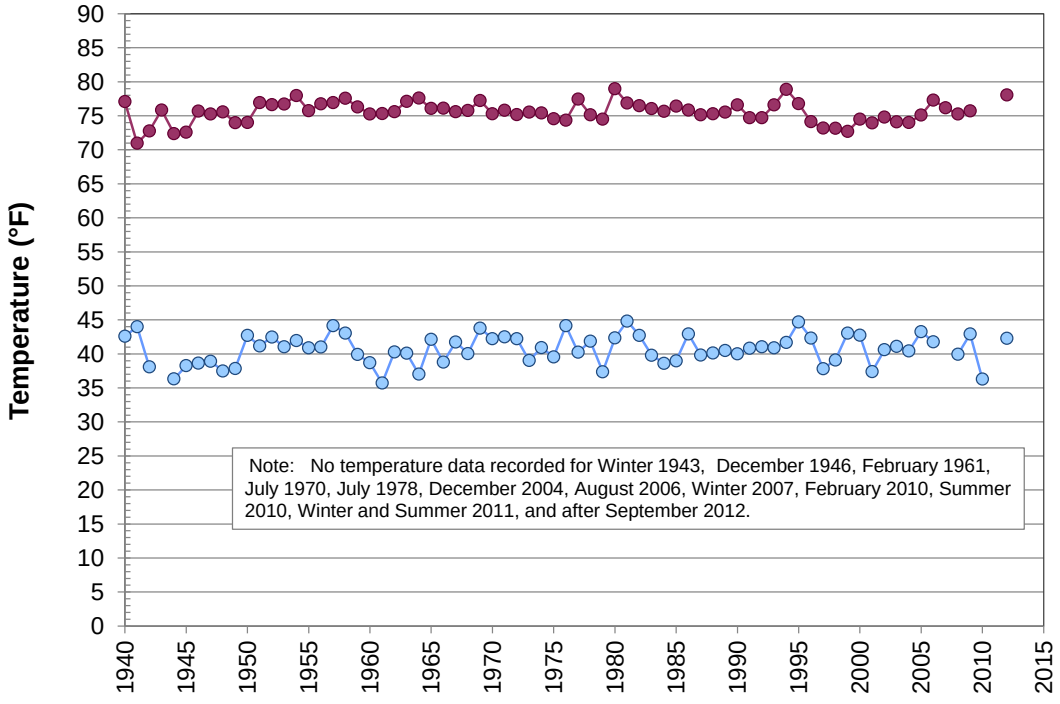
Conchas Dam



Santa Rosa



MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Average Temperature
Conchas Dam and Santa Rosa Climate Stations

Figure 5-2b

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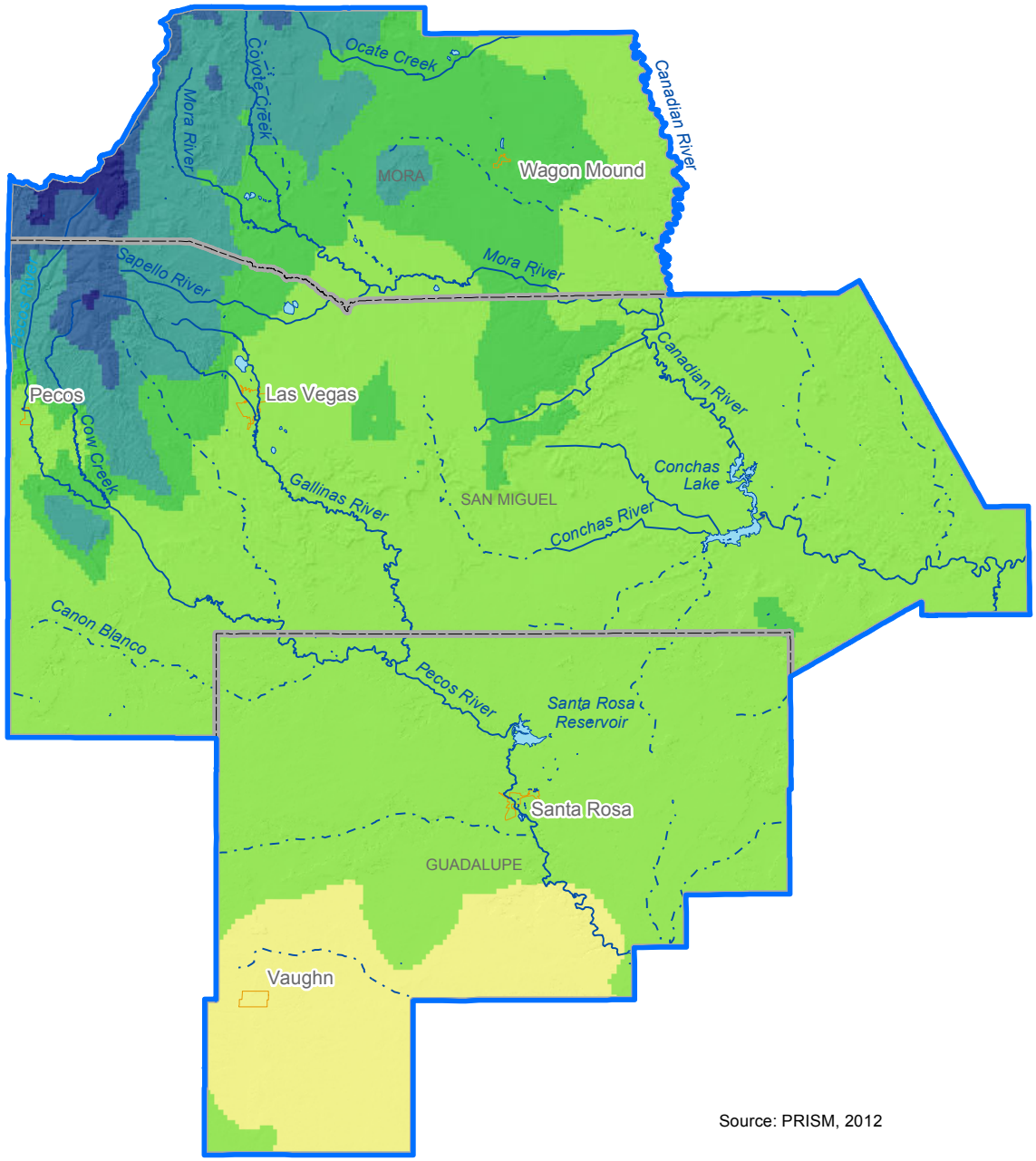

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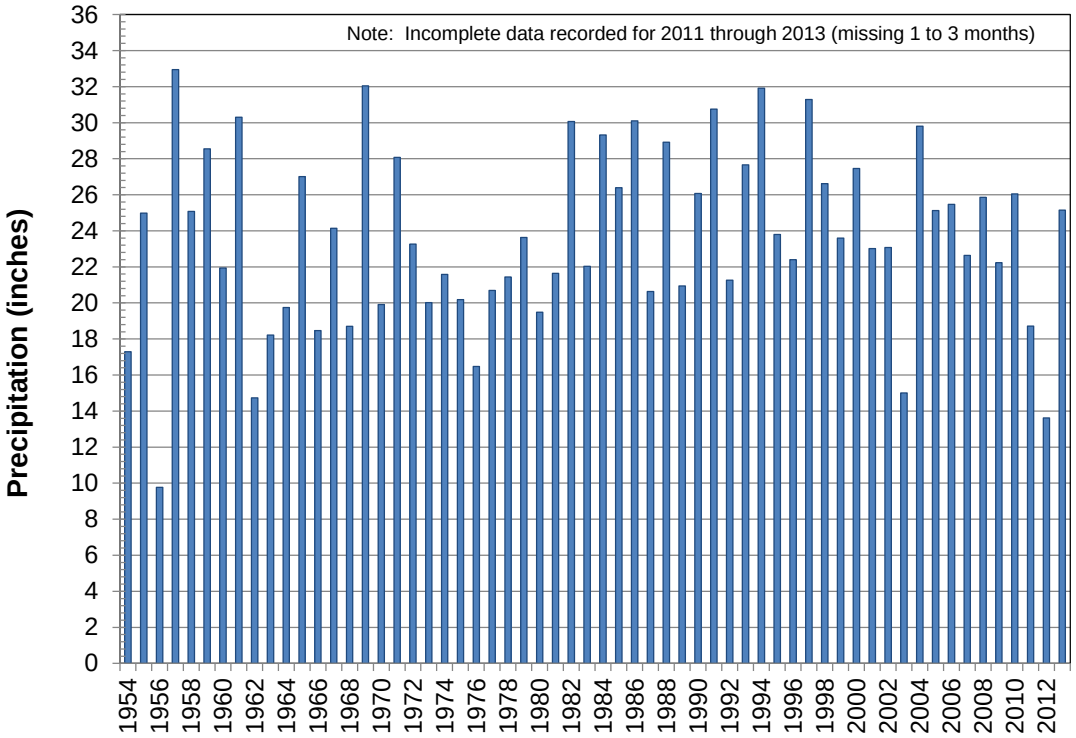
MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

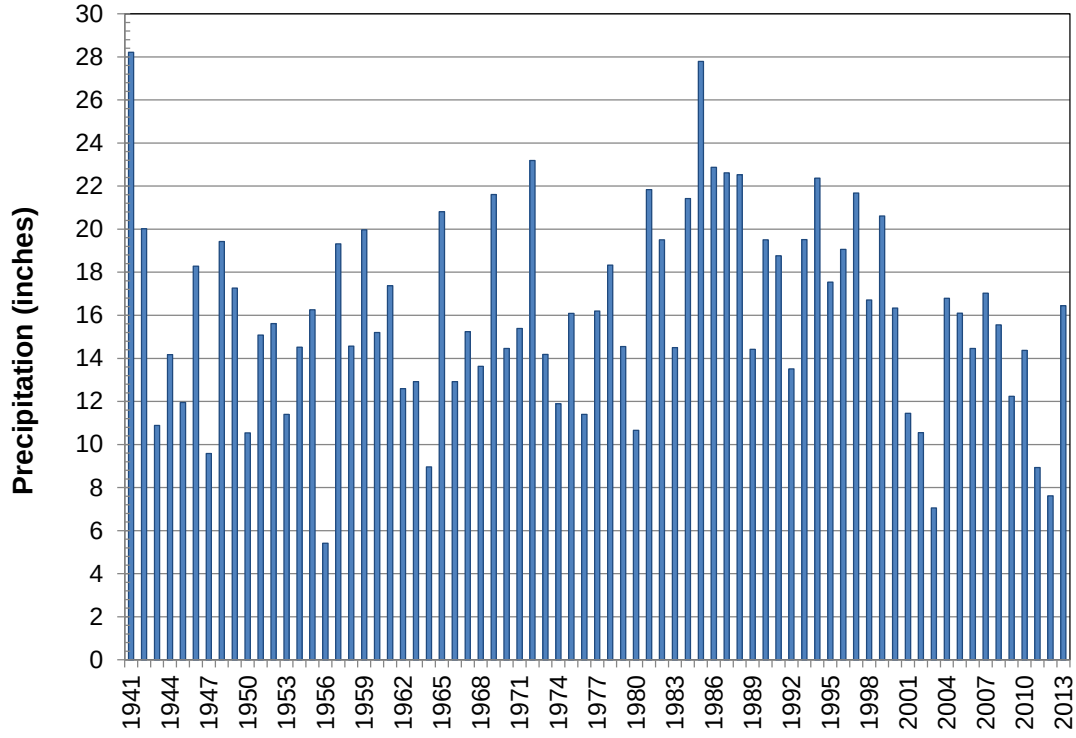
Average Annual Precipitation (1980 to 2010)

Figure 5-3

Gascon, NM



Las Vegas Municipal Airport



MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Annual Precipitation, Gascon and Las Vegas Municipal Airport Climate Stations

Figure 5-4a

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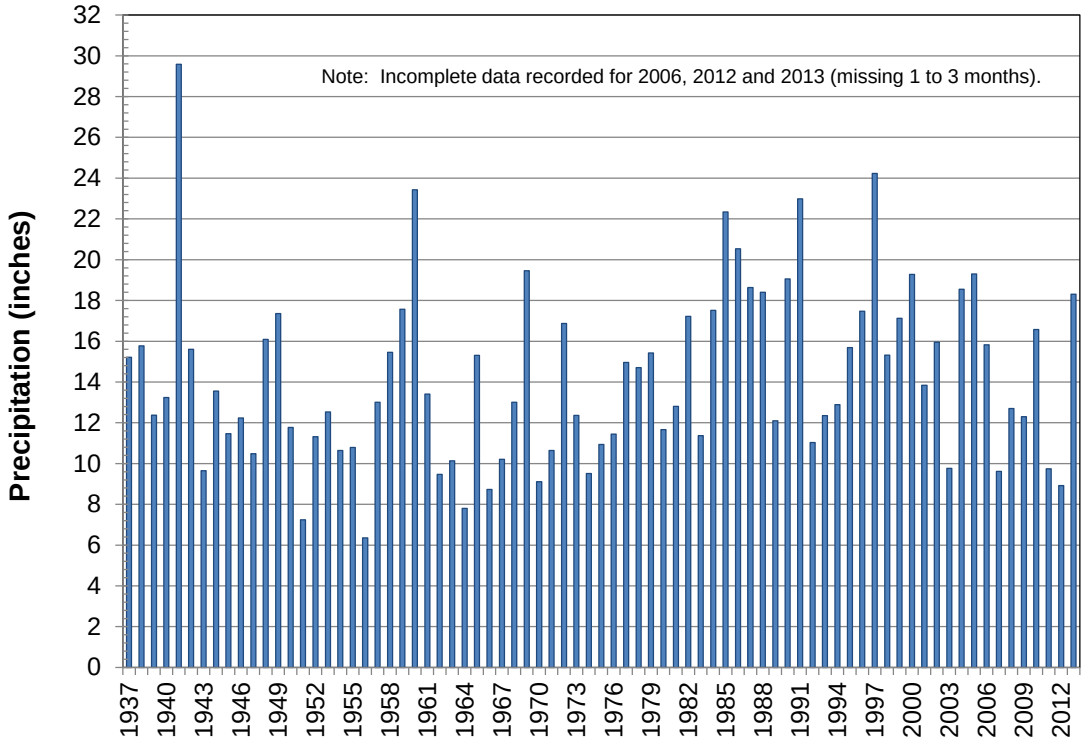
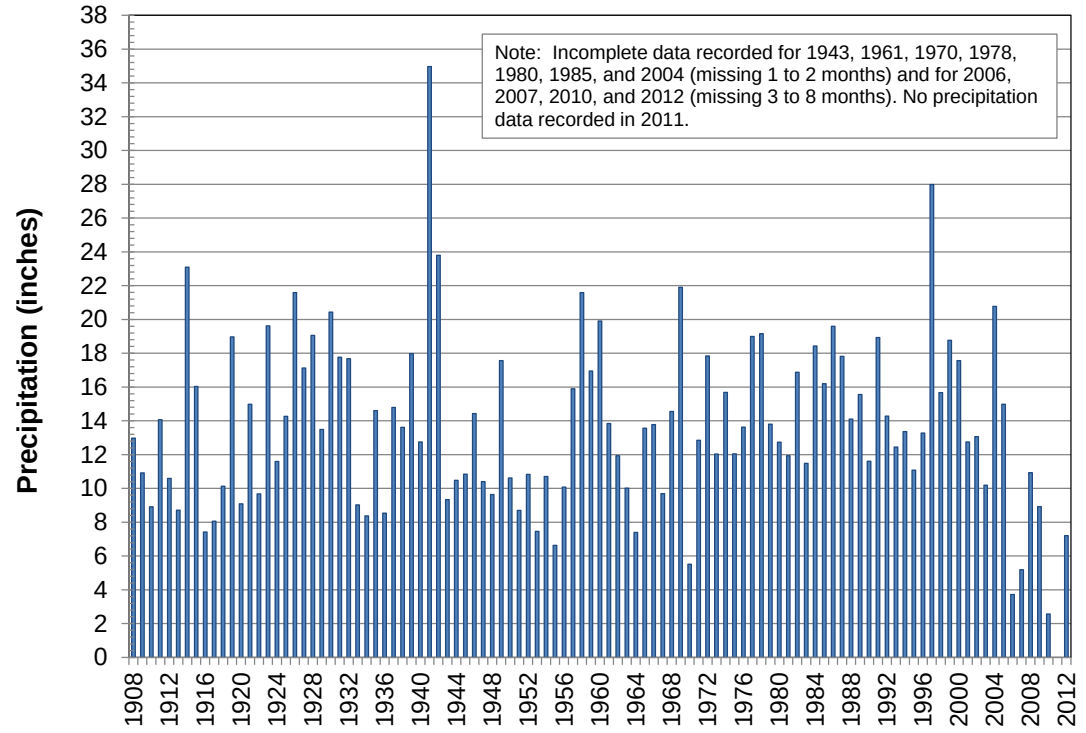
Conchas Dam



Santa Rosa



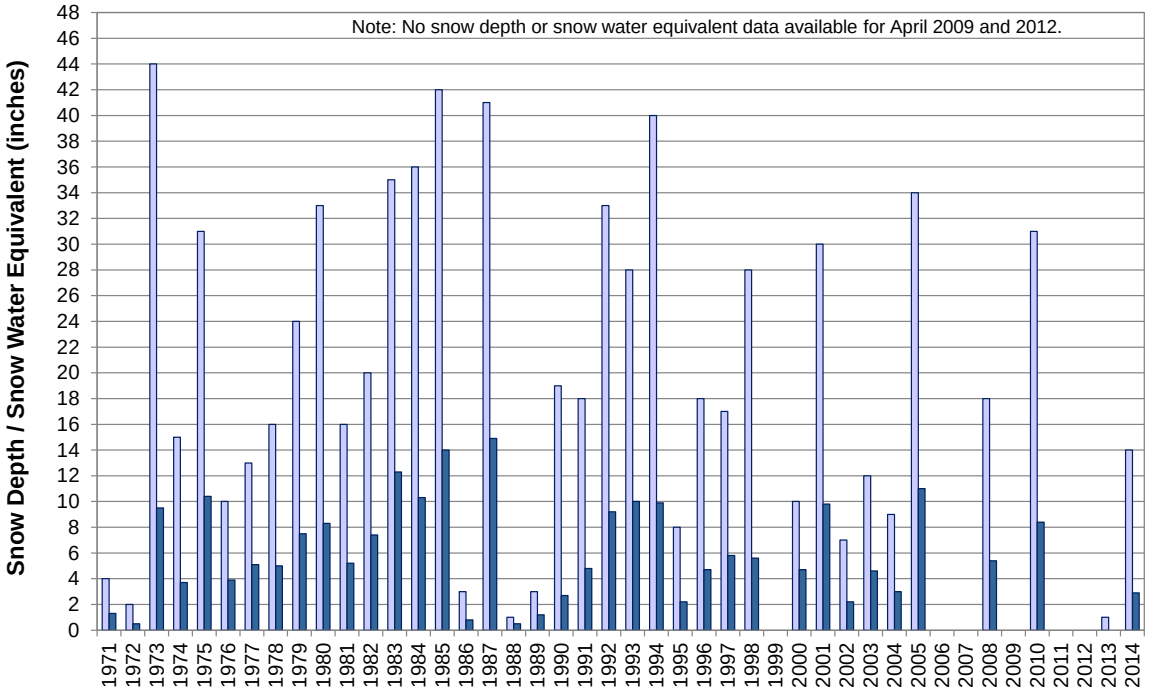
MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Annual Precipitation
Conchas Dam and Santa Rosa Climate Stations

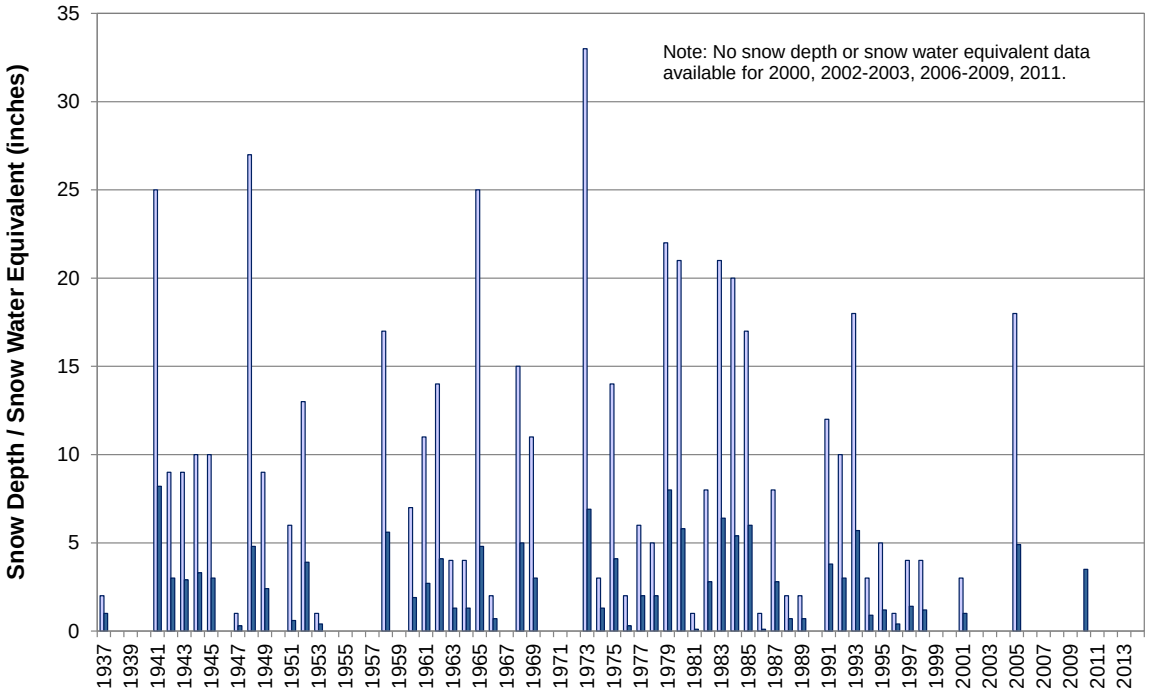
Figure 5-4b

P:_WR12-165\RWPs_2014\8_Mora-San Miguel-Guadalupe\Fig5-04b_Precip_Conchas-SantaRosa.docx 6/29/16

Alamitos Snow Course with Aerial Marker



Panchuela Snow Course with Aerial Marker



Snow depth

Snow water equivalent (the amount of water that would result if the snowpack were instantly melted)

Notes: 1. Measurements made in the last few days of March or first few days of April.
2. Years with no bars visible are years with zero snow depth (unless otherwise noted).

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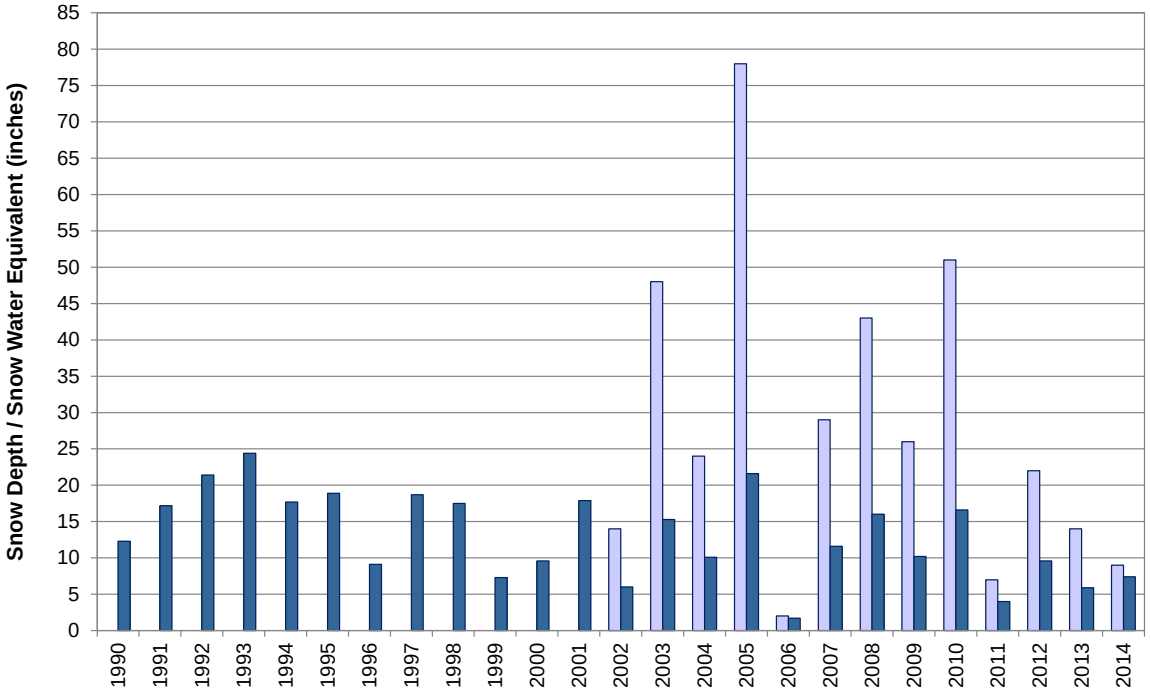
Snow Depth and Snow Water Equivalent for April

Figure 5-5a

P:_WR12-165\RWPs_2014\8_Mora-San Miguel-Guadalupe\Fig5-05a_SNOTEL_Alamitos-Panchuela.docx 6/29/16

Wesner Springs SNOTEL



Snow depth

Snow water equivalent (the amount of water that would result if the snowpack were instantly melted)

Notes: 1. Measurements made in the last few days of March or first few days of April.
2. Years with no bars visible are years with zero snow depth (unless otherwise noted).

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Snow Depth and Snow Water Equivalent for April

Figure 5-5b

P:_WR12-165\RWPs_2014\8_Mora-San Miguel-Guadalupe\Fig5-05b_SNOTEL_Wesner.docx 6/29/16

The snow water equivalent is the amount of water, reported in inches, within the snowpack, or the amount of water that would result if the snowpack were instantly melted (NRCS, 2014b). The end of season snowpack is a good indicator of the runoff that will be available to meet water supply needs. A summary of the early April (generally measured within a week of April 1) snow depth and snow water equivalent information at the three stations is provided on Figure 5-5. The figure shows that the snow depths and snow water equivalent vary greatly, with snow depths ranging from 0 in some years at low elevations to more than 70 inches at higher elevations.

Another way to review long-term variations in climate conditions is through drought indices. A drought index consists of a ranking system derived from the assimilation of data—including rainfall, snowpack, streamflow, and other water supply indicators—for a given region. The Palmer Drought Severity Index (PDSI) was created by W.C. Palmer (1965) to measure the variations in the moisture supply and is calculated using precipitation and temperature data as well as the available water content of the soil. Because it provides a standard measure that allows comparisons among different locations and months, the index is widely used to assess the weather during any time period relative to historical conditions. The PDSI classifications for dry to wet periods are provided in Table 5-3.

Table 5-3. Palmer Drought Severity Index Classifications

PDSI Classification	Description
+ 4.00 or more	Extremely wet
+3.00 to +3.99	Very wet
+2.00 to +2.99	Moderately wet
+1.00 to +1.99	Slightly wet
+0.50 to +0.99	Incipient wet spell
+0.49 to –0.49	Near normal
–0.50 to –0.99	Incipient dry spell
–1.00 to –1.99	Mild drought
–2.00 to –2.99	Moderate drought
–3.00 to –3.99	Severe drought
–4.00 or less	Extreme drought

There are considerable limitations when using the PDSI, as it may not describe rainfall and runoff that varies from location to location within a climate division and may also lag in indicating emerging droughts by several months. Also, the PDSI does not consider groundwater or reservoir storage, which can affect the availability of water supplies during drought conditions. However, even with its limitations, many states incorporate the PDSI into their drought monitoring systems, and it provides a good indication of long-term relative variations in drought conditions, as PDSI records are available for more than 100 years.

The PDSI is calculated for climate divisions throughout the United States. Mora County falls mainly within New Mexico Climate Division 2 (the Northern Mountains Climate Division), with the eastern portion of the County in Division 3 (the Northeastern Plateau Climate Division) (Figure 5-1), and San Miguel County falls mainly within Division 2 and Division 3, with a small portions of western San Miguel County in Division 6 (Central Highlands) and Division 7 (Southeastern Plains). Guadalupe County lies within Divisions 3, 6, and 7. Figure 5-6a and 5-6b show the long-term PDSI for these four divisions. Of interest are the large variations from year to year in all four divisions, which are similar in pattern though not necessarily in magnitude.

The chronological history of drought, as illustrated by the PDSI, indicates that the most severe droughts in the last century occurred in the early 1900s, the 1950s, the early 2000s, and in recent years (2011 to 2013) (Figures 5-6a and 5-6b). In 2013 the PDSI in Climate Division 2, which covers the headwaters of the Pecos and Canadian rivers, dipped to its lowest index value in almost 50 years (Figure 5-6a).

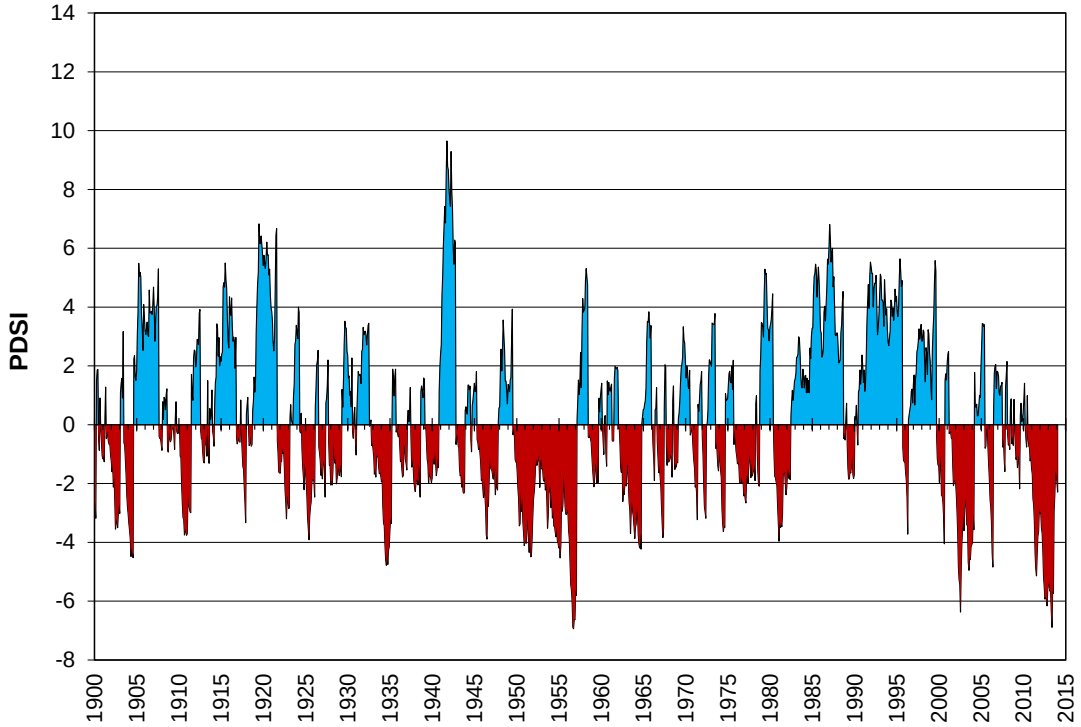
The likelihood of drought conditions developing in New Mexico is influenced by several weather patterns:

- *El Niño/La Niña:* El Niño and La Niña are characterized by a periodic warming and cooling, respectively, of sea surface temperatures across the central and east-central equatorial Pacific. Years in which El Niño is present are more likely to be wetter than average in New Mexico, and years with La Niña conditions are more likely to be drier than average, particularly during the cool seasons of winter and spring.

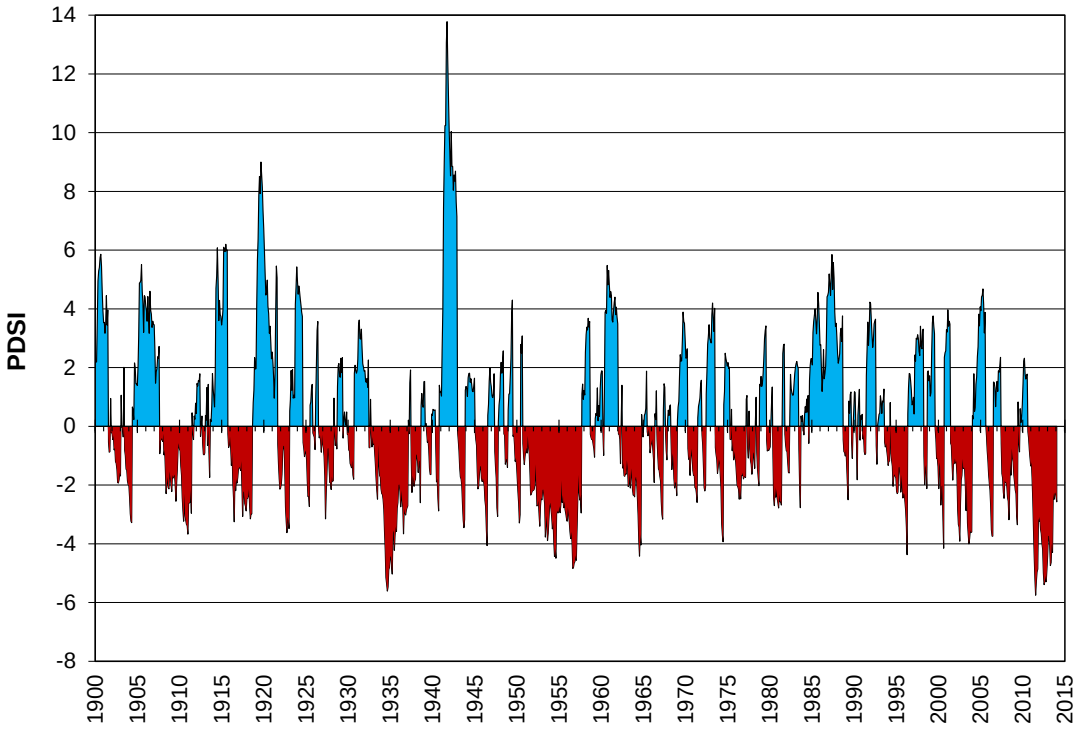
- *The Pacific Decadal Oscillation (PDO):* The PDO is a multi-decadal pattern of climate variability caused by shifting sea surface temperatures between the eastern and western Pacific Ocean that cycle approximately every 20 to 30 years. Warm phases of the PDO (shown as positive numbers on the PDO index) correspond to El Niño-like temperature and precipitation anomalies (i.e., wetter than average), while cool phases of the PDO (shown as negative numbers on the PDO index) correspond to La Niña-like climate patterns (drier than average). It is believed that since 1999 the planning region has been in the cool phase of the PDO.

- *The Atlantic Multidecadal Oscillation (AMO):* The AMO refers to variations in surface temperatures of the Atlantic Ocean which, similarly to the PDO, cycle on a multi-decade frequency. The pairing of a cool phase of the PDO with the warm phase of the AMO is typical of drought in the southwestern United States (McCabe et al., 2004; Stewart, 2009). The AMO has been in a warm phase since 1995. It is possible that the AMO may be shifting to a cool phase but the data are not yet conclusive.

Climate Division 2



Climate Division 3



Note: Blue indicates wetter than average conditions and red indicates drier than average conditions, as described on Table 5-3.

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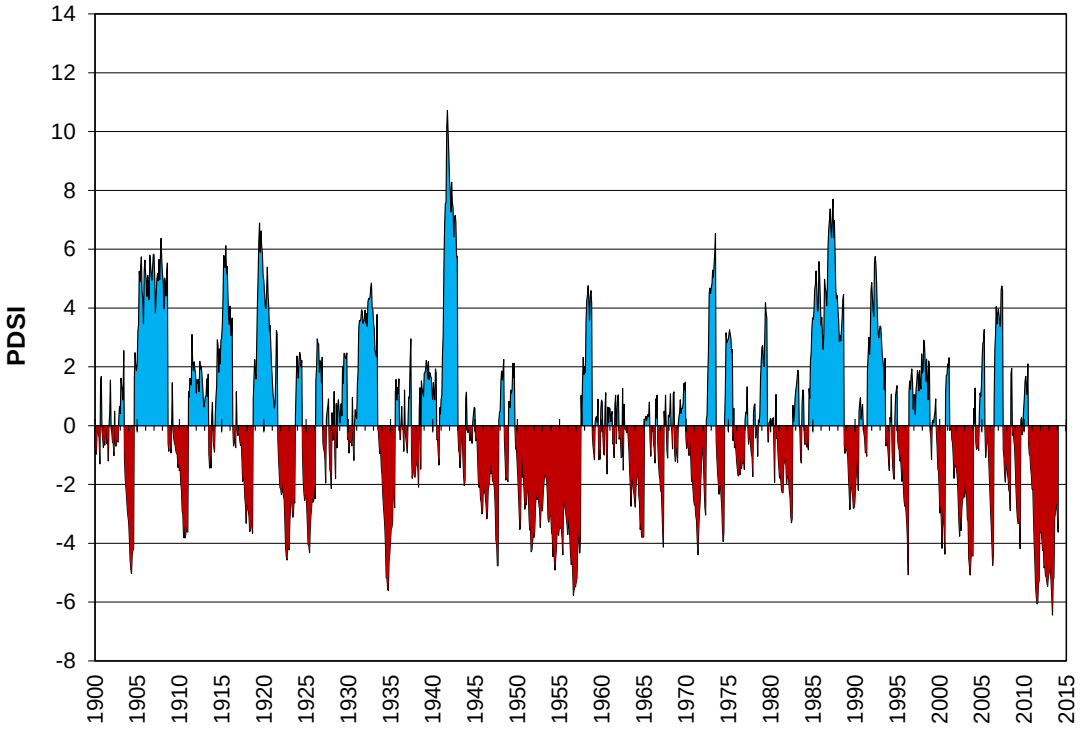
Palmer Drought Severity Index
New Mexico Climate Divisions 2 and 3

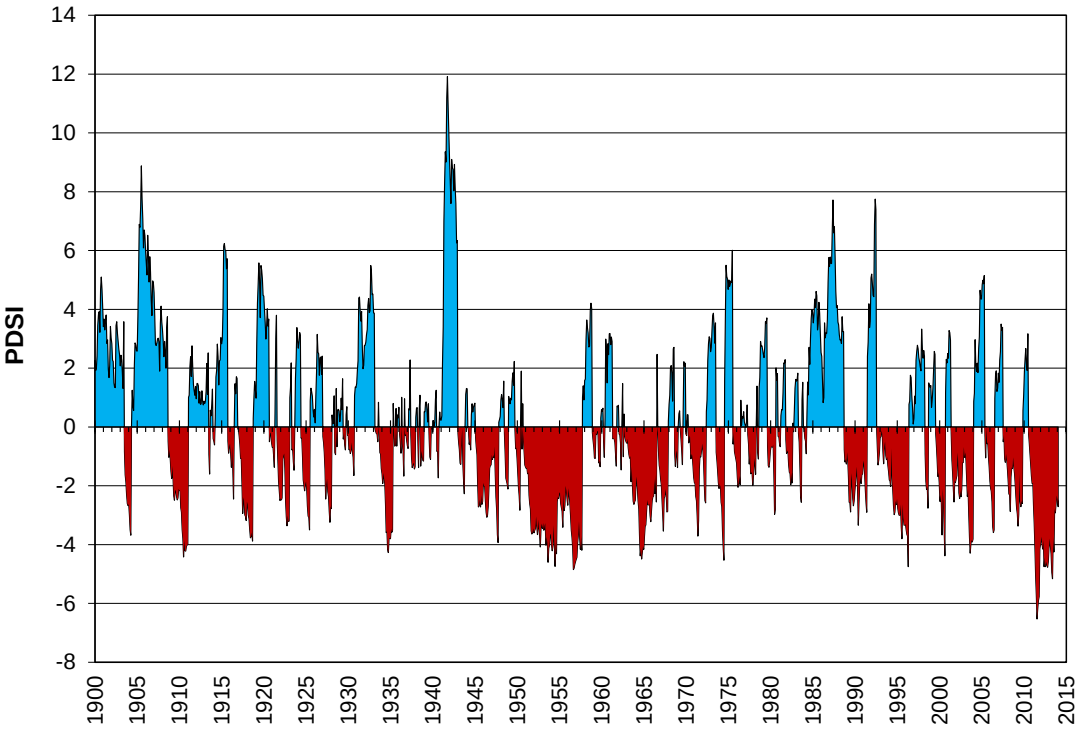
Figure 5-6a

P:_WR12-165\RWPs_2015-2016\8_MSMG\Figure 5-06a_MSMG PDSI Div 2&3.docx 6/29/16

Climate Division 6



Climate Division 7



Note: Blue indicates wetter than average conditions and red indicates drier than average conditions, as described on Table 5-3.

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Palmer Drought Severity Index
New Mexico Climate Divisions 6 and 7

Figure 5-6b

P:_WR12-165\RWPs_2015-2016\8_MSMG\Fig5-06b_MSMG PDSI Div 6&7.docx 6/29/16

- *The North American Monsoon* is characterized by a shift in wind patterns in summer, which occurs as Mexico and the southwest U.S. warm under intense solar heating. As this happens, the flow reverses from dryland areas to moist ocean areas. Low-level moisture is transported into the region primarily from the Gulf of California and eastern Pacific. Upper-level moisture is transported into the region from the Gulf of Mexico by easterly winds aloft. Once the forests of the Sierra Madre Occidental green up from the initial monsoon rains, evaporation and plant transpiration can add additional moisture to the atmosphere that will then flow into the region. If the Southern Plains of the U.S. are unusually wet and green during the early summer months, that area can also serve as a moisture source. This combination causes a distinct rainy season over large portions of western North America (NWS, 2015).

5.1.2 Recent Climate Studies

New Mexico's climate has historically exhibited a high range of variability. Periods of extended drought, interspersed with relatively short-term wetter periods, are common. Historical periods of high temperature and low precipitation have resulted in high demands for irrigation water and higher open water evaporation and riparian evapotranspiration. In addition to natural climatic cycles (i.e., El Niño/La Niña, PDO, AMO [Section 5.1.1]) that affect precipitation patterns in the southwestern United States, there has been considerable recent research on potential climate change scenarios and their impact on the Southwest and New Mexico in particular.

The consensus on global climate conditions is represented internationally by the work of the Intergovernmental Panel on Climate Change (IPCC), whose Fifth Assessment Report, released in September 2013, states, "Warming of the climate system is unequivocal, and since the 1950s many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased" (IPCC, 2013). Atmospheric concentrations of greenhouse gases are rising so quickly that all current climate models project significant warming trends over continental areas in the 21st century.

In the United States, regional assessments conducted by the U.S. Global Change Research Program (USGCRP) have found that temperatures in the southwestern United States have increased and are predicted to continue to increase, and serious water supply challenges are expected. Water supplies are projected to become increasingly scarce, calling for trade-offs among competing uses and potentially leading to conflict (USGCRP, 2009). Most of the major river systems in the southwestern U.S. are expected to experience reductions in streamflow and other limitations to water availability (Garfin et al., 2013).

Although there is consensus among climate scientists that global temperatures are warming, there is considerable uncertainty regarding the specific spatial and temporal impacts that can be expected. To assess climate trends in New Mexico, the NMOSE and NMISC (2006) conducted a study of observed climate conditions over the past century and found that observed wintertime

average temperatures had increased statewide by about 1.5°F since the 1950s. Predictions of annual precipitation are subject to greater uncertainty "given poor representation of the North American monsoon processes in most climate models" (NMOSE/NMISC, 2006).

A number of other studies predict temperature increases in New Mexico from 5° to 10°F by the end of the century (Forest Guild, 2008; Hurd and Coonrod, 2008; USBR, 2011). Predictions of annual precipitation are subject to greater uncertainty, particularly regarding precipitation during the summer monsoon season in the southwestern U.S.

In a study more specific to the Mora-San Miguel-Guadalupe Water Planning Region, Salgado and Gutzler (2013) reviewed climate change impacts on water availability in the Upper Pecos River Basin area, reviewing data from New Mexico Climate Division 2 and streamflow records from the Pecos gage located north of Pecos. They concluded:

- The timing of snowmelt runoff has exhibited a trend of earlier runoff that coincides with warmer temperatures in spring and early summer (March through June).
- Within the most recent 30-year period, the warmer spring and early summer temperature changes account for a larger percentage of the variability in streamflow than does precipitation. This shift may be an indicator of increased evaporation due to increased snowmelt season temperatures.

Based on these studies, the effects of climate change that are likely to occur in New Mexico and the planning region include (NMOSE/NMISC, 2006).

- Temperature is expected to continue to rise.
- Higher temperatures will result in a longer and warmer growing season, resulting in increased water demand on irrigated lands and increased evapotranspiration from riparian areas, grasslands, and forests, and thus less recharge to aquifers.
- Reservoir and other open water evaporation are expected to increase. Soil evaporation will also increase.
- Precipitation is expected to be more concentrated and intense, leading to increased projected frequency and severity of flooding.
- Streamflows in major rivers across the Southwest are projected to decrease substantially during this century (e.g., Christensen et al., 2004; Hurd and Coonrod, 2008; USBR, 2011, 2013; Garfin et al., 2013) due to a combination of diminished cold season snowpack in headwaters regions and higher evapotranspiration in the warm season. The seasonal distribution of streamflow is projected to change as well: flows could be somewhat higher than at present in late winter, but peak runoff will occur earlier and be diminished. Late spring/early summer flows are projected to be much lower than at

present, given the combined effects of less snow, earlier melting, and higher evaporation rates after snowmelt.

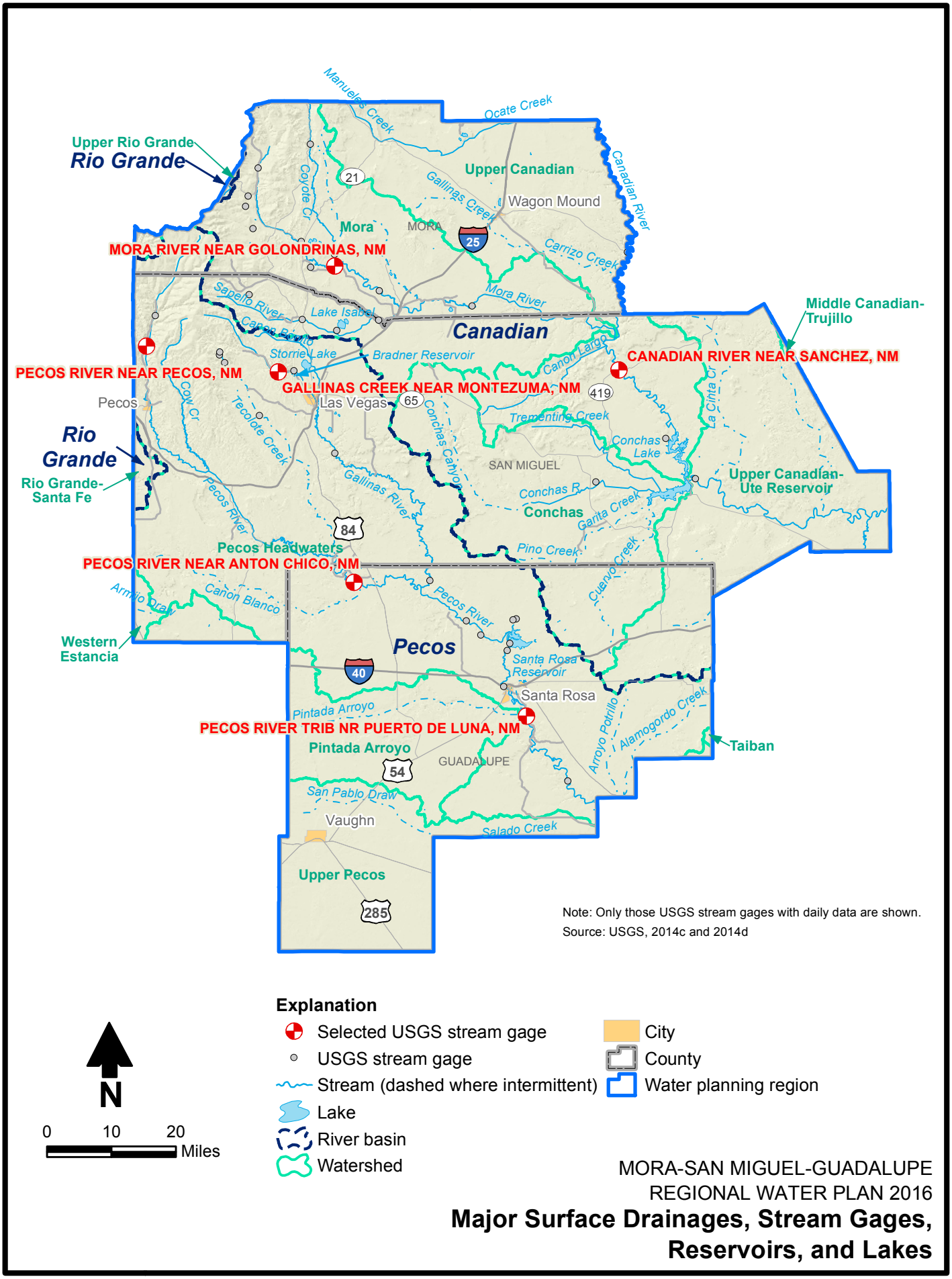
- Forest habitat is vulnerable to both decreases in cold-season precipitation and increases in warm-season vapor pressure deficit (Williams et al., 2010). Stress from either of these factors leave forests increasingly susceptible to insects, forest fires, and desiccation. Greater temperatures increase insect survivability and fire risk.

To minimize the impact of these changes, it is imperative that New Mexico plan for variable water supplies, including focusing on drought planning and being prepared to maximize storage from extreme precipitation events while minimizing their adverse impacts.

5.2 Surface Water Resources

Surface water supplies approximately 93 percent of the water currently diverted in the Mora-San Miguel-Guadalupe Water Planning Region, with its primary uses being for irrigated agriculture and reservoir evaporation. The dominant waterways flowing in the region are the Canadian and Pecos rivers and their tributaries, and surface waters in the planning region lie primarily within these river basins; a small portion along the western edge of the planning region is within the Rio Grande Basin. Major surface drainages (including both perennial and intermittent streams) and watersheds in the planning region are shown on Figure 5-7. When evaluating surface water information, it is important to note that streamflow does not represent available supply, as there are also water rights limitations. The administrative water supply discussed in Section 5.5 is intended to represent supply considering both physical and legal limitations. The information provided in this section is intended to illustrate the variability and magnitude of streamflow, and particularly the relative magnitude of streamflow in recent years.

Tributary flow is not monitored in every subwatershed in the planning region. However, streamflow data are collected by the USGS and various cooperating agencies at stream gage sites in the planning region plus one just upstream of the planning region in Colfax County. Table 5-4a lists the locations and periods of record for data collected at stream gages in the region, as well as the drainage area and estimated irrigated acreage for surface water diversions upstream of the station. Table 5-4b provides the minimum, median, and maximum annual yield for all gages that have 10 or more years of record. In addition to the large variability in annual yield, streamflow also varies from month to month within a year, and monthly variability or short-term storms can have flooding impacts, even when annual yields are low. Table 5-5 provides monthly summary statistics for each of the stations with 10 or more years of record, and indicates that most of the streamflow occurs in the March to June snowmelt runoff period, with some additional larger flows at some gages occurring during the July to September monsoon season. Relatively low flows are observed in October through February. Recent analysis of climate trends (Salgado and Gutzler, 2013) indicated that, prior to 2000, a greater percentage of flow occurred in May and June and less in March and April than in more recent years, a possible indication of a trend in earlier snowmelt since 2000.



MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Major Surface Drainages, Stream Gages, Reservoirs, and Lakes

Figure 5-7

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Table 5-4a. USGS Stream Gage Stations

USGS Station [a]							Period of Record	
Name [b]	Number	Latitude	Longitude	Elevation (ft amsl)	Drainage Area (sq mi)	Irrigated Upstream Land [c] (acres)	Start Date	End Date
Mora County								
Mora River near Holman, NM	07214500	36.1103097	–105.376401	7,845	57	—	1/1/1953	1/14/1974
Vigil Canyon Nr Holman, NM	07214600	36.0472538	–105.403347	7,840	3	—	10/1/1956	9/30/1963
Agua Fria C Nr Holman, NM	07214700	36.0236426	–105.410292	7,850	9	—	10/1/1956	9/30/1963
Rio La Casa Nr Cleveland, NM	07214800	35.9741996	–105.38918	7,635	23	—	6/1/1956	9/30/1970
Mora River at La Cueva, NM	07215500	35.9451167	–105.255733	7,025	174	7,000	5/1/1906	Present
Rito Cebolla Nr Golondrinas, NM	07215600	35.8875396	–105.229733	6,890	64	—	10/1/1956	9/30/1963
Mora River near Golondrinas, NM	07216500	35.8908722	–105.163619	6,750	267	12,000	4/1/1915	Present
Coyote Creek above Guadalupita, NM	07217100	36.1642016	–105.230844	7,605	71	—	6/1/1956	1/7/1974
Coyote Creek near Golondrinas, NM	07218000	35.9165222	–105.164083	6,780	215	4,000	10/1/1929	Present
Mora R Nr Watrous, NM	07218100	35.8347631	–105.040004	6,480	521	—	10/1/1956	9/30/1963
Sapello R Nr Watrous, NM	07220600	35.7680974	–105.04167	6,500	213	—	10/1/1956	9/30/1963
Mora River Nr Shoemaker, NM	07221000	35.8003178	–104.783328	6,145	1,104	—	10/1/1919	9/30/1996
San Miguel County								
Manuelitas C Nr Rociada, NM	07218700	35.825036	–105.39918	7,350	52	—	10/1/1956	9/30/1963
Sapello River at Sapello, NM	07220000	35.7697644	–105.251955	6,910	132	—	1/1/1917	12/31/1973
Lk Isabel Ca Nr Sapello, NM	07220100	35.7450425	–105.157507	6,790	—	—	10/1/1964	6/30/1975
Canadian River near Sanchez, NM	07221500	35.6548333	–104.378611	4,500	6,015	56,000	10/1/1912	Present
Canadian River near Bell Ranch, NM	07222000	35.5000457	–104.250533	4,130	6,200	—	10/1/1929	6/30/1939
Conchas River at Variadero, NM	07222500	35.4028257	–104.443594	4,430	523	—	10/1/1936	9/30/1996
Canadian River below Conchas Dam, NM	07224500	35.4089371	–104.169976	4,022	7,417	—	5/1/1936	9/30/1972
Rio Mora near Terrero, NM	08377900	35.7771139	–105.658028	7,890	53	—	10/1/1963	Present
Pecos River near Pecos, NM	08378500	35.70835	–105.682703	7,503	189	75	10/1/1919	Present

Source: USGS, 2014c (unless otherwise noted)

[a] Only those USGS stream gages with daily data are shown.

[b] **Bold** indicates gages in key locations selected for additional analysis.

[c] Source: DBS&A, 2005; USGS, 2014a

USGS = U.S. Geological Survey

ft amsl = Feet above mean sea level

sq mi = Square miles

— = Data not available from current source(s).

Table 5-4a. USGS Stream Gage Stations

USGS Station [a]						Irrigated Upstream Land [c] (acres)	Period of Record	
Name [b]	Number	Latitude	Longitude	Elevation (ft amsl)	Drainage Area (sq mi)		Start Date	End Date
San Miguel County (cont.)								
Tecolote Cr at Wright Canyon Nr El Porvenir, NM	08379178	35.6889254	–105.480848	—	—	—	4/1/1989	9/25/1990
Wright Canyon at Mile .55 Nr El Provenir, NM	08379185	35.6955919	–105.479737	—	—	—	6/1/1989	8/31/1990
Tecolote Cr Bl Wright Canyon Nr El Porvenir, NM	08379187	35.6719817	–105.466681	—	—	—	4/27/1989	9/30/1992
Tecolote C Nr San Pablo, NM	08379200	35.5528194	–105.370011	6,674	83	—	10/1/1960	9/30/1965
Gallinas Creek near Montezuma, NM	08380500	35.6519944	–105.318831	6,880	84	80	9/1/1926	Present
Gallinas Creek at Montezuma, NM	08381000	35.6542093	–105.275566	6,675	87	—	10/23/1904	12/31/1966
Gallinas River near Lourdes, NM	08382000	35.4689028	–105.161442	5,928	313	—	7/1/1951	Present
Guadalupe County								
Pecos River near Anton Chico, NM	08379500	35.1786694	–105.108803	5,130	1,050	4,900	10/1/1910	Present
Gallinas R Nr Colonias, NM	08382500	35.1819611	–104.900267	4,940	610	—	1/1/1951	Present
Pecos R Abv Canon Del Uta Nr Colonias, NM	08382600	35.0913889	–104.800556	4,800	2,330	11,800	1/1/1976	Present
Pecos River above Santa Rosa Lake, NM	08382650	35.0594444	–104.761111	4,760	2,340	11,800	2/28/1976	Present
Los Esteros Creek above Santa Rosa Lake, NM	08382730	35.0950553	–104.664155	—	66	—	7/26/1973	9/30/1997
Los Esteros Cr Trib above Santa Rosa Lake, NM	08382760	35.0931109	–104.672767	4,760	14	—	7/25/1973	1/31/1991
Pecos R Ab Los Este Damsite Nr Santa Rosa, NM	08382800	35.0406122	–104.681656	4,630	2,430	—	10/1/1965	2/28/1977
Pecos River below Santa Rosa Dam, NM	08382830	35.0241667	–104.688889	4,640	2,430	12,000	1/17/1980	Present
Pecos River at Santa Rosa, NM	08383000	34.9433921	–104.699156	4,538	2,650	—	10/1/1912	9/30/1992
Pecos River near Puerto De Luna, NM	08383500	34.7300833	–104.524911	4,311	3,970	—	5/1/1938	Present

Source: USGS, 2014c (unless otherwise noted)

[a] Only those USGS stream gages with daily data are shown.

[b] **Bold** indicates gages in key locations selected for additional analysis.

[c] Source: DBS&A, 2005; USGS, 2014a

USGS = U.S. Geological Survey

ft amsl = Feet above mean sea level

sq mi = Square miles

— = Data not available from current source(s).

Table 5-4b. USGS Stream Gage Annual Statistics for Stations with 10 or More Years of Record

USGS Station Name [a]	Annual Yield [b] (acre-feet)			Number of Years [c]
	Minimum	Median	Maximum	
Mora County				
Mora River At La Cueva, NM	1,426	16,868	89,482	85
Mora River Near Golondrinas, NM	1,528	19,402	115,328	87
Coyote Creek Above Guadalupita, NM	2,346	5,538	17,954	17
Coyote Creek Near Golondrinas, NM	919	5,958	43,945	83
Mora River Nr Shoemaker, NM	1,890	29,212	254,040	72
San Miguel County				
Sapello River At Sapello, NM	1,593	11,583	43,655	18
Canadian River Near Sanchez, NM	1,955	80,071	833,286	77
Conchas River At Variadero, NM	131	4,966	85,211	59
Canadian River Below Conchas Dam, NM	148	5,383	920,886	32
Rio Mora Near Terrero, NM	6,045	24,253	46,696	50
Pecos River Near Pecos, NM	18,027	70,732	208,937	84
Gallinas Creek Near Montezuma, NM	1,151	11,656	68,270	86
Gallinas Creek At Montezuma, NM	328	9,737	63,564	56
Gallinas River Near Lourdes, NM	2,100	8,362	34,099	12
Guadalupe County				
Pecos River Near Anton Chico, NM	5,973	77,320	397,892	85
Gallinas R Nr Colonias, NM	475	10,063	38,877	63
Pecos R Abv Canon Del Uta Nr Colonias, NM	16	53,972	179,906	38
Pecos River Above Santa Rosa Lake, NM	5,727	68,632	195,399	36
Los Esteros Creek Above Santa Rosa Lake, NM	15	775	3,924	23
Los Esteros Cr Trib Above Santa Rosa Lake, NM	0	24	1,875	17
Pecos River Below Santa Rosa Dam, NM	4,865	62,044	155,436	33
Pecos River At Santa Rosa, NM	28,814	75,691	116,414	12
Pecos River Near Puerto De Luna, NM	70,949	123,835	230,511	34

Source: USGS, 2014c

[a] Stations with complete years of data only
Bold indicates gages in key locations selected for additional analysis.

[b] Based on calendar years;

[c] Number of years used in calculation of annual yield statistics

Table 5-5. USGS Stream Gage Average Monthly Streamflow for Stations with 10 or More Years of Record

USGS Station [a]	Complete Years [b]	Average Monthly Streamflow [c] (acre-feet)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mora County													
Mora River at La Cueva, NM	85	448	393	620	1,816	4,507	3,633	1,995	2,529	1,578	980	590	467
Mora River near Golondrinas, NM	87	681	584	748	2,383	5,218	4,043	2,313	3,185	1,862	1,247	790	674
Coyote Creek above Guadalupita, NM	17	204	238	459	1,237	1,438	725	401	839	449	364	342	239
Coyote Creek near Golondrinas, NM	83	447	415	536	1,108	1,764	861	579	1,007	671	517	490	464
Mora River Nr Shoemaker, NM	72	1,758	1,357	1,561	4,341	8,032	6,422	3,735	5,734	3,692	2,361	1,800	1,759
San Miguel County													
Sapello River at Sapello, NM	18	482	423	742	2,612	2,176	875	984	3,315	936	1,086	757	506
Canadian River near Sanchez, NM	77	2,998	3,206	3,497	11,377	22,761	19,779	12,591	17,549	12,823	5,704	3,193	2,839
Conchas River at Variadero, NM	59	43	41	76	171	719	1,498	1,898	2,061	2,255	508	96	52
Canadian River below Conchas Dam, NM	32	1,068	1,058	725	11,774	9,823	12,469	4,547	4,435	13,617	3,654	1,161	781
Rio Mora near Terrero, NM	50	393	373	798	2,372	7,616	4,412	1,680	2,512	1,573	884	627	442
Pecos River near Pecos, NM	84	1,613	1,498	2,630	7,926	20,575	14,055	5,751	6,442	4,357	3,108	2,254	1,812
Gallinas Creek near Montezuma, NM	86	355	349	831	2,188	3,205	1,243	996	1,915	1,284	741	570	412

Source: USGS, 2014c

[a] **Bold** indicates gages in key locations selected for additional analysis.

[b] Monthly statistics are for complete months with locations where 10 or more years of complete data were available.

[c] Data from USGS monthly statistics averaged over the entire period of record, converted to acre-feet (from cubic feet per second) and rounded to the nearest acre-foot.

USGS = U.S. Geological Survey

Table 5-5. USGS Stream Gage Average Monthly Streamflow for Stations with 10 or More Years of Record

USGS Station [a]	Complete Years [b]	Average Monthly Streamflow [c] (acre-feet)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
San Miguel County (cont.)													
Gallinas Creek at Montezuma, NM	56	207	250	705	2,347	3,401	1,315	1,350	1,878	941	591	413	299
Gallinas River near Lourdes, NM	12	284	216	369	1,149	1,059	505	769	1,859	1,798	884	330	285
Guadalupe County													
Pecos River near Anton Chico, NM	85	1,506	1,489	3,934	10,757	21,780	14,258	7,314	11,145	7,072	3,521	2,234	1,628
Gallinas R Nr Colonias, NM	63	216	241	357	839	999	962	2,117	3,548	1,795	760	349	244
Pecos R Abv Canon del Uta Nr Colonias, NM	38	198	426	2,255	7,748	17,340	12,188	5,368	9,609	6,423	1,561	1,079	337
Pecos River above Santa Rosa Lake, NM	36	1,162	1,293	3,159	8,158	18,520	13,314	6,896	11,876	8,130	2,621	2,142	1,283
Los Esteros Creek above Santa Rosa Lake, NM	23	0	9	0	10	52	288	277	609	163	21	11	0
Los Esteros Cr Trib above Santa Rosa Lake, NM	17	0	0	0	0	4	12	23	122	11	1	0	0
Pecos River below Santa Rosa Dam, NM	33	624	2,244	4,454	3,456	12,299	15,130	9,277	9,669	8,154	603	457	583
Pecos River at Santa Rosa, NM	12	816	870	1,370	6,039	18,577	10,865	11,437	11,497	9,872	996	1,333	1,105
Pecos River near Puerto de Luna, NM	34	5,777	6,725	9,636	8,037	16,631	20,223	15,598	16,115	15,867	6,335	5,370	5,878

Source: USGS, 2014c

[a] **Bold** indicates gages in key locations selected for additional analysis.

USGS = U.S. Geological Survey

[b] Monthly statistics are for complete months with locations where 10 or more years of complete data were available.

[c] Data from USGS monthly statistics averaged over the entire period of record, converted to acre-feet (from cubic feet per second) and rounded to the nearest acre-foot.

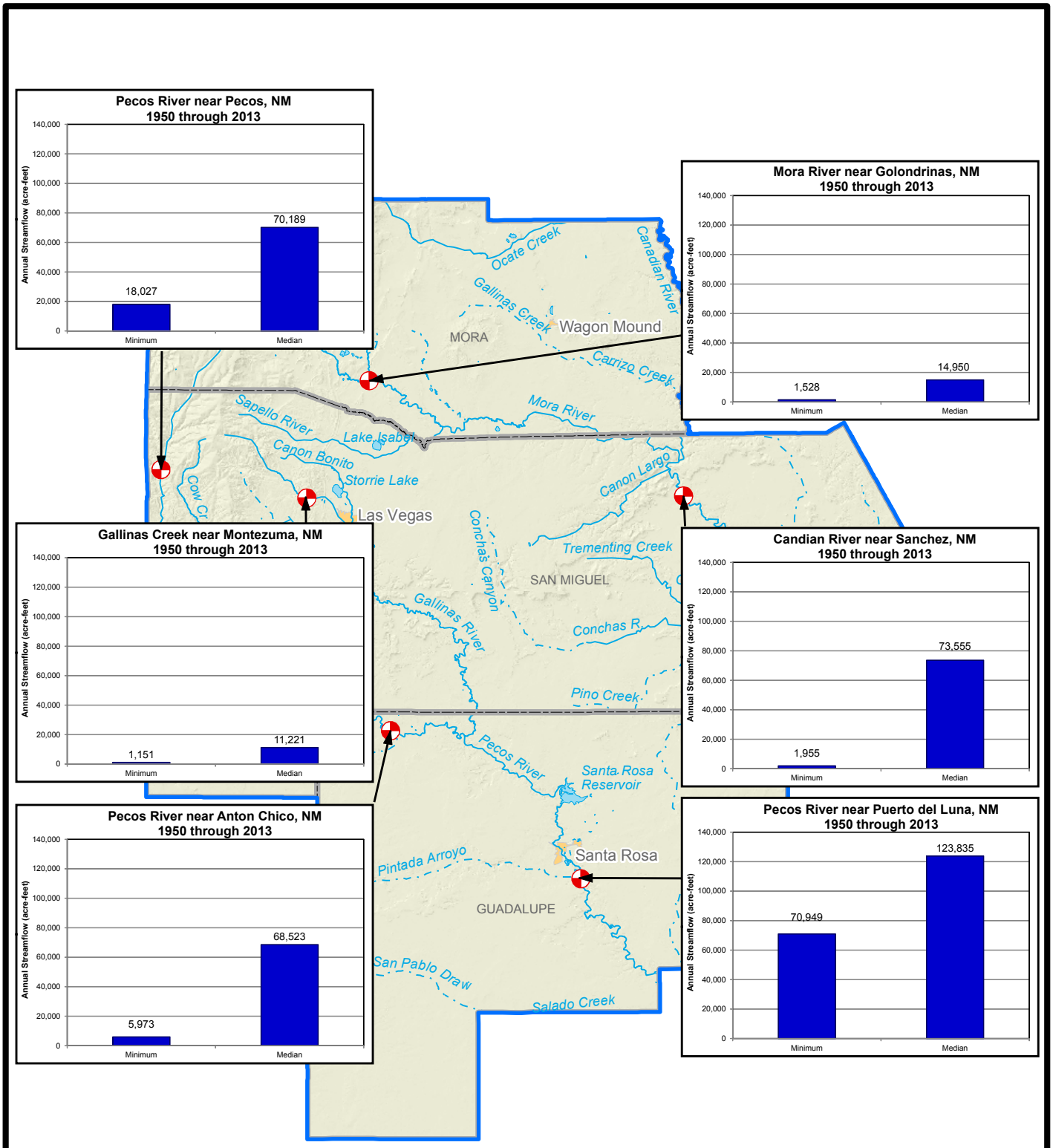
For this water planning update, six stream gages, shown on Figure 5-8, were analyzed in more detail. These stations were chosen because of their locations in the hydrologic system, completeness of record, and representativeness as key sources of supply. Figure 5-8 shows the minimum and median annual water yield for these gages. Figures 5-9a through 5-9c show the annual water yield from the beginning of the period of record through 2013 for the six gages. As shown in these figures, streamflow varies greatly from year to year, with the highest-flow years supplying many times more water than the drier years. The exceptionally low flows in 2011, 2012, and 2013 can be observed on Figures 5-9a and 5-9b.

Several lakes and reservoirs are present in the planning region (Figure 5-7). Table 5-6 summarizes the characteristics of the larger lakes and reservoirs (i.e., storage capacity greater than 5,000 acre-feet, as reported in the *New Mexico Water Use by Categories 2010* report [Longworth et al., 2013]). As indicated on Table 5-6, the two largest reservoirs in the planning region are Santa Rosa and Conchas reservoirs. While these two reservoirs provide important recreational and associated economic benefits to the region, the water stored is actually held primarily for users outside the planning region. Important reservoirs and lakes used within the Mora-San Miguel-Guadalupe region are Storrie Lake—which stores water for irrigators along the Gallinas River, the USFWS, and the City of Las Vegas—and Bradner and Petersen reservoirs, which provide additional storage capacity for the City of Las Vegas. Lake Isabella stores water from the Sapello River for irrigation.

In addition to the reservoirs shown in Table 5-6, several smaller lakes and reservoirs are present in the region; information on these smaller reservoirs was included in the accepted plan (DBS&A, 2005, Appendix E4). Many of these other lakes and reservoirs in the planning region, some of which are privately held, do not provide storage opportunities for most water users in the region.

The NMOSE conducts periodic inspections of non-federal dams in New Mexico to assess dam safety issues. Dams that equal or exceed 25 feet in height that impound 15 acre-feet of storage or dams that equal or exceed 6 feet in height and impound at least 50 acre-feet of storage are under the jurisdiction of the State Engineer. These non-federal dams are ranked as being in good, fair, poor, or unsatisfactory condition. Dams with unsatisfactory conditions are those that require immediate or remedial action. Dams identified in recent inspections as being deficient, with high or significant hazard potential, are summarized in Table 5-7.

The two San Miguel County dams with a high hazard potential ranking are operated by the City of Las Vegas, and the three Guadalupe County dams are operated by the City of Santa Rosa. None of these five high hazard potential dams had operation manuals and the only one that had an emergency action plan was Power Lake Dam. The sole dam in the region with a significant hazard potential ranking is operated by the Tierra y Monte Soil and Water Conservation District (SWCD).



Notes:
1. Years with incomplete data were not included in the analysis.
2. Source is USGS, 2014c.

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Minimum and Median Yield
1950 through 2013

Figure 5-8

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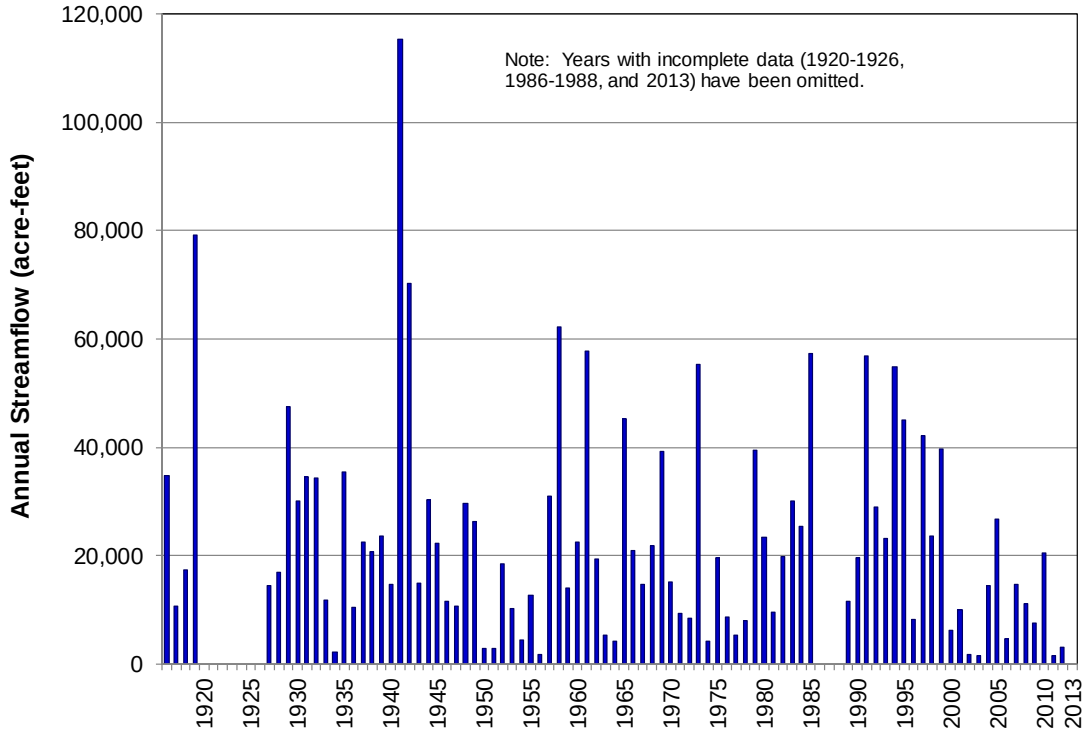
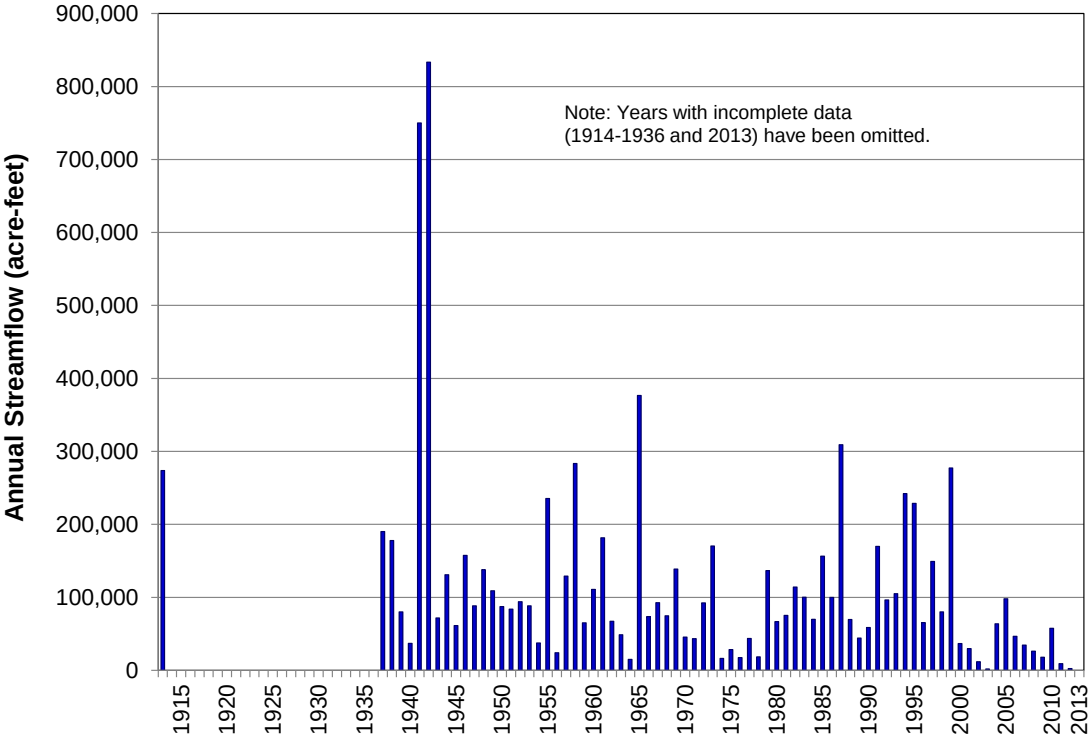
Mora River near Golondrinas, NM



Canadian River near Sanchez, NM



MORA-SAN MIGUEL-GUADALUPE
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Annual Streamflow for Selected Gaging Stations on the Mora and Canadian Rivers

Figure 5-9a

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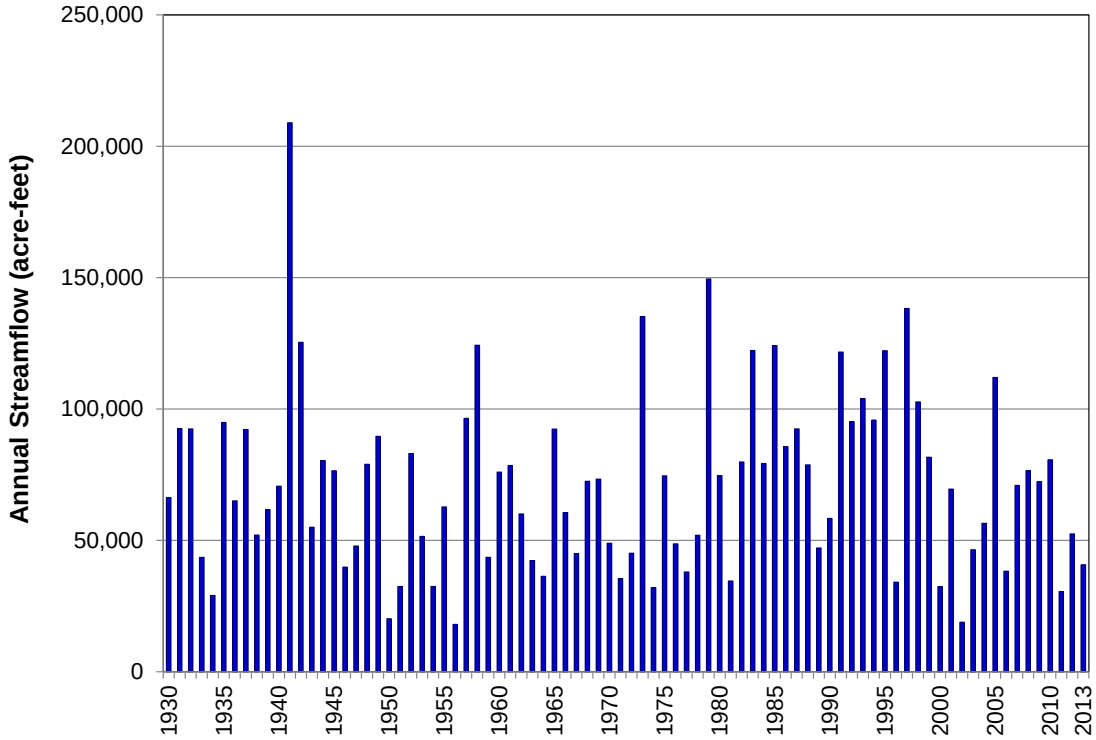
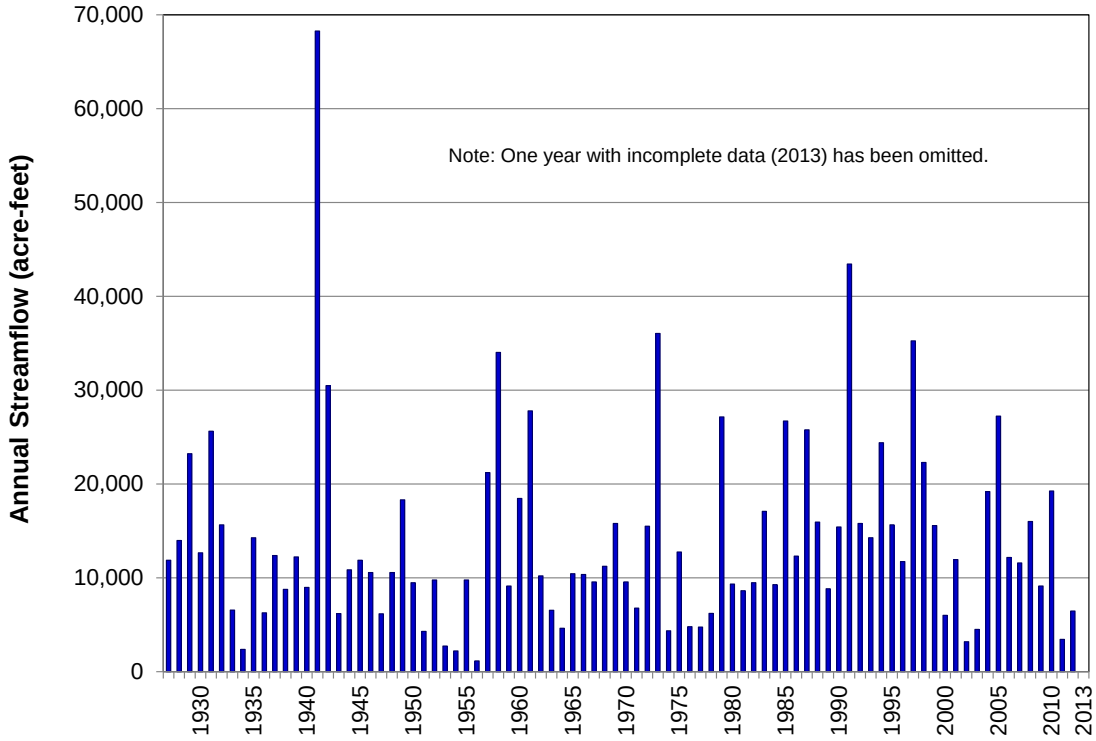
Pecos River near Pecos, NM



Gallinas Creek near Montezuma, NM



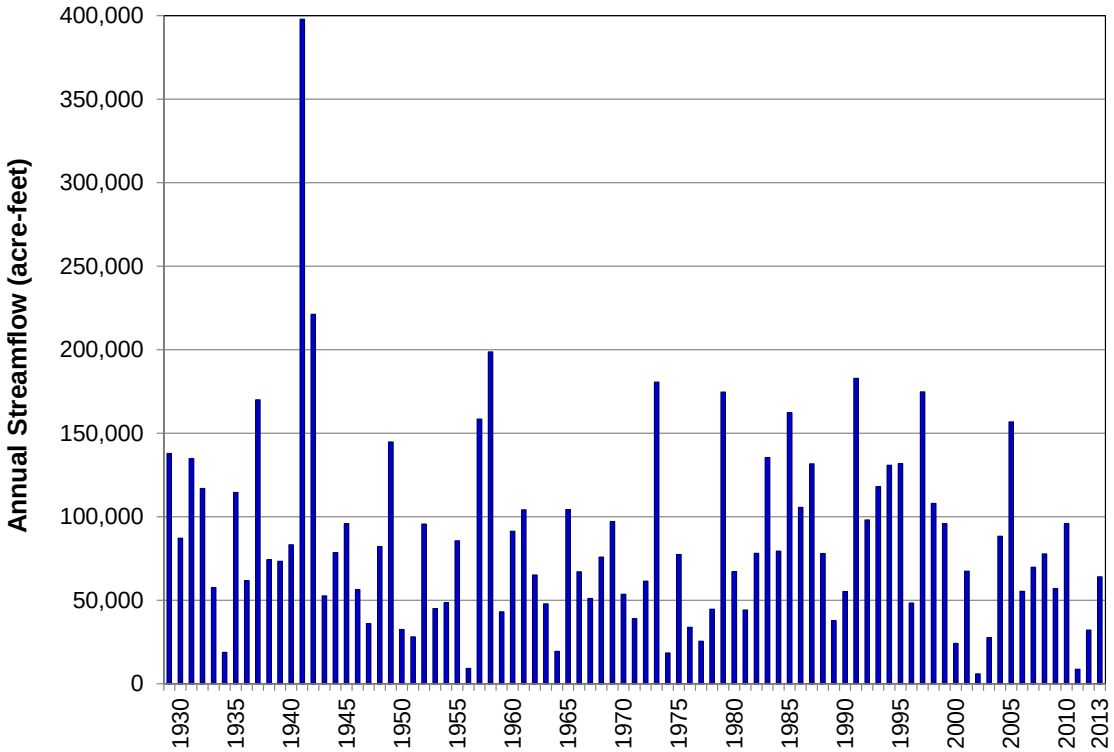
MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Annual Streamflow for Selected Gaging Stations on the Pecos River and Gallinas Creek

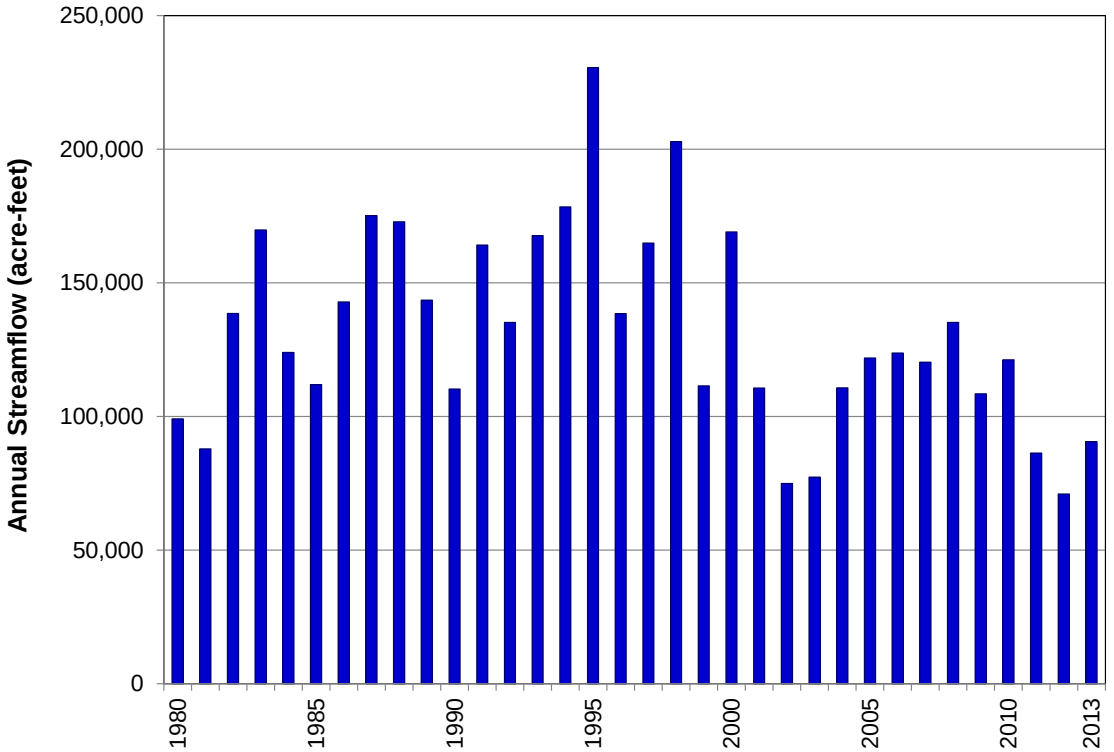
Figure 5-9b

P:_WR12-165\RWPs_2014\8_Mora-San Miguel-Guadalupe\Fig5-09b_Pecos-Gallinas streamflow.docx 6/29/16

Pecos River near Anton Chico, NM



Pecos River near Puerto de Luna, NM



MORA-SAN MIGUEL-GUADALUPE
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Annual Streamflow for Selected Gaging Stations on the Pecos River

Figure 5-9c

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Table 5-6. Reservoirs and Lakes (greater than 5,000 acre-feet) in the Mora-San Miguel-Guadalupe Water Planning Region

River	Reservoir	Primary Purpose	Operator	Date Completed	Total Storage Capacity (acre-feet)	Surface Area (acres)	Dam Height (feet)	Dam Length (feet)
San Miguel County								
Conchas and Canadian Rivers	Conchas Dam	Flood control	U.S. Army Corps of Engineers	1940	709,119	2,694	200	19,500
Sapello River	Lake Isabel	Irrigation	Kay Kirkpatrick	1919	6,500	600	15	2,100
Located in Bonito Arroyo, stores water from Gallinas River	Storrie Lake	Irrigation	Storrie Project Water Users Association	1921	23,480	950	90	1,490
Guadalupe County								
Pecos River	Santa Rosa Lake	Flood control	U.S. Army Corps of Engineers	1979	717,000	16,670	214	1,900

Source: USACE, 1999

Table 5-7. Dams with Dam Safety Deficiency Rankings

Dam	Condition Assessment [a]	Deficiency	Hazard Potential [b]	Estimated Cost to Repair ($)
Mora County				
Berlier Reservoir Dam	Poor	Spillway capacity ~50% of required flood	Low	2,500,000
		Outlet completely buried and inoperable		
Horse Lake Dam	Poor	Spillway capacity 35% of required flood	Low	2,500,000
		Lack of design information		
La Cueva Dam No. 1	Poor	Spillway capacity <30% of required flood	Low	2,500,000
		Maintenance needed		
		Lack of design information		
Morphy Lake Dam	Poor	Spillway capacity unknown	Low	2,500,000
		Outlet deteriorated		
		Local collapse of upstream slope		
		Maintenance needed		
Red Lake La Cueva Dam No. 2	Poor	Spillway capacity <30% of required flood	Low	2,500,000
		Maintenance needed		
		Lack of design information		
San Miguel County				
Aragon Dam	Fair	Woody vegetation	Low	200,000
		Erosion		
		Maintenance needed		
Bradner Dam	Fair	Spillway capacity 37% of WHPacific PMP, ~56% of URS PMP	High	3,000,000
		Woody vegetation		
		Rodents		
		Erosion		
Corralitas Dam	Fair	Woody vegetation	Low	200,000
		Erosion		
		Maintenance needed		

Source: NMOSE, 2014b

[a] Assessment criteria are attached at the end of this table.

[b] Hazard potential classifications are attached at the end of this table.

PMP = Probable maximum precipitation

Table 5-7. Dams with Dam Safety Deficiency Rankings

Dam	Condition Assessment [a]	Deficiency	Hazard Potential [b]	Estimated Cost to Repair ($)
San Miguel County (cont.)				
Lake Isabel Dam	Poor	Spillway capacity ~63% of required flood	Low	300,000
		Lack of design information		
Pecos Arroyo W.S. Site 1	Fair	Spillway capacity 50% of required flood	Significant	2,500,000
Peterson Dam	Fair	Scour of downstream toe	High	2,000,000
		Woody vegetation		
		Seepage		
Sink Hole Gap Reservoir	Poor	Spillway capacity 38% of required flood	Low	2,500,000
		Lack of design information		
Guadalupe County				
Power Lake Dam	Unsatisfactory	Spillway capacity 4% of required flood	High	6,000,000
		Dam partially breached		
Railroad Dam Number 1	Poor	Spillway capacity 2% of required flood	High	1,500,000
		No maintenance		
Railroad Dam Number 2	Poor	Spillway capacity 15% of required flood	High	1,500,000
		No maintenance		

Source: NMOSE, 2014

[a] Assessment criteria are attached at the end of this table.

[b] Hazard potential classifications are attached at the end of this table.

PMP = Probable maximum precipitation

Table 5-7. Dams with Dam Safety Deficiency Rankings
Page 3 of 3

[a] Condition assessment:

	2008 US Army Corps of Engineers Criteria (adopted by NM OSE in FY09)	*NMOSE Spillway Risk Guidelines*
Fair:	No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range [for the owner] to take further action.	Spillway capacity < 70% but ≥ 25% of the SDF.
Poor:	A dam safety deficiency is recognized for loading conditions, which may realistically occur. Remedial action is necessary. A poor condition is also used when uncertainties exist as to critical analysis parameters, which identify a potential dam safety deficiency. Further investigations and studies are necessary.	Spillway capacity < 25% of the SDF.
Unsatisfactory:	A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.	

[b] Hazard Potential Classifications:

High:	Dams where failure or mis-operation would likely result in loss of human life.
Significant:	Dams where failure or mis-operation would likely not result in loss of human life but could cause economic loss, environmental damage, disruption of lifeline facilities, or could impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but may be located in populated areas with significant infrastructure.
Low:	Dams where failure or mis-operation would likely not result in loss of life but may result in minimal economic or environmental losses. Losses would be principally limited to the dam owner's property

5.3 Groundwater Resources

Groundwater accounted for only about 7 percent of all water diversions in the year 2010 (Longworth et al., 2013). Nevertheless, groundwater is important to the region as it provides the sole source of drinking water for most communities, including the numerous small drinking water systems in the region. The only water systems that don't rely primarily on groundwater are Las Vegas, New Mexico (which depends on surface water with some supplemental groundwater), Pendaries Water System, Big Mesa Water Co-op, and Conchas Dam (Longworth et al., 2013).

5.3.1 Regional Hydrogeology

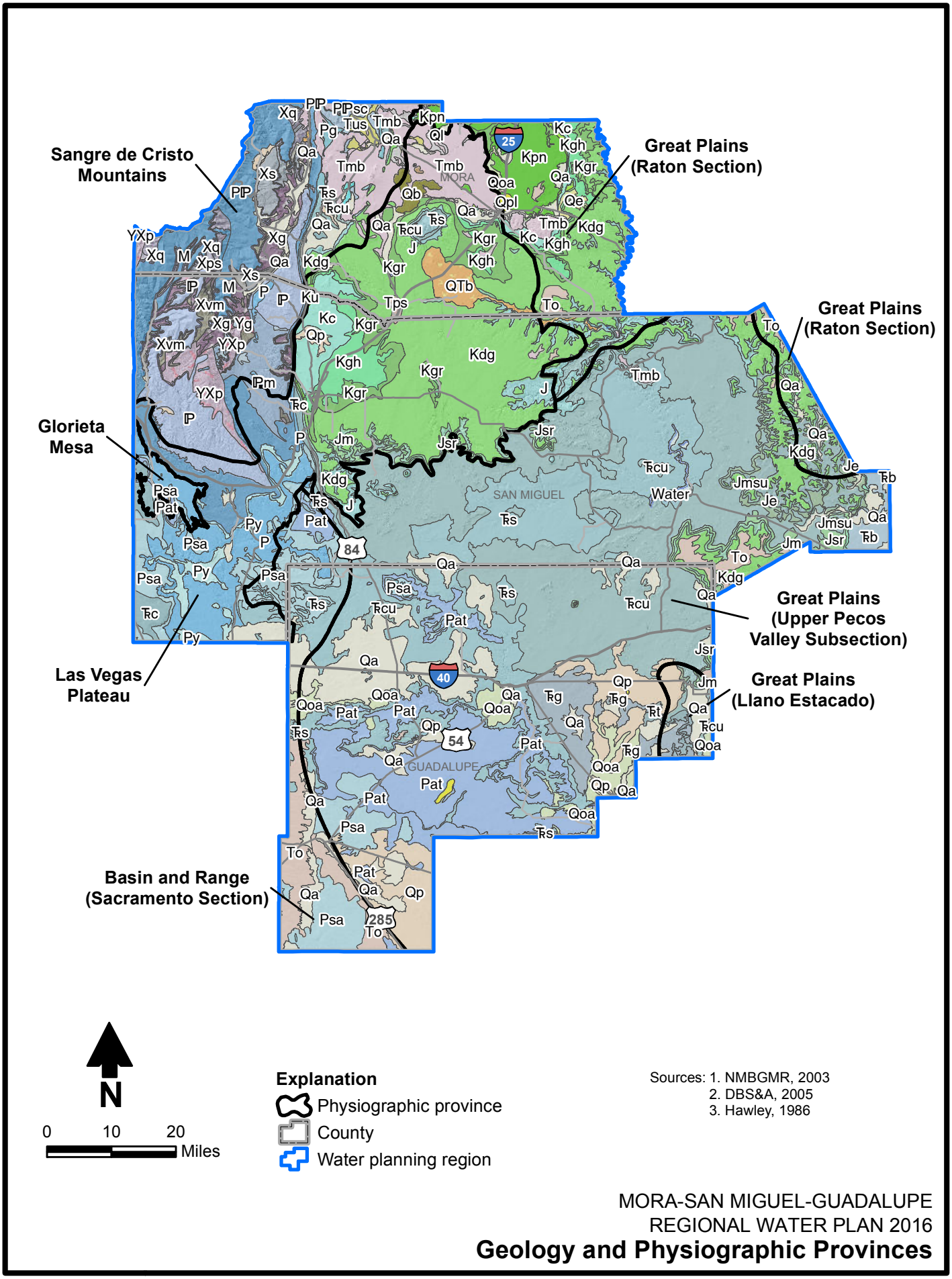
The geology that controls groundwater occurrence and movement within the planning region was described in the accepted *Mora-San Miguel-Guadalupe Regional Water Plan* (DBS&A, 2005), based on studies by Griggs and Hendrickson (1951), Mercer and Lappala (1970, 1972), Baltz (1972), Trauger (1972), Kelley (1972), Dinwiddie and Clebsch (1973), and Risser (1987). A map illustrating the surface geology of the planning region, derived from a geologic map of the entire state of New Mexico by the New Mexico Bureau of Geology & Mineral Resources (2003), is included as Figure 5-10.

Four physiographic regions exist within the planning region (Griggs and Hendrickson, 1951; Hawley, 1986). From the west to the east, these are:

- Sangre de Cristo Mountains
- Glorieta Mesa
- Las Vegas Plateau
- Great Plains

A small portion of the Basin and Range Province is also present in the region, but it does not represent a major groundwater resource. Figure 5-10 shows the approximate extents of these areas within the planning region.

The *Sangre de Cristo Mountains Province* constitutes the western portion of the planning region, where elevations extend from approximately 6,000 to 11,600 ft amsl. Within the Sangre de Cristo Mountains, limited groundwater can generally be found within small streamside alluvial deposits and near-surface (within 10 feet below ground surface [ft bgs]) fractured portions of the Precambrian rocks (Griggs and Hendrickson, 1951). More reliable groundwater can be found in the Sandia Formation, Madera Limestone, and Sangre de Cristo Formation, particularly in the Sandia Formation and Madera Limestone at depths of approximately 1,000 ft bgs, where strong artesian conditions exist (Griggs and Hendrickson, 1951). In western Mora County, unconsolidated alluvial, colluvial, and lacustrine deposits of variable thickness and extent are in many cases sufficient to support domestic, livestock, or small-scale irrigation uses (Mercer and Lappala, 1970, 1972).



MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Geology and Physiographic Provinces

Figure 5-10a

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Geology Explanation

- IP - Pennsylvanian rocks undivided
- IPm - Madera Group
- IPs - Sandia Formation
- J - Upper and Middle Jurassic rocks, undivided
- Je - Entrada Sandstone
- Jm - Morrison Formation
- Jmsu - Morrison Formation and upper San Rafael Group
- Jsr - San Rafael Group
- Kc - Carlile Shale
- Kdg - Dakota Group
- Kgg - Greenhorn Formation and Graneros Shale
- Kgh - Greenhorn Formation
- Kgr - Graneros Shale
- Knf - Fort Hays Limestone Member of Niobrara Formation
- Kpn - Pierre Shale and Niobrara Formation
- Ku - Upper Cretaceous Rocks of southwestern New Mexico, undivided
- M - Mississippian rocks, undivided
- P - Permian rocks, undivided
- PIP - Permian and Pennsylvanian rocks, undivided
- PIPsc - Sangre de Cristo Formation
- Pat - Artesia Group
- Pg - Glorieta Sandstone
- Psa - San Andres Formation
- Psg - San Andres Limestone and Glorieta Sandstone
- Py - Yeso Formation
- QTb - Basaltic to andesitic lava flows
- Qa - Alluvium
- Qb - Basaltic to andesitic lava flows
- Qd - Glacial deposits; till and outwash
- Qe - Eolian deposits
- Ql - Landslide deposits and colluvium
- Qoa - Older alluvial deposits of upland plains and piedmont areas, and calcic soils and eolian cover sediments of High Plains region
- Qp - Piedmont alluvial deposits
- Qpl - Lacustrine and playa deposits
- Qv - Basaltic tephra and lavas near vents
- Tmb - Basaltic to andesitic lava flows
- To - Ogallala Formation
- Tpb - Basaltic to andesitic lava flows
- Tps - Paleogene sedimentary units
- Tus - Upper Tertiary sedimentary units
- Water - Water
- Xg - Paleoproterozoic granitic plutonic rocks
- Xpc - Paleoproterozoic calc-alkaline plutonic rocks
- Xps - Paleoproterozoic pelitic schist
- Xq - Paleoproterozoic quartzite
- Xs - Paleoproterozoic metasedimentary rocks
- Xvf - Paleoproterozoic rhyolite and felsic volcanic schist
- Xvm - Paleoproterozoic mafic metavolcanic rocks with subordinate felsic metavolcanic rocks
- YXp - Mesoproterozoic and Paleoproterozoic plutonic rocks, undivided
- Yg - Mesoproterozoic granitic plutonic rocks
- TRb - Bull Canyon Formation
- TRc - Chinle Group
- TRcu - Upper Chinle Group, Garita Creek through Redonda Formations, undivided
- TRg - Garita Creek Formation
- TRr - Redonda Formation
- TRs - Santa Rosa Formation
- TRt - Trujillo Formation

Source: NMBGMR, 2003

MORA-SAN MIGUEL-GUADALUPE
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Geology Explanation

Figure 5-10b

The *Glorieta Mesa Province* comprises the southwestern corner of San Miguel County (south of the mountains), where elevations range between about 6,000 and 8,000 ft amsl. Depths of wells in the Glorieta Mesa area range from 200 to 1,100 feet (with a depth to water up to 500 feet in some places); the average well depth is approximately 300 feet (Griggs and Hendrickson, 1951). Most of the wells on the Glorieta Mesa are completed in the Yeso Formation, although some are completed in the deeper Sangre de Cristo Formation, and some shallower wells are completed in the Glorieta Sandstone and the Santa Rosa Sandstone.

The *Las Vegas Plateau Province* covers much of Mora County and the north-central portion of San Miguel County, with elevations between approximately 4,500 and 6,800 ft amsl. Most of the Las Vegas Plateau is capped by the Dakota Sandstone (labeled Kgd on Figure 5-10), which is the primary aquifer over much of this part of the planning region. The Dakota and Purgatoire Formations generally contain water within 250 feet of ground surface (Griggs and Hendrickson, 1951), and the strongest wells generally penetrate the entire thickness of these two units. Water has sometimes been obtained from wells completed in the Morrison Formation, Graneros Shale, Greenhorn Limestone, and Carlile Formation, where they are present, but these wells are usually weak (Griggs and Hendrickson, 1951).

Wells with the highest production rates have been drilled along a structural feature referred to as the Creston or "southern hogbacks," where sedimentary rocks have been uplifted by granitic intrusions of the Sangre de Cristo Mountains. In this area, folding and faulting have fractured bedrock units, increasing porosity and yield to wells. Most notable among these wells are those in the City of Las Vegas's Taylor well field, domestic wells in the Ojitos Frios area, and wells on ranches west of Las Vegas. West of the Creston hogback, the primary aquifer units are the middle sandstone member of the Chinle Formation, the Santa Rosa Sandstone, and the Glorieta Sandstone. East of the Creston hogback, the primary aquifer units are sandstone lenses in cretaceous shales (Graneros, greenhorn, Carlisle), the Dakota sandstone, and the Morrison Formation.

The Great Plains Province lies primarily in the south and southeastern portion of San Miguel and Guadalupe counties, between approximately 4,000 and 6,000 ft amsl. Over most of the Plains area, water sufficient for domestic and livestock use can be obtained from wells (generally 100 to 300 feet deep) completed in the Chinle Group or, in the eastern part of the area, the Entrada and Morrison Formations (Griggs and Hendrickson, 1951). In Guadalupe County, significant sources of water are present in the Santa Rosa and San Andres Formations (Risser, 1987). Groundwater is also produced from surficial alluvial deposits in all three counties.

Drought in conjunction with inadequate surface water storage has created significant water supply issues for the City of Las Vegas, which has recently initiated efforts to identify potential new groundwater supplies in the Las Vegas area. The following discussion presents a general overview of the geology within the vicinity of Las Vegas, New Mexico as it relates to

groundwater occurrence and movement. A map illustrating the surface geology of the area is provided as Figure 5-10.

The City of Las Vegas is located in San Miguel County in northwestern New Mexico. The greater Las Vegas area is located on the eastern flank of the southern Rocky Mountains. Precambrian granitic intrusions of the Sangre de Cristo Mountains occur a short distance to the west of Las Vegas, and the relatively flat-lying sedimentary deposits of the Las Vegas Basin occur beneath and to the east of the City.

The geology and hydrogeology of the two provinces contrasts starkly. The mountain province is comprised of Precambrian granitic rock that intruded the Phanerazoic (Cretaceous through Carboniferous) sedimentary rocks of the Las Vegas Plateau. Between the two provinces is a transition zone, which contains complex folding, faulting, and associated fracturing of the sedimentary bedrock. It is within the fractured transition zone the largest groundwater supply wells are currently located.

Within the transition zone, water-bearing sedimentary units of Cretaceous to Permian age exist from ground surface to depths exceeding 3,000 feet below ground surface (ft bgs). These units dip from west to east. Several structures (faults and folds) control the degree of dip, which varies greatly from 0 degrees to completely overturned beds. Key among these is a north-northwest trending monocline that forms a rocky ridgeline immediately west of Las Vegas, called the Creston Hogback. Within an approximately 1-mile-wide section, the sedimentary rocks of the Las Vegas Plateau transition from moderately dipping on the west to steeply dipping or overturned within the fold and then back to moderately dipping east of the fold.

The youngest unit at ground surface west of the Creston Hogback is the Chinle Formation, and the youngest units on the east of the hogback are Cretaceous shales. The Dakota, Morrison, and Entrada formations crop out on the ridge and slopes of the Creston, and are not present on the west side. Thus, the bedrock units from which groundwater is obtained are different east and west of the hogback. The most prolific wells are completed in a fracture zone located immediately west of the Creston. The fracture zone is oriented primarily north-south and is thought to be relatively thin and not extensive.

5.3.2 Aquifer Conditions

As reported in the accepted regional water plan (DBS&A, 2005), aquifer performance in the parts of San Miguel County and in Guadalupe County along the Pecos River has been fairly well characterized, but the aquifers of Mora County and southern and eastern San Miguel County are less well understood. In most of the aquifers in the planning region, the groundwater flow direction is to the east or southeast, from the mountains in the west toward the plains.

In order to evaluate changes in water levels over time, the USGS monitors groundwater wells throughout New Mexico (Figure 5-11). The periods of record for many of the wells are short (less than 10 years), and the hydrographs often exhibit periodic fluctuations or inconsistent patterns that do not indicate clear trends. Hydrographs for selected monitor wells with longer periods of record at locations within each county, as compiled by the USGS (2014b), are shown on Figure 5-12. A few wells in San Miguel and western Guadalupe County appeared to be showing a decline over time, but it is not known if the measured water levels are in some cases affected by local sporadic pumping (Figure 5-12).

A USGS evaluation of water level trends in Mora County between 1982 and 1987 (Cruz, 1988) indicated very little fluctuation in water levels, with some wells showing slight increases in water levels and one well showing a slight decline (Cruz, 1988). The USGS, in cooperation with San Miguel County, recently conducted a study to characterize the hydrologic resources of San Miguel County and to identify data gaps (Matherne and Stewart, 2011). The report indicated that most current development of groundwater resources is occurring in western San Miguel County, particularly in the vicinity of El Creston hogback (the hogback ridge just west of Las Vegas), where USGS groundwater monitoring indicates that groundwater levels are declining (Matherne and Stewart, 2011). The report suggested that the County could benefit from additional mapping, monitoring, and seepage studies (Matherne and Stewart, 2011).

Data regarding recharge of the planning region's aquifers are sparse. The aquifers in the planning region are generally recharged through direct rainfall and mountain front recharge; localized recharge also occurs along portions of the Pecos, Gallinas, and Canadian rivers, which recharge the underlying alluvial aquifers. The accepted regional water plan provided two published estimates of recharge in the region:

- For the mountain foothill region near Las Vegas, recharge of Taylor well field aquifers has been estimated to range from 0.2 to 2 inches per year (in/yr), or 1 to 12 percent of total rainfall (Molzen-Corbin and Lee Wilson, 1985).
- Near Santa Rosa, recharge of 0.18 to 0.3 in/yr has been estimated (Risser, 1987).

More recently, a soil-water-balance model developed as part of the City of Las Vegas planning efforts was used to estimate recharge for the primary aquifer units in the Las Vegas area. This modeling indicated that recharge ranged from less than an inch to more than 2 inches per year (DBS&A, 2014).

The major well fields in the planning region, along with the basins they draw from, are:

- City of Las Vegas's Taylor well field (Upper Pecos Basin)
- City of Santa Rosa's Colonias well field (Upper Pecos and Ft. Sumner basins)
- Town of Vaughn's Negra well field, (Upper Pecos and Ft. Sumner basins, outside the planning region)

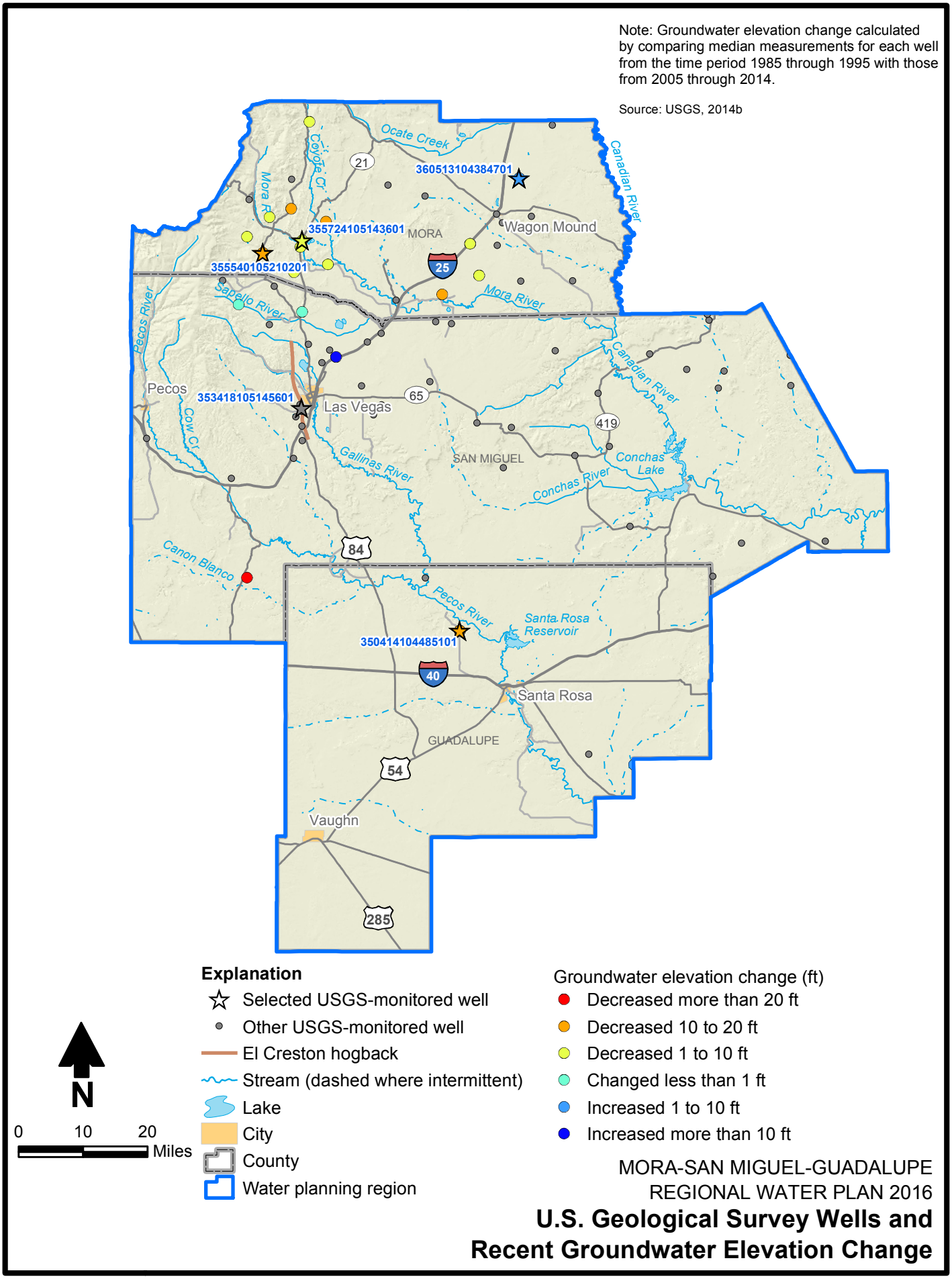
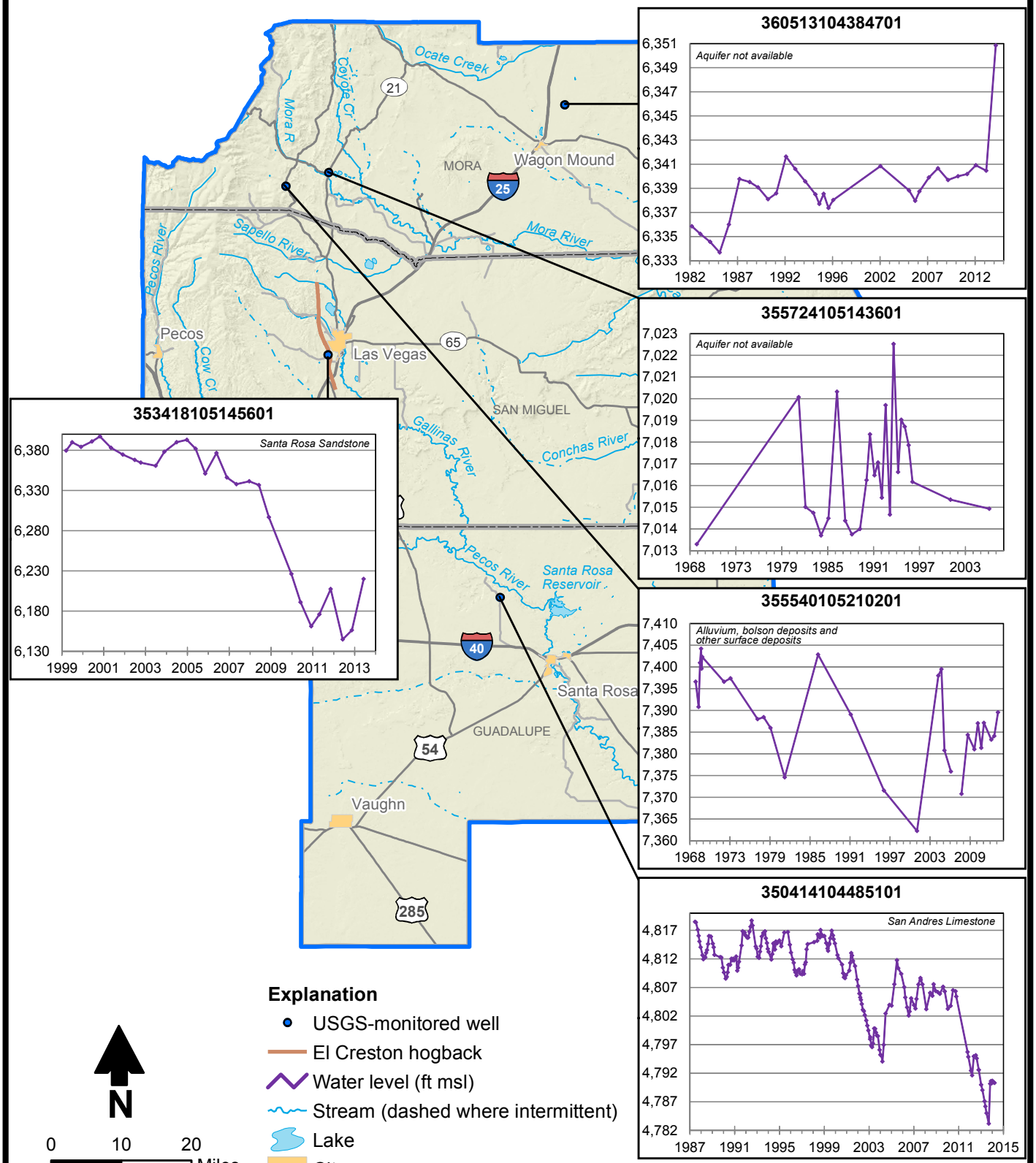

Note: Groundwater elevation change calculated by comparing median measurements for each well from the time period 1985 through 1995 with those from 2005 through 2014.
Source: USGS, 2014b
Ocate Creek
Coyote Cr
Mora R
Canadian River
360513104384701
355724105143601
MORA
Wagon Mound
355540105210201
Sapello River
Mora River
Pecos River
Pecos
353418105145601
Las Vegas
Cow Cr
Gallinas River
SAN MIGUEL
Conchas Lake
Conchas River
Canon Blanco
Pecos River
Santa Rosa Reservoir
350414104485101
Santa Rosa
GUADALUPE
Vaughn
21
25
65
419
84
40
54
285
Explanation
Selected USGS-monitored well
Other USGS-monitored well
El Creston hogback
Stream (dashed where intermittent)
Lake
City
County
Water planning region
Groundwater elevation change (ft)
Decreased more than 20 ft
Decreased 10 to 20 ft
Decreased 1 to 10 ft
Changed less than 1 ft
Increased 1 to 10 ft
Increased more than 10 ft
N
0
10
20
Miles
MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016
U.S. Geological Survey Wells and
Recent Groundwater Elevation Change
S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2016\MORA_SANMIGUEL_GUADALUPE\FIG5-11_USGS_WELLS.MXD 4/28/2016

Figure 5-11

Source: USGS, 2014b
Note: Completion aquifer of well noted on each hydrograph.



MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Hydrographs of Selected Wells

Figure 5-12

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2016\MORA_SANMIGUEL_GUADALUPE\FIG5-12_USGS_WELLS_HYDROGRAPHS.MXD 4/28/2016

The Taylor well field was developed during the severe drought of the 1950s to augment Las Vegas's dependence on surface water supplies (Romero, 1994) and is used by the City only when surface water supplies are insufficient to meet the needs of the community. The Santa Rosa Sandstone is the primary aquifer for the well field. As noted above, the City recently expanded and rehabilitated the well field, resulting in an increase in Taylor well field productivity from a single well of approximately 300 acre-feet per year (ac-ft/yr) to a capacity of approximately 600 ac-ft/year. If two additional existing wells are equipped with pumps, production capacity would rise to approximately 900 ac-ft/yr.

As also noted above, numerous domestic wells are located in the Romeroville (Ojitos Frios) area near the Taylor well field, and the owners of these wells have had considerable concern regarding the potential for longer-term pumping of the Taylor well field to impact domestic wells. The El Creston MDWCA was formed to provide an alternate water system in the area.

The City of Santa Rosa receives all of its supply from two production wells in the Colonias well field, which is located about 15 miles northwest of Santa Rosa. Both wells are completed in the San Andres Limestone to total depths of 620 and 635 ft bgs (ASCG, 2004). The wells were drilled in 1956 and 1963 (Molzen-Corbin, 1992) and produce more than 400 gallons per minute (gpm) of good quality water (ASCG, 2004). Santa Rosa has drilled a third well and is in the process of getting it permitted. The third well will provide needed backup supply for scheduled maintenance or emergency situations, as the current wells are operating at maximum pumping capacity.

The Town of Vaughn receives its water supply from four wells in the Negra well field (Town of Vaughn, 2004), which also supplies water to the communities of Encino and Duran and to local ranchers. The well field is located outside the planning region, in Torrance County. Two of the wells draw from the Upper Pecos declared groundwater basin and the other two from the Ft. Sumner basin. A fifth well in the Ft. Sumner basin is not currently in use.

In addition to these well fields, numerous domestic and stock wells are located throughout the Upper Pecos and Canadian River declared groundwater basins.

5.4 Water Quality

Assurance of ability to meet future water demands requires not only water in sufficient quantity, but also water that is of sufficient quality for the intended use. This section summarizes the water quality assessment that was provided in the accepted regional water plan and updates it to reflect new studies of surface and groundwater quality and current databases of contaminant sources. The identified water quality concerns should be a consideration in the selection of potential projects, programs, and policies to address the region's water resource issues.

Surface water quality in the Mora-San Miguel-Guadalupe Water Planning Region is evaluated through periodic monitoring and comparison of sample results to pertinent water quality standards. In general, surface water quality is good throughout the planning region with some exceptions. Several reaches of rivers within the Upper Canadian and Upper Pecos watersheds have been listed on the 2014-2016 New Mexico 303(d) list (NMED, 2014a). This list is prepared every two years by NMED and approved by the New Mexico Water Quality Control Commission (NMWQCC) to comply with Section 303(d) of the federal Clean Water Act, which requires each state to identify surface waters within its boundaries that do not meet water quality standards (see Section 4.2.2.1.1).

Section 303(d) further requires the states to prioritize their listed waters for development of total maximum daily load (TMDL) management plans, which document the amount of a pollutant a waterbody can assimilate without violating a state water quality standard and allocates that load capacity to known point sources and nonpoint sources at a given flow. Figure 5-13 shows the locations of lakes and stream reaches included in the 303(d) list. Table 5-8 provides details of impairment for those reaches. Causes of impairment in the Mora-San Miguel-Guadalupe region include arsenic, ammonia, biological indicators/nutrients, dissolved oxygen, E.coli bacteria, mercury and PCB in fish tissue, pH, sediment/siltation/turbidity, specific conductance, and temperature.

In evaluating the impacts of the 303(d) list on the regional water planning process, it is important to consider that impairments are tied to designated uses. Some problems can be very disruptive to a healthy aquatic community, while others reduce the safety of water recreation or increase the risk of fish consumption. Impairments will not necessarily make the water unusable for irrigation or even for domestic water supply, but the water may need treatment prior to use and the costs of this should be recognized.

Though groundwater use in the planning region is low (7 percent of the total use), it does supply most drinking water systems and wells for private domestic consumption, and thus groundwater quality is an important consideration in the region. Generally the quality of groundwater in the planning region is good, except for issues with naturally occurring fluoride and dissolved solids, which were noted in the accepted water plan

Several types and sources of contaminants that have the potential to impact either surface or groundwater quality are discussed below. Sources of contamination are considered as one of two types: (1) point sources, if they originate from a single location, or (2) nonpoint sources, if they originate over a more widespread or unspecified location. Information on both types of sources is provided below.

Source: NMED, 2014a and 2014c
Note: See Table 5-8 for IR Category definitions.

Explanation

- Impaired stream (IR category 4)
- Impaired stream (IR category 5)
- Impaired lake (IR category 5)
- Other stream (dashed where intermittent)
- Other lake
- City
- County
- Water planning region

N

0 10 20 Miles

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Water Quality-Impaired Reaches

Figure 5-13

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2016\MORA_SANMIGUEL_GUADALUPE\FIG5-13_WQ_IMPAIRED_REACHES.MXD 4/28/2016

Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
Mora County						
Charette Lake (Lower)	NM-2305.5_10	300 [e]	Source unknown	WWAL, ColdWAL	Mercury in fish tissue	5/5C
Coyote Creek (Mora River to Black Lake)	NM-2306.A_020	35.32	Natural sources Rangeland grazing	HQColdWAL	Specific conductance Temperature, water	4A
Encantada(Enchanted) Lake	NM-2305.3.B_10	2.4 [e]	Not assessed	—	—	3/3A
Jose Vigil Lake	NM-2118.B_20	1.8 [e]	Not assessed	—	—	3/3A
Lost Bear Lake	NM-2214.B_30	0.5 [e]	Not assessed	—	—	3/3A
Luna Creek (Mora River to headwaters)	NM-2306.A_001	4.03	Not assessed	—	—	3/3A
Middle Fork Lake of Rio de la Casa	NM-2306.B_10	4.5 [e]	Not assessed	—	—	3/3A
Mora River (Hwy 434 to Luna Creek)	NM-2306.A_000	16.67	Silviculture harvesting Rangeland grazing Natural sources	HQColdWAL	Sedimentation/siltation Specific conductance	4A
Mora River (USGS gage east of Shoemaker to Hwy 434)	NM-2305.3.A_00	53.44	Municipal point source discharges On-site treatment systems (septic) Flow alterations from water diversions	MCWAL	Nutrient/eutrophication Biological indicators Oxygen, dissolved	4A
Morphy(Murphy) Lake	NM-2305.3.B_30	50 [e]	Not assessed	—	—	3/3A
North Fork Lake of Rio de la Casa	NM-2306.B_20	4.5 [e]	Not assessed	—	—	3/3A
Ocate Creek (Ocate to Wheaton Creek)	NM-2306.A_070	4.22	Source unknown	HQColdWAL	Low flow alterations	4C

Source: NMED, 2014a

[a] Only waterbodies assigned to IR categories 3 and above are included.

[b] Unless otherwise noted.

[c] ColdWAL = Coldwater aquatic life
Cool WAL = Coolwater aquatic life
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MCWAL = Marginal coldwater aquatic life
MWWAL = Marginal warmwater aquatic life
PC = Primary contact
WWAL = Warm water aquatic life

[d] Impairment (IR) category definitions are attached as the last page of this table.

[e] Acres

— = No information provided (reach was not assessed).

Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
Mora County (cont.)						
Pacheco Lake	NM-9000.B_093	1.6 [e]	Not assessed	—	—	3/3A
Pecos Baldy Lake	NM-2214.B_50	5.6 [e]	Not assessed	—	—	3/3A
Rio Pueblo (Picuris Pueblo bnd to headwaters)	NM-2120.A_410	18.19	Source unknown	HQColdWAL	Nutrient/eutrophication Biological indicators	5/5A
Rito de Gascon (Rito San Jose to headwaters)	NM-2305.3.A_24	3.69	Not assessed	—	—	3/3A
Rito San Jose (Manuelitas Creek to headwaters)	NM-2305.3.A_22	8.27	Source unknown	—	Low flow alterations	4C
Sapello River (Mora River to Manuelitas Creek)	NM-2305.3.A_20	27.42	Source unknown	MCWAL	Sedimentation/siltation	4A
Truchas Lake (North)	NM-2214.B_60	0.7 [e]	Not assessed	—	—	3/3A
Truchas Lake (South)	NM-2214.B_61	2.6 [e]	Not assessed	—	—	3/3A
Wolf Creek (Mora River to headwaters)	NM-2305.3.A_10	24.48	Baseflow depletions	MCWAL	Low flow alterations	4C
San Miguel County						
Canadian River (Conchas River to Mora River)	NM-2305.A_000	36.53	Waterfowl Wildlife other than waterfowl Drought-related impacts Rangeland grazing	PC	Escherichia coli	4A

Source: NMED, 2014a

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[e] Acres

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Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
San Miguel County (cont.)						
Canadian River (Ute Reservoir to Conchas Reservoir)	NM-2303_00	63.36	Waterfowl Wildlife other than waterfowl Drought-related impacts Rangeland grazing Flow alterations from water diversions	PC	Escherichia coli	4A
Conchas Reservoir	NM-2304_00	4218.17 [e]	Source unknown	WWAL	Mercury in fish tissue Nutrient/eutrophication Biological indicators PCB in fish tissue	5/5C
Cow Creek (Bull Creek to headwaters)	NM-2214.A_102	22.25	Loss of riparian habitat Watershed runoff following forest fire Rangeland grazing	HQColdWAL	Temperature, water	4A
Cow Creek (Pecos River to Bull Creek)	NM-2214.A_090	15.57	Loss of riparian habitat Watershed runoff following forest fire Rangeland grazing Streambank Modifications/destabilization	HQColdWAL	Temperature, water	4A
Dalton Canyon Creek (Perennial prt Pecos R to headwaters)	NM-2214.A_070	8.02	Recreational pollution sources Drought-related impacts Impervious surface/parking lot runoff Road/bridge runoff Watershed runoff following forest fire Inappropriate waste disposal	HQColdWAL	Specific conductance	4A

Source: NMED, 2014a

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Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
San Miguel County (cont.)						
El Porvenir Creek (Gallinas River to SFNF bnd)	NM-2212_01	2.63	Source unknown	HQColdWAL	Temperature, water	5/5C
Falls Creek (Tecolote Creek to headwaters)	NM-2212_12	6.18	Wildlife other than waterfowl Impervious surface/parking lot runoff Road/bridge runoff Rangeland grazing	HQColdWAL	Specific conductance	4A
Gallinas River (Las Vegas Diversion to USFS bnd)	NM-2212_00	7.91	Livestock (grazing or feeding operations) Loss of riparian habitat Rangeland grazing	HQColdWAL	Temperature, water	4A
Gallinas River (Pecos River to Aguilar Creek)	NM-2213_20	20.32	Source unknown	MWWAL	Oxygen, dissolved	5/5C
Gallinas River (Perennial prt Aguilar Creek to Pecos Arroyo)	NM-2213_21	41.64	Source unknown	MCWAL	Nutrient/eutrophication Biological indicators Temperature, water Turbidity	5/5A
Glorieta Ck (Perennial prt Pecos R to Glorieta CC WWTP)	NM-2214.A_081	8.39	Source unknown	HQColdWAL	Nutrient/eutrophication Biological indicators Specific conductance	5/5B

Source: NMED, 2014a

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Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
San Miguel County (cont.)						
Macho Canyon Creek (Pecos River to headwaters)	NM-2214.A_071	7.82	Channelization On-site treatment systems (septic) Wildlife other than waterfowl Drought-related impacts Impervious surface/parking lot runoff Road/bridge runoff Rangeland grazing Rural (residential areas) Streambank modifications/destabilization	HQColdWAL	Specific conductance	4A
Maestas (Lost) Lake	NM-2305.3.B_20	2.9 [e]	Not assessed	—	—	3/3A
Maestas Creek (Manuelitas Creek to headwaters)	NM-2305.3.A_81	4.26	Not assessed	—	—	3/3A
McAllister Lake	NM-2211.3_00	183.76 [e]	Source unknown	ColdWAL	Arsenic	5/5C
Monastery Lake	NM-2214.B_40	5.8 [e]	Not assessed	—	—	3/3A
Pajarito Creek (Canadian River to headwaters)	NM-2303_10	55.92	Waterfowl Livestock (grazing or feeding operations) Municipal point source discharges Drought-related impacts Rangeland grazing	PC	Escherichia coli Nutrient/eutrophication Biological indicators	4A

Source: NMED, 2014a

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Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
San Miguel County (cont.)						
Pecos Arroyo (Gallinas River to headwaters)	NM-2213_22	13.54	Channelization On-site treatment systems (septic) Road/bridge runoff Inappropriate waste disposal Rangeland grazing Rural (residential areas) Streambank modifications/destabilization	PC	Escherichia coli	4A
Pecos River (Canon de Manzanita to Alamitos Canyon)	NM-2214.A_003	5.69	Source unknown Loss of riparian habitat Rangeland grazing Flow alterations from water diversions	HQColdWAL	Temperature, water	4A
Pecos River (Santa Rosa Reservoir to Tecolote Creek)	NM-2211.A_10	52.33	Low water crossing Livestock (grazing or feeding operations) On-site treatment systems (septic) Irrigated crop production Dredging - agriculture Road/bridge runoff Inappropriate waste disposal	PC	Escherichia coli	4A
Pecos River (Tecolote Creek to Villanueva State Park)	NM-2213_00	18.83	Source unknown	MCWAL	Temperature, water	5/5A

Source: NMED, 2014a

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Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
San Miguel County (cont.)						
Rito San Jose (Manuelitas Creek to headwaters)	NM-2305.3.A_22	8.27	Source unknown	—	Low flow alterations	4C
Sapello River (Mora River to Manuelitas Creek)	NM-2305.3.A_20	27.42	Source unknown	MCWAL	Sedimentation/siltation	4A
Storrie Lake	NM-2211.5_00	1081.06 [e]	Source unknown	ColdWAL, WWAL	Mercury in fish tissue	5/5C
Tecolote Creek (I-25 to Blue Creek)	NM-2212_10	22.05	Source unknown	HQColdWAL	Nutrient/eutrophication Biological indicators Specific conductance Temperature, water	5/5B
Tecolote Creek (Pecos River to I-25)	NM-2212_08	26.37	Not assessed	—	—	3/3A
Wallace Lake	NM-9000.B_107	17.5 [e]	Not assessed	—	—	3/3A
Willow Creek (Pecos River to headwaters)	NM-2214.A_030	5.8	Channelization Source unknown Wildlife other than waterfowl Impervious surface/parking lot runoff Road/bridge runoff Abandoned mine lands Rangeland grazing Streambank modifications/destabilization RCRA hazardous waste sites Mining reclamation	HQColdWAL	Sedimentation/siltation Specific conductance	5/5A

Source: NMED, 2014a

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Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
Guadalupe County						
El Rito (Pecos River to headwaters)	NM-9000.A_050	3.19	Municipal point source discharges Waterfowl Land development On-site treatment systems (septic) Recreational pollution sources Source unknown Impervious surface/parking lot runoff Road/bridge runoff Inappropriate waste disposal Rural (residential areas) Streambank modifications/destabilization	PC, ColdWAL	Ammonia (total) Escherichia coli	5/5C
Gallinas River (Pecos River to Aguilar Creek)	NM-2213_20	20.32	Source unknown	MWWAL	Oxygen, dissolved	5/5C
Pajarito Creek (Canadian River to headwaters)	NM-2303_10	55.92	Waterfowl Livestock (grazing or feeding operations) Municipal point source discharges Drought-related impacts Rangeland grazing	PC	Escherichia coli Nutrient/eutrophication Biological indicators	4A
Park Lake	NM-2211.B_20	2 [e]	Not assessed	—	—	3/3A

Source: NMED, 2014a

[a] Only waterbodies assigned to IR categories 3 and above are included.

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[c] ColdWAL = Coldwater aquatic life
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[e] Acres

— = No information provided (reach was not assessed).

Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

Waterbody Name [a] (basin, segment)	Assessment Unit ID	Affected Reach (miles [b])	Probable Sources of Pollutant	Uses Not Fully Supported [c]	Specific Pollutant	IR Category [d]
Guadalupe County (cont.)						
Pecos River (Santa Rosa Reservoir to Tecolote Creek)	NM-2211.A_10	52.33	Low water crossing Livestock (grazing or feeding operations) On-site treatment systems (septic) Irrigated crop production Dredging - agriculture Road/bridge runoff Inappropriate waste disposal	PC	Escherichia coli	4A
Pecos River (Sumner Reservoir to Santa Rosa Reservoir)	NM-2211.A_00	52.94	Source unknown	MWWAL	Nutrient/eutrophication Biological indicators	5/5A
Perch Lake	NM-2211.B_40	3.6 [e]	Not assessed	—	—	3/3A
Power Dam Lake	NM-2202.B_10	13.17 [e]	Not assessed	—	—	3/3A
Santa Rosa Reservoir	NM-2211.B_00	1752 [e]	Source unknown	CoolWAL	Mercury in fish tissue	5/5C
Sumner Reservoir	NM-2210_00	4277.79 [e]	Source unknown	WWAL	Mercury in fish tissue	5/5C
Tres Lagunas (Northeast)	NM-2211.B_30	30 [e]	Source unknown	ColdWAL	pH	5/5C
Tres Lagunas (Southeast)	NM-2211.B_31	25 [e]	Not assessed	—	—	3/3A
Tres Lagunas (West)	NM-2211.B_32	15 [e]	Not assessed	—	—	3/3A

Source: NMED, 2014a

[a] Only waterbodies assigned to IR categories 3 and above are included.

[b] Unless otherwise noted.

[c] ColdWAL = Coldwater aquatic life
Cool WAL = Coolwater aquatic life
HQColdWAL = High quality coldwater aquatic life
MCWAL = Marginal coldwater aquatic life
MWWAL = Marginal warmwater aquatic life
PC = Primary contact
WWAL = Warm water aquatic life

[d] Impairment (IR) category definitions are attached as the last page of this table.

[e] Acres

— = No information provided (reach was not assessed).

Table 5-8. Total Maximum Daily Load Status of Streams in the Mora-San Miguel-Guadalupe Water Planning Region

[d] Impairment (IR) categories are determined for each assessment unit (AU) by combining individual designated use support decisions.

The applicable unique assessment categories for New Mexico (NMED, 2013b) are described as follows:

Category 3: No reliable monitored data and/or information to determine if any designated or existing use is attained. AUs are listed in this category where data to support an attainment determination for any use are not available, consistent with requirements of the assessment and listing methodology.

Category 3A: Limited data (n = 0 to 1) available, no exceedences. AUs are listed in this subcategory when there are no exceedences in the limited data set. These are considered low priority for follow up monitoring (NMED, 2013).

Category 4A: Impaired for one or more designated uses, but does not require development of a TMDL because TMDL has been completed. AUs are listed in this subcategory once all TMDL(s) have been developed and approved by USEPA that, when implemented, are expected to result in full attainment of the standard. Where more than one pollutant is associated with the impairment of an AU, the AU remains in IR Category 5A (see below) until all TMDLs for each pollutant have been completed and approved by USEPA.

Category 4C: Impaired for one or more designated uses, but does not require development of a TMDL because impairment is not caused by a pollutant. AUs are listed in this subcategory if a pollutant does not cause the impairment. For example, USEPA considers flow alteration to be “pollution” vs. a “pollutant.”

Category 5/5A: Impaired for one or more designated or existing uses and a TMDL is underway or scheduled. AUs are listed in this category if the AU is impaired for one or more designated uses by a pollutant. Where more than one pollutant is associated with the impairment of a single AU, the AU remains in IR Category 5A until TMDLs for all pollutants have been completed and approved by USEPA.

Category 5/5B: Impaired for one or more designated or existing uses and a review of the water quality standard will be conducted. AUs are listed in this category when it is possible that water quality standards are not being met because one or more current designated use is inappropriate. After a review of the water quality standard is conducted, a Use Attainability Analysis (UAA) will be developed and submitted to USEPA for consideration, or the AU will be moved to IR Category 5A and a TMDL will be scheduled.

Category 5/5C: Impaired for one or more designated or existing uses and Additional data will be collected before a TMDL is scheduled. AUs are listed in this category if there is not enough data to determine the pollutant of concern or there is not adequate data to develop a TMDL. For example, AUs with biological impairment will be listed in this category until further research can determine the particular pollutant(s) of concern. When the pollutant(s) are determined, the AU will be moved to IR Category 5A and a TMDL will be scheduled. If it is determined that the current designated uses are inappropriate, it will be moved to IR Category 5B and a UAA will be developed. If it is determined that “pollution” is causing the impairment (vs. a “pollutant”), the AU will be moved to IR Category 4C.

5.4.1 Potential Sources of Contamination to Surface and Groundwater

Specific sources that have the potential to impact either surface or groundwater quality in the future are discussed below. These include municipal and industrial sources, leaking underground storage tanks, landfills, and nonpoint sources.

5.4.1.1 Municipal and Industrial Sources

As discussed in Section 4.2.2, a person or facility that discharges a pollutant from a point source to a surface water that is a water of the United States must obtain an NPDES permit. An NPDES permit must assure compliance with the New Mexico Water Quality Standards. A person or facility that discharges contaminants that may move into groundwater must obtain a groundwater discharge permit from the New Mexico Environment Department. A groundwater discharge permit ensures compliance with New Mexico groundwater quality standards. The NMWQCC regulations also require abatement of groundwater contamination that exceeds standards.

NPDES-permitted discharges in the planning region are summarized in Table 5-9 and shown on Figure 5-14; details regarding NPDES permits in New Mexico are available on the NMED's website (http://www.nmenv.state.nm.us/swqb/Permits/). The permitted discharges are primarily wastewater treatment plants and two fish hatcheries; these do not necessarily pose a significant water quality problem.

A summary list of current groundwater discharge permits in the planning region is provided in Table 5-10; their locations are shown in Figure 5-14. Details indicating the status, waste type, and treatment for discharge permits for industrial and domestic waste can be obtained from the NMED Ground Water Quality Bureau website (https://www.env.nm.gov/gwb/NMED-GWQB-PollutionPrevention.htm#PPSlist).

5.4.1.2 Remediation Sites

The accepted regional water plan (DBS&A, 2005) identified three sites in the planning region that were listed by the U.S. EPA (2004) as Superfund sites: the Terrero Mine and El Molino Mill on the Upper Pecos River and the East Pecos site. The sites are no longer listed as Superfund sites (and consequently Table 5-11 is not included in this plan), but may still be relevant to water quality in the area. Leachate from mine waste is a concern for both surface and groundwater supplies. Until reclamation at the Terrero Mine site occurred, the Pecos River was vulnerable to heavy metal runoff and acid mine drainage, especially during times of heavy stormwater flows.

Sites undergoing investigation or cleanup pursuant to other federal authorities or State authority can be found on the EPA website (https://www.epa.gov/superfund/national-priorities-list-npl-sites-state#NM).

Table 5-9. Municipal and Industrial NPDES Permittees in the Mora-San Miguel-Guadalupe Water Planning Region

Permit No	Municipality/Industry [a]	Permit Type [b]
Mora County		
NM0031097	Mora High School	Other
NM0024996	Mora Mutual Domestic Water and Sewer Association	Municipal (POTW)
NM0030031	Mora National Fish Hatchery & Technology Center	Fish hatchery
San Miguel County		
NM0028827	Las Vegas WWTP [c]	Municipal (POTW)
NM0030341	Las Vegas, City of/Water Treatment Plant	Utility
NM0030121	NMG&FD/Lisboa Fish Hatchery [c]	Fish hatchery
NM0029041	Pecos, Village of/WWTP	Municipal (POTW)
Guadalupe County		
NM0030155	NMG&FD/Rock Lake Fish Hatchery	Fish hatchery
NM0024988	Santa Rosa, City of	Municipal (POTW)

Source: NMED, 2016c

[a] Names appear as listed in the NMED database.

[b] Facilities and activities covered under the 2015 U.S. EPA NPDES Multi-Sector General Permit (MSGP) for Stormwater Discharges Associated with Industrial Activity (e.g., mining, timber products, scrap recycling facilities, as listed in Appendix D of the MSGP [U.S. EPA, 2015]) are not included due to the large number of facilities.

[c] Major discharger, classified as such by the Regional Administrator, or in the case of approved state programs, the Regional Administrator in conjunction with the State Director. Major municipal dischargers include all facilities with design flows of greater than 1 million gallons per day and facilities with U.S. EPA/State approved industrial pretreatment programs. Major industrial facilities are determined based on specific ratings criteria developed by U.S. EPA/State.

NPDES = National Pollutant Discharge and Elimination System
POTW = Publicly owned treatment works
WWTP = Wastewater treatment plant
NMG&FD = New Mexico Game and Fish
U.S. EPA = U.S. Environmental Protection Agency

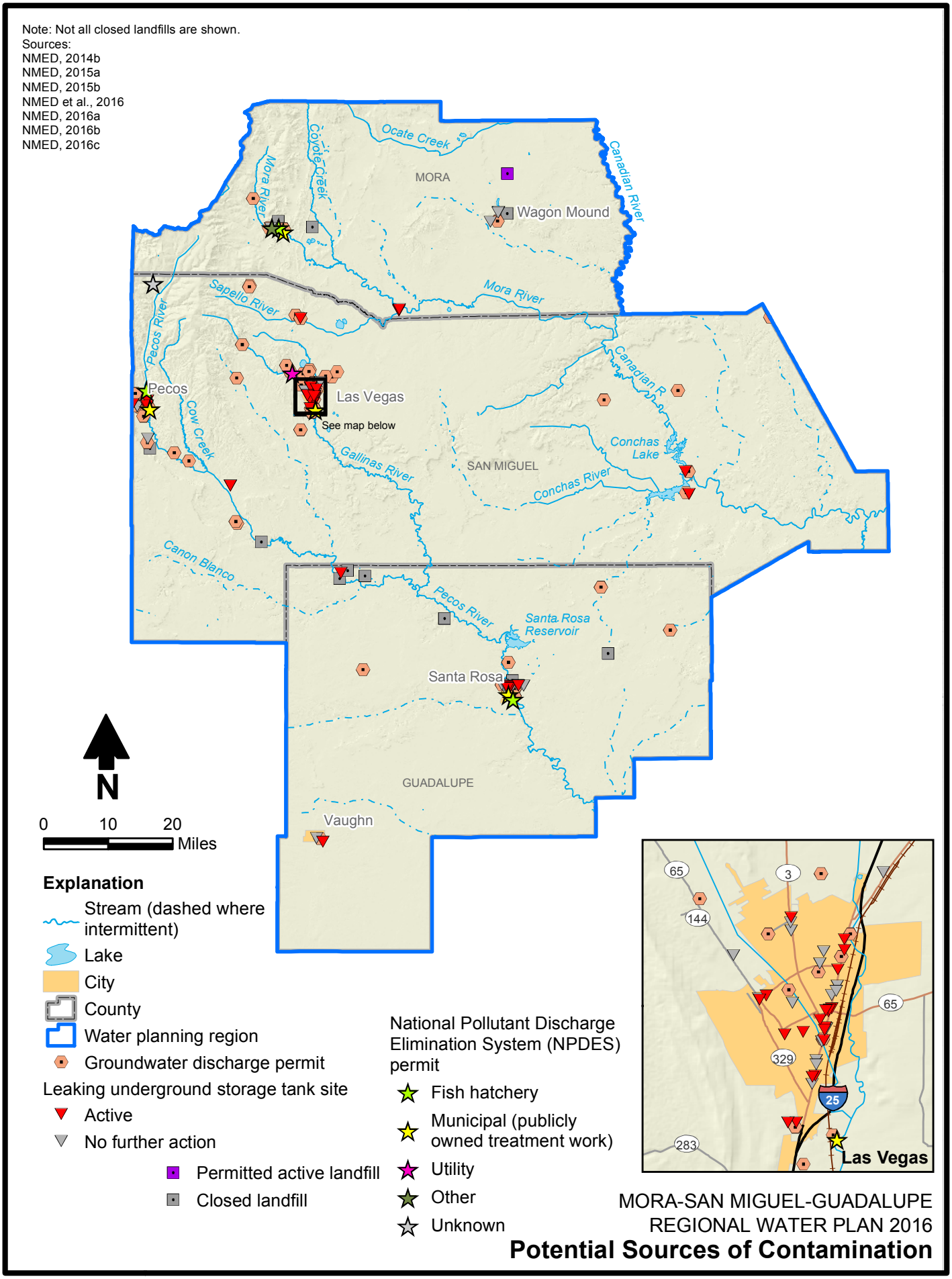

Note: Not all closed landfills are shown.
Sources:
NMED, 2014b
NMED, 2015a
NMED, 2015b
NMED et al., 2016
NMED, 2016a
NMED, 2016b
NMED, 2016c
Ocate Creek
Coyote Creek
Mora River
MORA
Wagon Mound
Canadian River
Sapello River
Mora River
Pecos River
Pecos
Las Vegas
See map below
Cow Creek
Gallinas River
SAN MIGUEL
Canadian R
Conchas Lake
Conchas River
Canon Blanco
Pecos River
Santa Rosa Reservoir
Santa Rosa
GUADALUPE
Vaughn
N
0
10
20
Miles
Explanation
Stream (dashed where intermittent)
Lake
City
County
Water planning region
Groundwater discharge permit
Leaking underground storage tank site
Active
No further action
Permitted active landfill
Closed landfill
National Pollutant Discharge Elimination System (NPDES) permit
Fish hatchery
Municipal (publicly owned treatment work)
Utility
Other
Unknown
65
3
144
65
329
25
283
Las Vegas
MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016
Potential Sources of Contamination
S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2016\MORA_SANMIGUEL_GUADALUPE\FIG5-14_CONTAM_SOURCES.MXD 6/14/2016

Figure 5-14

Table 5-10. Groundwater Discharge Permits in the Mora-San Miguel-Guadalupe Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Mora	Mora (Village of) - Wastewater Treatment Plant	DP-640	Active	100,000
	Holman Elementary School Cafeteria	DP-1659	Active	2,180
	Roper's Mobile Home Park	DP-1543	Pending	—
	Wagon Mound (Village of) - Wastewater Treatment Plant	DP-1075	Active	30,000
San Miguel	Armand Hammer United World College	DP-205	Active	48,750
	Blue Haven Youth Camp	DP-1357	Active	8,600
	Conchas Lake State Park	DP-1787	Active	3,960
	Country Acres Subdivision	DP-1190	Active	45,150
	Dodge City Mobile Home Park	DP-1570	Active	9,000
	El Porvenir Christian Camp	DP-1090	Active	9,500
	Giant 6078	DP-1573	Active	2,600
	Lakeside Mobile Home Park - Las Vegas	DP-1185	Active	12,550
	Las Vegas (City of) - Effluent Reuse Project	DP-1118	Active	520,000
	Las Vegas (City of) - Sludge Disposal Facility	DP-494	Active	15,900
	Las Vegas City Schools	DP-1630	Active	150,000
	Martinez & Sons Processing Plant	DP-1804	Active	1,100
	Midway Chevron	DP-1689	Active	4,320
	New Mexico (State of) Highway and Transportation Dept - District 4 Service Center	DP-1155	Active	4,320

Source: NMED, 2014b, 2016b, NMED et al., 2016

[a] Names appear as listed in the NMED database.

[b] Facilities with an NMED-designated status of active or pending are shown. Inactive facilities are not included; they can be identified on the NMED website.

gpd = Gallons per day

— = Not listed on GWQB web site

Table 5-10. Groundwater Discharge Permits in the Mora-San Miguel-Guadalupe Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
San Miguel (cont.)	New Mexico Highlands University	DP-1784	Active	35,000
	Pecos Benedictine Monastery	DP-40	Active	8,000
	Pecos National Historical Park	DP-1600	Active	3,240
	Pendaries Park At Rociada	DP-872	Active	11,760
	Quail Ridge Inn	DP-51	Active	80,000
	Salazar's Mobile Home Park	DP-477	Active	2,475
	San Miguel County - Northern NM Wood Business Park, GCP2 3957	DP-1726	Active	6,000
	Ten Rociada Townhouse Association - Pendaries Village	DP-1633	Pending	—
	Torres Golf Course - New Mexico Highlands University	DP-1595	Active	500,000
	Valley Elementary and Middle School	DP-995	Active	4,000
	West Las Vegas Public Schools	DP-1800	Active	150,000
Guadalupe	City of Santa Rosa Roping Arena	DP-669	Active	3,500
	Rio Pecos Villa Mda	DP-616	Active	3,750
	San Miguel County Courthouse	DP-1826	Active	1,290
	Santa Rosa Wastewater Treatment Facility	DP-665	Active	670,000
	Vaughn (Town of) - Wastewater Treatment Plant	DP-1112	Active	150,000

Source: NMED, 2014b, 2016b, NMED et al., 2016

gpd = Gallons per day

[a] Names appear as listed in the NMED database.

— = Not listed on GWQB web site

[b] Facilities with an NMED-designated status of active or pending are shown. Inactive facilities are not included; they can be identified on the NMED website.

Other than the former Superfund sites listed above, mining is not a major concern to water quality in most of planning region. The accepted regional water plan provided general information about the mines and mills currently operating in the planning region (one in Mora County, four in San Miguel County, and none in Guadalupe County), all of which are exclusively sand and gravel quarries. Such quarries are not generally considered potential contaminant sources.

5.4.1.3 Leaking Underground Storage Tanks

Leaking underground storage tank (UST) sites present a potential threat to groundwater, and the NMED maintains a database of registered USTs. Many of the facilities included in the UST database are not leaking, and even leaking USTs may not necessarily have resulted in groundwater contamination or water supply well impacts. These USTs could, however, potentially impact groundwater quality in and near the population centers in the future. UST sites in the Mora-San Miguel-Guadalupe region are identified on Figure 5-14. Many of the UST sites listed in the NMED database require no further action and are not likely to pose a water quality threat. Sites that are being investigated or cleaned up by the State or a responsible party, as identified on Table 5-12, should be monitored for their potential impact on water resources. Additional details regarding any groundwater impacts and the status of site investigation and cleanup efforts for individual sites can be obtained from the NMED database, which is accessible on the NMED website (https://www.env.nm.gov/ust/lists.html).

5.4.1.4 Landfills

Landfills used for disposal of municipal and industrial solid waste often contain a variety of potential contaminants that may impact groundwater quality. Landfills operated since 1989 are regulated under the New Mexico Solid Waste Management Regulations. Many small landfills throughout New Mexico, including landfills in the planning region, closed before the1989 regulatory enactment to avoid more stringent final closure requirements. Other landfills have closed as new solid waste regulations became effective in 1991 and 1995. Within the planning region, there is 1 operating landfill and 22 closed landfills (Table 5-13, Figure 5-14).

5.4.1.5 Nonpoint Sources

A primary water quality concern in the planning region is groundwater contamination due to septic tanks. In areas with shallow water tables or in karst terrain, septic system discharges can percolate rapidly to the underlying aquifer and increase concentrations of (NMWQCC, 2002):

- Total dissolved solids (TDS)
- Iron, manganese, and sulfides (anoxic contamination)
- Nitrate
- Potentially toxic organic chemicals
- Bacteria, viruses, and parasites (microbiological contamination)

Table 5-12. Leaking Underground Storage Tank Sites in the Mora-San Miguel-Guadalupe Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Mora County					
Watrous	Moberg's Garage	1189	29439	Hwy 161	Cleanup, State Lead with CAF
	Texaco Station	1623	1869	Hwy 161	Cleanup, State Lead with CAF
	Watrous Service Station	3176	31558	Hwy 85	Cleanup, Responsible Party
San Miguel County					
Conchas Dam	Conchas North Dock 9002	3543	27486	N Dock	Cleanup, Responsible Party
	Gopher Hole	4537	51008	State Rd 104 and Bell Ranch Rd	Pre-Investigation, Confirmed Release
Las Vegas	Atex 394(Allsup	817	26519	615 Grand Avenue	Investigation, State Lead, CAF
	Bob Dalton	3229	27624	1625 S Pacific	Cleanup, Responsible Party
	Ernie's Texaco	2745	30299	2525 Hot Springs Blvd	Investigation, State Lead, CAF
	Eusebio Bustos	985	27177	317 Grand	Pre-Investigation, Confirmed Release
	Faa Moon Ranch	1212	26611	6 Miles N of I 40 on US	Referred to Ground Water Quality Bureau
	Franken O&D Crp	1115	1268	503 Twelfth St	Referred to Ground Water Quality Bureau
	Giant Stopngo 54a	2538	1151	405 Grand St	Cleanup, Responsible Party
	Johnnys 66	929	1500	102 S Grand	Aggr Cleanup Completed, Resp Party
	Martinez Gas Co	2288	1509	300 S Grand Ave	Investigation, Responsible Party
	Nmshtd Dist 4 Service Center	4441	30534	W Frontage Rd	Investigation, Responsible Party

Source: NMED, 2014b, 2016a; NMED et al., 2016

[a] Determined according to latitude/longitude information in NMED database. In some cases this information was inconsistent with the facility address, and where such an inconsistency was identified, county and city were instead determined based on the facility address.

[b] Sites with No Further Action status (release considered mitigated) are not included. Information regarding such sites can be found on the NMED website (http://www.nmenv.state.nm.us/ust/lists.html

[c] Information appears as listed in the NMED database.

[d] Pre-Investigation, Suspected Release: Release not confirmed by definition
Pre-Investigation, Confirmed Release: Confirmed release as by definition
Investigation: Ongoing assessment of environmental impact
Cleanup: Physical removal of contamination ongoing
Aggressive Cleanup Completed (Aggr Cleanup Completed): Effective removal of contamination complete
Responsible Party (Resp Party): Owner/Operator responsible for mitigation of release
State Lead: State has assumed responsibility for mitigation of release
Federal Facility: Responsibility under the Federal Govt

Table 5-12. Leaking Underground Storage Tank Sites in the Mora-San Miguel-Guadalupe Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
San Miguel County (cont.)					
Las Vegas (continued)	NMSHTD Dist 4 Svc Ctr	1758	30534	W Frontage Rd	Referred to Ground Water Quality Bureau
	NNMDOT Las Vegas Patrol Yard 44 62	1184	29867	I 25 Frontage Mp 344	Referred to Ground Water Quality Bureau
	Performance 66	928	1583	1339 N Grand Ave	Cleanup, Responsible Party
	Pino Fina	879	29980	701 Grand Ave	Investigation, State Lead, CAF
	Pino's Truck Stop	1867	29981	1901 N Grand Ave	Cleanup, Responsible Party
	Retirement Ctr	1226	1717	722 Douglas Ave	Aggr Cleanup Completed, Resp Party
	Ross Texaco	719	1866	700 Grand Ave and University	Cleanup, State Lead with CAF
	Sav-O-Mat #11	577	30491	502 University Ave	Cleanup, Responsible Party
	Superstop Shell	2633	1851	Seventh and Legion Dr	Cleanup, Responsible Party
	Target Gas Station #1	3044	1860	225 Mills Ave	Cleanup, Responsible Party
	Texaco Bulk Plant Las Vegas	4599	51007	601 E University	Investigation, Responsible Party
	Thunderbird Con	2098	1861	S Hwy 85	Investigation, Responsible Party
	Warehouse, City	982	1462	1700 N Grand Ave	Aggr Cleanup Completed, Resp Party
Pecos	Its Gas and Food	3529	28677	50 Main St	Investigation, Responsible Party
	Ortiz Gulf	1663	29813	86 Cowles Hwy	Investigation, Responsible Party

Source: NMED, 2014b, 2016a; NMED et al., 2016

[a] Determined according to latitude/longitude information in NMED database. In some cases this information was inconsistent with the facility address, and where such an inconsistency was identified, county and city were instead determined based on the facility address.

[b] Sites with No Further Action status (release considered mitigated) are not included. Information regarding such sites can be found on the NMED website (http://www.nmenv.state.nm.us/ust/lists.html

[c] Information appears as listed in the NMED database.

[d] Pre-Investigation, Suspected Release: Release not confirmed by definition
Pre-Investigation, Confirmed Release: Confirmed release as by definition
Investigation: Ongoing assessment of environmental impact
Cleanup: Physical removal of contamination ongoing
Aggressive Cleanup Completed (Aggr Cleanup Completed): Effective removal of contamination complete
Responsible Party (Resp Party): Owner/Operator responsible for mitigation of release
State Lead: State has assumed responsibility for mitigation of release
Federal Facility: Responsibility under the Federal Govt

Table 5-12. Leaking Underground Storage Tank Sites in the Mora-San Miguel-Guadalupe Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
San Miguel County (cont.)					
Pecos (cont.)	Pecos 66	3535	29844	State Rd 63 50	Cleanup, Responsible Party
Ribera	El Pueblo Bar	4621	8582	Star Rte	Investigation, Responsible Party
	Sunshine Service Station	3555	30829	45 Highway 3	Cleanup, Responsible Party
Sapello	Midway Chevron	2964	29408	Hwy 518	Cleanup, Responsible Party
Guadalupe County					
Anton Chico	Abercrombie Store	3549	26375	State Rd 119	Pre-Investigation, Confirmed Release
Santa Rosa	Allsups 1152	3508	875	1485 Will Rogers	Cleanup, Responsible Party
	Bar F 10	336	27734	1190 Will Rogers	Cleanup, Responsible Party
	Bobbys Trading Post	4417	54456	1st St and W Parker Ave	Cleanup, Responsible Party
	Exxon/Conway #8	655	1782	1315 E Will Rodgers Dr	Cleanup, Responsible Party
	Leonards Conoco	755	29084	603 Parker	Investigation, State Lead, CAF
	Martinez Gulf	1554	26352	W Parker Ave	Cleanup, Responsible Party
	Santa Rosa Bulk Plant	4498	52324	2428 Will Rogers Dr	Investigation, Responsible Party
	Santa Rosa City Hall	1829	30474	141 S Fifth St	Investigation, Responsible Party
	Santa Rosa Consolidated Schools	771	30475	344 4th St	Referred to Ground Water Quality Bureau
Vaughn	Lalo's Chevron	4622	29014	Hwy 285	Investigation, Responsible Party

Source: NMED, 2014b, 2016a; NMED et al., 2016

[a] Determined according to latitude/longitude information in NMED database. In some cases this information was inconsistent with the facility address, and where such an inconsistency was identified, county and city were instead determined based on the facility address.

[b] Sites with No Further Action status (release considered mitigated) are not included. Information regarding such sites can be found on the NMED website (http://www.nmenv.state.nm.us/ust/lists.html

[c] Information appears as listed in the NMED database.

[d] Pre-Investigation, Suspected Release: Release not confirmed by definition
Pre-Investigation, Confirmed Release: Confirmed release as by definition
Investigation: Ongoing assessment of environmental impact
Cleanup: Physical removal of contamination ongoing
Aggressive Cleanup Completed (Aggr Cleanup Completed): Effective removal of contamination complete
Responsible Party (Resp Party): Owner/Operator responsible for mitigation of release
State Lead: State has assumed responsibility for mitigation of release
Federal Facility: Responsibility under the Federal Govt

Table 5-13. Landfills in the Mora-San Miguel-Guadalupe Water Planning Region

County	Landfill Name [a]	Landfill Operating Status [b]	Landfill Closure Date
Mora	Holman	Closed	1989
	Mora Landfill	Closed	1994
	Northeast New Mexico Regional	Open	NA
	Rainsville Landfill	Closed	1997
	Wagon Mound Landfill	Closed	1997
San Miguel	Big Mesa Coop	Closed	1989
	Blue Haven Coop	Closed	1993
	Conchas	Closed	—
	Las Vegas	Closed	1999
	Pecos Landfill	Closed	1995
	Rowe Landfill	Closed	1995
	San Miguel	Closed	1994
	Villanueva Landfill	Closed	1998
Guadalupe	Anton Chico Landfill	Closed	1989
	Colonias Landfill	Closed	1994
	Cuervo landfill	Closed	1999
	Dilia Landfill	Closed	1993
	La Loma Landfill	Closed	1993
	Newkirk	Closed	1989
	Pastura	Closed	1988
	Puerta de Luna	Closed	1989
	Santa Rosa Landfill	Closed	—
	Vaughn LF	Closed	2009

Sources: NMED, 2014b, 2015a, 2015b; DBS&A, 2005

[a] Names appear as listed in the NMED database.

[b] Except for the Northeast New Mexico Regional Landfill, all landfill sites are either closed or have become collection centers.

NA = Not applicable

— = Information not available

Because septic systems are generally spread out over rural areas, they are considered a nonpoint source. Collectively, septic tanks and other on-site domestic wastewater disposal systems constitute the single largest known source of groundwater contamination in New Mexico (NMWQCC, 2002), with many of these occurrences in areas with shallow water tables.

Other nonpoint sources of pollutants that are concerns for surface water quality in the planning region include wildfires, grazing, agriculture, recreation, hydromodification, streambank destabilization/modification, removal of riparian vegetation, road and highway maintenance, silvicultural activities, land disposal, resource extraction, road runoff, septic tanks, and natural and unknown sources (Table 5-8).

One approach to addressing nonpoint source pollution is through Watershed Based Planning or other watershed restoration initiatives that seek to restore riparian health and to address sources of contamination. NMED encourages cooperative planning efforts in watersheds where TMDLS are established (https://www.env.nm.gov/swqb/wps/WBP/index.html). Three watershed groups are active in the Mora-San Miguel-Guadalupe region:

- The Hermits Peak Watershed Alliance has identified needed restoration projects in the Gallinas Watershed (HPWA, 2014).
- The Upper Pecos Watershed Association has prepared a Watershed Based Plan for their watershed (UPWA, 2012).
- The Mora Watershed Association is working on water quality protection issues in that area.

5.5 Administrative Water Supply

The *Handbook* describes a common technical approach (referred to there as a *platform)* for analyzing the water supply in all 16 water planning regions in a consistent manner. As discussed in the Handbook (NMISC, 2013), many methods can be used to account for supply and demand, but some of the tools for implementing these analyses are available for only parts of New Mexico, and resources for developing them for all regions are not currently available. Therefore, the State has developed a simple method that can be used consistently across all regions to assess supply and demand for planning purposes. The use of this consistent method will facilitate efficient development of a statewide overview of the balance between supply and demand in both normal and drought conditions, so that the State can move forward with planning and funding water projects and programs that will address the regions' and State's pressing water issues.

The method to estimate the available supply, referred to as the *administrative water supply* in the Handbook, is based on withdrawals of water as reported in the *New Mexico Water Use by*

Categories 2010 report, which provide a measure of supply that considers both physical supply and legal restrictions (i.e., the water is physically available, and its use is in compliance with water rights policies) and thus reflects the amount of water available for use by a region. An estimate of supply during future droughts is also developed by adjusting the 2010 withdrawal data based on physical supplies available during historical droughts, as discussed in Section 5.5.2

5.5.1 2010 Administrative Water Supply

The administrative water supply (i.e., total withdrawals) in 2010 for the Mora-San Miguel-Guadalupe region, as reported in the *New Mexico Water Use by Categories 2010* report (Longworth et al., 2013), was 109,205 acre-feet. Of this total, 101,990 acre-feet were surface water withdrawals and 7,215 acre-feet were groundwater. The breakdown of these withdrawals among the various categories of use detailed in the *New Mexico Water Use by Categories 2010 report* is discussed in Section 6.1.

5.5.2 Drought Supply

The variability in surface water supply from year to year is a better indicator of how vulnerable a planning region is to drought in any given year or multi-year period than is the use of long-term averages. As discussed in Section 5.1.1, in the Mora-San Miguel-Guadalupe region, 2010 was a year with above average snowpack (Figure 5-5) and, according to the PDSI (Figures 5-6a and 5-6b), a near normal water year overall. As discussed in Section 5.1, the PDSI is an indicator of whether drought conditions exist and if so, what the relative severity of those conditions is. For the three main climate divisions present in the Mora-San Miguel-Guadalupe region, the PDSI classifications for 2010 were near normal (Climate Divisions 2 and 6) and incipient wet spell (Division 3). Given that the water use data for 2010 represent a normal to slightly wet year, it cannot be assumed that this supply will be available in all years; it is important that the region also consider potential water supplies during drought periods.

There is no established method or single correct way of quantifying a drought supply given the complexity associated with varying levels of drought and constantly fluctuating water supplies. For purposes of having an estimate of drought supplies for regional and statewide water planning, the State has developed and applied a method for regions with both stream-connected and non-stream-connected aquifers. The method adopted for stream-connected aquifers is described below:

- The drought adjustment is applied only to the portion of the administrative water supply that derives from surface water, as it is assumed that groundwater supplies will be available during drought due to the relatively stable thicknesses of groundwater aquifers that are continuously recharged through their connection to streams. While individual wells may be depleted due to long-term drought, this drought adjustment does not include an evaluation of diminished groundwater supplies.

- The minimum annual yield for key stream gages on mainstem drainages (Table 5-4b) was compared to the 2010 yield, and the gage with the lowest ratio of minimum annual yield to 2010 yield was selected.

- The 2010 administrative surface water supply for the region was then multiplied by that lowest ratio to provide an estimate of the surface water supply adjusted for the maximum drought year of record.

For the Mora-San Miguel-Guadalupe region, the gage with the minimum ratio of annual yield to 2010 yield is the Canadian River at Sanchez, with a ratio of 0.034 for minimum annual yield (1,955 acre-feet in 2003) to 2010 yield (57,627 acre-feet). Based on the region's total administrative surface water supply of 101,990 acre-feet (Section 5.5.1), the drought-adjusted surface water supply is 3,468 acre-feet. With the 7,215 acre-feet of groundwater supply, the total drought supply is 10,683 acre-feet, or about 10 percent of a normal year administrative water supply.

Though the adjustment is based on the minimum year of streamflow recorded to date, it is possible that drought supplies could be even lower in the future. Additionally, water supplies downstream of reservoirs may be mitigated by reservoir releases in early drought phases, while longer-term droughts can potentially have greater consequences. This approach does not evaluate mitigating influences of reservoir storage in early phases of a drought when storage is available or potential development of new groundwater supplies. Nonetheless, the adjusted drought supply provides a rough estimate of what may be available during a severe to extreme drought year.

6. Water Demand

To effectively plan for meeting future water resource needs, it is important to understand current use trends as well as future changes that may be anticipated. This section includes a summary of current water use by category (Section 6.1), an evaluation of population and economic trends and projections of future population (Sections 6.2 and 6.3), a discussion of the approach used to incorporate water conservation in projecting future demand (Section 6.4), and projections of future water demand (Section 6.5).

Four terms frequently used when discussing water throughout this plan have specific definitions related to this RWP:

- *Water use* is water withdrawn from a surface or groundwater source for a specific use. In New Mexico water is accounted for as one of the nine categories of use in the *New Mexico Water Use by Categories 2010* report prepared by the NMOSE.

- *Water withdrawal* is water diverted or removed from a surface or groundwater source for use.
- *Administrative water supply* is based on the amount of water withdrawals in 2010 as outlined in the *New Mexico Water Use by Categories 2010* report.
- *Water demand* is the amount of water needed at a specified time.

6.1 Present Uses

The most recent assessment of water use in the region was compiled by NMOSE for 2010, as discussed in Section 5.5. The *New Mexico Water Use by Categories 2010* report (Longworth et al., 2013) provides information on total withdrawals for nine categories of water use:

- Public water supply
- Domestic (self-supplied)
- Irrigated agriculture
- Livestock (self-supplied)
- Commercial (self-supplied)
- Industrial (self-supplied)
- Mining (self-supplied)
- Power (self-supplied)
- Reservoir evaporation

The total surface water and groundwater withdrawals for each category of use, for each county, and for the entire region, are shown on Table 6-1 and Figure 6-1.

The predominant water use in 2010 in all three counties was for irrigated agriculture, with the vast majority of agriculture being supplied with surface water. In San Miguel and Guadalupe counties, reservoir evaporation is also a large use. Two of the largest reservoirs in the region, Santa Rosa and Conchas, primarily store water for use outside of the region. Though the reservoirs benefit downstream users, the NMOSE accounts for the reservoir evaporation category for reservoirs with a capacity exceeding 5,000 acre-feet, based on the location of the reservoir, and this category is therefore reflected in Table 6-1 and Figure 6-1.

Most of the groundwater use in the Mora-San Miguel-Guadalupe region is for public water supply. Groundwater also supplies some agricultural, livestock, domestic, and commercial wells. Only 7 percent of the total withdrawals in the region are supplied by groundwater. Groundwater points of diversion are shown in Figure 6-2.

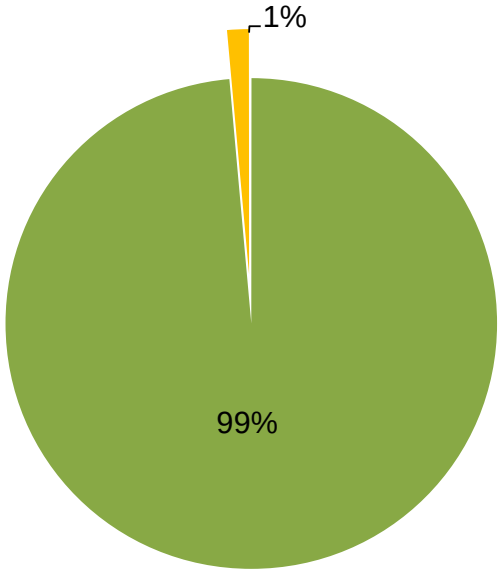
Table 6-1. Total Withdrawals in the Mora-San Miguel-Guadalupe Water Planning Region in 2010

Water Use Category	Withdrawals (acre-feet) [a]											
	Mora County			San Miguel County			Guadalupe County			Planning Region		
	Surface Water	Ground-water	Total	Surface Water	Ground-water	Total	Surface Water	Ground-water	Total	Surface Water	Ground-water	Total
Commercial (self-supplied)	0	237	237	174	987	1,161	0	66	66	174	1,290	1,464
Domestic (self-supplied)	0	87	87	0	654	654	0	39	39	0	780	780
Industrial (self-supplied)	0	0	0	0	3	3	0	0	0	0	3	3
Irrigated agriculture	12,914	0	12,914	36,913	0	36,913	18,728	1,890	20,617	68,554	1,890	70,443
Livestock (self-supplied)	188	213	400	273	325	598	79	318	398	540	856	1,396
Mining (self-supplied)	0	39	39	0	0	0	0	0	0	0	39	39
Power (self-supplied)	0	0	0	0	0	0	0	0	0	0	0	0
Public water supply	0	563	563	2,887	996	3,883	0	799	799	2,887	2,357	5,244
Reservoir evaporation	0	0	0	18,300	0	18,300	11,535	0	11,535	29,835	0	29,835
Total	13,101	1,139	14,240	58,547	2,964	61,511	30,342	3,112	33,454	101,990	7,215	109,205

Source: Longworth et al., 2013

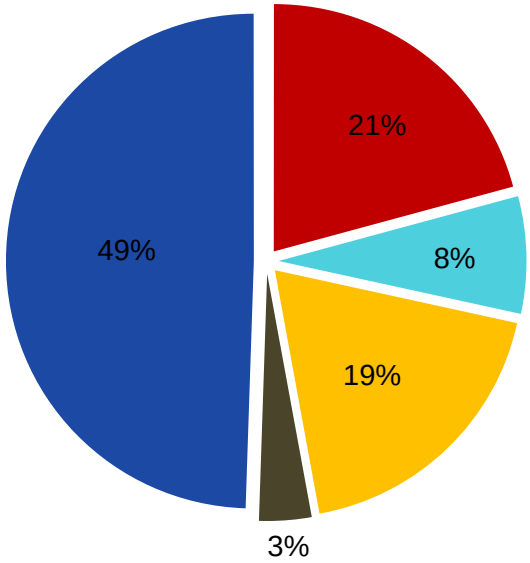
[a] Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this table.

Surface Water



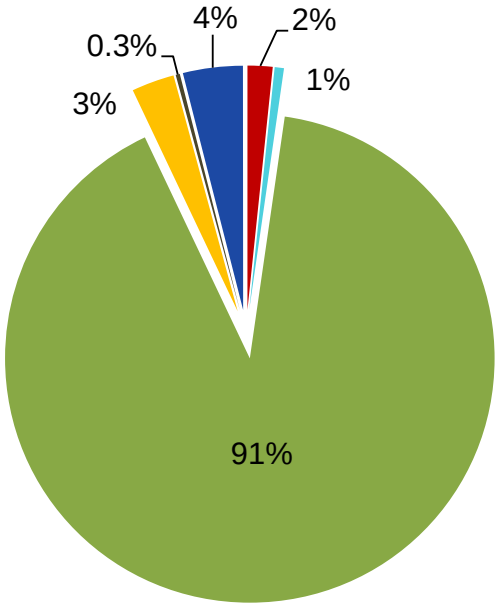
Total usage: 13,101 acre-feet

Groundwater



Total usage: 1,139 acre-feet

Total



Total usage: 14,240 acre-feet

Explanation

- Commercial (self-supplied)
- Domestic (self-supplied)
- Industrial (self-supplied)
- Irrigated agriculture
- Livestock (self-supplied)
- Mining (self-supplied)
- Power (self-supplied)
- Public water supply
- Reservoir evaporation

Source: Longworth et al., 2013

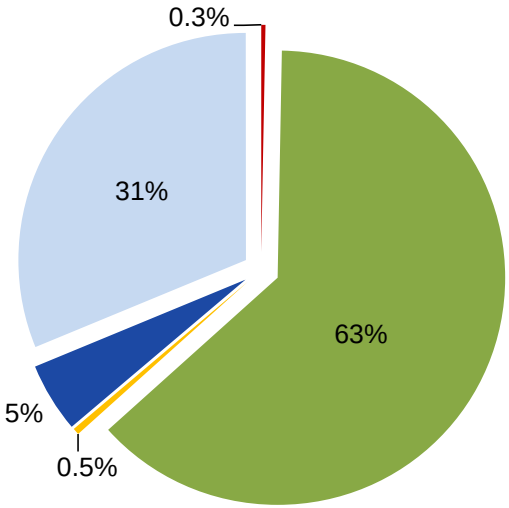
Note:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Mora County Water Demand, 2010

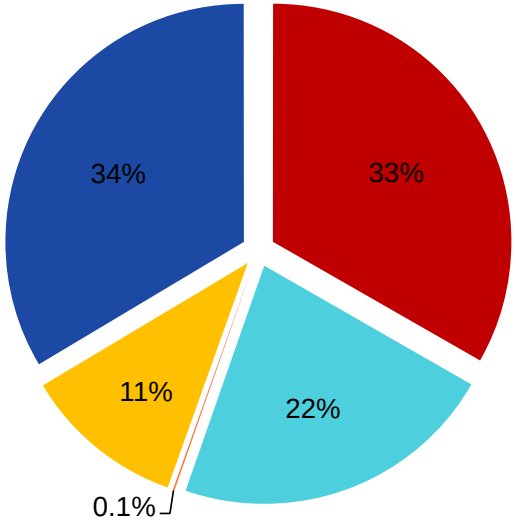
Figure 6-1a

Surface Water



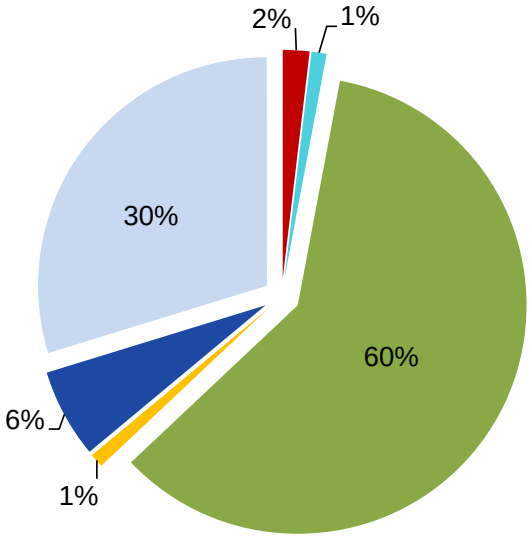
Total usage: 58,547 acre-feet

Groundwater



Total usage: 2,964 acre-feet

Total



Total usage: 61,511 acre-feet

Explanation

- Commercial (self-supplied)
- Domestic (self-supplied)
- Industrial (self-supplied)
- Irrigated agriculture
- Livestock (self-supplied)
- Mining (self-supplied)
- Power (self-supplied)
- Public water supply
- Reservoir evaporation

Source: Longworth et al., 2013

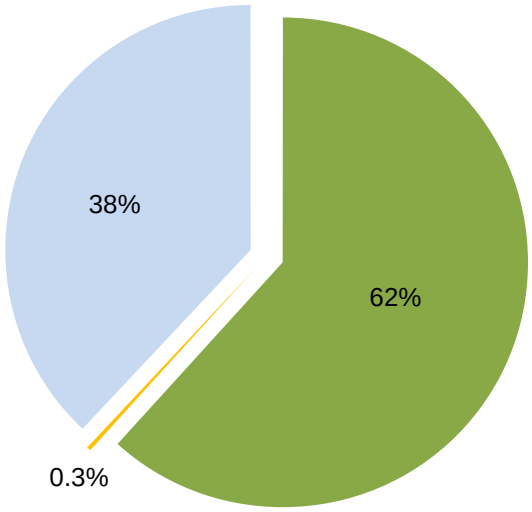
Note:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

San Miguel County Water Demand, 2010

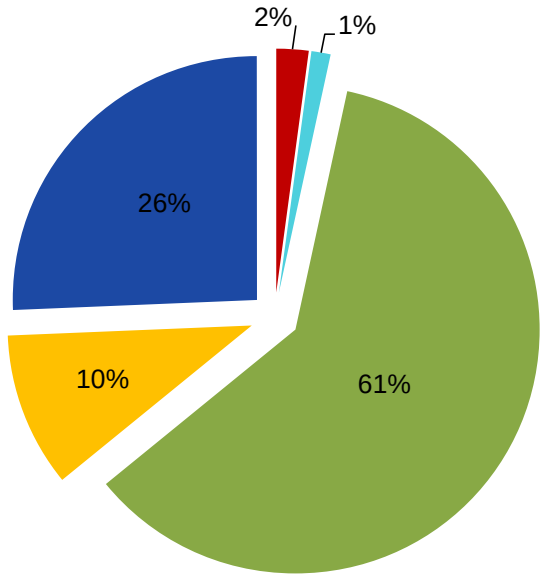
Figure 6-1b

Surface Water



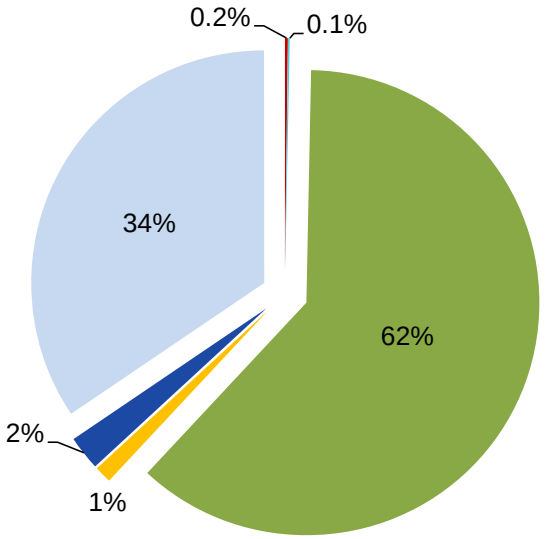
Total usage: 30,342 acre-feet

Groundwater



Total usage: 3,112 acre-feet

Total



Total usage: 33,454 acre-feet

Explanation

- Commercial (self-supplied)
- Domestic (self-supplied)
- Industrial (self-supplied)
- Irrigated agriculture
- Livestock (self-supplied)
- Mining (self-supplied)
- Power (self-supplied)
- Public water supply
- Reservoir evaporation

Source: Longworth et al., 2013

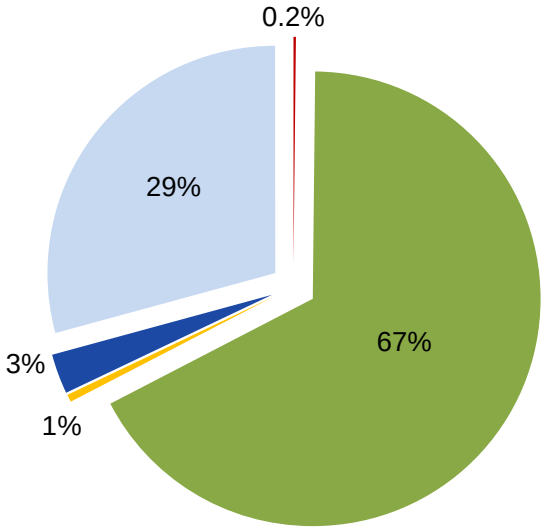
Note:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Guadalupe County Water Demand, 2010

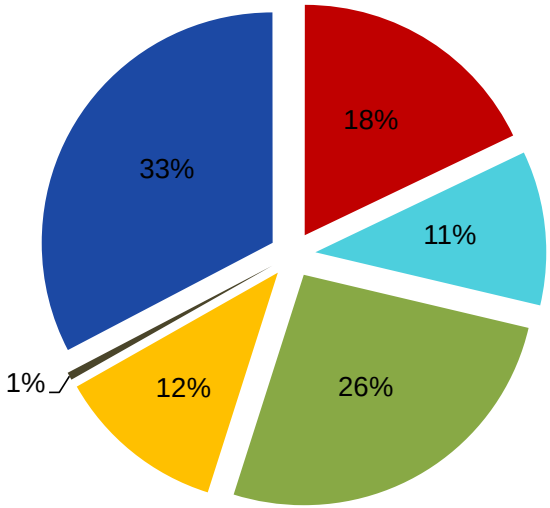
Figure 6-1c

Surface Water



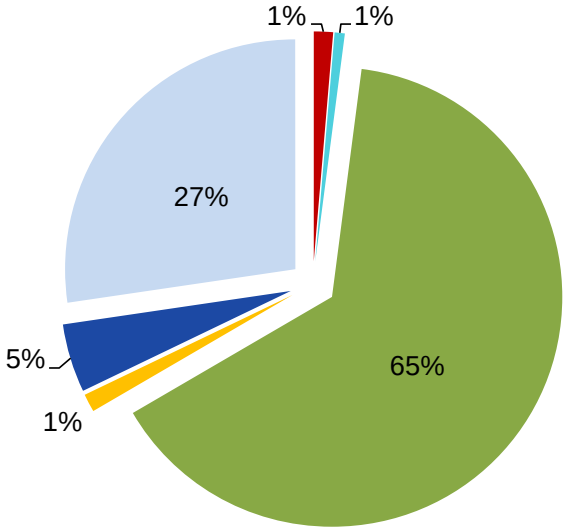
Total usage: 101,990 acre-feet

Groundwater



Total usage: 7,215 acre-feet

Total



Total usage: 109,205 acre-feet

Explanation

- Commercial (self-supplied)
- Domestic (self-supplied)
- Industrial (self-supplied)
- Irrigated agriculture
- Livestock (self-supplied)
- Mining (self-supplied)
- Power (self-supplied)
- Public water supply
- Reservoir evaporation

Source: Longworth et al., 2013

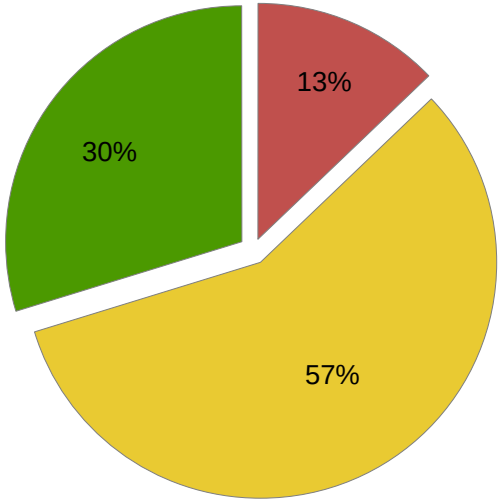
Note:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Total Regional Water Demand by Sector, 2010

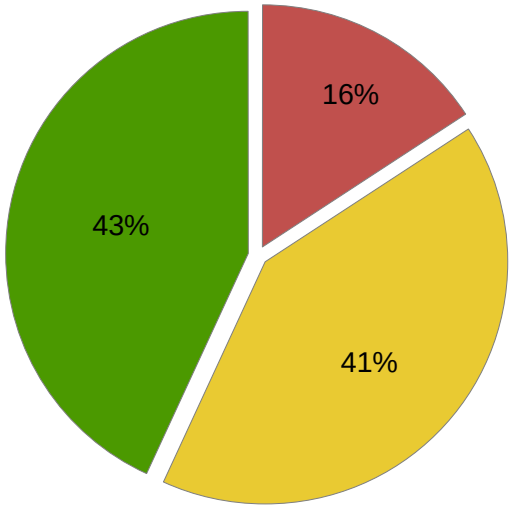
Figure 6-1d

Surface Water



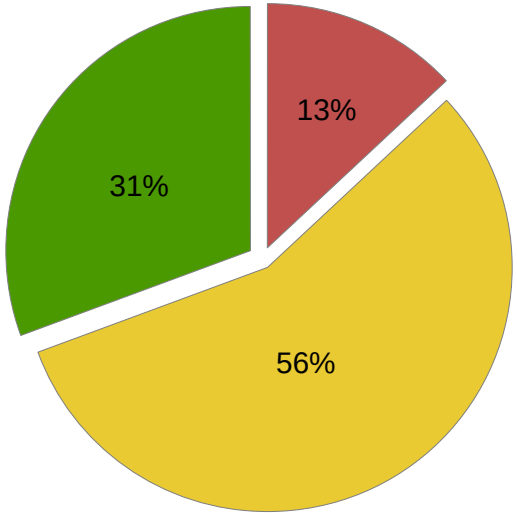
Total usage: 101,990 acre-feet

Groundwater



Total usage: 7,215 acre-feet

Total



Total usage: 109,205 acre-feet

Explanation

- Mora
- San Miguel
- Guadalupe

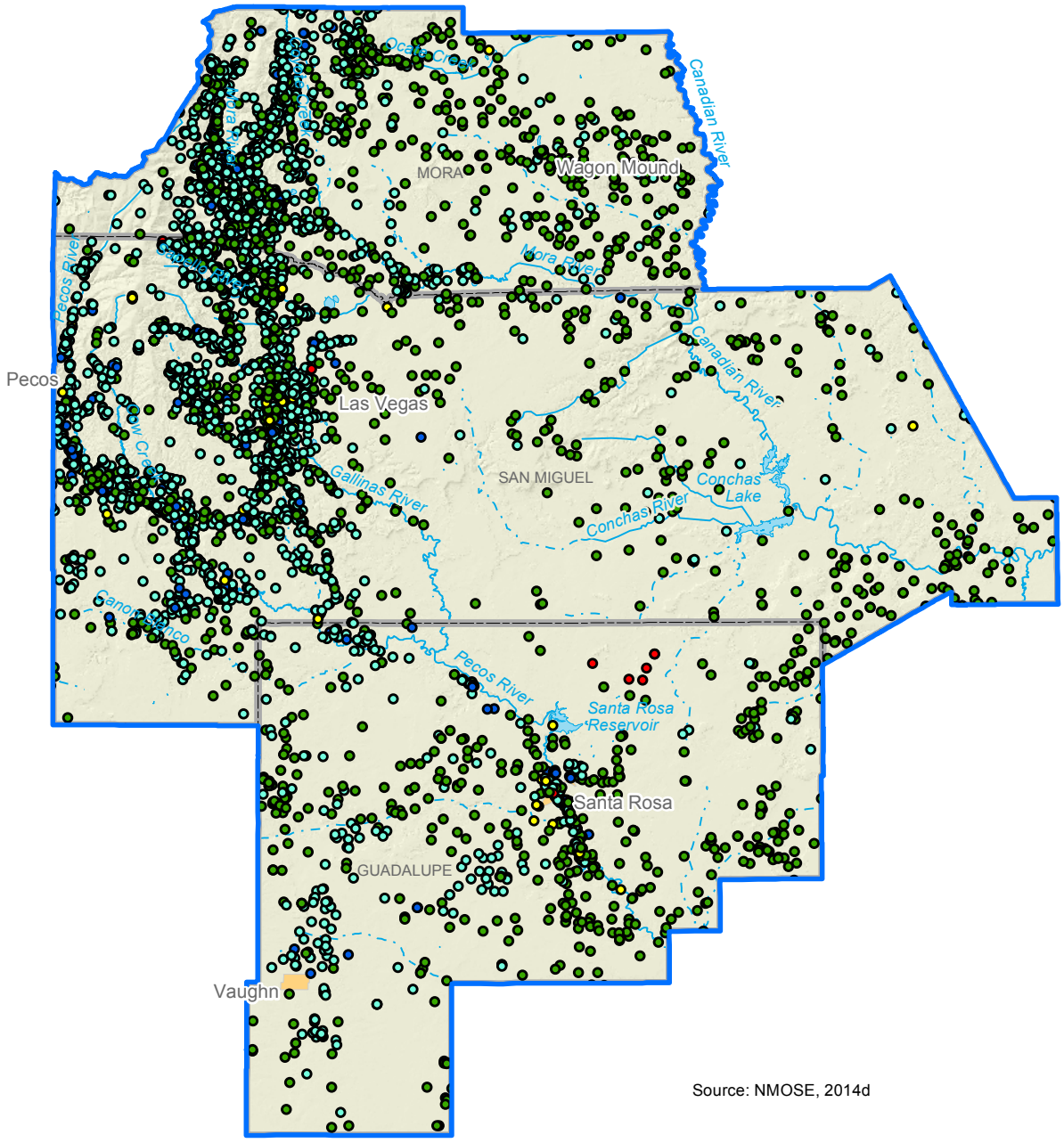
Source: Longworth et al., 2013

Notes: 1. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

Figure 6-1e

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Total Regional Water Demand by County, 2010



Explanation

- Stream (dashed where intermittent)
- Lake
- City
- County
- Water planning region

Well (use)

- Agriculture/irrigation
- Commercial/industrial/recreation
- Domestic
- Mining/oil/gas
- Public water supply

N

0 10 20 Miles

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Groundwater Points of Diversion

Figure 6-2

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2016\MORA_SANMIGUEL_GUADALUPE\FIG6-2_POINTS_OF_DIVERSION.MXD 4/28/2016

The categories included in the *New Mexico Water Use by Categories 2010* report and shown on Figure 6-1 and Table 6-1 represent the total withdrawals in the planning region. Tribes and Pueblos in New Mexico are not required to provide water use data to the State; therefore, tribal water use data are not necessarily reflected in this plan. There are also some unquantified additional categories of water use, including riparian evapotranspiration and instream flow.

- *Riparian evapotranspiration:* Some research and estimates have been made for riparian evapotranspiration in selected areas, such as along the middle and lower Rio Grande (Thibault and Dahm, 2011; Coonrod and McDonnell, Undated; Bawazir et al., 2009), but riparian evapotranspiration has not been quantified statewide. The New Mexico Water Resources Research Institute is currently developing those estimates but the results are not yet available. Though riparian evapotranspiration is anticipated to consume a relatively large quantity of water statewide, it will not affect the calculation of the gap between supply and demand using the method in this report, because the gap reflects the difference between future anticipated demands and present uses, and if both present and future uses do not include the riparian evapotranspiration category, then the difference will not be affected. The only impact to the gap calculation would be if evapotranspiration significantly changes in the future. There is potential for such a change due to warming temperatures, but anticipated changes have not been quantified and would be subject to considerable uncertainty. Anticipated changes in riparian and stream evapotranspiration are areas that should be considered in future regional and state water plan updates.

- *Instream flow:* The analysis of the gap between supply and demand relies on the largest use categories that reflect withdrawals for human use or reservoir storage that allows for withdrawals downstream upon release of the stored water. It is recognized that there is also value in preserving instream water for ecosystem and habitat and tourism purposes. Though this value has not been quantified in the supply/demand gap calculation, it may still be an important use in the region, and if the region chooses, it may recommend instream flow protections in its policy, program, and project recommendations.

In addition to the special conditions listed above, the data provided in the *New Mexico Water Use by Categories 2010* report are available for withdrawals only; depletions have not been quantified. In many cases, some portion of diverted water returns to surface or groundwater, for example from agricultural runoff or seepage or discharge from a wastewater treatment plant. In those locations where there is such return flow, the use of withdrawal data for planning purposes will add a margin of safety; thus the use of withdrawal data is a conservative approach for planning purposes.

6.2 Demographic and Economic Trends

To project future water demands in the region, it is important to first understand demographics, including population growth and economic and land use trends as detailed below. The 2013 populations of Mora, San Miguel, and Guadalupe counties were 4,704, 28,541, and 4,551 respectively (U.S. Census Bureau, 2014a). As shown in Table 3-1a, the population of all three counties has declined since 2010. As noted in Table 3-1d, livestock is the most valuable agricultural commodity in all three counties. A land use map was included in the original water plan and there have not been substantial changes.

Specific information regarding the population and economic trends in each county is provided in Sections 6.2.1 through 6.2.3. The information provided in these sections was obtained primarily from telephone interviews with government officials and other parties with knowledge of demographic and economic trends in the three counties; the list of interviewees is provided in Appendix 6-A. The information in these following subsections was used to project population, economic growth, and future water demand, as presented in Sections 6.3 and 6.5.

6.2.1 Mora County

After growing substantially between 1990 and 2000, the population of Mora County declined between 2000 and 2013, with a 3.6 percent decrease just between 2010 and 2013. The decline can be attributed partially to drought conditions as well as the lack of non-agricultural jobs in the county, which resulted in out-migration. Some people from out of state are reportedly moving to Mora County and buying small "hobby" farms, but there are no data to indicate that this is a large trend. Some farmers are turning to drip irrigation. The number of farms held steady between 2007 and 2012, but the average size of a farm decreased by 16 percent. During the same period, irrigated acreage declined by 40 percent, from 12,742 acres to 7,589 acres (USDA NASS, 2014). In 2012, payments to farmers participating in government agricultural support programs increased by 457 percent, from $330,000 in 2007 to $1,839,000 in 2012.

The drought in 2011 through 2013 had a significant impact on cattle herds in Mora County. Because so little hay was available, the supply was limited and very expensive, and the rangeland was not producing any grass. Therefore ranchers sold off a large percentage of their herds. The difficult ranching conditions discouraged people in their twenties and thirties from pursuing this livelihood, and some are leaving Mora County to pursue employment elsewhere. The school-age population has been declining for the past few years as persons of childbearing age leave the county.

While a few ranchers have sold their land to out-of-state buyers, who are aggregating large parcels of ranchland, most are trying to hold on to their land. Three very large ranches on the east side of the county comprise one-third of Mora County.

With encouragement from non-profit backers, some farmers are turning to hoop house or greenhouse small-scale farming. These farms are being irrigated with well water and drip irrigation. The objective is to have intensive small-scale farming on ¼-acre plots. A co-op has been formed to grow high value "gourmet" crops such as specialty lettuce and heirloom tomatoes that are sold to local food chains and to restaurants. Kenneth Alcon, the USDA NRCS District Conservationist for Mora County, states that the average farm size in Mora County is 10 to 15 acres. There were 858 farm operators in the County in 2012 (USDA NASS, 2014).

An effort is being made to form an arts district in an historic section of the Town of Mora. The Town would like to attract creative industries to occupy vacant buildings in the district. While Mora County attracts drive-through tourists, the Mora Valley Chamber of Commerce is trying to make the community more of a destination tourist venue.

6.2.2 San Miguel County

The 2013 population of San Miguel County decreased 2.9 percent from 2010. The City of Las Vegas represented 46.8 percent of the total population of the county as of 2012 (U.S. Census Bureau, 2014). Between 2007 and 2011 the total number of jobs in San Miguel County decreased by 5.4 percent. The largest industry in the private sector was retail trade with 1,298 jobs. There were 858 farm operators in 2012 (USDA NASS, 2014).

Between 2007 and 2012, the number of farms and ranches increased from 765 to 877, a 15 percent change. Acreage in farms and ranches increased by 5 percent, but the average size of a farm decreased by 9 percent, from 2,930 acres to 2,689 acres. Irrigated acreage decreased by 47 percent during the same timeframe, from 8,712 to 4,616 acres. Payments to farmers participating in governmental agricultural support programs increased by 226 percent, from $502,000 to $1,639,000 (USDA NASS, 2014)

San Miguel County and the City of Las Vegas have suffered from limited water supplies over the past few years. New water hook-ups are problematic, and attracting new businesses is difficult if they cannot be assured of water. Limited water supply is also preventing Highlands University from expanding on-campus housing. There are 500 new homes planned in three housing developments, but these homes will be on water restrictions during the summer.

Young people are leaving the county for larger cites in New Mexico. The school districts have lost 200 pupils over the past few years and the under-18 population continues to decline.

The county and city are seeking businesses that are not water intensive. The 150-acre Northern New Mexico Wood Business Park was established in 2009 to manufacture fiberboard, but the property is still undeveloped. Local economic development officials are trying to attract small businesses to the Park. Two biomass projects have been approved, but biomass is a heavy water user and it is uncertain if these projects will proceed. The Las Vegas-San Miguel County

Chamber of Commerce is attempting to boost tourism, but fishing and boating, mainstays of tourism in the county, have been adversely affected by the drought. Another Chamber-led effort is to establish Las Vegas as a center for assisted living housing to accommodate the aging local population.

Traditional crops are hay and alfalfa. Governmental and non-governmental entities are trying to rejuvenate the agricultural sector by increasing production for small growers with "value-added" crops such as organic bok choy and spinach grown in hoop houses and greenhouses. Farmers are being encouraged to join co-ops. These types of activities do attract younger farmers.

Some farm owners are leasing their land, but many parcels are abandoned. The average farm size is 10 to 15 acres, and the average ranch size is 15,000 to 20,000 acres. Ranchers are culling their herds due to lack of hay. Some prime farmland is being sold for residential development.

6.2.3 Guadalupe County

The population of Guadalupe County in 2013 was 2.9 percent lower than in 2010. The City of Santa Rosa, with a population of 2,802 in 2012 accounted for 61.8 percent of the population of the county.

The number of farms and ranches in the county increased by 44 percent between 2007 and 2012 from 258 to 372 (USDA NASS, 2014). During the same timeframe, land in farms and ranches increased by 17 percent but the average size of a farm decreased by 19 percent, from 5,446 acres to 4,417. Irrigated acreage grew from 2,330 acres in 2007 to 3,841 acres in 2012, a 65 percent increase. Payments to farmers participating in governmental agricultural support programs increased by 898 percent, from $286,000 to $2, 853,000.

There were 561 farm operators in the County in 2012 (USDA NASS, 2014). Retail trade was the large private sector employer, with 216 jobs, followed by recreation/hospitality. The economy of Santa Rosa relies heavily on recreation, tourism, and Interstate 40 travelers. Santa Rosa is home to the Blue Hole, a circular, bell shaped pool that is one of the most popular non-ocean dive destinations in the U.S. for scuba diving and training.

Ranchers in Guadalupe County are culling their herds, with the headcount down 40 percent between 2013 and 2014, after a 20 percent decline from 2012 to 2013. Farmers are not as affected by recent drought, as they rely on water from the Pecos River, which is still available. Ranches in Guadalupe County range from 20,000 acres to 50,000 acres, while farms are small, usually 5 to 10 acres with a few containing 40 acres. The main crops in Guadalupe County are vegetables, potatoes, and melons. Both the farmers and ranchers are holding onto their land.

Similarly to Mora and San Miguel County, young people are leaving the county and school enrollment is declining. People between the ages of 18 and 30 are moving to Albuquerque, Las Cruces, and out of state.

6.3 Projected Population Growth

The population projections for the 2005 Regional Water Plan encompassed two forecasts, a high and a low, each covering the period from 2000 through 2040. The Bureau of Business and Economic Research (BBER) at the University of New Mexico (UNM) prepared county-level population forecasts using data and historical trends from 1960 up to the 2000 Census. BBER projections constituted the high growth scenarios for Guadalupe and Mora counties and the low growth projection for San Miguel County.

Since 2005, drought, the national recession that started in 2007, and fundamental changes in career choices have resulted in population losses in all three counties. Given these changes, the 2005 water plan high growth scenarios for all three counties were too optimistic, and for Mora and San Miguel counties, even the low projections were too optimistic (Table 6-2). The BBER has continued to revise its population projections downward during the past 14 years to reflect slower growth than originally anticipated (BBER, 2012; 2008).

Table 6-2. Comparison of Projected and Actual 2010 Population

County	2005 Regional Water Plan Projected Population [a]		Actual Population/ 2010 U.S. Census [b]
	High	Low	
Mora	6.203	5,609	4,881
San Miguel	34,495	34,190	29,393
Guadalupe	5,304	4,687 [c]	4,687 [c]
Total Region	46,002	44,486	38,954

[a] DBS&A, 2005

[b] U.S. Census Bureau, 2014a

[c] DBS&A and Census numbers happen to be identical

For the population projections through 2060 (Table 6-3), two population forecasts were developed: one based on a moderately optimistic view of the economy for this region over the long-term and one that portrays a more pessimistic picture. The 2012 BBER population projections through 2040 (Appendix 6-B) were used as a starting point for the high population projections, extrapolated through 2060. The low population projections incorporate factors that have been affecting New Mexico since 2000, including drought, continuing recession, job losses, and most recently, out-migration.

Table 6–3. Mora-San Miguel-Guadalupe Population Projections July 1, 2010 to July 1, 2060

a. Annual Growth Rate

County	Projection	Growth Rate (%)				
		2010-2020	2020-2030	2030-2040	2040-2050	2050-2060
Mora	High	–0.21	–0.34	–0.53	–.050	–0.29
	Low	-0.86	-0.72	-0.60	-0.51	-0.35
San Miguel	High	–0.01	0.21	0.28	0.34	0.40
	Low	-0.62	-0.54	-0.48	-0.41	-0.31
Guadalupe	High	0.00	0.00	0.00	0.00	0.00
	Low	–0.83	–0.71	–0.58	–0.46	–0.28

b. Projected Population

County	Projection	Population					
		2010	2020	2030	2040	2050	2060
Mora	High	4,881	4,778	4,618	4,379	4,167	4,047
	Low	4,881	4,475	4,163	3,921	3,727	3,598
San Miguel	High	29,393	29,252	29,884	30,742	31,812	33,113
	Low	29,393	27,627	26,182	24,941	23,929	23,192
Guadalupe	High	4,687	4,687	4,687	4,687	4,687	4,687
	Low	4,687	4,311	4,014	3,789	3,620	3,519

Source: Poster Enterprises, 2014

While drought has the most profound effect on the agricultural sector, it also affects retailers such as agricultural equipment and supply merchants who sell to farmers and ranchers, and the low population projections reflect the ripple effect of a possible long-term drought in New Mexico. Although BBER's projections reflect periodic short-term droughts, their model does not take into account a more sustained period of drought affecting a larger population.

Furthermore, a substantial percentage of farmers and ranchers in the planning region are aged 50 to 70 (New Mexico has the highest average age for farmers and ranchers in the country—60.5 years). If drought conditions prevent younger people from pursuing agriculture as a livelihood, they may leave the region to pursue work in areas with more employment opportunities.

The population projections are detailed in Table 6-3 and summarized by county below:

- *Mora County:* The population of Mora County is projected to decline in both the high and low growth scenarios. The high scenario is similar to the 2012 BBER forecast, but reflects the slow growth that has occurred since 2010. The economy relies mainly on the agricultural sector, and in the absence of growth in the industrial or commercial sectors, it will be difficult to halt out-migration.

- *San Miguel County:* San Miguel's population is projected to decline for the next few years, as it has since 2010, under both the high and low scenarios. Under the high scenario, however, it is expected to grow slightly after 2020, assuming that economic development efforts in Las Vegas will be successful and dam and reservoir improvements will result in an increased water supply. Highlands University may also increase its enrollment. This scenario is more optimistic than the BBER's 2012 projection. The low scenario is predicated on continuing water restrictions that inhibit economic and residential growth and out-migration from both Las Vegas and the remainder of the county.

- *Guadalupe County:* The population of Guadalupe County is projected to continue to decline under both the high and low scenarios. As with Mora County, the high scenario is similar to the 2012 BBER forecast, but reflects the slow growth that has occurred since 2010. With agriculture being the backbone of the economy, the county has suffered greatly from drought in recent years. The high projections anticipate a lessening of the effects of drought and a small increase in tourism-related jobs. The low projections are predicated on a continuing severe drought and out-migration of younger residents.

6.4 Water Conservation

Water conservation is often a cost-effective and easily implementable measure that a region may use to help balance supplies with demands. The State of New Mexico is committed to water conservation programs that encourage wise use of limited water resources. The Water Use and

Conservation Bureau of the NMOSE developed the *New Mexico Water Conservation Planning Guide for Public Water Suppliers*. When evaluating water rights transfers or 40-year water development plans that hold water rights for future use, the NMOSE considers whether adequate conservation measures are in place. However, the 40 year water development plans are not incorporated into the RWP updates, as the resources needed to complete this work are not currently available. It is therefore important when planning for meeting future water demand to consider the potential for conservation.

To develop demand projections for the region, some simplifying assumptions regarding conservation have been made. These assumptions were made only for the purpose of developing an overview of the future supply-demand balance in the region and are not intended to guide policy regarding conservation for individual water users. The approach to considering conservation in each category of water use for developing water demand projections is discussed below. Specific recommendations for conservation programs and policies for the Mora-San Miguel-Guadalupe region, as identified by the regional steering committee, are provided in Section 8.

Public water supply. Public water suppliers that have large per capita usage have a greater potential for conservation than those that are already using water more efficiently. Through a cooperative effort with seven public water suppliers, the NMOSE developed a GPCD (gallons per capita per day) calculation to be used statewide, thereby standardizing the methods for calculating populations, defining categories of use, and analyzing use within these categories. The GPCD calculator was used to arrive at the per capita uses for public water systems in the region, shown in Table 6-4. These rates are provided to assist the regional steering committee in considering specific conservation measures.

The system-wide per capita usage for each water supplier includes uses such as golf courses, parks, and commercial enterprises that are supplied by the system. Hence there can be large variability among the systems. For purposes of developing projections, a county-wide per capita rate was calculated as the total public supply use in the county divided by the total county population (or portion of the county within the region), excluding those served by domestic wells. For future projections (Section 6.5), a consistent method is being used statewide that assumes that conservation would reduce future per capita use in each county by the following amounts:

- For current average per capita use greater than 300 gpcd, assume a reduction in future per capita use to 180 gpcd.
- For current average per capita use between 200 and 300 gpcd, assume a reduction in future per capita use to 150 gpcd.

Table 6-4. 2010 Water Withdrawals for Drinking Water Supply Systems and Rural Self-Supplied Homes

OSE Declared Groundwater Basin(s) [a]	Water Supplier [b]	Population	Per Capita Use (gpcd)	Withdrawals (acre-feet)	
				Surface Water	Groundwater
Mora County					
Canadian River	Agua Negra MDWCA	200	123	0	28
	Agua Pura MDWCA	260	80	0	23
	Buena Vista MDWCA	240	52	0	14
	Cleveland MDWCA	300	98	0	33
	Del Rio MDWCA	150	80	0	13
	El Alto MDWCA [c]	170	233	0	44
	Guadalupita MDWCA	150	80	0	13
	La Cordillera [c]	50	74	0	4
	Ledoux MDWCA	150	80	0	13
	Mora MDWCA	800	286	0	256
	North Cleveland MDWCA	70	122	0	10
	Ojo Feliz MDWCA	100	80	0	9
	Rainsville Water & Sanitation District	250	80	0	22
	Rancho Valmora	100	65	0	7
	San Antonio De Cleveland MDWCA	300	80	0	27
	South Holman MDWCA	100	32	0	4
	Upper Holman	150	34	0	6
	Wagon Mound MDWCA	369	87	0	36
NA	Del Rio MDWCA	150	80	0	13
	Mora County public water supply totals	3,909		0	563
	County-wide public water supply per capita use [d]		129		

Source: Longworth et al., 2013, unless otherwise noted.

[a] Determined based on NMED Drinking Water Bureau water supply source locations (NMOSE water use database doesn't distinguish groundwater basin) , unless otherwise noted.

[b] For systems supplied by surface water withdrawals, the river basin is provided in parenthesis. Rural self-supplied homes are located in the river basin specified in parentheses.

[c] Groundwater basin assumed based on geographic location of water supplier.

[d] County-wide per capita use, calculated as the total population divided by total withdrawals

gpcd = Gallons per capita per day
NA = Information not available

Table 6-4 2010 Water Withdrawals for Drinking Water Supply Systems and Rural Self-Supplied Homes

OSE Declared Groundwater Basin(s) [a]	Water Supplier [b]	Population	Per Capita Use (gpcd)	Withdrawals (acre-feet)	
				Surface Water	Groundwater
Mora County (cont.)					
Canadian River	Rural self-supplied homes (Canadian)	972	80	0	87
	Mora County domestic self-supplied totals	972		0	87
	County-wide domestic self-supplied per capita use [d]		80		
San Miguel County					
Canadian River	Big Mesa Water Co-op (Canadian)	604	80	54	0
	Las Tusas MDWCA [c]	28	103	0	3
	Watrous MDWCA	120	80	0	11
	Conchas Dam (Canadian)	391	146	5	59
	Pendaries Water System (Canadian)	400	103	46	0
Upper Pecos	Benedictine Monastery	41	143	0	7
	Coruco Village	43	80	0	4
	East Pecos MDWCA	498	49	0	27
	El Ancon MDWCA	60	80	0	5
	El Cerrito MDWCA	15	91	0	2
	El Coruco Domestic	200	80	0	18
	Gabaldon MDWCA	70	29	0	2
	Gonzales Ranch MDWCA	225	24	0	6
	Ilfield MDWCA	380	22	0	10
	La Cueva MDWCA	70	80	0	6
	La Pasada MDWCA	225	34	0	8

Source: Longworth et al., 2013, unless otherwise noted.

[a] Determined based on NMED Drinking Water Bureau water supply source locations (NMOSE water use database doesn't distinguish groundwater basin), unless otherwise noted.

[b] For systems supplied by surface water withdrawals, the river basin is provided in parenthesis. Rural self-supplied homes are located in the river basin specified in parentheses.

[c] Groundwater basin assumed based on geographic location of water supplier.

[d] County-wide per capita use, calculated as the total population divided by total withdrawals

gpcd = Gallons per capita per day
NA = Information not available

Table 6-4 2010 Water Withdrawals for Drinking Water Supply Systems and Rural Self-Supplied Homes

OSE Declared Groundwater Basin(s) [a]	Water Supplier [b]	Population	Per Capita Use (gpcd)	Withdrawals (acre-feet)	
				Surface Water	Groundwater
San Miguel County (cont.)					
Upper Pecos (cont.)	Las Vegas Water Supply System (Pecos)	14,857	191	2,781	402
	Lower Colonias MDWCA	28	80	0	3
	North San Ysidro MDWCA	230	80	0	21
	Pecos Water System	1,596	134	0	240
	Ribera MDWCA	200	75	0	17
	Rowe MDWCA	150	28	0	5
	San Jose MDWCA	200	30	0	7
	San Juan MDWCA/Soham MDWCA	200	55	0	12
	San Miguel [c]	60	80	0	5
	San Miguel Del Vado MDWCA	100	80	0	9
	Sena Water System	180	80	0	16
	South San Ysidro MDWCA	50	156	0	9
	Tecolote Domestic Water Users Assn	185	77	0	16
	Tecolotito MDWCA	380	57	0	24
	Tres Lagunas Home Owners Association	73	260	0	21
	Villanueva MDWCA	240	80	0	22
San Miguel County public water supply totals		22,099		2,887	996
County-wide public water supply per capita use [d]			157		
Canadian River Tucumcari	Rural self-supplied homes (Canadian)	284	80	0	25

Source: Longworth et al., 2013, unless otherwise noted.

[a] Determined based on NMED Drinking Water Bureau water supply source locations (NMOSE water use database doesn't distinguish groundwater basin), unless otherwise noted.

[b] For systems supplied by surface water withdrawals, the river basin is provided in parenthesis. Rural self-supplied homes are located in the river basin specified in parentheses.

[c] Groundwater basin assumed based on geographic location of water supplier.

[d] County-wide per capita use, calculated as the total population divided by total withdrawals

gpcd = Gallons per capita per day
NA = Information not available

Table 6-4 2010 Water Withdrawals for Drinking Water Supply Systems and Rural Self-Supplied Homes

OSE Declared Groundwater Basin(s) [a]	Water Supplier [b]	Population	Per Capita Use (gpcd)	Withdrawals (acre-feet)	
				Surface Water	Groundwater
San Miguel County (cont.)					
Upper Pecos	Rural self-supplied homes (Pecos)	7,010	80	0	628
	San Miguel County domestic self-supplied totals	7,294		0	654
	County-wide domestic self-supplied per capita use [d]		80		
Guadalupe County					
Upper Pecos	Anton Chico MDWCA [c]	365	58	0	24
	Dilia MDWCA [c]	102	80	0	9
	Sangre de Cristo MDWCA	175	92	0	18
	Santa Rosa Water Supply	2,848	208	0	662
	Upper Dilia MDWCA [c]	42	80	0	4
NA	Los Sisneros MDWCA	270	73	0	22
Fort Sumner Upper Pecos	Vaughn Water System	446	119	0	59
	Guadalupe County public water supply totals	4,248		0	799
	County-wide public water supply per capita use [d]		168		
Upper Pecos Fort Sumner Roswell	Rural self-supplied homes (Pecos)	146	80	0	13
Canadian River Tucumcari	Rural self-supplied homes (Canadian)	293	80	0	26
	Guadalupe County domestic self-supplied totals	439		0	39
	County-wide domestic self-supplied per capita use [d]		80		

Source: Longworth et al., 2013, unless otherwise noted.

[a] Determined based on NMED Drinking Water Bureau water supply source locations (NMOSE water use database doesn't distinguish groundwater basin), unless otherwise noted.

[b] For systems supplied by surface water withdrawals, the river basin is provided in parenthesis. Rural self-supplied homes are located in the river basin specified in parentheses.

[c] Groundwater basin assumed based on geographic location of water supplier.

[d] County-wide per capita use, calculated as the total population divided by total withdrawals

gpcd = Gallons per capita per day
NA = Information not available

- For current average per capita use between 130 and 200 gpcd, assume a reduction in future per capita use to 130 gpcd.

- For current average per capita use less than 130 gpcd, no reduction in future per capita use is assumed.

For the Mora-San Miguel-Guadalupe region, current per capita use in Mora County is just under 130 gpcd (Table 6-4), so no additional conservation is assumed. San Miguel and Guadalupe counties currently have per capita use between 130 and 200 gpcd (Table 6-4), so their future per capita use is assumed to be reduced to 130 gpcd. In the projections, these reductions are phased in over time.

Self-supplied domestic. Homeowners with private wells can achieve water savings through household conservation measures. These wells are not metered, and current water use estimates were developed based on a relatively low per capita use assumption (Table 6-4; Longworth et al., 2013). Therefore, no additional conservation savings were assumed in developing the water demand projections. For purposes of developing projections, a county-wide per capita rate was calculated as the total self-supplied domestic use in the county divided by the total county population (or portion of the county within the region), excluding those served by a public water system.

Irrigated agriculture. As the largest water use in the region, conservation in this sector may be beneficial. However, when considering the potential for improved efficiency in agricultural irrigation systems, it is important to consider how potential conservation measures may affect the region's water supply.

Withdrawals in both surface and groundwater irrigation systems include both consumptive and non-consumptive uses and incidental losses:

- Consumptive use occurs when water is permanently removed from the system due to crop evapotranspiration (i.e., evaporation and transpiration). Evapotranspiration is determined by factors that include crop and soil type, climate and growing season, on-farm management, and irrigation practices.

- Non-consumptive use occurs when water is temporarily removed from the stream system for conveyance requirements and is returned to the surface or groundwater system from which it was withdrawn.

- Incidental losses from irrigation are irrecoverable losses due to seepage and evapotranspiration during conveyance that are not directly attributable to crop consumptive use.

- Seepage losses occur when water leaks through the conveyance channel or below the root zone after application to the field and is either lost to the atmosphere or remains bound in the soil column.
- Evapotranspiration occurs as a result of (1) evaporation during water conveyance in canals or with some irrigation methods (e.g., flood, spray irrigation) and (2) transpiration by ditch-side vegetation.

Some agricultural water use efficiency improvements (commonly referred to as agricultural water conservation) reduce the amount of water diverted, but may not reduce depletions or may even have the effect of increasing consumptive use per acre on farms (Brinegar and Ward, 2009; Ward and Pulido-Velazquez, 2008). These efforts can result in economic benefits, such as increased crop yield, but may have the adverse effect of reducing return flows and therefore downstream water supply. For example, methods such as canal lining or piping may result in reduction of seepage losses associated with conveyance, but that seepage will no longer provide return flow to other users. Other techniques such as drip irrigation and center pivots may reduce the amount of water diverted, but if the water saved from such reductions is applied to on-farm crop demands, water supplies for downstream uses will be reduced.

Due to the complexities in agricultural irrigation efficiency, no quantitative estimates of savings are included in the projections. However, the regions are encouraged to explore strategies for agricultural conservation, especially those that result in consumptive use savings through changes in crop type or fallowing of land while concentrating limited supplies for greater economic value on smaller parcels. Section 8 outlines strategies developed by the Mora-San Miguel-Guadalupe steering committee to achieve savings in agricultural water use within the region.

Self-supplied commercial, industrial, livestock, mining, and power. Conservation programs can be applicable to these sectors, but since uses are expected to be zero to very low in these categories within the region, no additional conservation savings are assumed in the water demand projections.

Reservoir evaporation. In many parts of New Mexico, reservoir evaporation is one of the highest consumptive water uses, and in the Mora-San Miguel-Guadalupe region it is the second highest water use. To reduce usage in this category, some areas outside of the region have considered aquifer storage and recovery to replace some reservoir storage, and it may also be possible in some circumstances to gain some reduction in evaporation by storing more water at higher elevations or constructing deeper reservoirs with less surface area for evaporation. However, due to the legal, financial, and other complexities of implementing these techniques, no conservation savings are assumed in developing the reservoir evaporation demand projections for this region.

6.5 Projections of Future Water Demand for the Planning Horizon

To develop projections of future water demand, a consistent method was used statewide. Section 6.5.1 provides a comprehensive discussion of the methods applied consistently throughout the state to project water demand in all the categories reported in the *New Mexico Water Use by Categories* reports, and some of the categories may not be applicable to the Mora-San Miguel-Guadalupe region. The projections of future water demand determined using this consistent method, as applicable, for the Mora-San Miguel-Guadalupe region are discussed in Section 6.5.2.

6.5.1 Water Demand Projection Methods

The *Handbook* provides the time frame for the projections; that is, they should begin with 2010 data and be developed in 10-year increments (2020, 2030, 2040, 2050, and 2060). Projections will be for withdrawals in each of the nine categories included in the *New Mexico Water Use by Categories 2010* report (Longworth et al., 2013) and listed in Section 6.1.

To assist in bracketing the uncertainty of the projections, low- and high-water demand estimates were developed for each category in which growth is anticipated, based on demographic and economic trends (Section 6.2) and population projections (Section 6.3), unless otherwise noted. The projected growth in population and economic trends will affect water demand in eight of the nine water use categories; the reservoir evaporation water use category is not driven by these factors.

The 2010 administrative water supply (Section 5.5.1) was used as a base supply from which water demand was projected forward. As discussed in Section 5.5, the administrative water supply is based on withdrawals of water as reported in the *New Mexico Water Use by Categories 2010* report, which provide a measure of supply that considers both physical supply and legal restrictions (i.e., the water is physically available for withdrawal, and its use is in compliance with water rights policies) and thus reflects the amount of water available for use by a region.

The assumptions and method used statewide to develop the demand projections for each water use category follow. Not all of these categories are applicable to every planning region. The specific methods applied in the Mora-San Miguel-Guadalupe region are discussed in Section 6.5.2.

Public water supply includes community water systems that rely on surface water and groundwater diversions other than from domestic wells permitted under 72-12-1.1 NMSA 1978 and that consist of common collection, treatment, storage, and distribution facilities operated for the delivery of water to multiple service connections. This definition includes municipalities (which may serve residential, commercial, and industrial water users), mutual domestic water user associations, prisons, residential and mixed-use subdivisions, and mobile home parks.

For regions with anticipated population increases, the increase in projected population (high and low) was multiplied by the per capita use from the *New Mexico Water Use by Categories 2010* report (Longworth et al., 2013) (reduced for conservation as specified above), times the portion of the population that was publicly supplied in 2010 (calculated from Longworth et al., 2013); the resulting value was then added to the 2010 public water supply withdrawal amount. Current surface water withdrawals were not allowed to increase above the 2010 withdrawal amount unless there is a new source of available supply (i.e., water project or settlement). Both the high and low projections incorporated conservation for counties with per capita use above 130 gpcd, as discussed in Section 6.4, on the assumption that some of the new demand would be met through reduction of per capita use.

For planning purposes, in counties where a decline in population is anticipated (in either the high or low scenario or both), as a conservative approach it was assumed that public water supply would remain constant at 2010 withdrawal levels based on the 2010 administrative water supply (the water is physically available for withdrawal, and its use is in compliance with water rights policies). Likewise, in regions where the population growth is initially positive but later shows a decline, the water demand projection was kept at the higher rate for the remainder of the planning period.

The *domestic (self-supplied)* category includes self-supplied residences with well permits issued by the NMOSE under 72-12-1.1 NMSA 1978 (Longworth et al., 2013). Such residences may be single-family or multi-family dwellings. High and low projections were calculated as the 2010 domestic withdrawal amount plus a value determined by multiplying the projected change in population (high and low) times the domestic self-supplied per capita use from the *New Mexico Water Use by Categories 2010* report (Longworth et al., 2013), times the calculated proportion of the population that was self-supplied in 2010 (calculated from Longworth et al., 2013). In counties where the high and/or low projected growth rate is negative, the projection was set equal to the 2010 domestic withdrawal amount. This allows for continuing use of existing domestic wells, which is anticipated, even when there are population declines in a county. In regions where the population growth is initially positive but later shows a decline, the water demand projection was kept at the higher level for the remainder of the planning period, based on the assumption that domestic wells will continue to be used, even if there are later population declines.

The *irrigated agriculture* category includes all withdrawals of water for the irrigation of crops grown on farms, ranches, and wildlife refuges (Longworth et al., 2013). To understand trends in the agricultural sector, interviews were held with farmers, farm agency employees, and others with extensive knowledge of agriculture practices and trends in each county. Additionally, the New Mexico agriculture census data for 2007 and 2012 were reviewed and provided helpful agricultural data such as principal crops, irrigated acreage, farm size, farm subsidies, and age of farmers (USDA NASS, 2014). Comparison of the two data sets shows a downward trend in the

agricultural sector across New Mexico. This decline was in all likelihood related at least in part to the lack of precipitation in 2012: in most of New Mexico 2007 was a near normal precipitation year (ranging from mild drought to incipient wet spell across the state), while in 2012 the PDSI for all New Mexico climate divisions indicated extreme to severe drought conditions. Based on the interviews, economic factors are also thought to be a cause of the decline as aquifers go dry.

In much of the state, recent drought and recession are thought to be driving a decline in agricultural production. However, that does not necessarily indicate that there is less demand for water. In areas where irrigation is supplied by surface water, there are frequent supply limitations, with many ditches having no or limited supply later in the season. This results in large fluctuations in agricultural water use and productivity from year to year. While it is possible that drought will continue over a longer term, it is also likely that drought years will be interspersed with wetter years, and there is some potential for renewed agricultural activity as a result. With infrastructure and water rights in place, there is a demand for water if it becomes available.

In regions that use surface water for agriculture withdrawals, the 2010 administrative water supply used as the starting point for the projections reflects a near normal water year for the region. For the 2020 through 2060 projections, therefore, it was generally assumed that the surface water demand is equal to the 2010 administrative water supply for both the high and low scenarios. Even if some farmers cease operations or plant less acreage, the water is expected to be used elsewhere due to surface water shortages. Conversely, if increased agricultural activity is anticipated, water demand in this sector was still projected to stay at 2010 administrative water supply levels unless there is a new source of available supply (i.e., water project or settlement).

In areas where 10 percent or more of groundwater withdrawals are for agriculture and there are projected declines in agricultural acreage, the low projection assumes that there will be a reduced demand in this sector. The amount of decline projected is based on interviews with individuals knowledgeable about the agricultural economy in each county (Section 6.2). Even in areas where the data indicate a decline in the agricultural economy, the high projection assumes that overall water demand will remain at the 2010 administrative water supply levels since water rights have economic value and will continue to be used.

The *livestock* category includes water used to raise livestock, maintain self-supplied livestock facilities, and support on-farm processing of poultry and dairy products (Longworth et al., 2013). High and low projections for percentage growth or declines in the livestock sector were developed based on interviews with ranchers, farm agency employees, and others with extensive knowledge of livestock trends in each county (Section 6.2). The growth or decline rates were then multiplied by the 2010 water use to calculate future water demand.

The *commercial (self-supplied)* category includes self-supplied businesses (e.g., motels, restaurants, recreational resorts, and campgrounds) and public and private institutions (e.g., public and private schools and hospitals) involved in the trade of goods or provision of services (Longworth et al., 2013). This category pertains only to commercial enterprises that supply their own water; commercial businesses that receive water through a public water system are not included. To develop the commercial self-supplied projections, it was assumed that commercial development is proportional to other growth, and the high and low projections were calculated as the 2010 commercial water use multiplied by the projected high and low population growth rates. In regions where the growth rate is negative, both the high and low projections were assumed to stay at the 2010 administrative supply water level , based on water rights having economic value. In regions where the population growth is initially positive but later shows a decline, the water demand projection will remain at the higher level for the remainder of the planning period, again based on the administrative water supply and the value of water rights. This method may be modified in some regions to consider specific information regarding plans for large commercial development or increased use by existing commercial water users.

The *industrial (self-supplied)* category includes self-supplied water used by enterprises that process raw materials or manufacture durable or nondurable goods and water used for the construction of highways, subdivisions, and other construction projects (Longworth et al., 2013). To collect information on factors affecting potential future water demand, economists conducted interviews with industrial users and used information from the New Mexico Department of Workforce Solutions (2014) to determine if growth is expected in this sector. Based on these interviews and information, high and low scenarios were developed to reflect ranges of possible growth. If water use in this category is low and limited additional demand is expected, both the high and low projections are the same.

The *mining* category includes self-supplied enterprises that extract minerals occurring naturally in the earth's crust, including solids (e.g., potash, coal, and smelting ores), liquids (e.g., crude petroleum), and gases (e.g., natural gas). Anticipated changes in water demand in this category were based on interviews with individuals involved in or knowledgeable about the mining sector. If water use in this category is low and limited additional demand is expected, both the high and low projections are the same.

The *power* category includes all self-supplied power generating facilities and water used in conjunction with coal-mining operations that are directly associated with a power generating facility that owns and/or operates the coal mines. Anticipated changes in water demand in this category were based on interviews with individuals involved in or knowledgeable about the power sector. If water use in this category is low and limited additional demand is expected, both the high and low projections are the same.

Reservoir evaporation includes estimates of open water evaporation from man-made reservoirs with a storage capacity of approximately 5,000 acre-feet or more. The amount of reservoir evaporation is dependent on the surface area of the reservoir as well as the rate of evaporation. Evaporation rates are partially dependent on temperature and humidity; that is, when it is hotter and drier, evaporation rates increase. Surface areas of reservoirs are variable, and during extreme drought years, the low surface areas contribute to lower total evaporation, even though the rate of evaporation may be high.

The projections of reservoir evaporation for each region were based on evaporation rates reported in the *Upper Rio Grande Impact Assessment* (USBR, 2013), which evaluated potential climate change impacts in New Mexico. This report predicted considerable uncertainty, but some increase in evaporation rates and lower evaporation totals overall due to predicted greater drought frequency and resultant lower reservoir surface areas. Although it is possible that total evaporation will be lower in drought years, since the projections are to be compared to 2010 use, assuming lower reservoir evaporation would give a false impression of excess water. Thus, the low projection assumes 2010 evaporation amounts. For the high projection, the same surface areas as 2010 were assumed, but higher evaporation rates, derived from the *Upper Rio Grande Impact Assessment* (USBR, 2013), were used to reflect potentially warmer temperatures. The high scenario projected using this approach represents a year in which there is a normal amount of water in storage but the evaporation rates have increased due to increasing temperatures.

In reality the fluctuations in reservoir evaporation are expected to be much greater than the high/low range projected using this method. To evaluate the balance between supply and demand, the projections are being compared to the administrative water supply including reservoir evaporation. It is important to not show an unrealistic scenario of excess available water. Therefore the full range starting with potentially very low reservoir surface areas was not included in the projections.

6.5.2 Mora San-Miguel Guadalupe Projected Water Demand

Table 6-5 summarizes the projected water demands for each water use category for each of the three counties, which were developed by applying the methods discussed in Section 6.5.1. As discussed in Section 6.3, population is projected to decline under the low projections in all three counties. For the high growth scenario, population is projected to decline slightly in Mora County, increase slightly in San Miguel County, and remain steady in Guadalupe County. The total projected water demand in the county in 2060 ranges slightly, from 108,700 to 111,041 acre-feet per year. Surface water supplies may be considerably lower in drought years, as discussed in Section 5.5.2, but the demand for water does not necessarily decrease when the supply is diminished.

Table 6-5. Projected Water Use, 2020 through 2060
Mora-San Miguel-Guadalupe Water Planning Region

Use Sector	Projection	Water Use (acre-feet) [a]					
		2010 [b]	2020	2030	2040	2050	2060
Mora County							
Public water supply [c]	Low/High	563	563	563	563	563	563
Domestic (self-supplied) [c]	Low/High	87	87	87	87	87	87
Irrigated agriculture	Low/High	12,914	12,914	12,914	12,914	12,914	12,914
Livestock (self-supplied)	High	400	220	300	320	340	380
	Low	400	180	220	260	300	340
Commercial (self-supplied) [c]	Low/High	237	237	237	237	237	237
Industrial (self-supplied)	Low/High	0	0	0	0	0	0
Mining (self-supplied)	Low/High	39	39	37	37	37	37
Power (self-supplied)	Low/High	0	0	0	0	0	0
Reservoir evaporation	Low/High	0	0	0	0	0	0
San Miguel County							
Public water supply	High	3,883	3,883	3,898	3,922	3,950	3,987
	Low [c]	3,883	3,883	3,883	3,883	3,883	3,883
Domestic (self-supplied)	High	654	654	665	684	707	736
	Low [c]	654	654	654	654	654	654
Irrigated agriculture	Low/High	36,913	36,913	36,913	36,913	36,913	36,913
Livestock (self-supplied)	High	598	359	419	448	478	508
	Low	598	299	299	329	389	419
Commercial (self-supplied)	High	1,161	1,161	1,186	1,220	1,263	1,314
	Low [c]	1,161	1,161	1,161	1,161	1,161	1,161
Industrial (self-supplied)	Low/High	3	3	3	4	5	7
Mining (self-supplied)	Low/High	0	0	0	0	0	0
Power (self-supplied)	Low/High	0	0	0	0	0	0
Reservoir evaporation	High	18,300	18,478	18,655	18,869	19,153	19,295
	Low	18,300	18,300	18,300	18,300	18,300	18,300
Guadalupe County							
Public water supply [c]	Low/High	799	799	799	799	799	799
Domestic (self-supplied) [c]	Low/High	39	39	39	39	39	39

[a] Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this table.

[b] Actual withdrawals (Longworth et al., 2013)

[c] Population growth rates are used to project future water use in this sector. Where growth rates are negative, projected use is set at 2010 withdrawals. The withdrawals in 2010 represent water that has been put to beneficial use and is a valid water right. For planning purposes it is assumed that valid water rights are maintained and will be used in the future.

Table 6-5. Projected Water Use, 2020 through 2060
Mora-San Miguel-Guadalupe Water Planning Region

Use Sector	Projection	Water Use (acre-feet) [a]					
		2010 [b]	2020	2030	2040	2050	2060
Guadalupe County (cont.)							
Irrigated agriculture	High	20,617	20,617	20,617	20,617	20,617	20,617
	Low	20,617	20,050	20,050	20,145	20,239	20,428
Livestock (self-supplied)	High	398	239	258	279	318	378
	Low	398	179	200	250	279	318
Commercial (self-supplied) [b]	Low/High	66	66	66	66	66	66
Industrial (self-supplied)	Low/High	0	0	0	0	0	0
Mining (self-supplied)	Low/High	0	0	0	0	0	0
Power (self-supplied)	Low/High	0	0	0	0	0	0
Reservoir evaporation	High	11,535	11,647	11,759	11,893	12,073	12,162
	Low	11,535	11,535	11,535	11,535	11,535	11,535
Total Region							
Public water supply	High	5,245	5,245	5,260	5,285	5,313	5,349
	Low [c]	5,245	5,245	5,245	5,245	5,245	5,245
Domestic (self-supplied)	High	780	780	791	810	834	863
	Low [c]	780	780	780	780	780	780
Irrigated agriculture	Low/High	70,444	70,444	70,444	70,444	70,444	70,444
	Low	70,444	69,877	69,877	69,972	70,066	70,255
Livestock (self-supplied)	High	1,396	818	977	1,047	1,136	1,266
	Low	1,396	658	719	839	968	1,077
Commercial (self-supplied)	High	1,464	1,464	1,489	1,523	1,566	1,617
	Low [c]	1,464	1,464	1,464	1,464	1,464	1,464
Industrial (self-supplied)	Low/High	3	3	3	4	5	7
Mining (self-supplied)	Low/High	39	39	37	37	37	37
Power (self-supplied)	Low/High	0	0	0	0	0	0
Reservoir evaporation	High	29,835	30,125	30,414	30,762	31,225	31,457
	Low	29,835	29,835	29,835	29,835	29,835	29,835
Total regional demand	High	109,206	108,918	109,416	109,912	110,560	111,041
	Low	109,206	107,901	107,960	108,176	108,400	108,700

[a] Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this table.

[b] Actual withdrawals (Longworth et al., 2013)

[c] Population growth rates are used to project future water use in this sector. Where growth rates are negative, projected use is set at 2010 withdrawals. The withdrawals in 2010 represent water that has been put to beneficial use and is a valid water right. For planning purposes it is assumed that valid water rights are maintained and will be used in the future.

Demand in the *public water supply* category is projected to increase slightly in San Miguel County under the high scenario, proportional to the slightly increasing population projections. However, demand in this category is not projected to decline proportionally to the projections indicating declining population, because it is anticipated that existing water rights and domestic wells will continue to be used at the 2010 administrative supply level.

Projected water demand in the *commercial* and *domestic* categories is assumed to be proportional to the population growth rates, which are anticipated to decrease except in San Miguel County, where a slight increase is projected under the high scenario. For these two categories the high water use scenario reflects this anticipated growth in San Miguel County and assumes use at current levels for the other two counties. The low projections for all counties assume current levels of use for the domestic and commercial categories.

Water use in all three counties occurs primarily in the *agricultural* category, and interviews (Section 6.2) indicated that declines in the sector are anticipated. However, irrigated agriculture in all three counties is heavily dependent on surface water, which is highly susceptible to drought; therefore, the recent drought, along with the recession, is thought to be driving the decline, rather than a decrease in desire on the part of agricultural water rights holders to put those rights to beneficial use. Thus it would not be prudent to assume a significant decrease in demand for agricultural water in the future. While it is possible that drought will continue over a longer term, it is also likely that drought years will be interspersed with wetter years, and there is some potential for renewed agricultural activity as a result. With the many adjudicated water rights in the region (Section 4), there is clearly a demand for agricultural water if it is available. Hence, water demand in this category is projected to remain at 2010 levels throughout the planning period in the high scenario. Slight declines in agricultural irrigation supplied by groundwater are projected under the low scenario in Guadalupe County.

Livestock in Mora County is expected to recover to 95 percent of 2010 levels by 2060 in the high projection, but only to 85 percent of 2010 levels in the low projection. In the latter scenario, some ranches will go out of business because younger people, who do not view ranching as a desirable or economically viable career choice, will not replace the older generation of ranchers. In San Miguel County, livestock is projected to not rebound to 2010 levels by 2060 under both the low and high scenarios, primarily because the younger generation is unlikely to follow the older generation into ranching. By 2060 livestock will reach only 70 percent of the 2010 level in the low scenario and 85 percent of 2010 water use in the high scenario. By 2060 in Guadalupe County livestock is projected to rebound to 80 percent of the 2010 level in the low scenario and 95 percent in the high scenario.

Mining, power, and *industrial* activity in the region is very low. To collect information on factors affecting potential future water demand, economists conducted interviews to determine if growth is expected in these sectors. Based on these interviews, no significant activity is

expected; therefore, the projected water demand for both the high and low projections in this category is the same. None of the counties have any significant mining activity, and no water use for oil and gas extraction using hydraulic fracturing is occurring or projected due to widespread opposition. None of the counties have any significant power generation activity, and with the exception of low use levels in Mora County, no such activity is expected in the future. A low level of industrial development is anticipated within San Miguel County.

The Mora-San Miguel-Guadalupe region projections include significant water demand in the *reservoir evaporation* category due to the presence of Santa Rosa and Conchas reservoirs. Though these reservoirs are almost entirely for the benefit of the downstream users, the use is recorded in the Mora-San Miguel-Guadalupe region (Longworth et al., 2013). As discussed in Section 6.5.1, the projected demand is based on 2010 reservoir surface areas so that it can accurately be compared to the 2010 administrative water supply. The reservoir evaporation category is included for statewide accounting, but has little bearing on the supply available to the Mora-San Miguel-Guadalupe region.

7. Identified Gaps between Supply and Demand

Estimating the balance between supply and demand requires consideration of several complex issues, including:

- Both supplies and demands vary considerably over time, and although long-term balanced supplies may be in place, the potential for drought or, conversely, high flows and flooding must be considered. In general, storage, including the capture of extreme flows for future use, is an important aspect of allowing surface water supplies to be used when needed to meet demand during drought periods (i.e., reservoir releases may sustain supplies during times when surface water supplies are inadequate).

- In wet years when more water is available than in 2010, irrigators can increase surface water diversions up to their water right and reservoirs will fill when inflow exceeds downstream demand, provided that compact requirements are satisfied, to increase storage for subsequent years. Thus, though not quantified, the withdrawals in wet years may be greater than the high projection.

- Supplies in one part of the region may not necessarily be available to meet demands in other areas, particularly in the absence of expensive infrastructure projects. Therefore comparing the supplies to the demands for the entire region without considering local issues provides only a general picture of the balance.

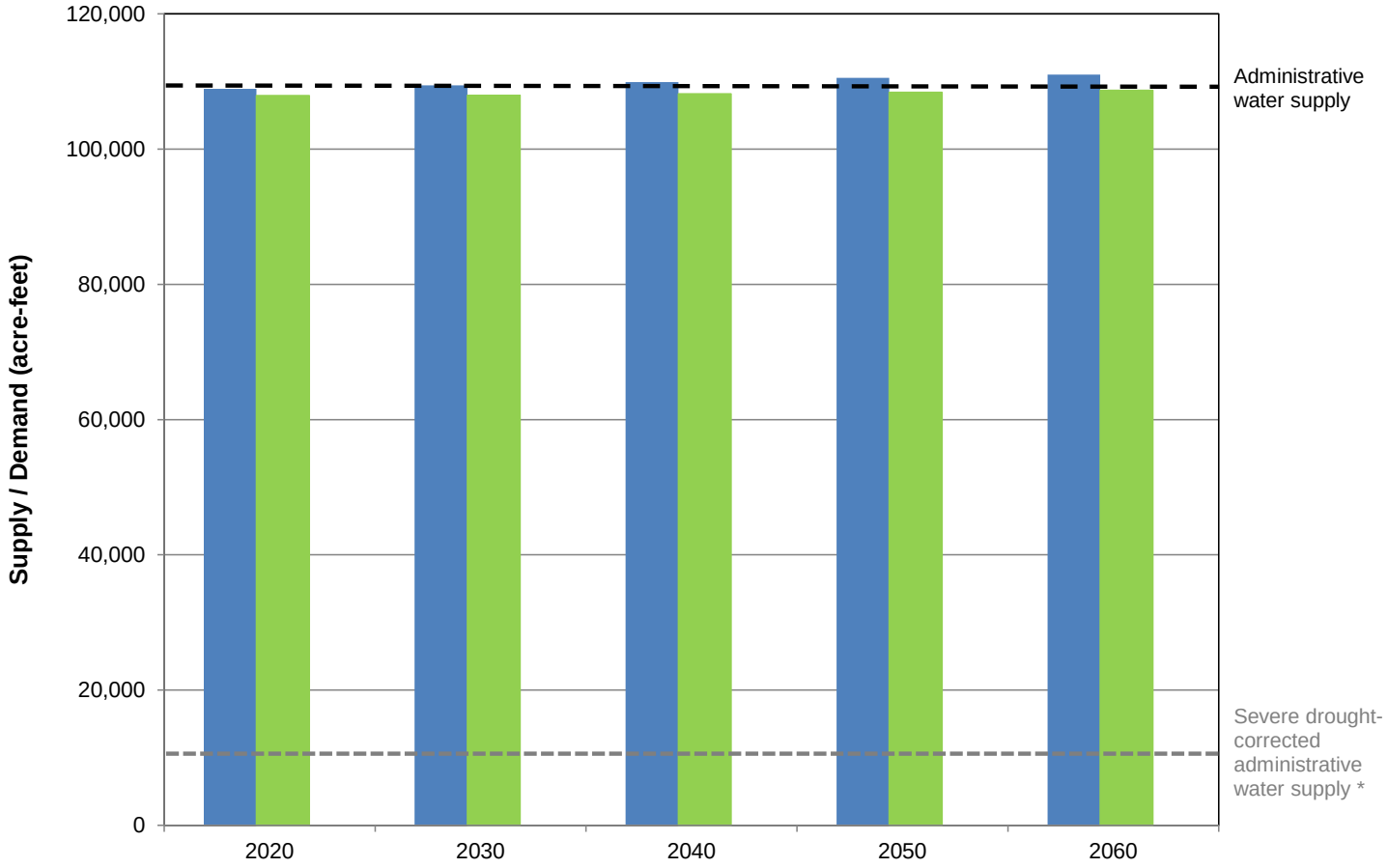
- As discussed in Section 6.5.1, the fluctuations in reservoir evaporation are expected to be much greater than the high/low projected range developed for this balance. When

comparing the projected demands to the administrative water supply, which is based on 2010 water withdrawals, 2010 surface areas of reservoirs were used to avoid an unrealistic scenario of excess available water. The actual amount of water that will be used for reservoir evaporation is dependent on the surface area of the reservoir and temperatures. During the first year of a drought when there is surface water in storage, the reservoir evaporation could be similar to 2010 use, but after subsequent years of drought, when storage and surface areas are lower, reservoir evaporation would be lower. As noted in Section 6.5.2, however, the reservoir evaporation category, while included for statewide accounting, has little bearing on the supply available to the Mora-San Miguel-Guadalupe region.

- As discussed in Section 4, there are considerable legal limitations on the development of new surface and groundwater resources, given that surface and surface-connected groundwater supplies are fully appropriated, which affects the ability of the region to prepare for shortages by developing new supplies.

- Besides quantitative estimates of supply and demand, numerous other challenges affect the ability of a region to have adequate water supplies in place. Water supply challenges include the need for adequate funding and resources for infrastructure projects, water quality issues, location and access to water resources, limited productivity of certain aquifers, and protection of source water.

Despite these limitations, it is useful to have a general understanding of the overall balance of the supply and demand. Figure 7-1 illustrates the total projected regional water demand under the high and low demand scenarios, and also shows the administrative water supply and the drought--adjusted water supply. As presented in Section 5.5, the region's administrative water supply is 109,205 acre-feet and the drought supply is 10,683 acre-feet, or about 10 percent of a normal year administrative water supply. Future water demand projections do not reflect substantial growth in water use (Figure 7-1), due to the declining economy discussed in Sections 3 and 6. However, even without significant growth in demand, major supply shortages are indicated in drought years. Because of its reliance on surface water, the region has a very high degree of vulnerability to drought, and the estimated shortage in drought years is expected to range from 98,000 to 100,000 acre-feet. Consequently, increasing storage, developing shortage-sharing agreements, protecting watershed health for the region's surface water supplies, and identifying alternative groundwater supplies are high priorities for the region.



* Based on the ratio of the minimum drought of record to the 2010 administrative water supply.

Note: Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

Figure 7-1

MORA-SAN MIGUEL-GUADALUPE
REGIONAL WATER PLAN 2016

Available Supply and Projected Demand

8. Implementation of Strategies to Meet Future Water Demand

An objective of the regional water planning update process is to identify strategies that will help the region prepare to balance the gap between supply and demand and to address other future water management challenges, including infrastructure needs, protection of existing resources and water quality, and the need to maximize limited resources through water conservation and reuse. The Mora-San Miguel-Guadalupe region considered a variety of strategies for addressing these water management challenges. As discussed in Sections 5 and 7, about 93 percent of the water used in 2010 was supplied by surface water; hence, the region is extremely vulnerable to drought, and there is a large gap between current and projected demands and drought supplies. In addition to the quantitative gap between supply and demand, the region identified concerns with project implementation, water storage, dam safety, acequia and drinking water system infrastructure and capacity, and watershed restoration. The strategies considered by the region address these comprehensive water management issues, as well as the supply-demand gap.

This RWP builds on the 2005 water plan and considers strategies that will enhance and update, rather than replace, the strategies identified in the accepted water plan. Section 8.1 assesses the status of strategies from the previous regional water plan. Additional strategies recommended in this RWP update—including a comprehensive list of projects, programs, and policies, key collaborative projects, and recommendations for the state water plan—are discussed in Section 8.3

8.1 Implementation of Strategies Identified in Previously Accepted Regional Water Plan

An important focus of the RWP update process is to both identify strategies and processes and consider their implementation. To help address the implementation of new strategies, a review of the implementation of previous strategies was first completed.

The 2005 *Mora-San Miguel-Guadalupe Regional Water Plan* recommended the following strategies for meeting future water demand:

- Municipal conservation, including education, rate structures, and graywater use, to reduce the demand in public water supplies
- Agricultural conservation, including on-farm improvements such as drip irrigation and delivery system efficiencies such as ditch lining, to reduce demands for agricultural use
- Watershed management, which focuses primarily on thinning in upland areas to reduce evapotranspiration and potentially increase water yields
- Non-native vegetation replacement, focusing on removal of salt cedar and re-establishment of lower-water-use native vegetation

- Water quality protection, including development of septic tank monitoring and maintenance or replacement programs
- Development of additional groundwater to provide supplies that are less vulnerable to drought conditions
- Development of additional storage through aquifer storage and recovery, raising the height of existing dams, building new dams, or removing accrued sediment
- Transferring water rights to create a permanent pool of water in Santa Rosa Lake
- Water rights protection, including adoption of acequia bylaws to prevent out-of-acequia transfers without the approval of the acequia
- Water banking, including mechanisms for short-term leasing of water rights within acequias or within larger geographic areas within the region
- Requiring proof of water availability to ensure that new subdivisions or other growth only occurs when reliable supplies have been secured prior to development
- Completion of 40-year water plans for municipalities and counties within the planning region
- Data collection, metering, measuring, monitoring and management to provide more reliable information for water resources planning

The steering committee reviewed each of the strategies and indicated that most are still relevant, though some are being refocused as new recommended strategies. Actions that have been completed in order to implement the strategies identified in the 2005 plan are summarized in Table 8-1.

8.2 Water Conservation

Municipal and small water system average per capita use in the Mora-San Miguel-Guadalupe Water Planning Region is variable (Section 6, Table 6-4); many systems have low per capita use, but some have moderate to high per capita uses. The larger municipal water systems have developed water conservation plans, and small drinking water systems in the region will continue to work toward improved water conservation and efficiency of water resources. Additionally, some smaller systems could benefit from assistance by the counties or agencies (such as the New Mexico Rural Water Association) in developing, updating, and implementing water conservation and drought contingency programs. Acequias in the region are also in need of capacity assistance for improved efficiency measures.

Table 8-1. Implementation Status of Strategies Identified in Accepted Plan Mora-San Miguel-Guadalupe Water Planning Region

Strategy	Status
Municipal conservation, including education, rate structures, and graywater use, to reduce the demand in public water supplies	Las Vegas increased water rates, increased usage of wastewater (reclaimed) thus reducing potable water, implemented a leak detection program, and completed an updated 40-year water plan. The City reduced demand by about 30 percent.
	Las Vegas completed a preliminary engineering report (PER) for additional reclaimed water usage.
	Las Vegas replaced meters on Gallinas.
	Santa Rosa Initiated a water rate study/conservation plan
	Santa Rosa Water reuse program in place that includes storage
	Santa Rosa Wastewater plant replaced and now more efficient
Agricultural conservation, including on-farm improvements such as drip irrigation and delivery system efficiencies such as ditch lining, to reduce demands for agricultural use	Guadalupe County made acequia improvement at Anton Chico.
	Storrie Project Water Users Association is working with Craig Conley from New Mexico Highlands University on agricultural conservation.
	Storrie Project Water Users Association has replaced several miles of open ditch with pipeline for improved water delivery and to reduce water loss. The Las Vegas National Wildlife Refuge/U.S. Fish and Wildlife Service through a deferred maintenance fund replaced 20 miles of open ditch with polyvinyl chloride piping.
	Tierra y Montes Soil and Water Conservation District (SWCD) received several grants for acequia improvements and private land support
Watershed management, which focuses primarily on thinning in upland areas to reduce evapotranspiration and potentially increase water yields	Santa Rosa did restoration on the El Rito Creek.
	Tierra y Montes SWCD completed numerous thinning projects.
	Hermit's Peak completed a watershed based plan, including plans for remediating temperature and conducting river and floodplain restoration. Hermit's Peak received a $1,000,000 grant for on-the-ground work.
	A water quality remediation project was completed in the lower Mora watershed.
	Mora County did a thinning project in Capulin with a Collaborative Forest Restoration Program (CFRP) grant.
	Canadian River restoration was conducted, funded through partnership with the Natural Resources Conservation Service (NRCS) (Jack Chatfield project).
	The Upper Pecos Watershed Association (UPWA) completed a watershed based plan.
	Pecos River improvements were implemented by UPWA.

Table 8-1. Implementation Status of Strategies Identified in Accepted Plan Mora-San Miguel-Guadalupe Water Planning Region

Strategy	Status
Watershed management (cont.)	A CFRP planning grant application was completed and will be submitted for future CFRP grants to mitigate fire.
	A river stewardship project was completed in the Dalton area.
	The recreation area in the upper Mora watershed was restored.
	Las Vegas conducted a thinning project in the Gallinas Watershed using Federal Emergency Management Agency (FEMA) funding.
	State Forestry and the U.S. Forest Service (USFS) conducted a thinning project.
	NRCS Regional Conservation Partnership Program helped with watershed treatment to remove invasive species. Four programs were funded in New Mexico including one conducted by the Tierra y Montes SWCD. The Program will continue to provide funding for watershed work that will also include private and state lands.
	NRCS in partnership with the New Mexico Environment Department (NMED) worked on the Gallinas watershed.
	An NMED statewide initiative has worked on a watershed-based approach throughout New Mexico.
Non-native vegetation replacement, focusing on removal of salt cedar and re-establishment of lower-water-use native vegetation	The Canadian SWCD has completed extensive salt cedar removal.
Water quality protection, including development of septic tank monitoring and maintenance or replacement programs	Las Vegas worked closely with NMED on addressing water quality issues. With the installation of new wells, the City has been able to rest some wells and allow for groundwater level recovery.
	Las Vegas improved well field monitoring (6 wells).
	Mora completed wastewater design work.
	NMED completed remediation of a leaking underground storage tank in the Sapello watershed.
	Mora completed wastewater treatment to protect water quality through federal and state funding.
Development of additional groundwater to provide supplies that are less vulnerable to drought conditions	Las Vegas installed 1 new well and rehabilitated 3 wells; 4 wells are now capable of operating.
	El Creston has developed an exploratory well.
Development of additional storage through aquifer storage and recovery, raising the height of existing dams, building new dams, or removing accrued sediment	Las Vegas worked on developing additional storage through money received for increasing capacity at Bradner Reservoir. There are no current plans to increase storage, though the dam will be rehabilitated.

Table 8-1. Implementation Status of Strategies Identified in Accepted Plan Mora-San Miguel-Guadalupe Water Planning Region

Strategy	Status
Development of additional storage (cont.)	Las Vegas investigated the feasibility of developing new groundwater resources.
	The Storrie Project Water Users Association has a legal agreement for water storage for Las Vegas.
	Morphy Lake restoration design was competed, which will help acequias and increase storage. Phase I construction funds have been approved.
Transferring water rights to create a permanent pool of water in Santa Rosa Lake	No activity noted by the steering committee.
Water rights protection, including adoption of acequia bylaws to prevent out-of-acequia transfers without the approval of the acequia	Many acequias have developed or updated bylaws. The New Mexico Acequia Association and New Mexico Legal Aid provided assistance.
	Numerous acequias have made improvements.
	Some acequias have signed agreements with the goal of protecting water rights.
Water banking, including mechanisms for short-term leasing of water rights within acequias or within larger geographic areas within the region	New Mexico Game & Fish leased water to the City of Las Vegas; this was a one-time lease to address water shortage.
Requiring proof of water availability to ensure that new subdivisions or other growth only occurs when reliable supplies have been secured prior to development	No activity noted by the steering committee.
Completion of 40-year water plans for municipalities and counties within the planning region	The Santa Rosa 40-year water plan was completed.
	Sangre de Cristo completed a 40 year plan and installed meters.
Data collection, metering, measuring, monitoring and management to provide more reliable information for water resources planning	A groundwater monitoring project was completed.

8.3 Proposed Strategies (Water Programs, Projects, or Policies)

In addition to continuing with strategies from the previous plan, the Mora-San Miguel-Guadalupe region discussed and compiled new project, program, and policy (PPP) information, identified key collaborative strategies, and provided recommendations for the state water plan. The recommendations included in this section were prepared by the Mora-San Miguel-Guadalupe Regional Water Planning Steering Committee and other stakeholders, and reflect their interest and intent. The recommendations made by the steering committee and other stakeholders have not been evaluated or approved by NMISC. Regardless of the NMISC's acceptance of this RWP, inclusion of these recommendations in the plan shall not be deemed to indicate NMISC support for, acceptance of, or approval of any of the recommendations, PPP information, and collaborative strategies included by the regional steering committee and other stakeholders.

8.3.1 Comprehensive List of Projects, Programs and Policies

Over the two-year update process, eight meetings were held with stakeholders in the Mora-San Miguel-Guadalupe region. These meetings identified the program objectives, presented draft supply and demand calculations for discussion and to guide strategy development, and provided an opportunity for stakeholders to provide input on the PPPs that they would like to see implemented (Section 2). A summary of the PPP information, obtained primarily from input supplied directly by stakeholders, is provided in Appendix 8-A. Information was requested during several open meetings. Requests for input were also e-mailed to all stakeholders who had expressed interest in the regional water planning process.

Some water projects were already identified through the State of New Mexico Infrastructure Capital Improvement Plan (ICIP), Water Trust Board, Capital Outlay, and NMED funding processes; these projects are also included in the Mora-San Miguel-Guadalupe PPP table. The projects included are from the 2017-2021 ICIP list (http://nmdfa.state.nm.us/ICIP.aspx, accessed March 2016), which is updated on an annual basis. Other infrastructure projects that are important to the region may therefore be identified before this RWP is updated again. In general, the region is supportive of water and wastewater infrastructure, water quality protection, watershed restoration, and water rights protection, in accordance with its plan goals.

The PPP list also contains several watershed restoration projects, including some identified in the New Mexico Forest Action Plan. New Mexico State Forestry Division provides annual updates to the recommended watershed restoration projects in the New Mexico Forest Action Plan, and the region is supportive of those ongoing watershed restoration projects, even those that are not specifically identified in the PPP list.

The information in Appendix 8-A has not been ranked or prioritized; it is an inclusive table of all of the PPPs that regional stakeholders are interested in pursuing. It includes both projects that are regional in nature (designated R in Appendix 8-A) and those that are specific to one system (designated SS in Appendix 8-A). The table identifies each PPP by category, including water and wastewater system infrastructure, water conservation, watershed restoration, flood prevention, water reuse, water rights, water quality, and data collection.

In the Mora-San Miguel-Guadalupe region, projects identified in the PPP table are primarily water system infrastructure including dam repairs, acequia system repairs, watershed restoration, and drought contingency projects.

8.3.2 Key Strategies for Regional Collaboration

Prioritizing projects for funding is done by each funding agency/program based on their current criteria, and projects are reviewed in comparison to projects from other parts of the state. Consequently, the regional water planning update program did not attempt to rank or prioritize the PPPs identified in Appendix 8-A. However, identifying larger regional collaborative strategies is helpful to successful implementation of the regional plan. At steering committee meetings held in 2015 and 2016, the group discussed PPPs that would have a larger regional or sub-regional impact and for which there is interest in collaboration with entities in other water planning regions to seek funding and for implementation.

The group used an informal process of discussing and refining the definition of potential collaborative strategies and voting to determine the projects of greatest interest and to identify opposition to proposed projects. Key collaborative strategies identified by the steering committee and Mora-San Miguel-Guadalupe region stakeholders are shown on Table 8-2.

In order to move forward with implementing the key collaborative projects, additional technical, legal, financial, and political feasibility assessment may be required. A detailed feasibility assessment was beyond the scope and resources of this RWP update.

The Mora-San Miguel-Guadalupe Steering Committee decided to form three subcommittees (Acequia Subcommittee, Watershed Restoration Subcommittee, and Mutual Domestic Subcommittee) to provide input on specific water management issues and strategies in the planning region, as discussed in Section 2. The Mutual Domestic Subcommittee worked with water systems to identify project needs, which are included in the PPP table in Appendix 8-A, and recommendations from all subcommittees were incorporated into the strategies listed on Table 8-2. Additionally, the Acequia and Watershed Restoration subcommittees provided policy recommendations, which are included in Sections 8.3.2.1 and 8.3.2.2.

Table 8-2. Key Collaborative Programs, Projects, and Policies
2016 Mora-San Miguel-Guadalupe Regional Water Plan
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Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Development of a regional water plan (RWP) implementation team to coordinate projects					
Establish a permanent regional group with limited authority to distribute project funds, provide advice, and conduct ongoing water planning processes. Coordinating proposals and resources would be an important goal. The team could set up a way to fund development of ideas to a point where they either become shovel-ready or are discarded.	Mora, San Miguel, and Guadalupe counties or possibly council of governments	• Existing regional water planning teams • New Mexico Interstate Stream Commission (NMISC) • New Mexico Environment Department (NMED) • Counties • Municipalities • Soil and water conservation districts (SWCDs) • Natural Resources Conservation Service (NRCS) • Councils of Governments • Regional acequia associations • Non-profit groups • Community based organizations • Watershed associations	State	Ongoing annual support needed	• Resistance by some local governments jealous of their authority • Need and difficulty of balancing interests • Money and administrative procedures

Table 8-2. Key Collaborative Programs, Projects, and Policies
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Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Integrated water plan					
Define water sources and uses, and determine how better management can be used to mitigate environmental, water supply, flooding, and risks. The goal is to maximize the use of each drop of water.	• San Miguel County • City of Las Vegas • Storrie Project Water Users Association • Rio Gallinas acequias	• Water users • SWCDs • Northeastern Economic Development District		$100,000	• Diverse interests with different planning objectives • Funding • Lack of preparation (e.g., water that could have been stored from recent flooding was lost due to poor infrastructure)
Watershed restoration and fire protection					
Minimize fire and flooding damage through implementation of forest management practices to protect watersheds and riparian areas within these watersheds. Mitigation measures include thinning, prescribed burns, riparian and floodplain restoration, and other management practices designed on a site-specific basis.	• Watershed groups • U.S. Forest Service (USFS) • State Forestry • Other interested parties • SWCDs	• Municipalities • Counties • Property owners • Volunteer fire departments	• Collaborative Forest Restoration Program (CFRP) • NMED • Water Trust Board • SWCDs	Costs vary depending on acreage, type of treatment, and location.	Coordination

Table 8-2. Key Collaborative Programs, Projects, and Policies
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Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Education on watershed best management practices					
Provide education on best management practices (BMPs) for fire prevention, livestock grazing, and road construction and maintenance. Topics could include: • Forest Service grazing (duration, timing) • Road maintenance, including cleaning culverts • Wildland Urban Interface (WUI) projects: $33,000,000 for rural fire and mutual domestics have been completed. • Hermits Peak Watershed efforts, watershed alliances within each area (state, county, federal) • Understanding the benefits of BMPs and living in the watersheds • Tying the youth to the land • Cattle causing problems downstream (perception problem) • Forest problem • Elk problem	Coordinated by RWP Implementation Team	• State government • Small unincorporated rural villages • Rural fire departments • El Valle youth farm to market internships • NRCS • SWCDs • Non-profit and watershed groups			Time and funding for outreach

Table 8-2. Key Collaborative Programs, Projects, and Policies
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Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Economic development planning linked with water / watershed issues					
Focus on economic development that is consistent with watershed health including: • Greenhouses • Fuel reduction and sale (firewood, lumber, pellets) • Farm-to-table-production and marketing (including cattle) • Acequias projects • Thinning projects	• IBMG (International Biomass Group) • Agriculture – Water Conservation Districts	• Los de Mora Growers • Farmers markets • San Miguel, Guadalupe, Mora counties • Communities within a 100-mile radius of Las Vegas • El Valle Youth internship program • Las Vegas/San Miguel Economic Development Leadership Collaborative • Hispanic Chamber of Commerce • Chamber of Commerce • Main Street organization	• NCRS block grants (EQUIP) • CFRP grants • USFS presence	Unknown	• Renewable energy • Technology catch up with reality • Concerns with wilderness area conditions (can't access wilderness) • Thinning projects are not profitable, dangerous, not economically feasible for landowners • Retaining and connecting people to the land • CFRP projects are extremely competitive.

Table 8-2. Key Collaborative Programs, Projects, and Policies
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Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Additional storage capacity					
Develop storage capacity that benefits acequias, MDWAs, municipalities, irrigation districts, and land grants. Small upland storage (watershed sponge) can address drought resilience and flood prevention. Rainwater harvesting is a component of the overall strategy.	• City of Las Vegas • Rural communities in upper watersheds	• Acequias • Mutual domestic water consumer associations (MDWCAs) • Municipalities • Irrigation districts • Land grants • SWCDs • NRCS • Hermits Peak Watershed Alliance • Other watershed groups • Counties • Storrie Lake Water Users Association	• Legislature • Water Trust Board • FEMA • User fees • Government bonds	$500,000 to $1,000,000 (feasibility study)	• Water rights • Environmental impact • Cost
Water disaster recovery (flood preparation and mitigation)					
• Review regional mapping and data related to the potential for flooding in the region. • Develop and implement a regional flood mitigation plan.	Office of Emergency Manager Region-Wide	• Municipalities • Counties • Acequias • Land grants • USFS	FEMA	$300,000	• Coordination • Finding funds

Table 8-2. Key Collaborative Programs, Projects, and Policies
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Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Dam safety					
Rehabilitate highest-priority dams based on risk / loss-of-life potential.	Each dam owner is a lead for their reservoir. The RWP implementation team would facilitate collaboration.	• New Mexico Office of the State Engineer (NMOSE) Dam Safety Bureau • County Offices of Emergency Management	• Legislature • User fees • Property tax	See Table 5-7	• Huge cost • Environmental impacts
Geohydrology database, aquifer mapping and groundwater exploration (drilling)					
To reduce drought vulnerability and provide more reliable groundwater supplies, this project would: • Compile existing reports and information. • Develop understanding of the region's groundwater resources, including quantity, quality, and age of the groundwater, and sustainability of groundwater resources • Conduct geohydrology studies in strategic areas. A second phase could include exploration of new groundwater resources	• Water Resources Research Institute and/or New Mexico Tech • Bureau of Geology & Mineral Resources • County and municipal governments • MDWCAs	• New Mexico State University (NMSU) • University of New Mexico • New Mexico Highlands University (NMHU) • U.S. Geological Survey (USGS) • Other universities • County • Municipality • Private sectors • MDWCAs? • NMOSE • NMED	• State, federal, and private • Capital Outlay • USGS • General obligation bonds	>$100,000 >200K for drilling	• Cost and political will • Some of this may already be in progress • Financial resources • Human resources • Access to property

Table 8-2. Key Collaborative Programs, Projects, and Policies
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Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Regionalization of MDWCAs					
Provide opportunities to improve small system efficiency and capacity by looking for ways to share resources for: • Technical management • Financial management • Safe Drinking Water Act compliance in some locations • Infrastructure improvement	Ramon Lucero / El Valle Water Alliance	• MDWCAs? • County governments • NMED • Funders	• Water Trust Board • Capital Outlay • Drinking Water State Revolving Loan Fund • U.S. Department of Agriculture • New Mexico Finance Authority • Community Development Block Grant for planning	>$100,000	Public perceptions

8.3.2.1 Acequia Subcommittee Recommendations

The Acequia subcommittee provided the following recommendations for protection of acequias in the Mora-San Miguel-Guadalupe region.

Protect Acequias and Agricultural Land

Protect the relative seniority of acequia water rights in accordance with the prior appropriation doctrine while also recognizing water sharing customs and agreements between and among acequias.

Strengthen coordination between acequias for water sharing agreements and between acequia and neighboring entities who share surface water supplies, provided that the State Engineer has the capacity to enforce priority if necessary.

Recognize and protect historic diversion rights of acequias to ensure adequate pressure head for efficient water delivery and irrigation.

Protect acequias from the negative impacts of water transfers and prevent expedited marketing of acequia-based water rights by protecting due process in the water transfer process and by including consideration of impairment of existing rights, public welfare, and conservation of water.

Support the continued use of a special valuation method for agricultural land by local county assessors that protects agricultural lands from abrupt and significant increases in property taxes.

Affirm Acequia Governance and Water Management

Support acequia mayordomos and commissioners in their local leadership duties to manage water by custom and tradition. Encourage all acequias to develop a common understanding of their water sharing customs and urge acequias to practice their traditions as an alternative or complement to State Engineer administration of water rights.

Ensure that any administration by the State Engineer support and complement acequia water management and that such administration not replace or interfere with historic customary practices of acequias.

Strengthen coordination between local acequias and Office of the State Engineer in implementing the 2003 acequia water transfer statutes (Sections 72-3-21(E) and 73-3-4.1, NMSA 1978) which authorize acequias to approve or deny water transfers. By statute, the State Engineer cannot consider an application for a water transfer into or out of an acequia unless the respective acequia has already approved the application.

Protect acequia easements through documentation and enforcement at the acequia level, request district attorneys to interpret easements for law enforcement and represent acequias in easements as appropriate, requesting real estate agents provide relevant information on easement to new property owners, and educating the public about the relevance, legal status, and significance of acequia easements.

Ensure that the State Engineer consult with affected acequias prior to a metering order to determine whether alternative means can be used to manage water rights in a stream system and, if a metering order is issued, recognize the autonomy of the acequia in determining the most appropriate metering agreement to protect the right of the acequia to govern and manage its own diversion.

Request that the State Engineer include acequias in affected basins in the process of promulgating basin specific AWRM regulations and that those regulations recognize and provide a mechanism to support acequia water sharing customs and practices and explicitly include provisions that acequias are exempt from expedited markets.

Support the participation of young people in acequias and will develop programs that engage young people in acequia traditions, producing educational materials about acequias, and developing community-based youth mentorship programs.

Protection and Management of Rural Water Rights

Incorporate into local and state policymaking recent research about the hydrological benefits of acequias including findings that acequias improve aquifer recharge and regulate stream flows.

Enact protections for communities at risk for water exports such as rural communities that are facing applications to transfer water rights out of their respective regions to other regions with greater economic wealth.

Scrutinize and revisit previously granted groundwater permits under the "pump now, pay later" system of offsets and relinquishment credits and develop strategies to minimize depletions on aquifers and the negative effects on irrigated agriculture.

Allow the change in point of diversion from domestic wells to MDWCAs, ensure that acequias have the option to lease water rights to MDWCAs rather than being restricted to permanent transfers, encourage acequias and MDWCAs in the same community to collaborative work on water right issues and to ensure the continued viability of acequias and to ensure a safe and secure supply of domestic water, and encourage acequias and MDWCAs to work together to retain local ownership and control of water rights so that water can be protected as a community resource in perpetuity.

Support more stringent regulation of surface water impoundments to prevent further impairment of acequia-based water rights and supports local efforts to prevent impairment of acequia-based water rights by upstream impoundments through legal strategies.

Prevent the condemnation of agricultural and rural water rights by municipalities, water utilities, or other state or local governmental entity by advocating reform to state statutes on eminent domain and develop strategies to stop speculative development that drives water rights away from rural and agricultural regions of the state.

Strategic Reinvestment in Irrigation Infrastructure

Consider the unique needs of acequias in enacting policies for capital funding by ensuring that acequias have access to technical assistance for planning and design of projects, that acequia construction projects are funded completely or in functional phases with partial funding, and that oversight and administration of acequia capital outlay funding continue to be provided by the Interstate Stream Commission with adequate resources for staff,

Protect the long term viability of the Irrigation Works Construction Fund of which $1.9 million annually is set aside for acequia projects. Funds are used for state-acequia 90-10 cost share program.

Reform capital outlay funding through a system of technical support that will ensure timely completion of projects and that provides adequate funding for completion of functional phases of projects.

Create additional revenue streams for water infrastructure generally and for acequias. Pass General Obligation Bonds (GOB) for statewide water infrastructure. Create a set aside for acequias in the Water Project Fund which is allocated by the Water Trust Board.

Fair and Timely Adjudication of Water Rights

In the adjudication process, provide opportunities to negotiate differences between the state and claimants early in the process and encourage greater support for negotiated settlements between various parties that can help bring closure to water rights adjudication cases.

Acequia Agriculture as Rural Economic Development

Make agricultural revitalization a priority in rural economic development. Policy initiatives and working groups around food, agriculture, and rural development policy should include acequia leadership.

Support programs for providing technical and financial assistance to farmers and ranchers, including youth, as well as for community and regional projects to rebuild local food systems.

Support funding for fresh, local fruits and vegetables in New Mexico schools by supplementing federal funds to buy local produce.

Watershed Management

Support policies that recognize the historic and traditional uses of acequias, land grants, and farmers and ranchers including improvements to historic irrigation works, grazing, harvesting of wild foods and herbs, gathering of firewood, and other traditional uses.

Support landscape-scale restoration of watersheds through mechanical thinning and other methods of watershed restoration that would improve the health of forests while also reducing the risk of catastrophic wildfire. Encourage the development of biomass systems that can utilize material harvested from thinning operations and the development of businesses with the ability to use small diameter timber.

8.3.2.2 Watershed Restoration Subcommittee Recommendations

The Watershed Restoration Subcommittee has provided the following guidance regarding watersheds in the Mora-San Miguel-Guadalupe water planning region.

Summary - Watersheds are the most fundamental part of our water supply system. When they are healthy and well functioning, they provide a sustainable supply of clean and abundant water and contribute substantially to the resilience of our communities. When they are not healthy, they can create many challenges that need costly measures to overcome. Restoring and maintaining their health is a cost effective means of ensuring our future water supply with numerous ancillary benefits.

Definition - A watershed is a region of land that drains to a particular body of water such as a river or a lake. Rain or snow that falls anywhere in that watershed eventually flows to that water body. It travels overland as surface water or flows underground as groundwater. A watershed includes all the rocks, soil, topography, water, plants, animals, and humans that occur within its boundary. The condition and interactions between these watershed elements affect the quality and quantity of water they produce.

Watersheds in the Mora/San Miguel/Guadalupe counties planning area include:

- *Mora River*
- *Upper Canadian River*
- *Upper Canadian-Ute Reservoir*
- *Conchas River*
- *Pecos Headwaters (Gallinas River)*
- *Pintada Arroyo*
- *Upper Pecos River*

Functions and Structures - Watersheds naturally serve as water conveyance, filtration and storage systems whose capacity to offer those ecological services has been largely underestimated. The condition of the landscape, soils, plants and wildlife across watersheds effect how well watersheds transport, filter and

store water. Restoring and maintaining the health of the land in our watersheds is a crucial part of ensuring that we have an adequate supply of clean water in the future.

Watersheds by their very nature are complex geographically, ecologically, and culturally so they need to be managed locally and uniquely. All parts of a watershed interact to produce water needed to maintain the region and its inhabitants. Ecological services provided by watersheds include:

- *capture, store, filter and transport water;*
- *regulate surface and ground water flow over space and time;*
- *reduce the severity of natural disturbances such as floods, drought, and fire;*
- *rebound after natural disturbances and human uses;*
- *produce and support topographic features, soil structures, vegetation, and wildlife that aid in watershed functions;*
- *produce natural resources (water, timber, forage, space) of value to humans.*

Important watershed structural elements that must be intact for them to function at optimal capacity are:

- *soil structure and composition that enables water to infiltrate;*
- *abundant and diverse upland, floodplain, and riparian plant cover;*
- *appropriately shaped drainages (i.e. hydrogeomorphology that is appropriate for the size and type of drainage);*
- *connectedness of drainages to their floodplains;*
- *intact and abundant wetlands.*

Watershed restoration involves on-the-ground work to improve the capacity of watersheds to perform these functions and sustain these structures. Restoration and subsequent management enable watersheds to provide ecosystem services to humans and support the natural communities that are essential to keeping watersheds self-sustaining.

Human Uses - We all use watersheds and often unknowingly affect their health. Watershed uses range from backcountry sportsmen and recreationalists, foresters, vacationers, farmers and acequia members, livestock growers, cottage industries, rural property owners, urban dwellers, businesses and each of us who drink or use water that they yield. Everyone gains when our watersheds are healthy; work to restore watershed health has far reaching benefits.

Degraded Conditions - Numerous watershed functions and structures have become degraded over time by human uses with negative consequences to water quality, water quantity, water flow regulation, and the ability of watersheds to reduce the severity of natural disturbances (floods, fire, and drought) and rebound after them. These conditions exist throughout the planning region and compromise the ability of key watershed structures and functions to perform effectively.

1. *Degraded drainage systems*
2. *Degraded riparian areas*
3. *Lost or degraded wetlands*
4. *Degraded floodplains and disconnected drainages from their floodplain*
5. *Degraded upland plant communities including forests and non-forested areas*
6. *Road systems incompatible with watershed functions*
7. *Upland and drainage channel erosion*

8. *Noxious and invasive plants*
9. *Lost or reduced fish and wildlife population*
10. *Overuse and lack of maintenance of existing recreational facilities*
11. *Pollution from human waste*

Restoration Needed – All of these degraded conditions can be remedied with thoughtful restoration and follow-up management activities. Watershed restoration and management planning must first occur to identify specific types and locations of degradation then recommend and prioritize needed actions. Well funded implementation of plans must then occur to realize long-term water supply benefits.

8.3.3 Key Program and Policy Recommendations

The legislation authorizing the state water plan was passed in 2003. This legislation requires that the state plan shall "integrate regional water plans into the state water plan as appropriate and consistent with state water plan policies and strategies" (§ 72-14-3.1(C) (10)). For future updates of the state water plan, NMISC has asked the regions to provide recommendations for larger programs and policies that would be implemented on a state level. These are distinct from the regional collaborative projects listed in Table 8-2 and the PPPs listed in Appendix 8-A, in that they would be implemented on a state level rather than on a regional or system-specific level. The State will consider the recommendations from all of the regions, in conjunction with state-level goals, when updating the state water plan.

After group discussion, the Mora-San Miguel-Guadalupe region identified the following recommendations for PPPs to be considered in the state water plan:

- Support capacity building and funding for small drinking water systems.
- Support capacity building for acequias.
- Support landscape-scale watershed restoration programs.
- Support mechanisms for RWP implementation including additional studies and planning needed to have "shovel-ready" projects.
- Develop a database of geohydrology reports, preliminary engineering reports, and technical data.
- Support education for best management practices to protect watersheds, including catastrophic fire prevention and mitigation and livestock management.
- Support economic development planning that is linked with water/watershed issues.
- Develop water disaster recovery programs, including flood preparation and mitigation.
- Address dam safety issues.
- Develop and fund groundwater aquifer mapping.

During an open meeting the group was given an opportunity to identify any policy recommendations that they thought would be problematic or lacked support; one recommendation regarding interbasin transfers was considered problematic, and after discussion the group decided to remove it from the list. The recommendations listed above did not have any opposition.

The 2016 Regional Water Plan characterizes supply and demand issues and identifies strategies to meet the projected gaps between water supply and demand. This plan should be added to, updated, and revised to reflect implementation of strategies, address changing conditions, and continue to inform water managers and other stakeholders of important water issues affecting the region.

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Appendix 2-A

Master Stakeholder List

Mora San Miguel-Guadalupe Region 8 RWP Master Stakeholder List

Updated June 14, 2016

Last	First	Affiliation/Category
Alcón	Kenneth	USDA-NRCS
Alexander	Joe	San Antonio de Cleveland MDWCA
Ammerman	S.K.	
Anderson	Harry	El Ancon MDWCA
Apodoca	Francisco	
Aragon	Clarence	Mora Mutual Water & Sewage Association
Aragon	Hilario	President of the Sangre de Cristo Regional Water Provider
Aragon	Yvonne	Acequia de los Ranchitos
Archuleta	Juan	Western Mora Soil & Water
Arellano	Ella	Mora Watershed Alliance
Austin	Carmen	NM State Forestry
Baca	Joaquin	US Fish and Wildlife
Baca	Joseph	KFUN Radio
Bain	Michael	General Manager, Twin Willows Ranch
Bentson	Ken	New Mexico Highlands University Department of Natural Sciences
Bernard	Scott	Lisboa Springs Fish Hatchery
Blaine	Tom	State Engineer
Boney	Peggy	Peggy's Produce
Bordegaray	Angela	State Water Planner, NM Interstate Stream Commission, OSE
Brinkman	Jim	
Campos	Pete	Senator, State of NM
Cantú	Philip Don	
Casias	Henry	Rainsville Water & Sanitation District
Cassidy	Bertha	North Cleveland MDWCA
Castro	Veronica	El Valle Water Alliance
Chatfield	Jack/Jill	Canadian River Riparian Restoration Project
Chavez	Felix	San Miguel County Planning & Zoning
Chavez	Michael	Guadalupe County
Cole	Don W.	Gallinas Water Master, OSE – Water Resource Allocation Program
Cordova	Gary L.	Army Corps of Engineers Santa Rosa Lake
Cordova	Onofre	City of Santa Rosa
Cordova	Vincent	Chairman, Guadalupe SWCD
Cribbs	Shank	Park Manager, Santa Rosa Lake SP
Dixon	Deborah	Interstate Stream Commission Director
Dodge	Tim	City Manager, Santa Rosa

Note: Those interested in developing collaborative projects or ongoing planning efforts may contact the NMISC Regional Water Planning Manager for further information about the region's stakeholders.

Mora San Miguel-Guadalupe Region 8 RWP Master Stakeholder List

Updated June 14, 2016

Last	First	Affiliation/Category
Dodge	George	Representative, State of NM
Dorman	Sheldon	OSE
Dunbar	Betty	Gallinas Canal
Estrada	Gabe	RGAA
Farmer	Tim	Office of the State Engineer District 7
Fenzi,	Lavinia	
Fernandez	Reina	Upper Pecos Watershed Association
Franko	Virginia	Ranching
Gallegos	Candelaria	NMED
Galvan	John	Lt. Governor, Jemez Pueblo
Garcia	Lorraine	Hermits Peak Watershed Alliance
Garcia	Paula	New Mexico Acequia Association Mora County Commission
Garcia	Roman	Mayor, Vaughn
Geery	Emily	Manager, ISC
Ghahate	Eric	NCNMEDD
Gilvarry	Maria	Interim Director Water Systems Manager City of Las Vegas Utilities Department
Gonzales	Danica	Santa Rosa Administrator
Gonzales	Ray	
Gonzales	William	New Mexico Acequia Commission
Gonzales	Yvette	City of Las Vegas City Clerk's office
Griego	Alfonso	Commissioner, Mora County
Griego	Joseph	Mora Watershed Alliance
Gurule	Tonita	Mayor, City of Las Vegas
Gutierrez	Adrian	Anton Chico Rest Area East Bound
Hayward	Claude	Tecolotito MDWCA
Hendrickson	Bill	Executive Director, Las Vegas / San Miguel Economic Development Corp.
Herrera	Joe and Angela	Tecolote Grant
Hilton	Joanne	Consultant
Hinker	Fred & Colleen	
Honegger	Martin	Pino Creek Ranch
Horwitz	Carol	White Duck Farm

Note: Those interested in developing collaborative projects or ongoing planning efforts may contact the NMISC Regional Water Planning Manager for further information about the region's stakeholders.

Mora San Miguel-Guadalupe Region 8 RWP Master Stakeholder List

Updated June 14, 2016

Last	First	Affiliation/Category
Howell	Vince	Councilor, City of Las Vegas
Jaramillo	Andrew	Western Mora SWCD Board
Jaramillo	Barbara	Sangre de Cristo Regional Water
Jeffords	Doug	Upper Pecos Watershed Association
Johnson	Carol	UPWA
Knutson	Lea	Hermits Peak Watershed Alliance
Lands	Marianna	Mora Watershed Association Advisory Committee
Larrañaga	Rob	Wildlife Refuge Manager, Northern New Mexico National Wildlife Complex, USFWS
Littlewood	Tim	Tenorio Travel Center
Louisell	Catherine A.	
Lovato	Carlos	Natural Resource Specialist, Forest Service, Pecos/Las Vegas Ranger District
Lucero	Cynthia	Gabaldon MDWCA
Lucero	Ken	El Curuco MDWA
Lucero, Jr.	Ramòn	El Valle Water Alliance
Lujan	Eugenio	NM Cooperative Extension Service Guadalupe County
Maestas	Alvin	Commissioner, Guadalupe County
Maestas	Pearl	Anton Chico
Mann	Bill	Anton Chico Acequia
Marquez	Celia	Sangre de Cristo Regional Water
Martinez	Elmer	City Manager, City of Las Vegas
Martinez	Frances	Tierra y Montes SWCD
Martinéz	Sofia	
Matthews	Denny and Debby	Las Vegas KOA
McCasland	Franklin	AHCD
Medina	Gina-Marie	Administrative Assistant to the County Manager
Meyers	Mark	NM State Lands Office
Micelli	Mark	Santa Rosa Utilities Director
Montoya	Michael	
Montoya	W.J. Les	County Manager, San Miguel County
Muller	Werner	Storrie Project
Old	David	Old Wood
Olivas	John	NM Wilderness Alliance
Olivas	Julian R.	Western Mora SWCD Board

Note: Those interested in developing collaborative projects or ongoing planning efforts may contact the NMISC Regional Water Planning Manager for further information about the region's stakeholders.

Mora San Miguel-Guadalupe Region 8 RWP Master Stakeholder List

Updated June 14, 2016

Last	First	Affiliation/Category
Ortiz	Alfonso	
Ortiz	Luis	Executive Director, NMHU Economic Development Center
Pacheco	Russell	San Miguel County
Padilla	Joseph	New Mexico Acequia Commissioner
Park	Dave	USFS SF National Forest
Perea-Casey	Barbara	Councilor, City of Las Vegas
Price	Martha	President, Gallinas Canal
Quintana	Ernest	Sapello Watershed Acequia
Quintana	L.T.	Mayor, Village of Wagon Mound
Quintana	Robert M.	Storrie Project Water Users Association
Quintana	S	US Forest Service Jacks Creek Campground
Reichert	Steve	Tierra y Montes SWCD
Reid	Kent	NM Watershed Restoration Institute Highlands University
Riseley-White	Hannah	ISC
Rivera	Jose	UNM Professor
Rivera	Marino	Acequia Association Mora Valley Community Health Clinic
Rivera	Megan	District Manager, Western Mora SWCD
Romero	Charles	Pecos Dairy Queen
Romero	David	Councilor, City of Las Vegas
Romero	Eric	Vice-Chair, New Mexico Acequia Commissioner
Romero	Rosemary	Rosemary Romero Consulting
Romero	Steve	US Forest Service
Roybal	Eloy & Anita	
Roybal	Tony J.	Mayor, Village of Pecos
Silas	Stephen	Congressman Ben R. Lujan's Office
Salayandia	Nick	Benedictine Monastery
Salazar	David R.	Chapelle MDWCA
Salazar	Tomas	NM State Representative
Sanchez	Ben	Manager, Mora County
Sanchez	Gary	Village of Wagon Mound
Sanchez	Michael	Acting Park Manager, Storrie Lake SP
Sanderson	Linda	Buena Vista MDWCA

Note: Those interested in developing collaborative projects or ongoing planning efforts may contact the NMISC Regional Water Planning Manager for further information about the region's stakeholders.

Mora San Miguel-Guadalupe Region 8 RWP Master Stakeholder List

Updated June 14, 2016

Last	First	Affiliation/Category
Schaeffer	Neal	NMED
Scheinberg	Joel	Owl Ridge
Sena	Edward	El Valle Water Alliance
Sena	Peter	MDWCA
Serna	Veronica	Buena Vista Community Ditch
Sill	Duncan	North Central Economic Development
Sloan	Mike	Lisboa Springs Fish Hatchery
Solyntjes	Gene	
Tafoya	Alex	San Miguel County
Taylor	George	
Thornburg	Chris	OSE
Trujillo	George	Vice Chairman, Mora County Commission
Trujillo	Harold	Mora Acequias
Trujillo	Richard	City Manager, City of Las Vegas
Ulibarri	David	Councilor, City of Las Vegas
Vander Meer	Sharon	Chair, LV-SM EDC board
Varela	Wanda	La Cueva MDWCA
Velarde	Doris	Rainsville Water & Sanitation District
Vigil	Christopher	Park Manager, Coyote Creek State Park
Vigil	Dave	Director of Facilities and Transportation, United World College
Vigil	Ralph	Chairman, New Mexico Acequia Commission
Vollmer	Art	Trout Unlimited
Wessely	Bob	Las Vegas City Water Board
Zebroski	Cheryl	Sustainable Las Vegas El Creston MDWCA
Zebroski	Joe	NM Highlands University El Creston MDWCA

Note: Those interested in developing collaborative projects or ongoing planning efforts may contact the NMISC Regional Water Planning Manager for further information about the region's stakeholders.

Appendix 6-A

List of Individuals Interviewed

Appendix 6-A. List of Individuals Interviewed
Mora-San Miguel-Guadalupe Water Planning Region

Name	Title	Organization	City
Clarence Aragon	President	Mora Mutual Water/Sewage Association	Mora
Rebecca Montoya	County Manager	Mora County	Mora
Roger Gonzalez	President	Mora County, Entrepreneurial Network, Los de Mora Local Growers' Cooperative	Mora
Kenneth Alcon	District Conservationist	USDA NRCS	Las Vegas
D'Layne Bruce	District Conservationist	USDA NRCS	Santa Rosa
Lavinia Fenzi	President	Las Vegas/San Miguel County Chamber of Commerce	Las Vegas
Merl Witt	Treasurer	Mora Valley Chamber of Commerce	Mora
Duncan Sill	Economic Development Director	North Central NM Economic Development District	Santa Fe
Tim Dodge	City Manager	City of Las Vegas	Las Vegas
Ernesto Salazar	VP Commercial Loans	First Bank	Las Vegas
George Dodge	County Manager	Guadalupe County	Santa Rosa
Richard Delgado	Director	City of Santa Rosa Economic Development	Santa Rosa
Dawn Biagianti	CFO	Mora Independent Schools	Mora
Denise Baca	Human Resources Specialist	West Las Vegas Public Schools	Las Vegas
Monica Abeita	Projects Coordinator	Guadalupe County	Santa Rosa
Sandy Chancey	Director	Eastern Plains COG	Clovis
Ken Bentson	Dean	Highlands University	Las Vegas
Les Montoya	County Manager	San Miguel County	Las Vegas

Appendix 6-B

Projected Population Growth Rates 2010 to 2040

Appendix 6-B. BBER Projected Five-Year Population Growth Rates, 2010 to 2040 Mora-San Miguel-Guadalupe Water Planning Region

County	Five-Year Growth Rate (%)					
	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040
Mora	-0.33	-0.80	-1.51	-1.85	-2.51	-2.75
San Miguel	-0.27	-0.54	-1.28	-2.12	-2.71	-2.99
Guadalupe	1.17	0.49	0.29	-0.06	-0.06	-0.27

Source: New Mexico County Population Projections, July 1, 2010 to July 1, 2040. Geospatial and Population Studies Group, Bureau of Business & Economic Research, University of New Mexico. Released November 2012.

Appendix 8-A

Recommended Projects, Programs, and Policies

Regional Water Planning Update

Projects, Programs, and Policies 6/28/2016

Water Planning Region: Mora-San Miguel-Guadalupe

Information Sorted by County then Project Lead

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program or Policy)	Category	Project Name	Source of Project Information[a]	Description	Project Lead (Entity or Organization)	Partners (Other Entities or Participants)	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or Reason for the Project, Program, or Policy	Comments
aaMora San Miguel Guadalupe	R	Program	Water Planning	Development of a mechanism for a regional water plan implementation team with funding to coordinate projects	Steering Committee, see Table 8-2	Establish a permanent regional group with limited authority to distribute project funds, provide advice, and conduct ongoing water planning processes. Coordinating proposals and resources would be an important goal. The team can set up a way to fund development of ideas to a point where they either become shovel-ready or are discarded.	A key project from the Steering Committee. The project lead is Mora, San Miguel, and Guadalupe Counties or possibly Council of Governments	• Existing RWP teams • NMISC • NMED • Counties • Municipalities • Soil and Water Conservation Districts (SWCDs) • Natural Resources Conservation Service (NRCS) • Councils of Governments • Regional Acequia Associations • Non-profit groups • Community based organizations • Watershed associations			Ongoing annual support needed		implementation Issues: resistance by some local governments jealous of their authority, need and difficulty of balancing interests, money and administrative procedures
abMora San Miguel Guadalupe	R	Project	Water Planning	Integrated water plan	Steering Committee, see Table 8-2	Define water sources and uses, and determine how better management can be used to mitigate environmental, water supply, flooding, and risks. The goal is to maximize the use of each drop of water.	A key project from the Steering Committee. The project leads are San Miguel County, City of Las Vegas Storrie Project Water Users Association and Rio Gallinas Acequias	• Water users • SWCDs • Northeastern Economic Development District			$100,000		Implementation Issues: diverse interests with different planning objectives, funding, lack of preparation (e.g., water that could have been stored from recent flooding was lost due to poor infrastructure)
acMora San Miguel Guadalupe	R	Project	Watershed Restoration	Watershed restoration and fire protection	Steering Committee, see Table 8-2	Minimize fire and flooding damage through implementation of forest management practices to protect watersheds and riparian areas within these watersheds. Mitigation measures include thinning, prescribed burns, riparian and floodplain restoration, and other management practices designed on a site-specific basis.	A key project from the Steering Committee. The project leads are watershed groups, U.S. Forest Service (USFS), State Forestry, other interested parties, SWCDs	• Municipalities • Counties • Property owners • Volunteer fire departments			Costs vary depending on acreage, type of treatment, and location.		Implementation Issues: coordination

[a] ICIP = Infrastructure Capital Improvement Plan (Projects, programs or policies may appear in this table more than once due to the compilation of PPPs and ICIP into one table.)

Regional Water Planning Update

Projects, Programs, and Policies 6/28/2016

Water Planning Region: Mora-San Miguel-Guadalupe

Information Sorted by County then Project Lead

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program or Policy)	Category	Project Name	Source of Project Information[a]	Description	Project Lead (Entity or Organization)	Partners (Other Entities or Participants)	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or Reason for the Project, Program, or Policy	Comments
adMora San Miguel Guadalupe	R	Project	Watershed Restoration	Education on watershed best management practices	Steering Committee, see Table 8-2	Provide education on best management practices (BMPs) for fire prevention, livestock grazing, and road construction and maintenance. Topics could include: • Forest Service grazing (duration, timing) • Road maintenance, including cleaning culverts • Wildland Urban Interface (WUI) projects: $33,000,000 for rural fire and mutual domestics have been completed. • Hermits Peak Watershed efforts, watershed alliances within each area (state, county, federal) • Understanding the benefits of BMPs and living in the watersheds • Tying the youth to the land • Cattle causing problems downstream (perception problem) • Forest problem • Elk problem	A key project from the Steering Committee. The project lead is the RWP implementation team	State government Small unincorporated rural villages Rural fire departments El Valle youth farm to market internships NRCS SWCD Non-profit and watershed groups			TBD		Implementation Issues: time and funding for outreach
aeMora San Miguel Guadalupe	R	Project	Water Planning/ Watershed Restoration	Economic development planning linked with water / watershed issues	Steering Committee, see Table 8-2	Focus on economic development that is consistent with watershed health including: • Greenhouses • Fuel reduction and sale (firewood, lumber, pellets) • Farm-to-table-production and marketing (including cattle) • Projects involve acequias • Thinning projects	A key project from the Steering Committee. The project lead is IBMG (International Biomass Group), Agriculture – Water Conservation Districts	Los de Mora Growers Farmers markets San Miguel, Guadalupe, Mora Counties Communities within a 100-mile radius of Las Vegas El Valle Youth internship program Las Vegas/San Miguel Economic Development Leadership Collaborative Hispanic Chamber of Commerce Chamber of Commerce Main Street organization			unknown		implementation Issues: Renewable energy, technology catch up with reality, concerns with wilderness area conditions (can't access wilderness), thinning projects are not profitable, dangerous, not economically feasible for landowners, retaining and connecting people to the land, CFRP projects are extremely competitive.
afMora San Miguel Guadalupe	R	Project	Water Storage	Additional storage capacity	Steering Committee, see Table 8-2	Develop storage capacity that benefits acequias, MDWAs, municipalities, irrigation districts, and land grants. Small upland storage (watershed sponge) can address drought resilience and flood prevention. Rainwater harvesting is a component of the overall strategy.	A key project from the Steering Committee. The project leads are City of Las Vegas rural communities in upper watersheds	• Acequias • MDWAs • Municipalities • Irrigation districts • Land grants • SWCDs • NRCS • Hermits Peak Watershed Alliance • Other watershed groups Counties Storrie Lake Water Users Association			$500,000 to $1,000,000 (feasibility study)		Implementation issues: water rights, environmental impact, cost

[a] ICIP = Infrastructure Capital Improvement Plan (Projects, programs or policies may appear in this table more than once due to the compilation of PPPs and ICIP into one table.)

Regional Water Planning Update

Projects, Programs, and Policies 6/28/2016

Water Planning Region: Mora-San Miguel-Guadalupe

Information Sorted by County then Project Lead

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program or Policy)	Category	Project Name	Source of Project Information[a]	Description	Project Lead (Entity or Organization)	Partners (Other Entities or Participants)	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or Reason for the Project, Program, or Policy	Comments
agMora San Miguel Guadalupe	R	Project	Flood Preparation/ Mitigation	Water disaster recovery (flood preparation and mitigation)	Steering Committee, see Table 8-2	• Review regional mapping and data related to the potential for flooding in the region. • Develop and implement a regional flood mitigation plan.	A key project from the Steering Committee. The project lead is the Office of Emergency Manager Region-Wide	• Municipalities • Counties • Acequias • Land grants • USFS			$300,000		coordination, finding funds
ahMora San Miguel Guadalupe	SS	Project	Dam Safety	Dam safety	Steering Committee, see Table 8-2	Rehabilitate highest-priority dams based on risk / loss-of-life potential.	A key project from the Steering Committee. The project lead(s) are the dam owners individually; the RWP implementation team would facilitate collaboration.	• NMOSE Dam Safety Bureau • County Offices of Emergency Management			See Table 5-7		Implementation issues: huge cost, environmental impacts
aiMora San Miguel Guadalupe	R	Project	Drought Contingency	Geohydrology database, aquifer mapping and groundwater exploration (drilling)	Steering Committee, see Table 8-2	To reduce drought vulnerability and provide more reliable groundwater supplies, this project would: • Compile existing reports and information • Develop understanding of the region's groundwater resources, including quantity and quality, and the age of the groundwater, and sustainability of groundwater resources • Conduct geohydrology studies in strategic areas. Second phase could include exploration of groundwater sources	A key project from the Steering Committee. The project leads are Water Resources Research Institute and/or NM Tech, Bureau of Geology and Mineral Resources, County and municipal governments, MDWCAs	• NMSU • University of New Mexico • NMHU • USGS • Other universities • County • Municipality • Private sectors • MDWCAs • NMOSE • NMED			>$100,000 >200K for drilling		Implementation issues: cost and political will, some of this may already be in progress, financial resources, human resources, access to property
ajMora San Miguel Guadalupe	R	Project	Water System Infrastructure	Regionalization of MDWCAs	Steering Committee, see Table 8-2	Provide opportunities to improve small system efficiency and capacity by looking for ways to share resources for technical management, financial management, Safe Drinking Water Act compliance in some locations, and infrastructure improvement.	A key project from the Steering Committee. The project lead is Ramon Lucero / El Valle Water Alliance	• MDWCAs • County governments • NMED • Funders			>$100,000		Implementation issues: public perceptions
Guadalupe	SS	Project	Water System Infrastructure	Acequia De Anton Chico Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, and construct improvements to the acequia de Anton Chico, the acequia de Bado de Paiz, the acequia del Hormigoso, and the acequia de Tecolotito	Acequia De Anton Chico				$30,000		
Guadalupe	SS	Project	Acequia Infrastructure	Acequia de Hormigoso Replacement of Overflows	ICIP FY 2016-2020/Pearl Maestes	To replace 11 over 70-year-old desagues that are non-functional. The project serves five acequias that divert from the Pecos River. We will replace 22 desagues over a period of 5 years. This is a replacement project and does not require design.	Acequia de Hormigoso	Acequia de los Ranchitos, Acequia de Anton Chico, and Vado de Juan Paz	$150,000 each year 2016 -2020, $750,000 total		$750,000		

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Guadalupe	SS	Project	Acequia Infrastructure	Acequia de Hormigoso replace canovas	ICIP FY 2016-2020/Pearl Maestes	Construct and replace canovas (arroyo crossings) along the Acequias de Anton Chico area.	Acequia de Hormigoso	Acequia de los Ranchitos, Acequia de Anton Chico, Acequia Tecolotito, and Vado de Juan Paz	$200,000 each 2016, 2017, 2018, $600,000 total		$600,000		
Guadalupe	SS	Project	Acequia Infrastructure	Acequia de Hormigoso realignment	ICIP FY 2016-2020/Pearl Maestes	Acequia Realignment	Acequia de Hormigoso		2016		$300,000		
Guadalupe	SS	Project	Acequia Infrastructure	Acequia de Hormigoso shut off valves	ICIP FY 2016-2020/Pearl Maestes	Installation of shut off valves	Acequia de Hormigoso	Acequia de los Ranchitos, Acequia de Anton Chico, Acequia Tecolotito, and Vado de Juan Paz	2016		$80,000		
Guadalupe	SS	Project	Acequia Infrastructure	Acequia de las Colonias Guadalupe Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de las Colonias (Guadalupe)	Acequia de las Colonias (Guadalupe)			Pre-Planning			
Guadalupe	SS	Project	Acequia Infrastructure	Acequia de Ranchitos Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to the Acequia de Ranchitos (Flume)	Acequia de Ranchitos			Pre-Planning		Flume	
Guadalupe	SS	Project	Acequia Infrastructure	Acequia de Tecolotito Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Tecolotito	Acequia de Tecolotito			Pre-Planning			
Guadalupe	SS	Project	Acequia Infrastructure	Acequia del Vado de Juan Paiz improvements	ICIP 2017	To plan, design, and construct improvements to Acequia del Vado de Juan Paiz	Acequia del Vado de Juan Paiz			ICIP 2017, Needs Design		Waiting for cost estimate and description from NMACD	
Guadalupe	SS	Project	Acequia Infrastructure	Anton Chico Ditch Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Anton Chico Ditch (Banks)	Anton Chico Ditch			Pre-Planning		Banks	
Guadalupe	SS	Project	Acequia Infrastructure	Borisch Ortega Acequia Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Borisch-Ortega Acequia	Borisch-Ortega Acequia			Pre-Planning			
Guadalupe	SS	Project	Water Systems Infrastructure	Water Meter Radio Readers	ICIP 2016-2020	Water Meter Radio Readers	City of Santa Rosa		2016		$450,000		
Guadalupe	SS	Project	Water Systems Infrastructure	Security Fence-Water Wells and Water Tanks	ICIP 2016-2020	Security Fence-Water Wells and Water Tanks	City of Santa Rosa		2016		$75,000		
Guadalupe	SS	Project	Water Systems Infrastructure	Citywide Water/Sewer Improvements	ICIP 2016-2020	Citywide Water/Sewer Improvements	City of Santa Rosa		2017-2020		$7,815,000		
Guadalupe	SS	Project	Water Systems Infrastructure	Water Main Crossing East of Hwy 54	ICIP 2016-2020	Water Main Crossing East of Hwy 54	City of Santa Rosa		2017		$56,000		
Guadalupe	SS	Project	Water Systems Infrastructure	RR Dam I and II (Tres Lagunas Dam)	ICIP 2016-2020	RR Dam I and II (Tres Lagunas Dam)	City of Santa Rosa		2018-2019		$375,000		

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Guadalupe	SS	Project	Water System Infrastructure	Santa Rosa Power Dam Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To design, construct, and equip improvements, including landscaping, to the Power dam in Santa Rosa	City of Santa Rosa				$7,000,000		
Guadalupe	SS	Project	Watershed Restoration	El Rito Creek Habitat Enhancement and Bank Stabilization Project (RSP)	NMED	El Rito Creek Habitat Enhancement and Bank Stabilization Project (RSP)	City of Santa Rosa		6/30/2018		$173,835		State Project #: 15-Q
Guadalupe	SS	Project	Water Reuse	Santa Rosa Effluent Reuse	City of Santa Rosa, Mark Micelli	Build a storage tank, replace the sprinkler system at the golf course, and run a line to the softball complex	City of Santa Rosa						
Guadalupe	SS	Project	Water Systems Infrastructure	Power Dam Improvements	ICIP 2017-2021	Power Dam Improvements	City of Santa Rosa		2017		$7,292,000		
Guadalupe	SS	Project	Water Systems Infrastructure	SCADA System/Water System Improvements	ICIP 2017-2021	SCADA System/Water System Improvements	City of Santa Rosa		2017		$341,650		
Guadalupe	SS	Project	Dam Replacement	City of Santa Rosa Dam Replacement	Water Trust Board	Dam replacement	City of Santa Rosa Dam Replacement		FY2015		$6,496,878		
Guadalupe	SS	Project	Water System Infrastructure	City of Santa Rosa Line Installation	Water Trust Board	Line installation	City of Santa Rosa Line Installation		FY2015		$191,229		
Guadalupe	SS	Project	Water System Infrastructure	City of Santa Rosa Water Meter Upgrade	Water Trust Board	Upgrading water meters	City of Santa Rosa Water Meter Upgrade		FY2015		$760,773		
Guadalupe	SS	Project	Acequia Infrastructure	East Puerto de Luna acequia	Capital Outlay Database	East Puerto de Luna acequia	East Puerto de Luna acequia				$40,000		Fund: STB
Guadalupe	SS	Project	Acequia Infrastructure	East Puerto de Luna Acequia Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to East Puerto de Luna Acequia	East Puerto de Luna Acequia			Pre-Planning			
Guadalupe	SS	Project	Water System Infrastructure	Guadalupe Co Newkirk Fire Department Building	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, and construct a building, septic system and water storage tank for the fire department in Newkirk	Guadalupe County				$700,000		
Guadalupe	SS	Project	Watershed Restoration	Pintada Arroyo Watershed Restoration Project	NM State Forestry, Carmen Austin	Unit-level planning and clearances (if required); on-the-ground implementation. Completed projects: Pecos River Riparian Fuel Reduction.	Guadalupe SWCD						See above
Guadalupe	SS	Project	Watershed Restoration	Plan and conduct riparian restoration projects	NM State Forestry, Carmen Austin	Plan and conduct riparian restoration projects along the Pecos River and its tributaries	Guadalupe SWCD						
Guadalupe	SS	Project	Watershed Restoration	Santa Rosa area wetlands restoration projects	NM State Forestry, Carmen Austin	City of Santa Rosa area wetlands restoration projects	Guadalupe SWCD						
Guadalupe	SS	Project	Watershed Restoration	Guadalupe SWCD	Water Trust Board	Pecos River Restoration	Guadalupe SWCD		FY2015		$500,000		

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Guadalupe	SS	Project	Water System Infrastructure	Hollywood Ranch DWUA Equipment	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To purchase and install equipment for the Hollywood Ranch domestic water users association	Hollywood Ranch DWUA				$50,000		
Guadalupe	SS	Project	Water System Infrastructure	Hollywood Ranch DWUA Loan Payback	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To pay back a loan for the Hollywood Ranch domestic water users association	Hollywood Ranch DWUA				$68,000		
Guadalupe	SS	Project	Acequia Infrastructure	Hormigoso Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Hormigoso (Desague repair)	Hormigoso			Pre-Planning		Desague repair	
Guadalupe	SS	Project	Acequia Infrastructure	Hormigoso Acequias Improve Anton Chico	Capital Outlay Database	Hormigoso Acequias Improvements, Anton Chico	Hormigoso Acequias, Anton Chico				$30,000		Fund: STB
Guadalupe	SS	Project	Acequia Infrastructure	Hormigoso Ditch Improvements	ICIP 2017	To plan, design, and construct improvements to Hormigoso Ditch	Hormigoso Ditch			ICIP 2017, Needs Design			
Guadalupe	SS	Project	Water System Infrastructure	Las Colonias Community Ditch: Diversion Dam & Irrigation Pipeline	ICIP FY 2017-2021	Planning, designing, and constructing a new diversion dam and irrigation pipeline in Guadalupe County. The installation of a new low-profile diversion dam and plastic irrigation pipeline will provide desperately needed irrigation water to the Colonias community. Approximately 29,500 feet of strong PVC piping will be installed.	Las Colonias Community Ditch		Scheduled entirely for 2017		1,600,000		
Guadalupe	SS	Project	Acequia Infrastructure	Lower Anton Chico Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Lower Anton Chico Ditch	Lower Anton Chico Ditch			Pre-Planning			
Guadalupe	SS	Project	Water System Infrastructure	Rivera's MDWCA	Water Trust Board	Installation of distribution lines	Rivera's MDWCA		FY2015		$527,240		
Guadalupe	SS	Project	Water System Infrastructure	Water system improvements to include a distribution system	MDWCA Subcommittee/ Ramon Lucero	Water system improvements to include a distribution system.	San Antonio de Cristo Regional MDWCA						see above
Guadalupe	SS	Project	Water System Infrastructure	Sangre De Cristo Regional MDWC & MSWA Water System	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, construct, purchase and install improvements to a water system for the Sangre de Cristo regional mutual domestic water consumers and mutual sewage works association	Sangre De Cristo Regional MDWC & MSWA				$30,000		
Guadalupe	SS	Project	Water System Infrastructure	Water system improvements to include supplemental water supply wells, rehabilitate existing wells, rehabilitate tank in Anton Chico	MDWCA Subcommittee/ Ramon Lucero	Water system improvements to include supplemental water supply wells, rehabilitate existing wells, rehabilitate tank in Anton Chico.	Sangre de Cristo Regional MDWCA						see above

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Guadalupe	SS	Project	Water System Infrastructure	SCADA, wastewater improvement projects, water system improvement projects to include water source, water storage and distribution	MDWCA Subcommittee/ Ramon Lucero	SCADA, wastewater improvement projects, water system improvement projects to include water source, water storage and distribution.	Santa Rosa MDWCA						see above
Guadalupe	SS	Project	Acequia Infrastructure	Santa Rosa Swamp Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Santa Rosa Swamp Ditch	Santa Rosa Swamp Ditch			Pre-Planning			
Guadalupe	SS	Project	Water Systems Infrastructure	Water Distribution Improvements	ICIP 2017-2021	Water Distribution Improvements	Town of Vaughn		2017		$4,160,000		
Guadalupe	SS	Project	Water Systems Infrastructure	Sewer System Improvements	ICIP 2017-2021	Sewer System Improvements	Town of Vaughn		2017		$480,000		
Guadalupe	SS	Project	Water System Infrastructure	Vaughn Water Sys Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct water system improvements in Vaughn	Town of Vaughn				$50,000		
Guadalupe	SS	Project	Water System Infrastructure	Vaughn Water Tank & Water System Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct water distribution and water tank improvements in Vaughn	Town of Vaughn				$500,000		
Guadalupe	SS	Project	Water System Infrastructure	Town of Vaughn	Water Trust Board	Transmission line replacement	Town of Vaughn		FY2015		$1,255,000		
Guadalupe	SS	Project	Acequia Infrastructure	Vado de juan Paiz Improvements	NMAA	Vado de juan Paiz Improvements	Vado de Juan Paiz					Waiting for cost estimate and description from NMACD	
Guadalupe	SS	Project	Acequia Infrastructure	West Puerto de Luna acequia improvements & loan	Capital Outlay Database	West Puerto de Luna acequia improvements & loan	West Puerto De Luna Acequia				$30,000		Fund: STB
Guadalupe	SS	Project	Water System Infrastructure	West Puerto De Luna Acequia Improve	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, construct and install concrete ditch lining and pipeline for the west Puerto de Luna acequia	West Puerto De Luna Acequia				$45,000		
Guadalupe	SS	Project	Acequia Infrastructure	West Puerto de Luna Acequia Association Improvements	Statewide Acequia Survey, NMAA	To plan design, and construct improvements on West Puerto de Luna Acequia Association (Silt removal)	West Puerto de Luna Acequia Association			Pre-Planning		Silt Removal	
Mora	SS	Project	Acequia Infrastructure	Acequia del Alto del Norte Improvements	NMAA	To plan, design, and construct improvements including diversion dam and new headgates	Acequia Alto del Norte			ICIP 2017, Design Complete	$91,000.00	Rebuild Presa, Design Complete, Cost Est. $91,000.	
Mora	SS	Project	Acequia Infrastructure	Acequia Arellano Y Essary Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Arellano Y Essary	Acequia Arellano Y Essary			Pre-Planning			

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Mora	SS	Project	Acequia Infrastructure	Acequia de Golondrinas Norte Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements te Acequia de Golondrinas Norte (Banks)	Acequia de Golondrinas Norte			Pre-Planning		Banks	
Mora	SS	Project	Acequia Infrastructure	Acequia de Golondrinas Sur Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements Acequia de Golondrinas Sur (Pipe)	Acequia de Golondrinas Sur			Pre-Planning		Pipe	
Mora	SS	Project	Acequia Infrastructure	Acequia de Buena Vista Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Buena Vista	Acequia de Buena Vista			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia De Encinal de San Antonio Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia De Encinal de San Antonio (Main headgate)	Acequia De Encinal de San Antonio			Pre-Planning		Main headgate	
Mora	R	Project	Acequia Infrastructure	Acequia de la Aguila improvements	Harold Trujillo, 575-447-2964, hjtrujillo@aol.com	Build modern diversion and improve conveyance on channel to improve transportation water efficiency of system	Acequia de La Aguila			2018 - 6 month duration. Acequia de La Aguila will implement project	300,000 for entire project		
Mora	SS	Project	Acequia Infrastructure	Acequia de la Canada Seca Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de la Canada Seca	Acequia de la Canada Seca			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de La Cueva Canoncito Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de La Cueva Canoncito	Acequia de La Cueva Canoncito			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Morphy Lake Dam Improvements	ICIP 2017	To plan, design, and construct renovation to Morphy Lake Dam	Acequia de la Isla	Acequia de San Jose		ICIP 2017, Design complete	$3,500,000		
Mora	SS	Project	Acequia Infrastructure	Acequia de la Isla Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia de la Isla (Storage Dam)	Acequia de la Isla			Pre-Planning		Storage Dam	
Mora	SS	Project	Water System Infrastructure	Acequia De La Isla Morphy Lake Dam Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, construct, and renovate the Morphy Lake dam for the acequia de la Isla and the acequia de la San Jose	Acequia de la Isla				$3,500,000		
Mora	SS	Project	Water System Infrastructure	Morphy Lake Dam Renovation	Water Trust Board 2016 Recommendations	Construction	Acequia de la Isla				$1,200,000		
Mora	R	Project	Acequia Infrastructure	Acequia de La Joya improvements	Lucille Trujillo de Duran, 505-699-4655, hjtrujillo@aol.com	Build modern diversion and improve conveyance on channel to improve transportation water efficiency of system.	Acequia de La Joya			2018 - 6 month duration. Acequia de La Joya will implement project	200,000 for entire project		
Mora	SS	Project	Acequia Infrastructure	Acequia de La Morada Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de La Morada	Acequia de La Morada			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de la Piedras Coloradas Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de la Piedras Coloradas	Acequia de la Piedras Coloradas			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de la San Jose Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia de la San Jose (Diversion Dam)	Acequia de la San Jose			Pre-Planning		Diversion Dam	
Mora	SS	Project	Acequia Infrastructure	Acequia de La Sierra de Holman Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements Acequia de La Sierra de Holman (Silt Removal)	Acequia de La Sierra de Holman			Pre-Planning		Silt Removal	

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Mora	SS	Project	Water System Infrastructure	Alamitos Diversion for Acequia de Sierra	Acequia de Sierra, Ella Arellano/ NMAA	Acequia de la Sierra -Diversion in Los Alamitos needs to be fixed. It is a transmountain acequia.	Acequia de la Sierra; Ella Arellano	Concuto acequia would need to collaborate			$150,000		
Mora	SS	Project	Acequia Infrastructure	Acequia de las Colonias Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia de las Colonias (Farm Headgates)	Acequia de las Colonias			Pre-Planning		Farm Headgates	
Mora	SS	Project	Acequia Infrastructure	Acequia de Las Cruces Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia de Las Cruces	Acequia de Las Cruces			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Alamitos del Canoncito Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Los Alamitos del Canoncito	Acequia de Los Alamitos del Canoncito			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Borregos Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia de Los Borregos	Acequia de Los Borregos			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Lovatos Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Los Lovatos	Acequia de Los Lovatos			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Martinez Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Los Martinez	Acequia de Los Martinez			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Ortegas Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia de Los Ortegas (Diversion Dam)	Acequia de Los Ortegas			Pre-Planning		Diversion Dam	
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Romeros Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Los Romeros	Acequia de Los Romeros			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Romeros de Holman Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia de Los Romeros de Holman (Diversion Dam)	Acequia de Los Romeros de Holman			Pre-Planning		Diversion Dam	
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Tramperos Medio Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Los Tramperos Medio	Acequia de Los Tramperos Medio			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Tramperos Medio 2 Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Los Tramperos Medio #2	Acequia de Los Tramperos Medio #2			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Los Vallecitos San Ysidro Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Los Vallecitos San Ysidro	Acequia de Los Vallecitos San Ysidro			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia de Rainsville Norte Improvements	ICIP 2017	To plan, design, and construct improvements to Acequia de Rainsville Norte	Acequia de Rainsville Norte			ICIP 2017			
Mora	SS	Project	Acequia Infrastructure	Acequia De Rainsville,Norte Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements Acequia De Rainsville,Norte (Culverts)	Acequia De Rainsville Norte			Pre-Planning		Culverts	
Mora	SS	Project	Acequia Infrastructure	Acequia De Rito De Diego Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia De Rito De Diego (Flume)	Acequia De Rito De Diego			Pre-Planning		Flume	
Mora	SS	Project	Acequia Infrastructure	Acequia de San Antonio Cleveland Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia de San Antonio Cleveland	Acequia de San Antonio Cleveland			Pre-Planning		Improvements	
Mora	SS	Project	Acequia Infrastructure	Acequia de San Jose Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de San Jose	Acequia de San Jose			Pre-Planning			

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Information Sorted by County then Project Lead

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program or Policy)	Category	Project Name	Source of Project Information[a]	Description	Project Lead (Entity or Organization)	Partners (Other Entities or Participants)	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or Reason for the Project, Program, or Policy	Comments
Mora	SS	Project	Acequia Infrastructure	Morphy Lake Dam Improvements	NMAA	Morphy Lake Dam Improvements	Acequia de San Jose				$3,500,000.00	Morphy Lake Dam rehabilitation, No design, Cost est. $3.5 Million.	
Mora	SS	Project	Acequia Infrastructure	Acequia de Santiago del Alto de Talco Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Santiago del Alto de Talco	Acequia de Santiago del Alto de Talco			Pre-Planning			
Mora	SS	Project	Water System Infrastructure	Acequia Del Alto Al Norte Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, and construct improvements for the acequia del Alto al Norte	Acequia Del Alto Al Norte				$30,000		
Mora	SS	Project	Acequia Infrastructure	Acequia del Alto del Norte improvements	Capital Outlay Database	Acequia del Alto del Norte improvements	Acequia del Alto del Norte				$15,000		Fund: STB
Mora	SS	Project	Acequia Infrastructure	Acequia del Canon de Luna Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia del Canon de Luna (Headgates)	Acequia del Canon de Luna			Pre-Planning		Farm Headgates	
Mora	SS	Project	Acequia Infrastructure	Acequia del Canoncito Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia del Canoncito (Main headgate)	Acequia del Canoncito			Pre-Planning		Main headgate	
Mora	SS	Project	Acequia Infrastructure	Acequia del Canoncito de la Cueva Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Cueva Acequia del Canoncito de la Cueva (Acequia lining)	Acequia del Canoncito de la Cueva			Pre-Planning		Acequia lining	
Mora	R	Project	Acequia Infrastructure	Acequia del Canyon de Luna	Lucille Trujillo de Duran, 505-699-4655, hjtrujillo@aol.com	Build modern diversion and improve conveyance on channel to improve transportation water efficiency of system.	Acequia del Canyon de Luna			2018 - 6 month duration. Acequia del Canyon de Luna will implement project	150,000 for entire project		
Mora	SS	Project	Acequia Infrastructure	Acequia del Lado Norte de Golondrinas Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia del Lado Norte de Golondrinas	Acequia del Lado Norte de Golondrinas			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia del Medio de Holman Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements Acequia del Medio de Holman (Desague repair)	Acequia del Medio de Holman			Pre-Planning		Desague repair	
Mora	SS	Project	Acequia Infrastructure	Acequia Del Molino Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia Del Molino (Diversion Dam)	Acequia Del Molino			Pre-Planning		Diversion Dam	
Mora	SS	Project	Acequia Infrastructure	Acequia del Rito de Diego improvements, Mora County	Capital Outlay Database	Acequia del Rito de Diego improvements, Mora County	Acequia del Rito de Diego				$15,000		Fund: STB
Mora	SS	Project	Acequia Infrastructure	Acequia del Rito y la Sierra Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia del Rito y la Sierra (Banks)	Acequia del Rito y la Sierra			Pre-Planning		Banks	
Mora	SS	Project	Acequia Infrastructure	Acequia del Alto del Norte Improvements	ICIP 2017	To plan, design, and construct improvements including diversion dam and new headgates	Acequia el Alto del Norte			ICIP 2017, Design Complete	$151,000.00	Rebuild Presa, Design Complete, Cost Est. $91,000. Headgates $60000	
Mora	SS	Project	Acequia Infrastructure	Acequia Encinal Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Encinal	Acequia Encinal			Pre-Planning			

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Mora	SS	Project	Acequia Infrastructure	Acequia Larga de Las Cruces Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements Acequia Larga de Las Cruces (Banks)	Acequia Larga de Las Cruces			Pre-Planning		Banks	
Mora	SS	Project	Acequia Infrastructure	Acequia Lovatos Y Romeros Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Lovatos Y Romeros	Acequia Lovatos Y Romeros			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia Madre de Holman Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia Madre de Holman (Acequia Lining)	Acequia Madre de Holman			Pre-Planning		Acequia Lining	
Mora	SS	Project	Acequia Infrastructure	Acequia Romero del Medio Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Romero del Medio	Acequia Romero del Medio			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Acequia Sierra de Holman Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Sierra de Holman	Acequia Sierra de Holman			Pre-Planning			
Mora	SS	Project	Water System Infrastructure	Water System Improvements to include replacement of the distribution	MDWCA Subcommittee/ Ramon Lucero	Water system improvements to include replacement of the distribution	Agua Negra MDWCA						Ramon Lucero suggests that all mutual domestics comply with capacity development checklist. The following are proposed 10-year projects.
Mora	SS	Project	Water System Infrastructure	Agua Pura MDWC & MSWA Fence & Wall	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To purchase, install, and construct a fence and retaining wall around the water storage tank and water treatment facility for the Agua Pura Mutual Domestic Water Consumers and Mutual Sewage Works Association	Agua Pura MDWC & MSWA				$50,000		
Mora	SS	Project	Water System Infrastructure	Agua Pura MDWC & MSWA Water Sys Improve Mora County	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, and construct water system improvements for the Agua Pura Mutual Domestic Water Consumers and Mutual Sewage Works Association in Chacon	Agua Pura MDWC & MSWA				$100,000		
Mora	SS	Project	Acequia Infrastructure	Buena Vista Ditch Association Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Buena Vista Ditch Association (Acequia Lining)	Buena Vista Ditch Assoc.			Pre-Planning		Acequia Lining	
Mora	SS	Project	Water System Infrastructure	Buena Vista MDWC & MSWA	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, and construct water system improvements for the Buena Vista mutual domestic water consumers and sewage works association in Buena Vista in Mora County	Buena Vista MDWC & MSWA				$76,000		
Mora	SS	Project	Water System Infrastructure	Supplemental water supply well, replacing existing waterlines, expand distribution lines, and fire hydrants	MDWCA Subcommittee/ Ramon Lucero	Supplemental water supply well, replace existing waterlines, expand distribution lines, radio read water meters.	Buena Vista MDWCA						see above
Mora	SS	Project	Water System Infrastructure	Buena Vista MDWCA	Water Trust Board	Supplemental well/meter install	Buena Vista MDWCA		FY2015		$499,249		
Mora	SS	Project	Acequia Infrastructure	Cassidy Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Cassidy Ditch	Cassidy Ditch			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Cassidy Roller Mill Acequia Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Cassidy Roller Mill Acequia	Cassidy Roller Mill Acequia			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	El Alto de Medio Sur Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to El Alto de Medio Sur	El Alto de Medio Sur			Pre-Planning			

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Mora	SS	Project	Acequia Infrastructure	El Rito Diego Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to El Rito Diego	El Rito Diego			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	El Rito Griego Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to El Rito Griego	El Rito Griego			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Essary & Arellano Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements nts Essary & Arellano (Diversion Dam)	Essary & Arellano			Pre-Planning		Diversion Dam	
Mora	SS	Program	Watershed Plan	Watershed Based Plan for the Mora River – Upper Canadian Plateau	NMED		Hermits Peak Watershed Alliance				$300,222		State Project #: 13-D
Mora	SS	Project	Weather Monitoring	Rangeland Water & Weather Monitoring	High Plains Grassland Alliance, Inc, Michael Bain, President	Program: Rangeland Water & Weather Monitoring: Monitoring is an important tool that enables ranch owners and managers to make informed decisions and maintain healthy rangelands and water sources. Our current project within this program area works to allow ranchers and other land managers to collect baseline weather and climate data and have the analysis developed to facilitate long-term planning and decision-making processes over time. The potential policy application would be conservation and quality, with the aim of identifying relevant weather and climate data and data analysis techniques that efficiently and effectively inform public and private land management policies, and to share this knowledge with the ranching and land management community. For this current project, the HPGA has invested in weather monitoring data devices and is actively working on methods to analyze the data gathered for practical uses by ranchers and other landowners, The desired outcome is better rangeland management resulting in better water management.	High Plains Grassland Alliance (HPGA), with 501 (c) 3 designation		4 years. One year of data gathering has been completed. The project has initial internal start-up funding, with additional funding being sought in FY 2016 with completion in FY 2018. Funding request: will be sought beginning in FY 2016 through grants and through the NM Legislature.		These costs are for the above described project within our Monitoring Program area. We expect this data collection and analysis project to last 4 years with one year of data gathering completed to date. Our main funding need is for data analysis. At this time we anticipate the data analysis development to cost $12,500 plus GRT: $6,500 in FY 2016, $3,000 in FY 2017 and $3,000 in FY 2018.	Monitoring is an important tool that enables ranch owners and managers to make informed decisions and maintain healthy rangelands and water sources.	
Mora	R	Project	Acequia Infrastructure	Holman Acequia de La Sierra improvements	Ella Arellano, 575-387-2729	Build modern diversion and improve conveyance on channel to improve transportation water efficiency of system.	Holman Acequia de La Sierra			2018 - 6 month duration. Holman Acequia de La Sierra will implement project	250,000 for entire project		
Mora	SS	Project	Acequia Infrastructure	La Acequia Del Alto Del Norte Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia Acequia Del Alto Del Norte (Diversion dam)	La Acequia Del Alto Del Norte			Pre-Planning		Diversion Dam	
Mora	SS	Project	Acequia Infrastructure	La Acequia del Medio de Cleveland de San Antonio Improvements	Statewide Acequia Survey, NMAA		La Acequia del Medio de Cleveland de San Antonio			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	La Banda Bandita Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to La Banda/Bandita	La Banda/Bandita			Pre-Planning			

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Mora	SS	Project	Acequia Infrastructure	La Piedra Coloradas Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to La Piedra Coloradas (Farm Headgates)	La Piedra Coloradas			Pre-Planning		Farm Headgates	
Mora	SS	Project	Acequia Infrastructure	Los Hueros Del Norte Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Los Hueros Del Norte	Los Hueros Del Norte			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Los Hueros Del Sur Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Los Hueros Del Sur	Los Hueros Del Sur			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Lovato Acequia Improvements	Statewide Acequia Survey, NMAA	Lovato Acequia Improvements	Lovato Acequia			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Lovato y Romero Acequia AKA Romero y Lovato Improvements	Statewide Acequia Survey, NMAA	Lovato y Romero Acequia AKA Romero y Lovato Improvements	Lovato y Romero Acequia AKA Romero y Lovato			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Lower Los Lefebres Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements ents Lower Los Lefebres (Main headgate)	Lower Los Lefebres			Pre-Planning		Main headgate	
Mora	SS	Project	Water System Infrastructure	Mora MDWC & MSWA Phase 2 Water/Wastewater	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct phase 2 water and wastewater system improvements for the Mora mutual domestic water consumers and mutual sewage association in Mora county	Mora MDWC & MSWA				$921,221		
Mora	SS	Project	Dam Repair	Morphy Lake Dam	Capital Outlay Database	Morphy Lake Dam	Morphy Lake Dam				$35,000		Fund: STB
Mora	SS	Project	Water System Infrastructure	Supplemental water supply well, expand distribution system	MDWCA Subcommittee/ Ramon Lucero	Supplemental water supply well, expand distribution system.	Rainsville MDWCA						see above
Mora	SS	Project	Acequia Infrastructure	Rainsville Sur Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Rainsville Sur (Infiltration Gallery)	Rainsville Sur			Pre-Planning		Infiltration Gallery	
Mora	SS	Project	Water System Infrastructure	Rainsville WSD	Water Trust Board	Waterline repair/meter replacements	Rainsville WSD		FY2015		$450,300		
Mora	SS	Project	Acequia Infrastructure	San Jose de Abajo Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to San Jose de Abajo (Diversion Dam)	San Jose de Abajo			Pre-Planning		Diversion Dam	
Mora	SS	Project	Acequia Infrastructure	Santa Rita Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Santa Rita (Diversion Dam)	Santa Rita			Pre-Planning		Diversion Dam	
Mora	SS	Project	Acequia Infrastructure	Santo Tomas 1 Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Santo Tomas # 1	Santo Tomas # 1			Pre-Planning			
Mora	SS	Project	Acequia Infrastructure	Santo Tomas 2 Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Santo Tomas # 2	Santo Tomas # 2			Pre-Planning			
Mora	SS	Project	Water System Infrastructure	Fluoride treatment system and replacement of existing distribution	MDWCA Subcommittee/ Ramon Lucero	Fluoride treatment system and replacement of existing distribution	Upper Holman MDWCA						see above
Mora	SS	Project	Acequia Infrastructure	Upper Lefrebres Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Upper Lefrebres (Farm Headgates)	Upper Lefrebres			Pre-Planning		Farm Headgates	

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Mora	SS	Project	Water Systems Infrastructure	Wastewater, Water, Sewer Improvements/ Natural Gas	ICIP 2017-2021	Wastewater, Water, Sewer Improvements/Natural Gas	Village of Wagon Mound		2017-2021		$1,152,000		
Mora	SS	Project	Water System Infrastructure	Village of Wagon Mound	Water Trust Board	Water System Improvements	Village of Wagon Mound		FY2015		$725,000		
Mora	SS	Project	Water System Infrastructure	Supplemental water supply well, water storage tank, new waterlines, water meters and fire hydrants	MDWCA Subcommittee/ Ramon Lucero	Supplemental water supply well, water storage tank, new waterlines, water meters and fire hydrants.	Wagon Mound MDWCA						see above
Mora	SS	Project	Watershed Restoration	Develop Watershed Based Plan - Upper Mora River	Lea Knutson, Hermit's Peak Watershed Alliance (HPWA)	With water quality, quantity and overall watershed health as the objective, develop a comprehensive Watershed Based Plan to guide future watershed restoration and management.	Western Mora SWCD	HPWA, Collaborative Visions, NMED, USFS, Acequia Assoc.	2 years		$200,000		
Mora	SS	Project	Water System Infrastructure	Western Mora SWCD Conservation Cost-share Program: Acequia Assistance	Mora SWCD	Acequia Assistance (Headgate) Grant -- Western Mora SWCD has developed this grant to provide assistance in the development or restoration of Acequia headgates located on private property off the main ditch from or on their own personal ditch. The district has partnered with the NRCS Mora Office, which provides technical assistance to include surveying and designing projects. The grant is a 50/50 cost share up to $500 available per customer per year dependent upon annual funding. Applications for cost-share are reviewed for eligibility and funding on a first come, first serve basis until current year funding is exhausted. Western Mora SWCD's goal is to protect the tax base by assisting private property owners to conserve the natural resources of Mora County.	Western Mora SWCD	NRCS	Approved projects have 60 days to complete the project after the design is complete on private property (not on a main ditch) and a year to complete the project after the design is complete on the main ditch. Funding request: FY2015-2016 has been approved by the board and the source of the funding is the Western Mora SWCD budget.	This project is established for individual community members under the direction and guidance of the NRCS.	Funding varies from year to year. However, since it was in development in 2013, the board has consistently budgeted the grant with $5,000 per year. Cost-share payments for acequia-related projects will not exceed $500 each program year, per applicant. Each applicant must provide 50% cost share, which may be in cash, in-kind, or labor/equipment in-kind.		
Mora	SS	Project	Watershed Restoration	Watershed Restoration Project	NM State Forestry, Carmen Austin	Western Mora NFL Project on 198 acres	Western Mora SWCD						
Mora	SS	Project	Watershed Restoration	Watershed Restoration Project	NM State Forestry, Carmen Austin	Mora Wildland Urban Interface II on 200 acres	Western Mora SWCD						

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Mora	SS	Project	Watershed Restoration	Mora River Watershed Restoration Project	NM State Forestry, Carmen Austin	Unit-level planning and clearances (if required); on-the-ground implementation. Completed projects: WUI Hazard VIII; Vigil NFL; Villa NFL Phase 1 and 2; Fresquez NFL; Marrujo NFL; Arellano NFL; Grace NFL; and Bartley Ranch Fuel Break.	Western Mora SWCD						See above
Mora	SS	Project	Acequia Infrastructure	Wheaton Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Wheaton	Wheaton			Pre-Planning			
Mora San Miguel Guadalupe	SS	Project	Dam Safety	Dam Safety/ Repairs and Upgrades	OSE Dam Safety Bureau	Dam Safety/Upgrades as defined in RWP Update Table 5-7	See Table 5-7	See Table 5-7			See Table 5-7		See Table 5-7
Mora, Guadalupe	SS	Project	Watershed Restoration	Develop and adopt County Hazard Mitigation Plans	NM State Forestry, Carmen Austin	Develop and adopt County Hazard Mitigation Plans for Mora and Guadalupe Counties (focus on the sections on wildland fire and post-fire impacts, e.g. floods and debris flows.	Mora County, Guadalupe County						
Mora, San Miguel	SS	Project	Watershed Restoration	Upper Canadian and Upper Canadian-Ute Reservoir Watershed Restoration Projects	NM State Forestry, Carmen Austin	Unit-level planning and clearances (if required): Completed projects: Canadian River Riparian Restoration Project	Canadian River Riparian Restoration Project						See above
Mora, San Miguel	SS	Project	Watershed Restoration	Extend the Canadian River Riparian Restoration Projects	NM State Forestry, Carmen Austin	Extend the Canadian River Riparian Restoration Projects up into the headwater tributaries	Canadian River Riparian Restoration Project						
Mora, San Miguel, Guadalupe	R	Policy	Water Rights	Regional Groundwater Right Consolidation	MDWCA Subcommittee/ Ramon Lucero	Regional groundwater right consolidation.	MDWCA Subcommittee						
Mora, San Miguel, Guadalupe	R	Policy	Water Planning	OSE/County/Water Utility Land Use and Water Planning	MDWCA Subcommittee/ Ramon Lucero	OSE/county/water utility land use and water planning	MDWCA Subcommittee						
Mora, San Miguel, Guadalupe	R	Policy	Well Metering	Private Well Metering	MDWCA Subcommittee/ Ramon Lucero	Private well metering	MDWCA Subcommittee						
Mora, San Miguel, Guadalupe	R	Policy	Surface Water	Ponding of Surface Water	MDWCA Subcommittee/ Ramon Lucero	Ponding of surface water.	MDWCA Subcommittee						
Mora, San Miguel, Guadalupe	R	Policy	Congressional Legislators	Develop Relationship with Local State and Congressional Legislators	MDWCA Subcommittee/ Ramon Lucero	Develop relationship with local state and congressional officials.	MDWCA Subcommittee						
Mora, San Miguel, Guadalupe	R	Program	Data Collection	Consolidation and Data Storage of Regional Technical Documents	MDWCA Subcommittee/ Ramon Lucero	a) Preliminary Engineering Reports b) Environmental Reports c)Geo-hydrology Reports d) Comprehensive Plans	MDWCA Subcommittee						

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Mora, San Miguel, Guadalupe	R	Program	Education	Develop Relationships and Programs with Higher Education of Learning	MDWCA Subcommittee/ Ramon Lucero	a) Highlands University b) Luna Community College c) New Mexico State University d) New Mexico Institute of Mining & Technology e) University of New Mexico i. technical data ii. science iii. water study programs iv. internships v. environmental curriculum (water) for elementary, middle, and high school students	MDWCA Subcommittee						
Mora, San Miguel, Guadalupe	R	Program	Water Planning	Develop Relationships and Programs with North East Economic Development Organization (NEEDO)	MDWCA Subcommittee/ Ramon Lucero	Develop relationships and programs with NEEDO	MDWCA Subcommittee						
Mora, San Miguel, Guadalupe	R	Project	Data Collection	Baseline Water Quality Monitoring and Planning	Frances Martinez, Tierra y Montes SWCD	Collect baseline water quality data to fill NMED data gaps needed to evaluate whether water bodies are meeting water quality standards. Develop water quality monitoring plan for each area.	Tierra y Montes SWCD	Hermit's Peak Watershed Alliance, Upper Pecos Watershed Association	ongoing		$40,000 per sub-watershed		
Mora, San Miguel, Guadalupe	R	Program/Policy	Watershed Restoration	Support Existing Watershed Restoration Plans	RWP Watershed Subcommittee, Lea Knutson, Hermit's Peak Watershed Alliance (HPWA) and the	Support the following plans (currently in existence) that direct various aspects of watershed health restoration. Considerable work has already gone into the development of these plans and their implementation should be fully supported to improve watershed conditions. Those plans include: 1. Clean Water Act (319) related Watershed Based Plans (EPA approved) - Upper Pecos Watershed Based Plan, Watershed Based Plan - Upper Gallinas River, Watershed Based Plan - Mora River: Upper Canadian Plateau; 2. New Mexico Forest Action Plan (Statewide Assessment & Strategy Response Plans) – NM Forestry Division; 3. NM Phreatophyte Plan; 4. San Miguel Community Wildfire Protection Plan; 5. Mora Community Wildfire Protection Plan; 6. Guadalupe Community Wildfire Protection Plan; 7. Santa Fe National Forest Plan; 8. Carson National Forest Plan; 9. Environmental Assessment for the Gallinas Municipal Watershed Wildland-Urban Interface Project; 10. Taos Field Office Resource Management Plan (Bureau of Land Management); 11. NM State Parks Management Plan (Santa Rosa, Villanueva, Conchas Lake, Storrie Lake, Morphy Lake, Coyote Creek State Parks); 12. Las Vegas National Historic Park Foundation Plan 13. Las Vegas National Wildlife Refuge Comprehensive Conservation Plan;	Various organizations that have developed and implement these plans	numerous	ongoing		Identified in each plan		

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Mora, San Miguel, Guadalupe, Union, Quay, Harding	R	Program	Watershed Restoration	Watershed Restoration	Canadian River Riparian Restoration Project, Jack Chatfield, Project Manager	The Canadian River Riparian Restoration Project's goal is to restore the riparian corridors of the Canadian River, both on the main stem and on its tributaries, to a healthy productive state that will provide native habitat for a variety of wildlife and improve water for communities, agriculture, and recreation throughout the course of the watershed. This project is a multi-phase, multi-year, multi-partnered watershed-scale project using a headwaters-down approach on over 2,000 miles of river corridor. Since 2004, CRRP has mapped 880,000 acres of infested riparian area, aerially treated over 15,000 acres of salt cedar, accomplished biological renovation on 435 acres of treated area, mulched over 800 acres, used cut stump method to treat 78 acres, revegetated over 600 acres with native trees and shrubs and installed riparian fencing. Funding of this project will allow us to continue the successful efforts already invested by its partners.	Canadian River Riparian Restoration Project	8 Soil & Water Conservation Districts, NRCS, FSA, State Forestry, USDA Forest Service, NMSU, NMDGF, NM Department of Ag., NMENV	Canadian River Riparian Restoration is multi-phased and ongoing. Funding request: NMFA WTB 15-16, NMED 15-16, USDA Forest Srv 15-16, RCPP 15-16	Planning completed, Successful Watershed Project since 2004	Approx. 4 million received on grant funding for 15-16.		
Mora-San Miguel	R	Program	Watershed Protection	Headwater/Watershed Protection/Protect the Pecos	Protect the Pecos Coalition, John Olivas NM Wilderness Alliance	Campaign to expand the Pecos Wilderness to include the roadless areas to eliminate major development in existing headwater watershed in Mora and San Miguel Counties.	Protect the Pecos New Mexico Wilderness Alliance	Sierra Club, NM Wildlife Federation, Trout Unlimited, The Wilderness Society	**ongoing**			Prevent large scale development that could contaminate the water resource/watershed protection	3 of 5 Counties supported along with many state elected officials, tribal communities, businesses, and individuals
San Miguel	SS	Project	Acequia Infrastructure	Acequia de la Agua Caliente improvements, San Miguel county	Capital Outlay Database	Acequia de la Agua Caliente improve San Miguel co	Acequia de la Agua Caliente				$30,000		Fund: STB
San Miguel	SS	Project	Acequia Infrastructure	Acequia de la Agua Caliente Improvements	ICIP 2017	To plan, design, and construct improvements to Acequia de la Agua Caliente	Acequia de la Agua Caliente			ICIP 2017, Design Completed	$27,000.00	Elevation and Break Improvements, Yes Design, Cost Est. $27,000.	
San Miguel	SS	Project	Acequia Infrastructure	Acequia De La Concepcion Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia De La Concepcion (Main headgate)	Acequia De La Concepcion			Pre-Planning		Main headgate	
San Miguel	SS	Project	Acequia Infrastructure	Acequia De La Placita North San Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia De La Placita North San Porvenir (Farm headgates)	Acequia De La Placita-North San Isidro			Pre-Planning		Farm Headgates	
San Miguel	SS	Project	Acequia Infrastructure	Acequia de Llano Sapello Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Llano Sapello	Acequia de Llano Sapello			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Acequia De los Seguras Improvements	ICIP 2017	To plan, design, and construct improvements to Acequia de los Seguras	Acequia De los Seguras			ICIP 2017, Needs Design		Waiting for a Cost Est.	
San Miguel	SS	Project	Acequia Infrastructure	Acequia de los Vallecitos de los Vecinos West Improvements	ICIP 2017	Acequia de los Vallecitos de los Vecinos West Improvements	Acequia de los Vallecitos de los Vecinos West					Waiting for a cost estimate.	
San Miguel	SS	Project	Acequia Infrastructure	Acequia de Molino Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Molino	Acequia de Molino			Pre-Planning			

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San Miguel	SS	Project	Acequia Infrastructure	Acequia de San Jose de Abajo Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de San Jose de Abajo	Acequia de San Jose de Abajo			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Acequia Del Agua Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia Del Agua Porvenir (Adverse grade)	Acequia Del Agua Caliente			Pre-Planning		Adverse grade	
San Miguel	SS	Project	Acequia Infrastructure	Acequia del Cerrito Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia del Cerrito	Acequia del Cerrito			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Acequia del Llano de la Presa Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia del Llano de la Presa	Acequia del Llano de la Presa			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Acequia del Medio de Manuelitas Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia del Medio de Manuelitas	Acequia del Medio de Manuelitas			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Acequia del Rio de la Vaca Improvements	ICIP 2017	Acequia del Rio de la Vaca Improvements	Acequia del Rio de la Vaca					Waiting for a cost estimate.	
San Miguel	SS	Project	Acequia Infrastructure	Acequia del Toro Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia del Toro	Acequia del Toro			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Acequia El Ancon de Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia El Ancon de Porvenir (Silt Removal)	Acequia El Ancon de Saracino			Pre-Planning		Silt Removal	
San Miguel	SS	Project	Acequia Infrastructure	Acequia Madre de las Vegas improvements	Capital Outlay Database	Acequia Madre de Las Vegas improvements	Acequia Madre de las Vegas				$25,000		Fund: STB
San Miguel	SS	Project	Acequia Infrastructure	Acequia Madre de Las Vegas Improvements	ICIP 2017	To plan, design, and construct improvements to Acequia Madre de las Vegas	Acequia Madre de Las Vegas			ICIP 2017, Needs Design		Waiting on a Cost estimate.	
San Miguel	SS	Project	Water System Infrastructure	Acequia Madre De Las Vegas Equipment & Backhoe	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To purchase equipment and a backhoe for the acequia Madre de Las Vegas	Acequia Madre De Las Vegas				$85,000		
San Miguel	SS	Project	Water System Infrastructure	Acequia Madre De Las Vegas Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct improvements to the acequia Madre de Las Vegas	Acequia Madre De Las Vegas				$25,000		
San Miguel	SS	Project	Acequia Infrastructure	Acequia Madre de Los Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Acequia Madre de Los Porvenir (Desague repair)	Acequia Madre de Los Romeros			Pre-Planning		Desague repair	
San Miguel	SS	Project	Acequia Infrastructure	Acequia Madre de Los Vigiles Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia Madre de Los Vigiles (Diversion Dam)	Acequia Madre de Los Vigiles			Pre-Planning		Diversion Dam	
San Miguel	SS	Project	Acequia Infrastructure	Acequia Madre de Villanueva Southside Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Madre de Villanueva Southside	Acequia Madre de Villanueva Southside			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Acequia Madre North Villanueva Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Madre North Villanueva	Acequia Madre North Villanueva			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Acequia Madre Villaneuva dam improvements	Capital Outlay Database	Acequia Madre Villaneuva dam improvements	Acequia Madre Villaneuva dam improvements				$40,050		Fund: STB

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San Miguel	SS	Project	Acequia Infrastructure	Acequia Madre Villaneuva ditch southside improvements	Capital Outlay Database	Acequia Madre Villaneuva ditch southside improve	Acequia Madre Villaneuva ditch southside				$10,000		Fund: STB
San Miguel	SS	Project	Acequia Infrastructure	Acequia North de San Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements for Acequia North de San Porvenir (Diversion Dam)	Acequia North de San Yisidro			Pre-Planning		Diversion Dam	
San Miguel	SS	Project	Acequia Infrastructure	Agapita Vigil Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Agapita Vigil ditch (Main headgate)	Agapita Vigil			Pre-Planning		Main headgate	
San Miguel	SS	Project	Acequia Infrastructure	Agapito Vigil Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Agapito Vigil Ditch	Agapito Vigil Ditch			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Asylum Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Asylum Ditch	Asylum Ditch			Pre-Planning			
San Miguel	SS	Project	Water System Infrastructure	Chapelle MDCA water system improvements	Capital Outlay Database	Chapelle MDCA water system improve	Chapelle MDCA				$88,600		Fund: STB
San Miguel	SS	Project	Water System Infrastructure	Chapelle MDCA water system improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, and construct improvements to a water system for the Chapelle mutual domestic consumers association	Chapelle MDCA Water System				$90,000		
San Miguel	SS	Project	Water System Infrastructure	New water supply well, water storage tank, new distribution lines, water meters, and fire hydrants	MDWCA Subcommittee/ Ramon Lucero	New water supply well, water storage tank, new distribution lines, water meters, and fire hydrants.	Chapelle MDWCA						see above
San Miguel	SS	Project	Stormwater Management	Storm/Surface Water Control	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Water supply, utilities (publicly owned), wastewater.	City of Las Vegas		2016-2020	Development.	$13,064,100		
San Miguel	SS	Project	Dam Improvements	Bradner Dam Improvements/Rehabilitation	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Bradner Dam Improvements	City of Las Vegas		Funding to date: $9 million		$8.5 Million		This project will not be implemented in phases.
San Miguel	SS	Project	Dam Rehabilitation	Peterson Dam Rehabilitation	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Peterson Dam Rehabilitation	City of Las Vegas		2016. Funding to date: $1,287,818.	2019 Funding $9Million	Not yet funded $9Million		This project will be implemented in phases.

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San Miguel	SS	Project	Plant Oxidation	Water Treatment Plant Oxidation	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Water Treatment Plant Oxidation	City of Las Vegas		2016. Funding to date: $293,751.		Total cost: $3,840,649. Amt not yet funded: $10.5 Million		This project will be implemented in phases.
San Miguel	SS	Project	System Improvements	Raw Water Conveyance System Improvements	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Raw Water Conveyance System Improvements	City of Las Vegas		2016. Funding to date: $1,222,100. Funding for 2017: $1.3 Million		Total cost: $13,064,100. Amt not yet funded: $10.5 Million		This project will be implemented in phases.
San Miguel	SS	Project	Treatment and Production	Groundwater Treatment and Production	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Groundwater Treatment and Production	City of Las Vegas		2016. Funding to date: $2,369,561.		Total cost: $11,720,832. Amt not yet funded: $9,351,271		This project will not be implemented in phases.
San Miguel	SS	Project	Building Repairs	Water Treatment Plant Building Repairs	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Water Treatment Plant Building Repairs	City of Las Vegas		2016. Funding to date: $176,000		Total cost: $176,100. Complete		This project will not be implemented in phases.
San Miguel	SS	Project	Reuse System	Effluent Reuse System	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Effluent Reuse System	City of Las Vegas		2016. Funding to date: $0. Funding for 2017: $1,406,498. Funding for 2018: $900,000. Funding for 2019: $500,000. Funding for 2020: $500,000. Funding for 2020: $500,000. Funding for 2021: $500,000		Total cost: $3,806,498. Amt not yet funded: $3,806,498		This project will not be implemented in phases.

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San Miguel	SS	Project	Collection System		City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Wastewater Collection System	City of Las Vegas		2016. Funding to date: $0. Funding for 2017: $2,050,000. Funding for 2018: $375,000. Funding for 2019: $200,000. Funding for 2020: $200,00. Funding for 2021: $200,000		Total cost: $3,025,000. Amt not yet funded: $3,025,000		This project will not be implemented in phases.
San Miguel	SS	Project	Wastewater Infrastructure	Wastewater Treatment Plant Upgrade	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Wastewater Treatment Plant Upgrade	City of Las Vegas		2016. Funding to date: $0. Funding for 2017: $918,637.5		Total cost: $918,637.5. Amt not yet funded: $918,637.5		This project will not be implemented in phases.
San Miguel	SS	Project	Heavy Equip	Replacements of Solid Waste Heavy Equip	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Replacements of Solid Waste Heavy Equip	City of Las Vegas		2016. Funding to date: $0. Funding for 2017: $350,000. Funding for 2018: $300,000		Total cost: $650,000. Amt not yet funded: $650,000		This project will not be implemented in phases.
San Miguel	SS	Project	Drainage Project	Transfer Station Pavement and Drainage Project	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Transfer Station Pavement and Drainage Project	City of Las Vegas		2016. Funding to date: $0. Funding for 2017: $333,000		Total cost: $333,000. Amt not yet funded: $333,000		This project will not be implemented in phases.
San Miguel	SS	Project	Improvements to Arroyos	Drainage Improvements to Arroyos	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Drainage Improvements to Arroyos	City of Las Vegas		2016. Funding to date: $0. Funding for 2017: $300,000. Funding for 2018: $533,662. Funding for 2019: $1,500,000. Funding for 2020: $15,000,000		Total cost: $17,333,662. Amt not yet funded: $17,333,662		This project will not be implemented in phases.

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San Miguel	SS	Project	Repair and Replacement	Annual Leak Repair and Replacement	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Annual Leak Repair and Replacement	City of Las Vegas		2016. Funding to date: $0. Funding for 2017: 578,000. Funding for 2018: $1,100,000. Funding for 2019: $550,000. Funding for 2020: $550,000. Funding for 2021: $550,000		Total cost: $3,328,000. Amt not yet funded: $3,328,000		This project will not be implemented in phases.
San Miguel	SS	Project	Brackish Groundwater	Desalination of Taylor Well 7 Brackish Groundwater	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Desalination of Taylor Well 7 Brackish Groundwater	City of Las Vegas		2016. Funding to date: $0. Funding for 2017: 1,597,365. Funding for 2018: $2,928,906. Funding for 2019: $1,464,453. Funding for 2020: $1,464,453. Funding for 2021: $1,464,453		Total cost: $8,889,630. Amt not yet funded: $8,889,630		This project will not be implemented in phases.
San Miguel	SS	Project	Impervious Liner	Bradner and Peterson Dam Impervious Liner	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Bradner and Peterson Dam Impervious Liner	City of Las Vegas		2017. Funding to date: $0. Funding for 2018: $850,000. Funding for 2019: $3,200,000		Total cost: $4,050,000. Amt not yet funded: $4,050,000		This project will not be implemented in phases.
San Miguel	SS	Project	Mechanic Garage	Solid Waste Mechanic Garage	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Solid Waste Mechanic Garage	City of Las Vegas		2017. Funding to date: $0. Funding for 2018: $35,000. Funding for 2019: 315,000		Total cost: $350,000. Amt not yet funded: $350,000		This project will not be implemented in phases.

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San Miguel	SS	Project	Las Vegas	Replacement of PVC Gas Lines in West Las Vegas	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Replacement of PVC Gas Lines in West Las Vegas	City of Las Vegas		2017. Funding to date: $0. Funding for 2018: $10,000. Funding for 2019: $120,000		Total cost: $130,000. Amt not yet funded: $130,000		This project will not be implemented in phases.
San Miguel	SS	Project	Lines to Airport	Water Gas Lines to Airport	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Water Gas Lines to Airport	City of Las Vegas		2017. Funding to date: $0. Funding for 2018: $123,000. Funding for 2019: $1,227,500		Total cost: $1,350,500. Amt not yet funded: $1,350,000		This project will not be implemented in phases.
San Miguel	SS	Project	Recycling Center and	Solid Waste Recycling Center and	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Solid Waste Recycling Center and	City of Las Vegas		2017. Funding to date: $0. Funding for 2018: $60,000. Funding for 2019: $740,000		Total cost: $800,000. Amt not yet funded: $800,000		This project will not be implemented in phases.
San Miguel	SS	Project	O&M Improvement	Stage 2 WTP O&M Improvement	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Stage 2 WTP O&M Improvement	City of Las Vegas		2018. Funding to date: $0. Funding for 2019: $46,600. Funding for 2020: $77,600		Total cost: $124,200. Amt not yet funded: $124,200		This project will not be implemented in phases.
San Miguel	SS	Project	Kretz Drainage	Kretz Drainage	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Kretz Drainage	City of Las Vegas		2018. Funding to date: $0. Funding for 2019: $15,000. Funding for 2020: 185,000. Funding for 2021: $1,000,000		Total cost: $1,200,000. Amt not yet funded: $1,200,000		This project will not be implemented in phases.
San Miguel	SS	Project	Street Drainage	Second Street Drainage	City of Las Vegas Water Division, Maria Gilvarry, Project Manager, and Eric Tapia	Second Street Drainage	City of Las Vegas		2018. Funding to date: $0. Funding for 2019: $40,000. Funding for 2020: $760,000		Total cost: $800,000. Amt not yet funded: $800,000		This project will not be implemented in phases.

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San Miguel	SS	Project	Water Systems Infrastructure	Mechanical Biological Treatment Facility	ICIP 2017-2021	Mechanical Biological Treatment Facility	City of Las Vegas		2017		$956,000		
San Miguel	SS	Project	Water Systems Infrastructure	Ram Water Conveyance System Improvements	ICIP 2017-2021	Ram Water Conveyance System Improvements	City of Las Vegas	San Miguel County	2017-2019		$16,376,200		
San Miguel	SS	Project	Water Systems Infrastructure	New Wells for Increased Groundwater Production	ICIP 2017-2021	New Wells for Increased Groundwater Production	City of Las Vegas		2017-2020		$6,052,764		
San Miguel	SS	Project	Water System Infrastructure	City of Las Vegas	Water Trust Board	Water Lines Design/Construct	City of Las Vegas		FY2015		$670,501		
San Miguel	SS	Project	Dam Enlargement	City of Las Vegas	Water Trust Board	Bradner Enlargement	City of Las Vegas		FY2014		$4,000,000		
San Miguel	SS	Project	Acequia Infrastructure	East Pecos Acequia Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to East Pecos Acequia Porvenir (Arroyo Crossing)	East Pecos Acequia Molino			Pre-Planning		Arroyo Crossing	
San Miguel	SS	Project	Acequia Infrastructure	El Alcantar Community Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to El Alcantar Community Ditch	El Alcantar Community Ditch			Pre-Planning			
San Miguel	SS	Project	Water System Infrastructure	El Alcantar Community Ditch Upgrades	El Alcantar Community Ditch Association	Repairs and infrastructure upgrades for El Alcantar Community Ditch Association in Canyoncito de Manualitas	El Alcantar Community Ditch Association				Unknown		
San Miguel	SS	Project	Water System Infrastructure	Supplemental water supply well, replacing existing waterlines, expand distribution lines, and fire hydrants	MDWCA Subcommittee/ Ramon Lucero	Supplemental supply well	El Ancon MDWCA						see above
San Miguel	SS	Project	Water System Infrastructure	El Creston MDWCA water system improvements	Capital Outlay Database	El Creston MDWCA water system improvements	El Creston MDWCA				$10,000		Fund: STB
San Miguel	SS	Project	Water System Infrastructure	El Creston MDWCA Water System Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct improvements to a water system for El Creston mutual domestic water consumers association	El Creston MDWCA				$150,000		
San Miguel	SS	Project	Water System Infrastructure	Supplemental water supply wells, water storage tanks, distribution lines, water meters, and fire hydrants	MDWCA Subcommittee/ Ramon Lucero	Supplemental water supply wells, water storage tanks, distribution lines, water meters, and fire hydrants.	El Creston MDWCA						see above
San Miguel	SS	Project	Water System Infrastructure	El Creston MDWCA	Water Trust Board	Distribution Lines Design/Construct	El Creston MDWCA		FY2014		$701,895		
San Miguel	SS	Project	Acequia Infrastructure	El Provenir Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to El Provenir Ditch	El Provenir Ditch			Pre-Planning			
San Miguel	SS	Project	Water System Infrastructure	El Valle Water Alliance water system improvements	Capital Outlay Database	El Valle Water Alliance water system improvements	El Valle Water Alliance				$10,000		Fund: STB

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County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program or Policy)	Category	Project Name	Source of Project Information[a]	Description	Project Lead (Entity or Organization)	Partners (Other Entities or Participants)	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or Reason for the Project, Program, or Policy	Comments
San Miguel	SS	Project	Water System Infrastructure	El Valle Water Alliance Water System Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, and construct improvements to a water system for El Valle water alliance	El Valle Water Alliance				$100,000		
San Miguel	SS	Project	Water System Infrastructure	El Valle Water Alliance	Water Trust Board	Rehabilitation of existing water supply well/new well	El Valle Water Alliance		FY2015		$882,278		
San Miguel	SS	Project	Water System Infrastructure	Water system improvements to include supplemental water supply wells, water storage tanks, new distribution lines, radio read meters and fire hydrants.	MDWCA Subcommittee/ Ramon Lucero	Water system improvements to include supplemental water supply wells, water storage tanks, new distribution lines, radio read meters and fire hydrants.	El Valle Water Alliance - Lower Colonias, South San Ysidro, Ilfeld, San Juan, El Coruco, San Miguel del Bado, La Sacatosa, Villaneuva						see above
San Miguel	SS	Project	Water System Infrastructure	Supplemental water supply well, nitrate treatment and distribution	MDWCA Subcommittee/ Ramon Lucero	Supplemental water supply well, nitrate treatment and distribution.	Gabaldon MDWCA						see above
San Miguel	SS	Project	Acequia Infrastructure	Gonzales Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Gonzales Ditch	Gonzales Ditch			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Porvenir (Adverse grade)	Grezelachowski			Pre-Planning		Adverse grade	
San Miguel	SS	Project	Acequia Infrastructure	Grezelachowski Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Grezelachowski Ditch	Grezelachowski Ditch			Pre-Planning			
San Miguel	SS	Project	Watershed Restoration	Gallinas Village River and Floodplain Restoration (RSP)	NMED	Gallinas Village River and Floodplain Restoration (RSP)	Hermits Peak Watershed Alliance		2015-2016		$292,746		State Project #: 15-F
San Miguel	SS	Project	Monitoring	Upper Gallinas River Monitoring	NMED	Upper Gallinas River Monitoring	Hermits Peak Watershed Alliance		2015-2018		$42,455		State Project #: 15-E
San Miguel	SS	Project	Watershed Restoration	City of Las Vegas Municipal Watershed Restoration	Hermit's Peak Watershed Alliance (HPWA), Lea Knutson	Conduct comprehensive river and floodplain restoration in the City of Las Vegas Municipal Watershed to include reconnect the river to its floodplain for flood control and floodplain water storage, restore instream conditions improve water quality and quantity and fish habitat, and restore wetlands for water purification and storage.	Hermit's Peak Watershed Alliance	City of Las Vegas	5 years		$1,000,000		

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San Miguel	SS	Program	Watershed Restoration	Implement Watershed Based Plan - Upper Gallinas River	Hermit's Peak Watershed Alliance (HPWA), Lea Knutson,	The Watershed Based Plan - Upper Gallinas River (WBP) was developed by HPWA and approved by NMED and EPA in 2012 to improve water quality in this temperature impaired river system and restore overall watershed health in a comprehensive fashion. It should be fully implemented to restore and improve overall watershed functions needed to supply the City of Las Vegas and surrounding communities with high quality and abundant water. The WBP presents the following work needed to restore watershed health: 1) restore and maintain a continuous riparian zone of diverse native vegetetation along the Gallinas RIver and its tributaries through Riparian Sensitive Grazing, redeveloping riparian buffers in residential and recreational areas and replanting and protecting vegetation in degraded areas; 2) restore instream channel characteristics and drainage channel connectivity to floodplains that enables slowing, spreading, and infiltrating water into the watershed's underground storage and filtration systems while mitigating floods and drought; 3) improve roads to reduce erosion, restore natural drainage patterns and buffer streams from road runoff; 6) arrest and heal upland erosion.	Hermit's Peak Watershed Restoration	San Miguel County, City of LV, Tierra y Montes SWCD, USFS, Private Landowners	2013-2023		$1.7 million		
San Miguel	SS	Project	Watershed Restoration	Develop Watershed Based Plan - Tecolote Cr.	Lea Knutson, Hermit's Peak Watershed Alliance (HPWA)	With water quality, quantity and overall watershed health as the objective, develop a comprehensive Watershed Based Plan to guide future watershed restoration and management.	Hermit's Peak Watershed Restoration	San Miguel County, Trout Unlimited Truchas Chapter, El Valle Water Alliance, Holy Ghost Homeowners' Assn, Village of Pecos, Tierra y Montes Soil and Water Conservation District, Pecos Valley Community Foundation, USDA Forest Service Pecos/ Las Vegas Ranger District, NM Environmental Department Surface Water Quality Bureau, NM Department of Game and Fish, Friends of the Pecos National Historic Park.	2 years		$150,000		

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San Miguel	SS	Project	Watershed Restoration	Develop Watershed Based Plan - Sapello River	Lea Knutson, Hermit's Peak Watershed Alliance (HPWA)	With water quality, quantity and overall watershed health as the objective, develop a comprehensive Watershed Based Plan to guide future watershed restoration and management.	Hermit's Peak Watershed Restoration	San Miguel County, Trout Unlimited Truchas Chapter, El Valle Water Alliance, Holy Ghost Homeowners' Assn, Village of Pecos, Tierra y Montes Soil and Water Conservation District, Pecos Valley Community Foundation, USDA Forest Service Pecos/ Las Vegas Ranger District, NM Environmental Department Surface Water Quality Bureau, NM Department of Game and Fish, Friends of the Pecos National Historic Park.	2 years		$150,000		
San Miguel	SS	Project	Watershed Restoration	Develop Watershed Based Plan - Lower Gallinas River	Lea Knutson, Hermit's Peak Watershed Alliance (HPWA)	With water quality, quantity and overall watershed health as the objective, develop a comprehensive Watershed Based Plan to guide future watershed restoration and management.	Hermit's Peak Watershed Restoration	San Miguel County, Trout Unlimited Truchas Chapter, El Valle Water Alliance, Holy Ghost Hoewoners' Assn, Village of Pecos, Tierra y Montes Soil and Water Conservation District, Pecos Valley Community Foundation, USDA Forest Service Pecos/Las Vegas Ranger District, NM Environmental Department Surface Water Quality Bureau, NM Department of Game and Fish, Friends of the Pecos National Historic Park.	2 years		$150,000		
San Miguel	SS	Project	Watershed Restoration	City of Las Vegas Municipal Watershed Restoration	Lea Knutson, Hermit's Peak Watershed Alliance (HPWA)	Conduct comprehensive river and floodplain restoration in the City of Las Vegas Municipal Watershed to include: reconnect the river to its floodplain for flood control and floodplain water storage, restore instream conditions improve water quality and quantity and fish habitat, restore wetlands for water purification and storage.	Hermit's Peak Watershed Restoration	City of Las Vegas	5 years		$1,000,000		

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San Miguel	SS	Project	Acequia Infrastructure	La Concepcion Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to La Concepcion Ditch	La Concepcion Ditch			Pre-Planning			
San Miguel	SS	Project	Water System Infrastructure	La Cueva MDWCA Water System Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct improvements to the water system of La Cueva mutual domestic water consumers association	La Cueva MDWCA				$80,152		
San Miguel	SS	Project	Water System Infrastructure	Supplemental water supply well, nitrate treatment and distribution		Supplemental water supply well, new pumphouse with booster station, new distribution lines, radio read water meters and fire hydrants.	La Cueva MDWCA						see above
San Miguel	SS	Project	Drill New Well	La Cueva MDWCA	Water Trust Board	Design of supplemental well	La Cueva MDWCA		FY2015		$81,000		
San Miguel	SS	Project	Water System Infrastructure	Las Tusas MDWCA water system improvements	Capital Outlay Database	Las Tusas MDWCA water system improvements	Las Tusas MDWCA				$35,000		Fund: STB
San Miguel	SS	Project	Acequia Infrastructure	Los Trigos Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Los Trigos Porvenir (Arroyo Crossing)	Los Trigos Ditch			Pre-Planning		Arroyo Crossing	
San Miguel	SS	Project	Acequia Infrastructure	Lower Bull Creek Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Lower Bull Creek Ditch	Lower Bull Creek Ditch			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Lower Colonias Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Lower Colonias Ditch	Lower Colonias Ditch			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Molina de la Isla Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Molina de la Isla	Molina de la Isla			Pre-Planning			
San Miguel	SS	Project	Water System Infrastructure	SPWUA Lateral Delivery Canals	SPWUA/Rob Larranaga Wildlife Refuge Manager	Replace several miles of SPWUA Lateral Delivery Canals in order to reduce water loss and increase conservation of water delivery to the 54 SPWUA Shareholders. Projects include (1) East Lateral to the McAllister Lake Waterfowl Management Area, (2) #1 Lateral at Pat Melton's Property, (3) All other miscellaneous/smaller lateral delivery canals to include repair and or replacement of existing piped canals.	New Mexico Department of Game and Fish, Las Vegas National Wildlife Refuge/USFWS, NRCS	Storrie Project Water Users Association (SPWUA)	FY2016 and beyond for State Capital Outlay funding for projects #1 and #3.	The planning of #1 Lateral (project #2) started in 2015 with NRCS providing engineering services. The McAllister Lake WMA delivery Canal (Project #1) will require the granting of a right-of-way easement by the U.S. Fish and Wildlife Service (USFWS) and discussions have started.	Project #1 estimated cost of $120,000. Project #2 estimated cost of $45,000. And Project #3/ all remaining lateral canals has an estimated cost of $2 million.		
San Miguel	SS	Project	Watershed Restoration	Watershed Restoration Project	NM State Forestry, Carmen Austin	Interstate 25 Median Project (Glorieta to Rowe exit) on 100 acres	NM Department of Transportation						
San Miguel	SS	Project	Water System Infrastructure	Northside Acequia Madre De Villanueva Improve	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To construct, purchase and install improvements to the northside acequia Madre de Villanueva	Northside Acequia Madre De Villanueva				$6,000		
San Miguel	SS	Project	Water System Infrastructure	Northside Acequia Madre De Villanueva Pipeline	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct a pipeline project for the Northside acequia Madre de Villanueva	Northside Acequia Madre De Villanueva				$40,000		

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San Miguel	SS	Project	Acequia Infrastructure	Placita Arriba Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Placita Arriba	Placita Arriba			Pre-Planning			
San Miguel	SS	Project	Water System Infrastructure	Replace distribution lines, water meters and fire hydrants	MDWCA Subcommittee/ Ramon Lucero	Replace distribution lines, water meters, and fire hydrants.	Ribera MDWCA						see above
San Miguel	SS	Project	Acequia Infrastructure	Round House Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Round House Ditch (Diversion Dam)	Round House Ditch			Pre-Planning		Diversion Dam	
San Miguel	SS	Project	Acequia Infrastructure	Round House Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements ements Round House Porvenir (Farm Headgates)	Round House Ditch			Pre-Planning		Farm Headgates	
San Miguel	SS	Project	Water System Infrastructure	Rowe MDWCA water system improvements	Capital Outlay Database	Rowe MDWCA water system improvements	Rowe MDWCA				$10,000		Fund: STB
San Miguel	SS	Project	Water System Infrastructure	Supplemental water supply well, expand distribution system, radio read water meters and fire hydrants	MDWCA Subcommittee/ Ramon Lucero	Supplemental water supply well, expand distribution system, radio read water meters and fire hydrants.	Rowe MDWCA						see above
San Miguel	SS	Project	Water System Infrastructure	Rowe MDWCA	Water Trust Board	Installation of distribution lines	Rowe MDWCA		FY2015		$499,000		
San Miguel	SS	Project	Water System Infrastructure	San Augustin CMTY ditch improvements	Capital Outlay Database	San Augustin CMTY ditch improvements	San Augustin CMTY ditch				$25,000		Fund: STB
San Miguel	SS	Project	Acequia Infrastructure	San Augustine Community Ditch Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on San Augustine Community Ditch (Culverts)	San Augustine Community Ditch			Pre-Planning		Culverts	
San Miguel	SS	Project	Acequia Infrastructure	San Miguel Community Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on San Miguel Community Porvenir (Acequia Lining)	San Miguel Community Ditch			Pre-Planning		Acequia Lining	
San Miguel	SS	Project	Water Systems Infrastructure	El Valle Water Alliance System Improvements	ICIP 2016-2020	El Valle Water Alliance System Improvements	San Miguel County		2016-2018		$1,114,000		
San Miguel	SS	Project	Water System Infrastructure	Stormwater Management/ permit	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Repair and reconstruction of Gallinas River diversion gates for flood control and water management.	San Miguel County	City of Las Vegas and Storrie Project Water Users Association	Ongoing.	Ongoing.			
San Miguel	SS	Project	PER	Septage Treatment Facility	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Preliminary engineering report or feasibility study for water or wastewater infrastructure. Develop a facility to accept and treat septage waste for proper septage disposal and water quality.	San Miguel County	USDA and Souder Miller and Associates	PER Completion date: Dec 2015. Funding request: USDA for grant funding source.	Preliminary engineering report and rate study underway.			

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San Miguel	SS	Project	Planning	40-year Water Development Plan	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	County provides support to El Valle Water Alliance and El Creston Mutual Domestic Water Association. Participates in the regional water planning effort.	San Miguel County	El Valle Water Alliance Mutual Domestic Systems County Support. El Creston Mutual Domestic. San Miguel Mora Guadalupe Regional Water Planning effort.	Ongoing.	Ongoing.			
San Miguel	SS	Project	Planning	Water and Sewer Master Plan	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Water and Sewer Master Plan	San Miguel County	Office of State Engineer and NMED	As needed.				
San Miguel	SS	program	Data Collection	Well Testing or Other Hydrogeologic Study	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Review of applications for subdivisions and permits for oil and gas exploration and drilling.	San Miguel County						Well testing other than compliance monitoring.
San Miguel	SS	Project	Data Collection	Surface Water Monitoring or Investigation	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Surface Water Monitoring or Investigation	San Miguel County						
San Miguel	SS	Project	Data Collection	Water Quality Data or Investigation	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Water Quality Data or Investigation	San Miguel County						
San Miguel	SS	Project	Water System Infrastructure	Dam Safety Investigation	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Dam Safety Investigation	San Miguel County						
San Miguel		Policy	Water Conservation	Other: Conservation, Water Quality and Quantity as per San Miguel County Subdivision Ordinance and San Miguel County Oil and Gas Ordinance. Regional Economic Plan.	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	As per subdivision applications received. As per conditional use permits received for oil and gas exploration and drilling. NEEDO-NM plan addresses water issues - regional economic development.	San Miguel County	Office of the State Engineer, North East Economic Development Organization (NEEDO-NM)	Ongoing.				

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San Miguel	SS	Project	Water System Infrastructure	Micro Biological Treatment	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Micro Biological Treatment	San Miguel County	USDA	12 months. Funding request: $956,000	Planning.	$956,000		Program: USDA
San Miguel	SS	Project	Water System Infrastructure	Gallinas River Diversion Repair	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Gallinas River Diversion Repair	San Miguel County		Unknown. Funding request: $900,000	Planning.	$900,000		Program: Hazard Mitigation
San Miguel	R	Policy	Data Collection	Well Testing	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Develop a County Ordinance for Well Testing	San Miguel County		Ongoing.	Planning.	N/A		
San Miguel	R	Policy	Water Conservation	Water Conservation	San Miguel County, Alex Tafoya, Planning and Zoning Supervisor	Water Conservation	San Miguel County		Ongoing.	Planning.	N/A		Program: OSE and NEEDO-NM
San Miguel	SS	Project	Water System Infrastructure	Supplemental water supply well, new water storage tank, new distribution systems, radio read water storage distribution lines	MDWCA Subcommittee/ Ramon Lucero	Supplemental water supply well, new water storage tank, new distribution systems, radio read water meters and fire hydrants	Sena MDWCA						see above

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San Miguel	SS	Project	Water System Infrastructure	Replace SPWUA headgates and Spillway	SPWUA/Rob Larranaga Wildlife Refuge Manager	Replace SPWUA headgates and spillway at the SPWUA main diversion on the Gallinas River in Los Vigiles. The antiquated structure serves as the primary means of diverting flows of the Gallinas River that have the potential to cause flooding in Las Vegas and the surrounding communities. The headgates also control the delivery of water to the Los Vigiles Acequia. Built into the Spillway is also the main Gallinas River Headgate which controls the flow of water to over 10 acequias in the Gallinas River Basin, and the Agapito Acequia.	Storrie Project Water Users Association (SPWUA)	SPWUA, City of Las Vegas, San Miguel County Flood Control, and Los Vigiles Acequia/Rio Gallinas Acequia Association?	FY2016 for State Capital Outlay funding; Dependent upon securing the funding for the Preliminary Engineering Report and the success of FEMA and/or other grants. The gates currently cannot be closed efficiently in order to address repairs of any potential future breaches in the canal, as occurred during the flood of September, 2013.	The planning of this project has been under development by FEMA since the flood of September 2013. San Miguel County has currently taken the lead in attempting to secure funding for a Preliminary Engineering Report. Both the County and SPWUA have committed funding. The project is identified in the SMC Hazardous Mitigation Plan.	Estimated cost of $900,000 in 2013		
San Miguel	SS	Project	Water System Infrastructure	Tecolote MDWCA water meters San Miguel County	Capital Outlay Database	Tecolote MDWCA water meters San Miguel County	Tecolote MDWCA				$10,000		Fund: STB
San Miguel	SS	Project	Water System Infrastructure	Tecolotito MDWCA water meters San Miguel County	Capital Outlay Database	Tecolotito MDWCA water meters San Miguel County	Tecolotito MDWCA				$10,000		Fund: STB
San Miguel	SS	Project	distribution lines	SCADA, radio read water meters and replace existing distribution lines	MDWCA Subcommittee/ Ramon Lucero	SCADA, radio read water meters and replace existing distribution lines.	Tecolotito MDWCA						see above
San Miguel	SS	Project	Acequia Infrastructure	The Placita Arriba Community Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements on Acequia Placita Arriba Community Porvenir (Diversion dam)	The Placita Arriba Community Ditch			Pre-Planning		Diversion Dam	
San Miguel	SS	Project	Monitoring and Planning	Lower Gallinas River Water Quality Monitoring and Plan	Frances Martinez, Tierra y Montes SWCD	This project entails baseline water quality monitoring and the development of a water quality monitoring plan. Data and plan will be used to inform NMED of needed changes to water quality standards for the Lower Gallinas River.	Tierra y Montes SWCD	Hermit's Peak Watershed Alliance	2015-2016		$26,000	This project will be completed by June 30, 2016.	
San Miguel	SS	Project	Watershed Restoration	Los Vigiles/Morada de Santana	Frances Martinez, Tierra y Montes SWCD	Los Vigiles and Morada de Santana -National Forest Land thinning project which involves treatment of 180 acres within the Gallinas Watershed	Tierra y Montes SWCD						see above

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San Miguel	SS	Project	Watershed Restoration	Watershed Planning	NM State Forestry, Carmen Austin	Land Grant Forest Stewardship Plan within the high priority Gallinas Watershed	Tierra y Montes SWCD						
San Miguel	SS	Project	Watershed Restoration	Watershed Restoration Project	NM State Forestry, Carmen Austin	Pendaries Village on 100 acres	Tierra y Montes SWCD						
San Miguel	SS	Project	Watershed Restoration	Watershed Restoration Project	NM State Forestry, Carmen Austin	Los Vigiles and Morada de Santana Land Grants on 230 acres.	Tierra y Montes SWCD						
San Miguel	SS	Project	Watershed Restoration	Gallinas and Pecos Headwaters Watershed Restoration Project	NM State Forestry, Carmen Austin	Unit-level planning and clearances (if required); on-the-ground implementation. Note: the Gallinas Municipal Forest and Watershed Restoration Phase 2 Project, the Los Vigiles and Morada de Santana Land Grants Watershed Restoration Projects and the Pendaries Village are units within the footprint of this landscape-scale project area.	Tierra y Montes SWCD						The Regional Water Plan PPP list should not be limited only to projects planned for implementing in the immediate future. Our list includes out-year watershed restoration projects, despite the fact that those larger, landscape-scale initiatives may not yet have the same detailed level of planning as the three projects identified above. To maximize their impact over time, watershed project units need to be strategically located within the larger landscape, and that requires long-range, landscape-scale planning. Foresters develop progressively more detailed plans as they zoom in to a particular treatment unit within the larger watershed project, in much the same way that county planners do when they progress from a comprehensive plan to an area plan to a sector plan. New funding opportunities or urgent situations may arise that will cause the planning process for units within larger watershed projects to be fast-tracked. Therefore it is counterproductive to limit the Regional Water Plans' lists to already planned unit-scale
San Miguel	SS	Project	Water System Infrastructure	SPWUA Earthen Ditch Delivery Canal	SPWUA/Rob Larranaga Wildlife Refuge Manager	Replace 13 miles of earthen ditch delivery canal with PVC pipe in order to curtail the approximately 50% conveyance loss. The amount of water lost on an average good year of water delivery is approximately 3,000 acre-feet, more that the 2,800 acre-feet water right for the City of Las Vegas. The canal is the main delivery of water to 54 SPWUA shareholders which include the City of Las Vegas, NM State Parks (Storrie Lakes SP), NM Dept. of Game and Fish (McAllister Lake WMA), Las Vegas National Wildlife Refuge and 50 private individuals.	U.S. Fish and Wildlife Services, State of New Mexico, and/or City of Las Vegas	Storrie Project Water Users Association (SPWUA)	FY2016 for State Capital Outlay funding. Start in 2015 if purchase agreement for storage by the City of Las Vegas is finalized, or later dependent on funding.	The planning of this project has been under development for over two years. The City of Las Vegas' Engineers have compiled a Preliminary Engineering Report for a total cost of $18 million. The report has been reviewed by the SPWUA's contracted engineers: Bohannan Houston.	2013 estimated cost of $18 million, with a reduced scope of work for $12 million in 2014. FY2015 cost of $18.5 million		

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Regional Water Planning Update

Projects, Programs, and Policies 6/28/2016

Water Planning Region: Mora-San Miguel-Guadalupe

Information Sorted by County then Project Lead

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program or Policy)	Category	Project Name	Source of Project Information[a]	Description	Project Lead (Entity or Organization)	Partners (Other Entities or Participants)	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or Reason for the Project, Program, or Policy	Comments
San Miguel	SS	Project	Water System Infrastructure	SPWUA Delivery Canal Lining	SPWUA/Rob Larranaga Wildlife Refuge Manager	Providing Lining of approximately 1/2 mile of SPWUA Delivery Canal from the Gillanas River Headgates to the Los Vigiles Acequia Diversion to reduce water loss (especially during low flows). Continue the lining of the remaining 1.5 miles of the Delivery Canal to Storrie Lake, past the Los Vigiles Diversion, to increase conservation of water delivery and minimize the chance of breach in the canal due to the burrowing of rodents into the existing earthen canal. A breach in the canal during high flows will cause flooding of the City of Las Vegas and the surrounding areas.	U.S. Fish and Wildlife Services, State of New Mexico, and/or City of Las Vegas??	San Miguel County ?, City of Las Vegas, Rio Gallinas Acequia Association ? Storrie Project Water Users Association	FY2016 and beyond for State Capital Outlay Funding; project dependent upon the success of state funding and/or potential partnership funding sources.	The discussion for this project have occurred, but no direct planning has commenced.	Project estimated cost of up to $2 million.		
San Miguel	SS	Project	Acequia Infrastructure	Upper Colonias Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Upper Colonias Porvenir (Reopen acequia)	Upper Colonias Acequia			Pre-Planning		Reopen acequia	
San Miguel	SS	Project	Acequia Infrastructure	Upper Colonias Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Upper Colonias Ditch	Upper Colonias Ditch			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Upper Cow Creek Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Upper Cow Creek	Upper Cow Creek			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	Upper Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Upper Porvenir (Diversion Dam)	Upper Maestas			Pre-Planning		Diversion Dam	
San Miguel	SS	Project	Acequia Infrastructure	Upper Maestas Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Upper Maestas Ditch	Upper Maestas Ditch			Pre-Planning			
San Miguel	SS	Program	Watershed Restoration	Implement Upper Pecos Watershed Based Plan	Reina Fernandez, Upper Pecos Watershed Association (UPWA)	The Watershed Based Plan - Upper Pecos Watershed Based Plan was developed by UPWA and approved by NMED and EPA in 2012 to improve water quality in this temperature impaired river system and restore overall watershed health in a comprehensive fashion. It should be fully implemented to restore and improve overall watershed functions needed to supply the village of Pecos and surrounding communities with high quality and abundant water. The WBP presents the following work needed to restore watershed health: 1) restore the Pecos River and its tributaries to an unimpaired condition so that they can achieve all their designated uses; 2) restore instream channel characteristics and drainage channel connectivity to floodplains that enables slowing, spreading, and infiltrating water into the watershed's underground storage and filtration systems while mitigating floods and drought; 3) keep sediment from runoff or eroding stream banks from becoming a source of impairment (as it has been in the past); 6) arrest and heal upland erosion; 7) identify wetland gems and prioritize them for restoration.	Upper Pecos Watershed Association	San Miguel County, Tro	2012-2020				

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Water Planning Region: Mora-San Miguel-Guadalupe

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San Miguel	SS	Project	Watershed Restoration	Cow Creek Direct Implementation Pilot Project	NMED		Upper Pecos Watershed Association		6/30/2016		$21,602		State Project #: 13-E
San Miguel	SS	Project	Watershed Restoration	Pecos River In-stream and Riparian Restoration at the Dalton Day Use Area (RSP)	NMED		Upper Pecos Watershed Association		6/30/2018		$216,366		State Project #: 15-G
San Miguel	SS	Project	Watershed Restoration	Watershed Restoration Project	NM State Forestry, Carmen Austin	Gallinas Municipal Forest & Watershed Restoration Project -- Phase 1 on 411 acres.	USFS Las Vegas Ranger District						
San Miguel	SS	Project	Watershed Restoration	Watershed Restoration Project	NM State Forestry, Carmen Austin	Gallinas Municipal Forest & Watershed Restoration Project -- Phase 2 on 288 acres.	USFS Las Vegas Ranger District						
San Miguel	SS	Project	Water System Infrastructure	Pecos water sys improvements	Capital Outlay Database	Pecos water system improve	Village of Pecos				$30,000		Fund: STB
San Miguel	SS	Project	Water Systems Infrastructure	Supply Well, Collector & Asbestos Waterline	ICIP 2017-2021	Supply Well, Collector & Asbestos Waterline	Village of Pecos		2017-2018		$1,400,000		
San Miguel	SS	Project	Water Systems Infrastructure	Main St 2" Galvanized Waterline	ICIP 2017-2021	Main St 2" Galvanized Waterline	Village of Pecos		2017-2018		$250,000		
San Miguel	SS	Project	Water System Infrastructure	Pecos Sewer Line Construction	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct a sewer line between the east Pecos area and the water treatment plant in the west Pecos area	Village of Pecos				$376,365		
San Miguel	SS	Project	Water System Infrastructure	Pecos Water System Improvements	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, construct, improve and replace a well and water lines for the water system in Pecos	Village of Pecos				$150,000		
San Miguel	SS	Project	Water System Infrastructure	Village of Pecos	Water Trust Board	Pecos Well Collector Waterline	Village of Pecos		FY2015		$950,000		
San Miguel	SS	Project	Acequia Infrastructure	West Pecos Acequia Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to West Pecos Acequia	West Pecos Acequia			Pre-Planning			
San Miguel	SS	Project	Acequia Infrastructure	West Pecos Porvenir Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to West Pecos Porvenir (Acequia Lining)	West Pecos Acequia			Pre-Planning		Acequia Lining	
San Miguel, Guadalupe, Mora	SS	Project	Watershed Restoration	Update county-level Community Wildfire Protection Plans	NM State Forestry, Carmen Austin	Update county-level Community Wildfire Protection Plans for Mora, San Miguel and Guadalupe Counties	Mora County, San Miguel County, Guadalupe County						

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Regional Water Planning Update

Projects, Programs, and Policies 6/28/2016

Water Planning Region: Mora-San Miguel-Guadalupe

Information Sorted by County then Project Lead

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program or Policy)	Category	Project Name	Source of Project Information[a]	Description	Project Lead (Entity or Organization)	Partners (Other Entities or Participants)	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or Reason for the Project, Program, or Policy	Comments
San Miguel/ Mora	SS	Program	Watershed Restoration	Implement *Watershed Based Plan - Mora River - Upper Canadian Plateau*	Lea Knutson, Hermit's Peak Watershed Alliance (HPWA)	The *Watershed Based Plan - Mora River - Upper Canadian Plateau* (WBP) was developed by HPWA and adopted in 2016. It should be fully implemented in order to improve water quality in this nutrient impaired river system and restore overall watershed functions in a comprehensive fashion. The WBP recommends the following projects to restore watershed health: 1) facilitate watershed friendly livestock management with planned grazing systems and related tools (fencing, water development) across the watershed with an emphasis on riparian areas; 2) put into practice watershed friendly regenerative agriculture; 3) improve roads, residential developements, and other infrastructure for compatibility with watershed functions and develop buffers between infrastructure and waterways; 4) support beaver; 5) protect and restore wetlands; 6) treat noxious weeds; 7) restore upland vegetation and soils; 8) arrest and reverse upland erosion; 9) restore riparian vegetation; 10) reconnect streams to floodplains; 11) restore streambank and channel characterisitcs.	Hermit's Peak Watershed Restoration	US Fish and Wildlife Service, San Miguel County, Mora County, NRCS, Tierra y Montes and Mora-Wagon Mound SWCD, High Plains Grassland Alliance, Private Landowners	2017 - 2032		$33 million		

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