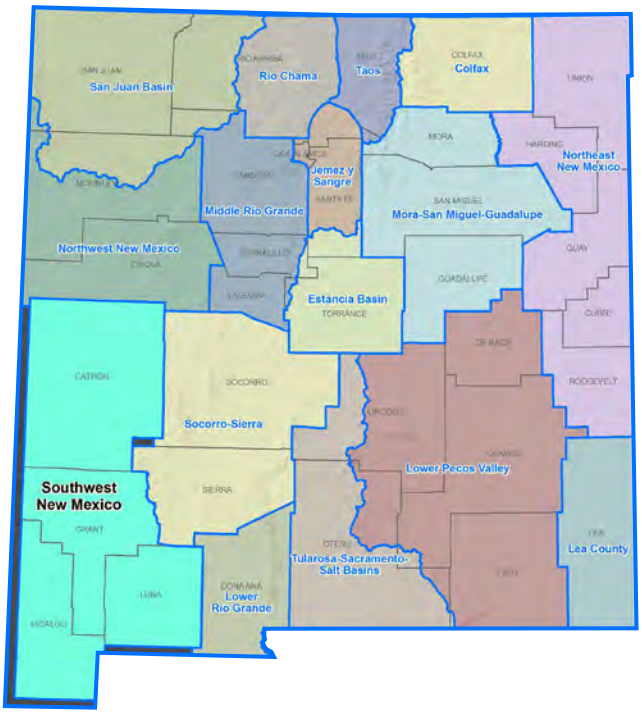
Southwest New Mexico Regional Water Plan



March 2017

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

Cover photograph: Big Ditch, Silver City

Table of Contents

List of Figures

List of Tables

List of Appendices

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
AWRM	Active Water Resource Management
AWSA	Arizona Water Settlements Act
BBER	Bureau of Business and Economic Research
BLM	Bureau of Land Management
CAP	Central Arizona Project
CDBG	Community Development Block Grant
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CID	Carlsbad Irrigation District
CWA	Clean Water Act
DBS&A	Daniel B. Stephens & Associates, Inc.
DWRLF	Drinking Water Revolving Loan Fund
DWS	Domestic Well Statute
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
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
IPCC	Intergovernmental Panel on Climate Change
LQ	location quotient
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MDWCA	mutual domestic water consumers association
MSGP	Multi-Sector General Permit
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
PDO	Pacific decadal oscillation
PDSI	Palmer Drought Severity Index
PPP	project, program, and policy
PSTB	Petroleum Storage Tank Bureau (NMED)
PVACD	Pecos Valley Artesian Conservancy District
RTI	Resource Technology, Inc.
RWP	regional water plan
SDWA	Safe Drinking Water Act
SNOTEL	snowpack telemetry
SWCD	soil and water conservation district
TDS	total dissolved solids
TMDL	total maximum daily load
U.S. EPA	U.S. Environmental Protection Agency
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
UST	underground storage tank
UWB	underground water basin

WQA	Water Quality Act (New Mexico)
WRCC	Western Regional Climate Center
WRRI	Water Resources Research Institute
WSD	water and sanitation district
WUA	water users association

Executive Summary

The Southwest New Mexico Water Planning Region, which includes Catron, Grant, Hidalgo, and Luna 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 *Southwest New Mexico Regional Water Plan* was completed and accepted by NMISC in 2005.

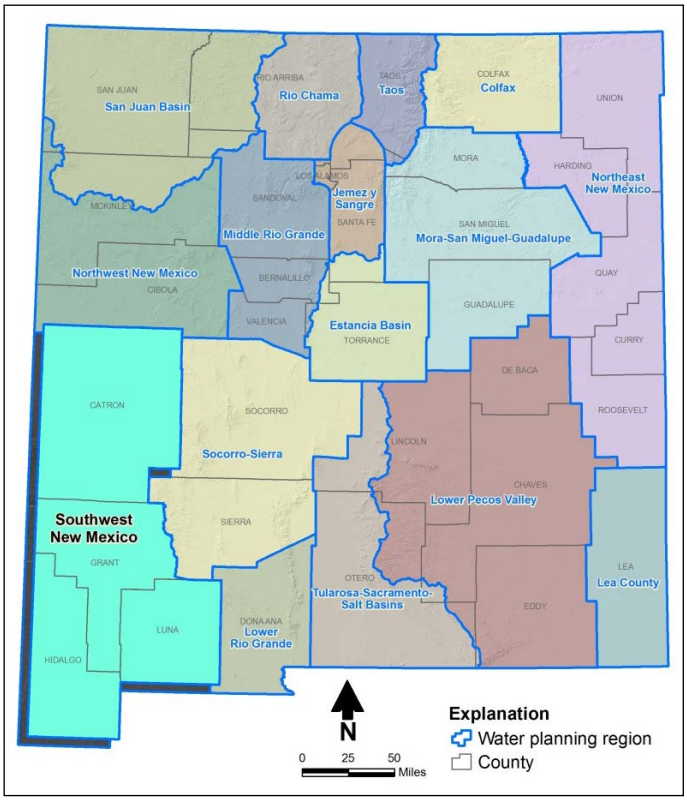


Figure ES-1. Southwest New Mexico Water Planning Region

The purpose of this document is to provide new and changed information related to water planning in the Southwest New Mexico 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 updated water use (Figure ES-2) data from 2010, 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. Future water demand projections indicate that low to moderate growth in water use is anticipated. Additionally, in the Southwest New Mexico region, surface water supplies about 40 percent of the total supply, and thus portions of the region that are dependent on surface water are vulnerable to drought. In some areas where there is heavy groundwater water use, water levels are declining and existing developed supplies are being reduced, although it is recognized that additional groundwater supplies could potentially be developed.

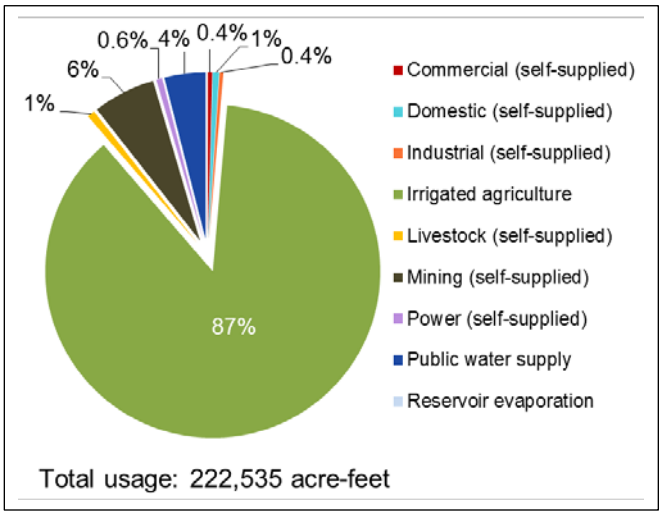


Figure ES-2. Total Regional Water Use, 2010

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.

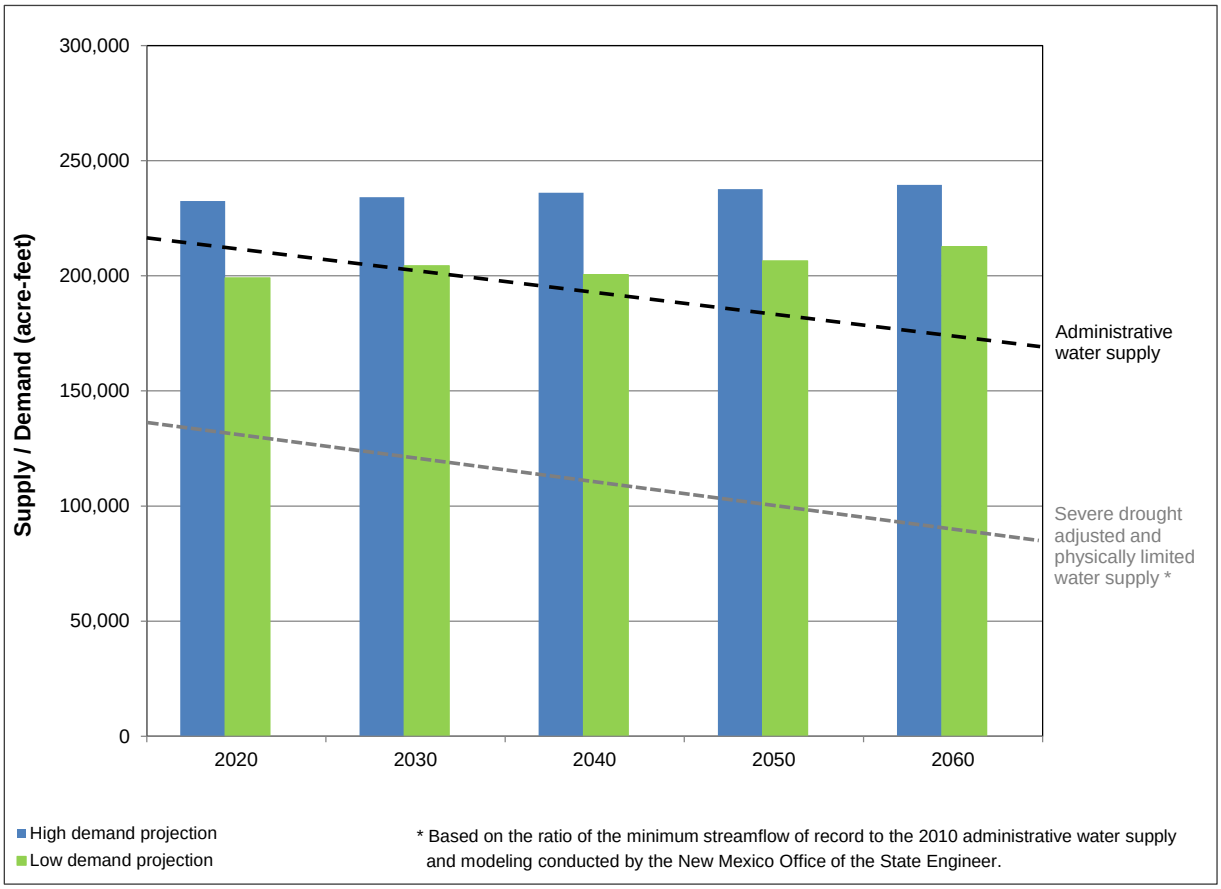


Figure ES-3. Available Supply and Projected Demand

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.

The estimated shortage in drought years, considering both surface water shortages and declines in existing groundwater supplies, is expected to range from 122,000 to 149,000 acre-feet in 2060. Strategies that the region identified for addressing drought shortages and other infrastructure, water management, and water quality issues included water rights purchases, public education, water conservation and effluent reuse, drought contingency planning, water quality protection, hydrogeological investigation, infrastructure maintenance and repair, and surface water and groundwater development strategies.

Planning Method

For this RWP, 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 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.

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, eight meetings were held in the Southwest New Mexico 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 Southwest New Mexico region include the following:

- Drought is a major concern. For the two climate divisions in the planning region, several recent years exhibited severe to extreme drought conditions. This is a particular concern for agricultural users that are dependent on surface water, but drought preparedness (developing drought contingency plans and shortage sharing agreements) is important for every community and irrigation system in the region.

- Due to the large amount of forested land within the region, coupled with the recent drought conditions, the threat of wildfire and subsequent sedimentation impacts on streams remains a key planning issue. The 2012 Whitewater Baldy Complex Fire and the 2013 Silver Fire burned large portions of the watersheds in the Southwest New Mexico region. 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.

- Protection of the natural environment of the Gila and San Francisco rivers (which supply agricultural demands in the northern to central part of the region) to support recreation uses and endangered species is an important issue in the region.

- Declining groundwater levels in parts of the Animas, Mimbres, and Nutt Hockett basins (central and southern part of the region) due to heavy pumping for municipal and agricultural use present an issue for long-term sustainability of groundwater resources in the region. One study found that efforts to improve irrigation efficiency in the Mimbres area have increased crop yields, but have also increased the amount of water consumption. Groundwater level recovery has been observed in some areas where pumping has diminished.

- Development of water resources in the region is limited by a number of legal decrees and federal statutes:

    - The Globe Equity Decree of 1935, which adjudicated most of the water rights to irrigators in the Virden Valley. However, there is often insufficient river water for these irrigators by late summer.

    - The U.S. Supreme Court's *1964 Arizona v. California* Decree limited New Mexico's consumptive use from the Gila and San Francisco rivers and San Simon Creek to about 30,000 acre-feet per year with no consideration for future growth. The 1964 Decree also limits the amount of water use in each of New Mexico's three sub-basins in the Gila Basin. Any unused amount in one sub-basin cannot be added to the limit imposed on another sub-basin.

    - Water rights in the sub-basins subject to the 1964 *Arizona v. California* Decree were adjudicated in 1967 (*New Mexico ex rel Reynolds v Anderson*, Cause No. 16290) in the Sixth Judicial Court, which enjoined the State Engineer from "permitting new uses of water within the Gila River Stream System, which would cause the total uses therefrom to exceed the limitations decreed by the U.S. Supreme Court in *Arizona v California . . .*"

    - State Engineer Steve Reynolds found, based on the 1964 Supreme Court Decree and the subsequent adjudications in the region, that New Mexico was at about 93 percent of the consumptive use limit and about 92 percent of the acreage limit in the Gila sub-basin, was already over both limits in the San Francisco sub-basin, and was at about 60 percent of the consumptive use limit and about 85 percent of the acreage limit in the San Simon sub-basin. State Engineer permits for the remaining available acres in the Gila and San Simon sub-basins have since been issued.

    - Annual accounting compiled by the NMISC of consumptive use in the sub-basins subject to the 1964 *Arizona v. California* Decree shows that consumptive use by New

Mexico in the Gila and San Francisco sub-basins has varied considerably from year to year, but that in some recent years New Mexico has used up to 95 percent of the Decree's average yearly limits. Consumptive use in the San Simon sub-basin has been less than 10 percent of the Decree's average yearly limit in recent years. However, water use in the San Simon sub-basin is all or almost all from groundwater, since the basin has little surface water, and the unused portion of the consumptive use is not transferrable to the other sub-basins.

- Thus, while New Mexico is not consuming all of the water allocated to the state in the 1964 *Arizona v. California* Decree, the Decree effectively limits new or large water development projects in the Gila or San Francisco sub-basins.
- The 1968 Colorado River Basin Project Act allocated an additional 18,000 acre-feet per year to New Mexico's Gila and San Francisco River basins, allowing for a total of approximately 48,000 acre-feet per year of consumptive use. This act also authorized the Central Arizona Project (CAP).
- The 2004 Arizona Water Settlements Act (AWSA) reduced the 1968 allocation from 18,000 to 14,000 acre-feet per year of annual average consumptive use, resolved the issue of New Mexico's junior priority, and included funding of up to $128 million. The AWSA provides that, "in the operation of the Central Arizona Project, the Secretary shall offer to contract with water users in the State of New Mexico, with the approval of its Interstate Stream Commission, or with the State of New Mexico, through its Interstate Stream Commission, for water from the Gila River, its tributaries and underground water sources in amounts that will permit consumptive use of water in New Mexico of not to exceed an annual average in any period of 10 consecutive years of 14,000 acre-feet, including reservoir evaporation, over and above the consumptive uses provided for by article IV of the decree of the Supreme Court of the United States in Arizona v. California (376 U.S. 340). Such increased consumptive uses shall continue only so long as delivery of Colorado River water to downstream Gila River users in Arizona is being accomplished in accordance with the AWSA, in quantities sufficient to replace any diminution of their supply resulting from such diversion from the Gila River, its tributaries and underground water sources. In determining the amount required for this purpose, full consideration shall be given to any differences in the quality of the water involved."
- The AWSA also gave New Mexico $66 million to finance a New Mexico Unit or other water utilization project in the Southwest region. Initial funding became available beginning in 2012 and is being paid to the New Mexico Unit Fund in annual increments.

- In November 2014, in accordance with the AWSA, the NMISC provided notice to the Secretary of the Interior that New Mexico intends to have a New Mexico Unit of the CAP constructed or developed. In 2014 and 2015, the NMISC also voted to partially fund additional water use projects in the region:
  - Municipal water conservation: $3 million
  - Gila Basin Irrigation Commission diversion structure: $1.25 million
  - Catron County Community Ditch permanent points of diversion: $500,000
  - Deming effluent reuse: $1.75 million
  - Pleasanton East-Side Ditch Company ditch improvement: $200,000
  - Sunset Canal and New Mexico New Model Canal ditch improvements: $200,000 (in 2016 Sunset Canal renounced its share of the funding and asked that it be transferred to New Model)
  - 1892 Luna Irrigation Ditch Association permanent diversion structure: $100,000
  - Grant County Regional Water Supply Project : $2.1 million

- The AWSA provides for the designation of a New Mexico CAP Entity to own and hold title to the New Mexico Unit of the CAP. The Entity was designated by the NMISC and created through a Joint Powers Agreement among the participating local governments in July 2015.

- The New Mexico CAP Entity is continuing to plan for the development of a New Mexico Unit project, which must be designed to comply with the terms of the AWSA. Environmental and planning studies, including preparation of an environmental impact statement by the NMISC and the USBR, must be completed before construction. The AWSA allows New Mexico to be a joint lead in the NEPA process. Information on the process is available on the New Mexico AWSA website (http://nmawsa.org/). Steering committee support for this project is mixed, with some strong supporters but others in the group voicing strong opposition. Even if no New Mexico CAP Unit is built, up to $66 million of the $128 million may be used for projects that meet a water supply demand in the Southwest New Mexico region.

- There are many small rural drinking water systems within 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 can be a financial and logistical challenge for these small systems.

- The many agricultural water users in the region also face challenges in obtaining full water supplies and financing for maintaining their infrastructure.

- Portions of the Southwest New Mexico region are vulnerable to flooding, particularly Santa Clara and those areas downstream of large forest fire burn scars. The Federal Emergency Management Administration (FEMA) provides floodplain maps for New Mexico that define hazard areas and indicate flood insurance rate boundaries. These maps can help to define areas and infrastructure that are vulnerable to flooding during extreme climate events, helping the region prepare for extreme precipitation. These maps do not consider the impact of climate change, which is predicted to cause more extreme precipitation events and even greater flooding impacts than presented on the FEMA maps. Existing infrastructure is not adequate to withstand peak flow events.
- Silver City and Deming have completed updated water conservation plans in the last few years and are actively implementing water conservation projects.
- Since the 2005 *Southwest New Mexico Regional Water Plan* was developed, the NMOSE has released new administrative criteria for the Mimbres Basin.

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 facilitate their implementation. To help address the implementation of new strategies, a review of the implementation of previous strategies was first completed.

The 2005 Southwest New Mexico Regional Water Plan recommended the following priority strategies for meeting future water demand:

- Municipal conservation and management
- Agricultural water conservation
- Watershed management
- Enhancement of surface recharge
- Provision of water for natural riparian and aquatic habitat on the Gila and San Francisco rivers
- Aquifer storage and recovery of Gila River flows
- Water banking
- Groundwater development

Additionally, the 2005 Southwest New Mexico RWP recommended the following strategies for long-term planning in the region:

- Water quality protection
- Groundwater management planning
- U.S.-Mexico border groundwater management
- Rain harvesting
- Industrial conservation
- Restrictions on domestic wells

The steering committee reviewed each of the strategies and indicated that many implementation actions have occurred and most are still relevant, though some are being refocused as new recommended strategies.

During the two-year update process the 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 New Mexico Environment Department 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 Southwest New Mexico region, projects identified in the PPP table are primarily water system infrastructure and watershed restoration projects, with some water conservation, education, agricultural support, and other projects also included.

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 working together to seek funding and for implementation. The following key projects were identified by the steering committee and Southwest New Mexico region stakeholders; these projects were not vetted through a priority ranking process but are listed in a general order of interest, with those with the most interest being listed first:

- *Grant County regional water supply project.* Improve and increase access to public water supplies that currently serve approximately 26,000 people in central Grant County, including developing a new well field and pipeline to Hurley.

- *Watershed restoration / erosion control / water quality protection / riparian restoration / post–fire restoration.* Implement forest thinning, prescribed fire, stream restoration, riparian restoration, erosion control structures, grassland restoration, meadow restoration, wetland improvement/creation, post-fire rehabilitation, road decommissioning, road best management practices for drainage, rangeland recovery, trail improvement, noxious weed eradication, invasive species treatment, aquatic habitat improvement, and stream stabilization.

- *Gila River Water utilization in accordance with the AWSA.* Use up to 14,000 acre-feet per year, on average, of Gila River water for industrial, municipal, agricultural, and environmental use. Steering committee support for this project is mixed, with some strong supporters and some strong opposition. As there is a detailed separate process under the AWSA regarding implementation of a Gila diversion, the regional water planning process did not attempt to resolve diverse opinions on the subject.
- *Hydrogeological investigation of the San Agustin and connected groundwater basins.* Determine how much the San Agustin aquifers support adjacent watersheds and groundwater basins.
- *Water conservation, source water protection, drought mitigation, and rainwater harvesting.* Establish a regional working group to leverage resources and expertise across the Southwest New Mexico water planning region to implement projects on water conservation, source water protection, drought mitigation, and rainwater harvesting. Collaborate in grant funding and coordinate activities in these areas across all sectors (agriculture and municipal and industrial).
- *Maintenance and optimization of regional existing diversion structures (Gila, San Francisco, Mimbres, Tularosa).* Maintain and optimize existing diversions from perennial streams to facilitate fish passage and water efficiency. Improve ditch infrastructure to minimize water loss and maximize use.
- *Twin Sisters effluent reuse.* Implement effluent reuse, to preserve more potable water for other needs, in connection with sub-regional infrastructure for greater system capacity in the southern Grant County/Santa Clara area.
- *Purchase of unused mining water rights to support local agriculture.* Develop regional water harvesting and agricultural small growers' use of water for conservation and economic development potential.
- *Education for four-county area on such issues as septic system impacts, conservation, capacity building, resources, and energy efficiency.* Education on programs to improve awareness in protecting groundwater, enhancing water conservation measures, capacity building, resources, and energy efficiency.
- *Repair of flood, sediment control, and recreational dams*. Maintain, repair, or decommission flood, sediment control, and recreational dams on public land (excluding dirt stock tanks).

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 Southwest New Mexico Water Planning Region, which includes all of Catron, Grant, Hidalgo, and Luna 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 *Southwest New Mexico Regional Water Plan* was completed and accepted by NMISC in 2005 (DBS&A, 2005).

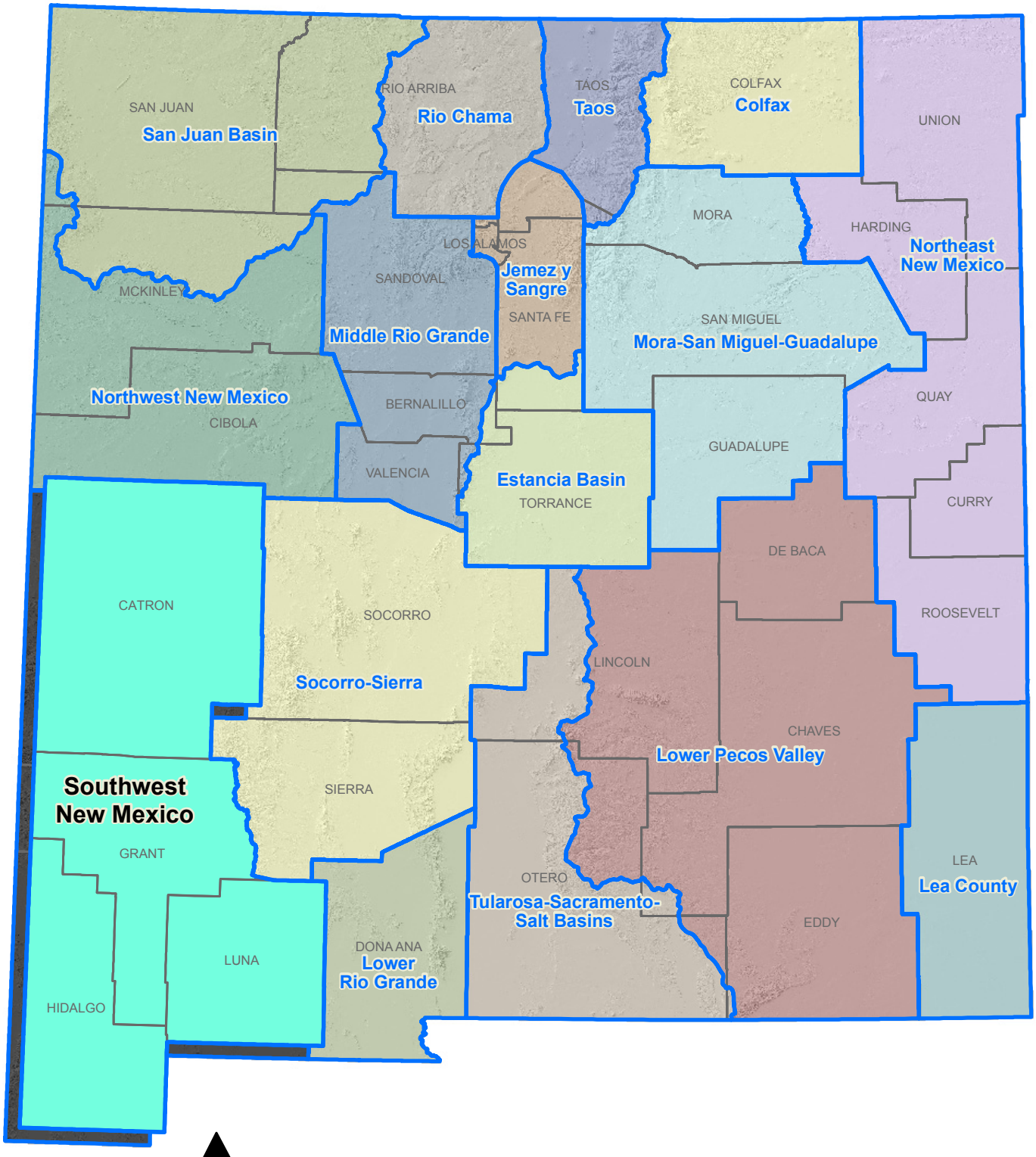
The purpose of this document is to provide new and changed information related to water planning in the Southwest New Mexico region, as listed in the bullets below, and to evaluate projections of future water supply and demand for the region using a common technical approach applied to all 16 planning 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 Southwest New Mexico 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 Southwest New Mexico 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):

- 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.



SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Location of Southwest New Mexico Water Planning Region

Figure 1-1

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG1-1_LOCATION.MXD 12/21/2016

- Section 3 provides background information regarding the characteristics of the Southwest New Mexico 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.
- 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.

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.*

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 method 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 in 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 Steam 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, 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 Southwest 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 *Southwest New Mexico Regional Water Plan 2016*, as well as gather public comments. (Appendix 2-B includes a summary of comments on the technical and legal sections of the document that were prepared by the NMISC [Sections 1, 3, 4, 5, 6, and 7].)

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 representative to participate in the regional water planning process

Section 2.2 provides additional detail regarding the public involvement process for the Southwest New Mexico 2016 regional water plan.

2.2 Public Involvement in the Southwest New Mexico 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
- 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 initially identified and asked to participate through the Southern New Mexico Council of Government Board, which represents the four counties in the Southwest New Mexico Water Planning Region and includes key decision-makers. Other steering committee members were recruited through interviews, public meetings, recommendations, and outreach to specific interests. Through this outreach, the Southwest New Mexico region established a representative steering committee, the members of which are listed in Table 2-1.

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 local water-related initiatives and/or have expertise such as watershed restoration or mutual domestic concerns and issues. The steering committee identified Priscilla Lucero, Executive Director of the Southwest New Mexico Council of Governments, as the chair of the regional water planning effort. Ms. Lucero's knowledge about the region, funding, and leadership have been helpful to maintain an active steering committee.

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. Steering committee members were also 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. A local online newspaper helped by writing summaries of the meetings and posting articles about the meetings on a regular basis.

Table 2-1. Steering Committee Members, Southwest New Mexico Water Planning Region

Page 1 of 2

Water User Group	Name	Organization / Representation
Agricultural – groundwater user		
Agricultural – surface water user	Kenneth Stockton	NM Acequia Commissioner
Agricultural / Livestock	Stewart Rooks	Grant County Farm and Livestock Bureau
Environmental interest	Allyson Siwik	Gila Resources Information Project
Watershed interest	Martha Schuman Cooper	Nature Conservancy
Extractive industry	Kevin Cook Ty Bays	Freeport-McMoRan
Local (retail) business	Michael Deubel	Alternative Forestry Unlimited
Tribal representative	Jeff Haozous	Chairman, Fort Sill Apache
Resource Agencies		
Federal agency	Carolyn Koury	U.S. Forest Service Gila National Forest
Federal agency	William Childress	Bureau of Land Management, District Manager
Federal agency	Vivian Gonzales	Bureau of Reclamation
State agency	Priscilla Lucero	Executive Director, Southwest New Mexico Council of Governments
State agency	Doug Boykin	NM State Forestry
State agency	Lacey Levine	NM Dept. of Agriculture
State agency	John Moeny	NMED/SWQB
State agency	Willie Lucero	NM State Land Office
County / Municipal Government		
Grant County	Charlene Webb	Grant County Manager
Luna County	Javier Diaz	Luna County Commissioner
Hidalgo County	Dar Shannon	Hidalgo County Commissioner
Catron County	Bucky Allred	Catron County Commissioner
City of Bayard	Charles Kelly	City of Bayard Mayor
Village of Santa Clara	Richard Bauch	Village of Santa Clara Mayor
Town of Hurley	Fernando Martinez	Town of Hurley Mayor
Village of Columbus	Phillip Skinner	Village of Columbus Mayor
City of Deming	Jim Massengill	Public Works Director
City of Lordsburg	Clark Smith Frank Madrid, alternate	Lordsburg Mayor/ Public Works Director
Village of Virden	Rulene Jensen	Village of Virden, Mayor

Table 2-1. Steering Committee Members, Southwest New Mexico Water Planning Region

Page 2 of 2

Water User Group	Name	Organization / Representation
Village of Reserve	Hilda Kellar	Village of Reserve, Mayor
Town of Silver City	Alex Brown	Town of Silver City, City Manager
San Agustin Plains	Eileen Dodds Anita Hand, alternate	Northern Catron County
Other		
Technical representative	Dennis Inman	
Health and food issues	John Song	Grant County Food Policy Council

The steering committee discussed and made the following recommendations regarding meeting times and locations that would maximize public involvement:

- Meetings should be held in Silver City, a central point in the region.
- The Southwest New Mexico Council of Governments training room is a good central meeting location.
- Weekdays during the day were the best meeting times.

Over the two-year update process, eight meetings were held in the Southwest New Mexico 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 local governments will continue to post information about RWP activities on their websites. The group also suggested regular updates to websites of the various governing bodies.
- Meetings will continue to be held in Silver City. The Southern New Mexico Council of Governments will continue to maintain the master list and steering committee list.
- The RWP effort will be chaired by the Southwest New Mexico Council of Governments.
- The group suggested that it would helpful to have subcommittees such as a watershed subcommittee, a mutual domestic subcommittee, and a food policy subcommittee.

2.2.4 Arizona Water Settlements Act Process

Separately from the regional water planning process, the Arizona Water Settlements Act (AWSA) process is also addressing regional water projects. Periodic open meetings are held regarding specific issues. Meeting notices as well as a library of documents and other information relevant to the AWSA process are available at www.NMAWSA.org.

3. Description of the Planning Region

This section provides a general overview of the Southwest New Mexico 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.

Table 2-2. Southwest New Mexico Region Public Meetings

Date	Location	Purpose	Meeting Summary
FY 2014			
8/13/2014	Western New Mexico University Silver City, NM	Kickoff meeting: Present the regional water planning update process to the region; discuss roles of the region and 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			
3/11/2015	Deming City Council Chambers Deming, 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.
5/12/2015	Southwest New Mexico Council of Government Annex Silver City, NM	Review the update process and the timeline for completing the RWP update.	The group discussed new information from the region and/or the projects, policies, programs that had been implemented since the 2005 plan. The steering committee membership and leadership were affirmed, with alternates named as appropriate. The group further discussed where future meetings would be held and the time that worked the best for getting the most attendance. A date was set for the next meeting and a summary of the discussion was sent to the master stakeholder list with information about the next meeting, including agenda items, location, date and time, and next steps.

Table 2-2. Southwest New Mexico Region Public Meetings

Date	Location	Purpose	Meeting Summary
6/3/2015	Southwest New Mexico Council of Government Annex Silver City, 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 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 planning update process. The consultants affirmed the next steps for the RWP update effort and a general idea for meeting again in FY 2015-2016.
FY 2016			
1/13/2016	Southwest New Mexico Council of Government Annex Silver City, NM	Review steering committee membership and leadership. Focus on the projects, programs, and policies to be included in the update.	The group reviewed the steering committee membership and suggested additional members to fill vacancies and affirmed that steering committee leadership would be Priscilla Lucero, Executive Director of the Southwest New Mexico Council of Government. The group participated in an activity that helped to refine regional projects that held the potential for the greatest collaboration and effort. The consultants affirmed the next steps for the RWP update effort and a general idea for meeting again in FY 2015-2016.
3/10/2016	Southwest New Mexico Council of Government Annex Silver City, NM	Refine the key collaborative projects, programs, and policy 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. The final meeting was scheduled for April 28, 2016 (subsequently changed to May 11, 2016).

Table 2-2. Southwest New Mexico Region Public Meetings
Page 3 of 3

Date	Location	Purpose	Meeting Summary
5/11/2016	Southwest New Mexico Council of Government Annex Silver City, NM	Discuss comments and revisions to the Executive Summary, Public Involvement, and Strategy sections and review the process for finalizing the RWP update.	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.
6/09/2016	Southwest New Mexico Council of Government Annex Silver City, NM	Conduct final review of changes to Executive Summary, Public Involvement, and Strategy sections made at the previous meeting.	The group had additional review and discussion of edits made to the Executive Summary, Public Involvement Section 2, Section 8, Key Strategies, and PPP list. Previous edits were approved and some additional edits were made.

3.1 General Description of the Planning Region

The Southwest New Mexico Water Planning Region is located in southwest New Mexico. The region is bounded on the north by the Northwest New Mexico Planning Region (Cibola County), on the west by the Arizona state line, on the south by the international border with Mexico, and on the east by the Socorro-Sierra and Lower Rio Grande Planning Regions (Socorro, Sierra, and Doña Ana counties) (Figure 1-1).

The total area of the planning region is approximately 17,337 square miles, distributed among the four counties as follows:

- Catron: 6,941 square miles
- Grant: 3,974 square miles
- Hidalgo: 3,454 square miles
- Luna: 2,968 square miles

The Southwest New Mexico region includes a mix of both public and private land. The public land is largely the Gila National Forest and Gila Wilderness. Other public lands include those held by the federal Bureau of Land Management and the State Land Office. The private land in the region is primarily large farms and ranches.

Mining has historically been an important land use in the region, with the largest copper mines in the state located in Grant County. Mining activity has fluctuated over time based on market conditions, but continues to be an important part of the regional economy.

3.2 Climate

Climate in the Southwest New Mexico planning region is semiarid, with temperatures and precipitation varying with latitude and elevation. Mean annual temperatures in the planning region are generally between 50 and 60 degrees Fahrenheit (°F). Average annual precipitation ranges from more than 40 inches in the mountain ranges to 9 to 12 inches in the lowest elevations. Annual precipitation is extremely variable, fluctuating over a range of more than 50 percent above and below the long-term average. More detail about regional climate and its influence on water supply is provided in Section 5.1.

3.3 Major Surface Water and Groundwater Sources

The major surface water resources in the region include the Gila, San Francisco, and Mimbres rivers (Figure 3-1). Surface water flows originate primarily in the higher elevations, as snowmelt in the spring and rain during the monsoon season. Flows are highly variable from year to year,

N

0 15 30 Miles

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

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Regional Map

Figure 3-1

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG3-1_REGIONAL_MAP.MXD 12/21/2016

and the streams are typically characterized by long periods of low flow interspersed with short durations of high volume flow.

Groundwater is present in the region in 14 declared underground water basins (UWBs): Animas, Cloverdale, Gallup, Gila-San Francisco, Hatchita, Las Animas Creek, Lordsburg, Mimbres, Nutt-Hockett, Playas Valley, Rio Grande, San Simon, Virden Valley, and Yaqui. (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.) Groundwater in the region is shared with the Northwest New Mexico, Socorro-Sierra, and Lower Rio Grande planning regions, with the State of Arizona, and with Mexico. A map showing the UWBs in the region is provided in Section 4.1.2.2.

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 Southwest New Mexico region includes the entirety of Catron, Grant, Hidalgo, and Luna counties. The 2013 populations were 3,607 in Catron County, 29,364 in Grant County, 4,809 in Hidalgo County, and 24,967 in Luna County (U.S. Census Bureau, 2014a).

As shown in Table 3-1, Catron and Luna counties experienced small increases in population from 2000 to 2010, while Grant and Hidalgo counties (the centers of copper mining within the region) experienced declines. All four counties experienced small declines from 2010 to 2013.

The economy of the region has traditionally been driven by mining and tourism. The largest employment categories in the region are education/healthcare, agriculture and mining, retail trade, and tourism-related services (arts, entertainment, recreation, hospitality, and food services). Agriculture is the largest water user, followed by mining and public water supply.

Land in the Southwest New Mexico water planning region is owned by various federal, tribal, state, and private entities, as illustrated on Figure 3-2 and outlined below:

- Federal agencies: 8,883 square miles
- Tribes: 17 square miles
- State agencies: 2,808 square miles
- Private entities: 5,629 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 Southwest New Mexico Water Planning Region

a. Population

County	2000 Total	2010	2013
Catron	3,543	3,725	3,607
Grant	31,002	29,514	29,364
Hidalgo	5,932	4,894	4,809
Luna	25,016	25,095	24,967
Total Region	65,493	63,228	62,747

Source: U.S. Census Bureau, 2014a, unless otherwise noted.
[a] U.S. Census Bureau, 2010

b. Income and Employment

	2008-2012 Income [a]		Labor Force Annual Average 2013 [b]		
County	Per Capita ($)	Percentage of State Average	Number of Workers	Number Employed	Unemployment Rate (%)
Catron	19,549	82	1,556	1,447	6.5
Grant	22,415	94	11,863	10,996	7.3
Hidalgo	19,164	81	2,596	2,429	6.4
Luna	16,546	70	12,637	10,534	16.6
Total Region	—	—	28,652	25,406	11.3

[a] U.S. Census Bureau, 2014c, American Community Survey 5-Year Estimate
[b] NM Department of Workforce Solutions, 2014

c. Business Environment

County	Industry	Number Employed	Number of Businesses
	2008-2012 [a]		*2012* [b]
Catron	Retail trade Education/healthcare Agriculture, forestry, etc. Construction	204 198 174 165	64
Grant	Education/healthcare Agriculture, mining, etc. Retail trade Arts, entertainment, recreation, lodging, dining	3,846 1,614 1,149 886	649

Table 3-1. Summary of Demographic and Economic Statistics for the Southwest New Mexico Water Planning Region

c. Business Environment (continued)

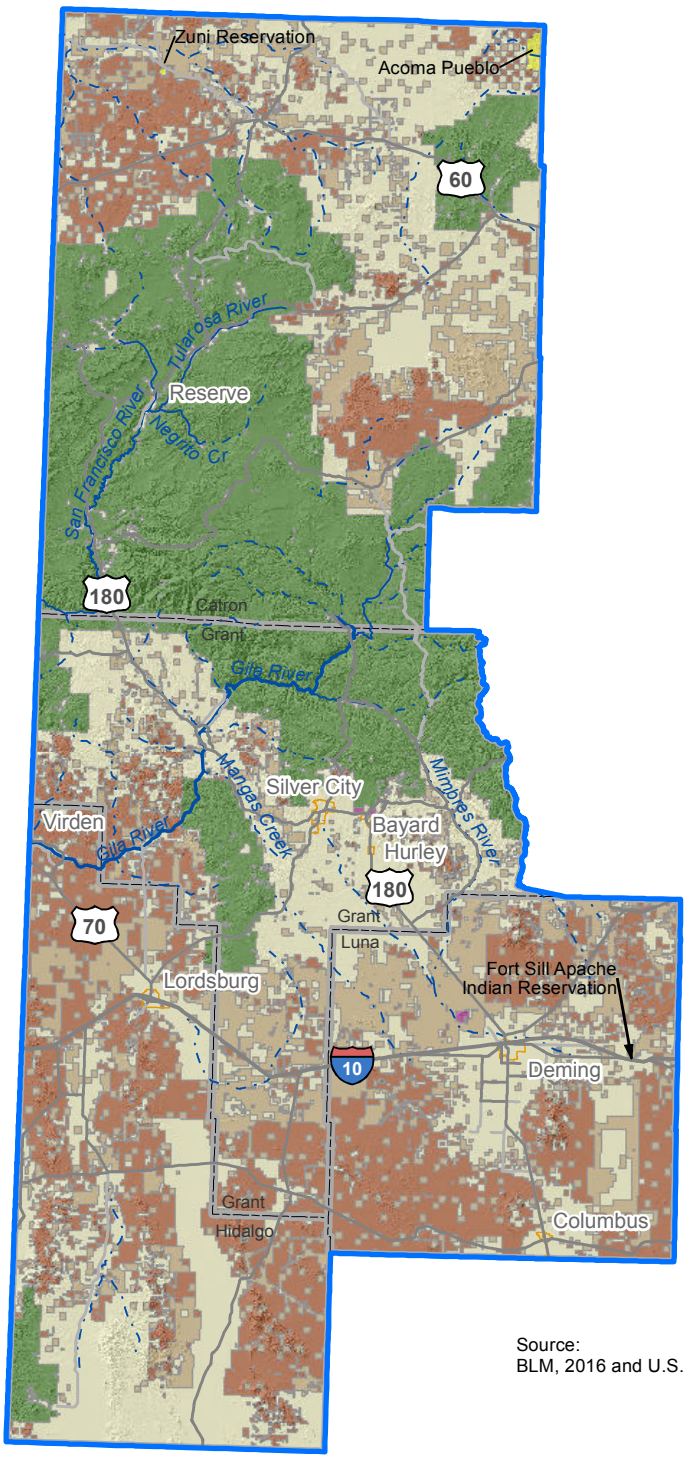
County	Industry	Number Employed	Number of Businesses
Hidalgo	Education/healthcare Agriculture, mining, etc. Arts, entertainment, recreation, lodging, dining	455 331 322	91
Luna	Education/Healthcare Retail trade Arts, entertainment, recreation, lodging, dining Agriculture, mining, etc.	2,068 1,136 1,050 848	395

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

d. Agriculture

County	Farms / Ranches [a]			Most Valuable Agricultural Commodities [b]
	Number	Acreage		
		Total	Average	
Catron	351	1,077,534	3,070	Cattle, calves
Grant	407	1,064,487	2,615	Cattle, calves Hay, other crops
Hidalgo	171	930,271	5,440	Cattle, calves Fruit, nuts, berries
Luna	372	1,643,213	4,417	Cattle, calves, milk Vegetables, potatoes, melons Hay, other crops Grains, beans, peas, oilseeds Fruit, nuts, berries Cotton, cotton seeds
Total Region	1,301	4,715,505	3,265	

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



N

0 15 30 Miles

Source:
BLM, 2016 and U.S. Census Bureau, 2015

Explanation

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

Land surface ownership

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

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Land Ownership

Figure 3-2

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG3-2_LAND_OWNERSHIP.MXD 12/21/2016

4. Legal Issues

4.1 Relevant Water Law

4.1.1 State of New Mexico Law

Since the accepted regional water plan for the Southwest New Mexico 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 Southwest New Mexico region is discussed in Section 4.1.2.

4.1.1.1 Regulatory Powers of the NMOSE

Several cases have addressed the 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 Southwest New Mexico 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 1948 Pecos River Compact (Compact) and the 1988 United States Supreme Court Decree, 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, Sections 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, Section 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.

Finally, and of great importance to the Southwest New Mexico planning region, the State Engineer's power to deny an application without holding an evidentiary hearing was addressed in a case involving the application filed by Augustin Plains Ranch, LLC (Applicant) to divert and use water from the San Agustin Basin in Catron County, New Mexico. *Augustin Plains Ranch, LLC, v. Verhines and Kokopelli Ranch*, No. D-728-CV-2012-008, Memorandum Decision on Motion for Summary Judgment (11/14/2012). The Applicant sought to appropriate 54,000 acre-feet of groundwater per year for a wide variety of purposes within the broad areas of Catron, Sierra, Socorro, Valencia, Bernalillo, Sandoval, and Santa Fe counties. After notice of the application was published, several protestants filed a motion to dismiss the application, arguing

that it was too broad in scope and did not adequately meet the requirements of a water rights application. The State Engineer denied the application without an evidentiary hearing, holding that the application did not sufficiently describe the place of use and the beneficial use to which the water would be applied. On appeal the district court addressed whether the State Engineer was justified in denying the application without holding an evidentiary hearing. The district court affirmed the State Engineer's denial of the application, agreeing that the application failed to specify the beneficial purpose and place of use of water, contrary to statute. The court also found that the application contradicted the New Mexico Constitution's declaration that water is owned by the public, not individuals, and failed to clearly demonstrate the water would be put to beneficial use, which is the basis of a water right.

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 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's) 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, Section 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, Section 72-12-25 (2009), to provide for administrative regulation of deep, non-potable aquifers. These groundwater basins are greater than 2,500 feet 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, Section 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, Section 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, Section 72-4A-9 (2005), and the Acequia Project Fund, NMSA 1978, Section 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, Section 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.

4.1.1.10 Ditch and 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, Section 73-2-21(E) (2003). The Owners appealed the acequias decision to district court. On appeal, the standard of review listed in Section 73–2–21(E) only allowed reversal of the acequia commissioners 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, Section 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, Section 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, Section 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 present the county with (1) NMOSE-issued water use permits for the subdivision or (2) proof 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.

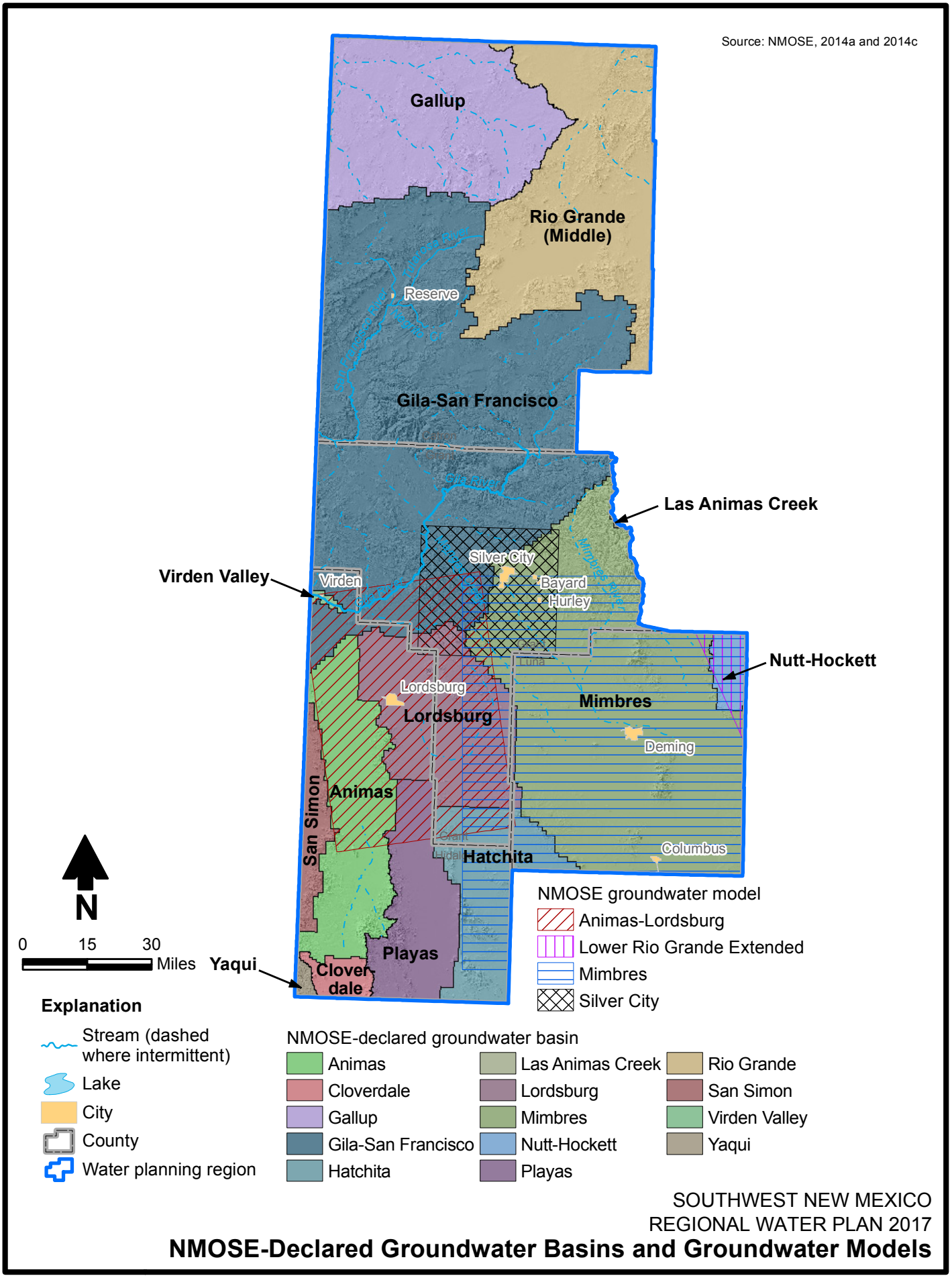
4.1.2.1 Water Masters

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). Within the planning region, two water masters have been appointed. One water master is in charge of the Gila, San Francisco, and San Simon Creek basins, and one is in charge of the Mimbres basin.

4.1.2.2 Groundwater Basin Guidelines

Guidelines for declared UWBs in the Southwest New Mexico region (Figure 4-1) are discussed in detail in the 2005 plan, Section 4.5 and Appendix C, Section C.6.3. Additional information regarding basin guidelines (not discussed in the 2005 plan) includes:

- A 2004 State Engineer Order requires the metering and reporting by March 1, 2006 of all groundwater withdrawals, except for domestic and livestock, in the Lower Rio Grande Water Master District, which includes all lands within the Lower Rio Grande, Hot Springs, and Las Animas Creek UWBs. In the Matter of the Requirements for Metering Groundwater Withdrawals in the Lower Rio Grande Watermaster District, 12/03/2004.
- The Cloverdale UWB was declared on September 23, 2005. 19.27.65.2 NMAC. No specific guidelines governing appropriations in the basin have been issued.
- Guidelines for the Deming-Columbus Administrative Area within the Mimbres UWB were adopted on May 20, 2011. A critical management area was designated in the Deming area; no new appropriations are allowed in the area.
- The Hatchita UWB was declared on September 23, 2005. 19.27.65.2 NMAC. No specific guidelines governing appropriations in the basin have been issued.



S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG4-1_GW_BASINS_MODELS.MXD 12/21/2016

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

NMOSE-Declared Groundwater Basins and Groundwater Models

Figure 4-1

- The Las Animas Creek UWB was declared on August 9, 1968. 9.27.60.8 NMAC. No specific guidelines governing appropriations in the basin have been issued. However, this basin is subject to the State Engineer Order requiring metering and reporting of all groundwater withdrawals except for domestic and livestock uses in the Lower Rio Grande Water Master District.

- The Virden Valley UWB was declared on December 5, 1938 and extended on October 20, 1960. 19.27.59.8 NMAC. No specific guidelines governing appropriations in the basin have been issued.

- The Yaqui UWB was declared on September 23, 2005. 19.27.65.2 NMAC. No specific guidelines governing appropriations in the basin have been issued.

4.1.2.3 AWRM Implementation in the Basin

The Upper Mimbres Basin has been designated as a priority basin for AWRM; however, AWRM regulations have not yet been issued for the basin.

4.1.2.4 Special Districts in the Basin

Special districts are various districts within the region having legal control over the use of water in that district. All are subject to specific statutes or other laws concerning their organization and operation, found in Chapter 73 of the New Mexico Statutes. In the Southwest New Mexico region, such special districts include the following soil and water conservation districts, which are governed by NMSA 1978, §§ 73-20-25 through 48:

- Deming Soil and Water Conservation District
- Hidalgo Soil and Water Conservation District
- Grant Soil and Water Conservation District
- San Francisco Soil and Water Conservation District

4.1.2.5 State Court Adjudications in the Basin

The Mimbres adjudication, *Mimbres Valley Irrigation Co. v. Salopek*, Luna County District Court No. 6326, was completed in the 1990s. The final decree was entered in that case on January 14, 1993 and remains in effect.

4.1.3 Federal Water Laws

The law of water appropriation has been developed primarily through decisions made by state courts. That said, in the Southwest New Mexico region two federal court decrees and congressional action govern surface and groundwater use. Specifically, water rights in the region are subject to the 1935 consent decree in *United States v. Gila Valley Irrigation District*, Globe Equity No. 59, (D. Ariz. June 29, 1935), and to the decree of the U.S. Supreme Court in

Arizona v. California, 376 U.S. 340 (1964). Water rights are also subject to the 2004 Arizona Water Settlement Act, which amended the Colorado River Basin Project. These decrees and congressional acts are discussed in depth in the 2005 plan, Section 4.2.1.

In addition to these federal cases and actions specific to the region, since the accepted plan was published in 2005 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.

Federally reserved water rights on Indian lands are known as "*Winters* reserved rights." The *Winters* Doctrine provides that at the time the United States established an Indian reservation, it also reserved sufficient water to provide for the reservation as a permanent homeland. *Winters v. United States*, 207 U.S. 564 (1908). Neither the priority date nor the amount of *Winters* reserved rights is based on the historical actual beneficial use of water. Under the *Winters* Doctrine, the priority date is based on the date the federal government established the Indian reservation. A *Winters* reserved right is quantified based on the amount of water needed to make the reservation a permanent homeland and fulfill the purposes of the reservation.

Several courts have held that *Winters* rights are unique federally reserved rights because of the many purposes served by federally created Indian reservations. In 1963, the United States Supreme Court adopted the "practically irrigable acreage" standard for quantifying federal Indian reserved water rights through a determination of the number of acres that can be practically or

feasibly irrigated on the reservation. *Arizona v. California*, 376 U.S. 546 (1963). Federal reservations and federally reserved water rights are discussed at length in the 2005 plan, Section 4.2.2 and Appendix C, Section C.3.6.1.

Federally reserved lands within the Southwest New Mexico planning region include the following:

- Gila National Forest
- Gila Wilderness
- Gila Cliff Dwellings National Monument
- Small portions of Coronado, Cibola, and Apache National Forests
- Fort Sill Apache tribal trust land
- Small portion of Acoma Pueblo

4.1.3.2 Interstate Stream Compacts

Interstate compacts become federal law once ratified by Congress. The "Law of the River" pertaining to the Colorado River, including the Colorado River Compact, is relevant to this region because the Gila River is a tributary to the Colorado River.

Signed in 1922, the Colorado River Compact was ratified by California, Colorado, Nevada, New Mexico, Utah, and Wyoming in 1929 and approved by Congress in the Boulder Canyon Project Act of 1929. The Compact apportions the use of waters of the Colorado River system to the upper and lower basins. Parts of Arizona, Colorado, New Mexico, Utah, and Wyoming constitute the upper basin. The lower basin includes parts of Arizona, California, Nevada, New Mexico, and Utah. The Compact does not provide for an administrative commission. Instead, it provides that each state, through the state official charged with water rights administration and together with certain agencies of the federal government, cooperate to:

- Promote the systematic determination and coordination of the facts as to flow, appropriation, consumption, and use of water in the Colorado River basin.
- Ascertain and publish the annual flow of the Colorado River at Lee Ferry, the point of division between the two basins.
- Perform such other duties as may be assigned by mutual consent of the signatory states.

4.1.3.3 Treaties

The 1944 Treaty between the United States and Mexico regarding distribution of the waters of the Colorado may have some applicability since the Gila is a tributary to the Colorado River.

4.1.3.4 Federal Water Projects

The Arizona Water Settlements Act (AWSA), Pub. L. 108-451, discussed in detail in the 2005 plan, Section 4.2.1.4, allocates to New Mexico an annual average of 14,000 acre-feet of water from the Gila Basin and up to $128 million in non-reimbursable federal funding. Contrary to the information contained in Section 4.2.1.4 of the DBS&A 2005 Plan, the AWSA is composed of four titles (instead of three), the fourth title being the "San Carlos Apache Tribe Water Rights Settlement." The water provided to New Mexico in the AWSA is in addition to that allocated to New Mexico in the 1964 U.S. Supreme Court decree in *Arizona v. California*, 376 U.S. 340 (1964). The funds provided by the AWSA may be used only in the Southwest New Mexico Water Planning Region of New Mexico (Catron, Grant, Hidalgo, and Luna counties). The AWSA requires that the NMISC approve uses of the water and funds.

To guide the allocation of water and funds, the NMISC formally adopted the following policy:

> *The Interstate Stream Commission recognizes the unique and valuable ecology of the Gila Basin. In considering any proposal for water utilization under Section 212 of the Arizona Water Settlements Act, the Commission will apply the best available science to fully assess and mitigate the ecological impacts on Southwest New Mexico, the Gila River, its tributaries and associated riparian corridors, while also considering the historic uses of and future demands for water in the Basin and the traditions, cultures and customs affecting those uses.*

On November 24, 2014, in accordance with the AWSA, the NMISC provided notice to the Secretary of the Interior that New Mexico intends to have a New Mexico Unit of the Central Arizona Project (CAP) constructed or developed. The NMISC also voted to fund additional water use projects in the planning region. On February 26, 2015, the NMISC adopted a resolution requesting the Secretary of the Interior to designate the NMISC as joint lead for the National Environmental Policy Act (NEPA) process for the New Mexico Unit of the CAP, as authorized by the AWSA. On June 9, 2015, the NMISC adopted a resolution approving the text of a Joint Powers Agreement to create the New Mexico CAP Entity. The New Mexico CAP Entity entered into the New Mexico Unit Agreement with the Secretary of the Interior November 23, 2015. In addition to the NMISC, 13 political subdivisions within the region have signed onto the Joint Powers Agreement and are now parties to the New Mexico CAP Entity. The NMISC is a non-voting member of the New Mexico CAP Entity.

In the coming months, the NMISC will continue working to support the efforts of the New Mexico CAP Entity and to administer the New Mexico Unit Fund.

4.1.3.5 Federal Adjudications in the Basin

See above discussion (Section 4.1.3) on federal court decrees governing surface and groundwater in the region.

4.1.4 Tribal Law

Water use on the Fort Sill Apache and Acoma Pueblo tribal trust land in New Mexico is governed by tribal law.

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 Catron County

Water use in Catron County is regulated through ordinances and resolutions and is guided by two comprehensive plans.

The Catron County ordinances addressing water use include:

- Ordinance No. 008-92 provides for intergovernmental coordination in water planning and mandates that the County be notified of all interstate and federal water developments.
- Ordinance No. 009-92 provides for water allocation and riparian management, and allows the County to establish a water bank and promote watershed improvement, instream flow, riparian management, and drought management. The ordinance also protects the customary and cultural access to water.
- Ordinance No. 010-92 provides for emergency water management and allows the County to create critical water areas when the long-term health and safety of County residents is in immediate danger due to diminished water supply or water quality. The ordinance also allows the County to protect critical water needs during times of drought.
- Ordinance No. 011-92 provides for the protection of rights to and uses of water and prohibits the involuntary restriction of water rights and the contamination of water. The ordinance permits the County to review changes in water use to ensure no adverse impact to historical, customary, and cultural uses.
- Ordinance No. 004-93 creates the Catron County Water Advisory Board, which advises the County Commission and the public on proposed actions, legislation, and regulations that may impact water use.

Two Catron County resolutions also relate to water use.

- Resolution 013-2012 states the County's position on water rights and states that the County will attempt to obtain numbers to be included in any claim of water rights used for livestock on federal or state lands.
- Resolution 024-2012 is the County's declaration of its public welfare policy for water use and conservation.

The Catron County Comprehensive Land Use Plan (Catron County, 1992 [updated 2012]) sets forth the County's general policies on water resource issues:

- Proper management of the public land watershed, which supplies the majority of the agricultural, domestic, and industrial water use in this water-short area, is critical.
- An adequate supply of clean water is essential to the health of the County's residents and to the continued growth of the County's economy. Every aspect of the County's economy depends on a dependable and clean supply of water.
- Agencies must analyze the effect of their actions on water quality, watershed yields, and timing of those yields. Any action, lack of action, or permitted use that results in a significant or long-term decrease in water quality or quantity will be opposed.
- It is important to protect water from significant long-term decreases in quality or quantity.
- Any agency action must analyze the impacts on facilities such as dams, reservoirs, delivery systems, and monitoring facilities located on or downstream from land covered by the proposal.
- The County will oppose any movement toward nationalization or federal control of New Mexico's water resources or rights.
- Privately held water rights should be protected from federal and/or state encroachment and/or coerced acquisition.
- It is imperative that the quality and quantity of water is not reduced below current levels.
- The County supports projects that will improve water quality and increase the amount and dependability of the water supply.
- All potential reservoir sites and delivery system corridors shall be protected from any federal or state action that would inhibit their future use for such purposes.
- Any proposed sale, lease, or other exchange of water must adequately consider and satisfy the County's interest and concerns before the County will participate or support the proposal. The County recognizes and will support the existence of all legal canals, laterals, or ditch rights-of-way.
- All federal and state mandates governing water or water systems should be funded by those agencies and developed in cooperation with the County.
- The County supports livestock grazing and other managed uses of watersheds and holds that, if properly managed, multiple uses are compatible with watershed management.

- The County will support all reasonable water conservation efforts, with water saved through such efforts allocated to those persons or entities whose efforts created the savings.

The Catron County comprehensive plan and capital improvement plan (Consensus Planning, Inc., 2007) sets forth the policy that an adequate supply of water be available for use by existing residents, for future development, and for use in firefighting. In order to meet the plan's stated goal of an efficient use of water throughout Catron County, the plan includes the following objectives:

- Review and implement the recommended alternatives from the *Southwest New Mexico Regional Water Plan* that are appropriate for Catron County water providers and users.
- Protect water quality in Catron County by implementing a wellhead protection program and/or other actions designed to ensure the quality of the County's potable water.
- Complete current infrastructure projects involving water supply, and plan for new improvements such as new wells and water tanks for underserved areas.

4.1.5.2 Village of Reserve

The Village has no water code or comprehensive land use plan, but sections of the Village Code regarding subdivision of land (Chapter 200) address in detail what subdividers must do to connect to an available water supply or secure a water supply for a subdivision. Subdividers must file a water supply and water quality plan for approval by the Planning Commission. The water supply plan must be adequate for domestic use, fire protection, and any other purpose of use of water proposed by the subdivider. The water supply plan must contain plans and specification for diversion, storage, and distribution facilities, a geohydrologic report (for groundwater sources) or a hydrologic report (for surface water sources), geologic maps, and information regarding depth to water, water level contours, direction of groundwater movement, estimated thickness of saturation in the aquifer, and probable yield (for groundwater sources), or analysis of historical runoff and projected water supply (for surface water sources). In the case of a groundwater supply, the subdivider must also provide a 40-year schedule of the effects of the projected water withdrawals for the subdivision on water levels and natural discharge.

4.1.5.3 Grant County

Grant County has no water code. However, the County's Comprehensive Plan, revised in 2004, provides the County's general policies regarding water.

- Grant County has an interest in securing water for current and future residential, commercial, industrial, and government uses because the County recognizes that the economic and general welfare of people in the County depends upon maintenance of adequate supplies of good quality water.

- The County recognizes that certain areas of the County are experiencing degraded groundwater quality due to a high density of individual wastewater disposal systems. Some of these problems could be addressed effectively with an integrated systems approach. The County supports the use of appropriate disposal systems based on housing density, depth to groundwater, depth to bedrock or impervious layers, and soil type. The County also has a goal to prohibit land uses that are determined to risk contamination of the water supply.

- Some additional water rights for the County need to be secured to meet current and future needs.

- The County has a goal to encourage residents to adopt water conservation practices such as using native plants in landscaping, smaller lawns, and water-saving fixtures and appliances, and limiting the use of high-quality water where lower-quality water should suffice. The County also plans to explore and implement economic incentives for water conservation.

- The County supports New Mexico's claim to the water allocated to New Mexico under the 1968 Colorado River Basin Project Act, which created the CAP.

- The County has a goal to work with the NMOSE and the NMISC to develop a water budget for the water basins of the County.

- The County should prepare a strategic water action plan outlining actions to address water supply such as:

    - Restoring watershed sub-basins within the County
    - Managing stormwater to enhance recharge
    - Managing water resources through better understanding of hydrogeology
    - Accommodating appropriate flood flows
    - Cleaning contaminated groundwater and surface water
    - Funding programs to protect surface water and groundwater
    - Restoring stream and river bosques
    - Encouraging rainwater collection
    - Requiring wastewater re-use
    - Maintaining and repairing existing public water systems
    - Analyzing drought severity and vulnerability of water supplies, including vulnerability to priority calls.

4.1.5.4 Silver City

Silver City set forth its policy on water use through its comprehensive plan (Town of Silver City, 2004) and the Land Use & Zoning Code of 2010. Silver City also regulates water use through a water conservation ordinance. The comprehensive plan and the Land Use & Zoning Code set forth the following policy statements:

- Coordinate land use and growth management with water management priorities and extensions of infrastructure.
- Maintain a dependable, quality water supply in Silver City to safeguard public health and enhance the quality of life.
- Manage water resources efficiently, maintain or lower the current level of per capita consumption, and provide incentives for conservation to ensure availability of water.
- Prevent adverse impacts of development on the availability of water and water quality, among other things.
- Subdivision approval is contingent upon adequate water supply, including a buffer level.

Silver City's Water Conservation Ordinance No. 1038, passed on September 12, 2000 and now codified in Chapter 52, prohibits water waste and sets three water conservation levels based upon the relationship between water demand and municipal safe production and delivery demand:

- *Level 1:* Voluntary water conservation, when annual precipitation is 80 percent or less of the annual long-term average for the past two years.
- *Level 2:* Water restrictions, when water demand is greater than safe production capabilities for two consecutive weeks.
- *Level 3:* Water crisis, any time water demand exceeds total water production or delivery capabilities.

Both the Town's Municipal Code and the Land Use & Zoning Code contain specific provisions regarding water for new developments. Developers are required to pay all water connection fees for all lots platted in a new development. Subdivision approval is contingent upon the Town having adequate water supply, infrastructure, and water rights to provide all units in the subdivision water for normal operation and fire protection at current and future levels. The required level includes an amount of water as a buffer. If adequate supplies are not available, obtaining adequate supplies may become a condition of subdivision approval.

In addition, the Town of Silver City has also passed a number of resolutions related to water issues. Among the most relevant ones are:

- Resolution No. 2008-30, approving local support for water planning funding.
- Resolutions No. 2011-08, 2012-02, 2012-04, and 2012-05, authorizing submission of WaterSMART applications to the U.S. Department of Interior.
- Resolution No. 2012-30, requesting a Colonias grant for regional water planning purposes.
- Resolution No. 2013-32, adopting a water conservation plan.

4.1.5.5 Hidalgo County

Water use in Hidalgo County is guided by the *Hidalgo County Comprehensive Plan Update 2011* (CommunityByDesign et al., 2011a). The Plan's goals include:

- Encouraging water conservation in a manner that is fair and equitable to all users.
- Allowing for water banking.
- Recognizing and protecting historical water rights for future generations.
- Securing, protecting, and maintaining safe and sustainable water quality and quantity through effective and coordinated watershed and aquifer management.
- Promoting, protecting, and restoring the open spaces and natural resources such as rivers, riparian areas, floodplains, wildlife habitats, forests and grasslands, and migration corridors.
- Encouraging collaboration, cooperation, and partnerships with all mutual domestics, community organizations, municipalities, colonias, and state and federal jurisdictions in determining future land and water uses.

4.1.5.6 City of Lordsburg

Water use in Lordsburg is guided by the *City of Lordsburg 2011 Comprehensive Plan Update* (CommunityByDesign et al., 2011b). Strategies set forth in the plan include:

- Rehabilitate and regionalize with adjacent water system providers to provide economy of scale in operation of water treatment systems.
- Design and fund service extensions as needed to provide for future growth.
- Continue to obtain water rights and associated water supplies to provide water for the future growth of the community through an appropriate water policy that outlines the strategies for increasing both potable and non-potable water supply.

- Educate the community on water conservation and recycling techniques through community events such as water fairs, free workshops, or other means to raise awareness of the issues related to water conservation.
- Develop educational literature regarding water conservation for insertion in City utility bills.
- Institute rebates or other incentives for water conservation measures (low-flow fixtures, front loading washing machines, and water conserving xeriscapes).
- Identify opportunities for use of treated effluent for irrigation of public facilities, develop tertiary wastewater treatment facilities and a distribution system, and encourage new development to install "purple pipe," graywater, or distribution systems for non-potable/reuse sources.

4.1.5.7 Luna County

The Mimbres River is perennial in a portion of its reach in Luna County and is the only perennial stream in the Mimbres Basin, a closed water basin that covers almost all of Luna County. Luna County set forth its policy on water use through the *Luna County Comprehensive Plan Update* (Sites Southwest, 2012) and regulates water use through its subdivision ordinances.

The County is mining the aquifer, which is predicted to run short of needed water supplies between 2040 and 2060, depending on location. Therefore, the comprehensive plan update outlines County policy on water quantity and water quality and outlines the following water quantity strategies:

- Decrease the average amount of water used per day by Luna County and its residents through water conservation, rainwater harvesting, and use of graywater systems.
- Encourage efficient use of water at the residential and commercial level by preparing water conservation guidelines or regulations for residential and commercial users.
- Revise the subdivision ordinance to encourage aquifer recharge through the design of storm drainage systems.
- Encourage the use of drip irrigation for agriculture and residential landscapes to reduce consumptive use of water.
- Work with community water systems on water conservation efforts.
- Incorporate water conservation standards for indoor and outdoor water use into the County building code.
- Encourage the attraction and growth of businesses that are not water-intensive and/or recycle their water.

The plan also outlines the following water quality strategies:

- Develop a wellhead protection plan.
- Encourage nearby residents, through incentives or requirements, to hook up to the Deming water and sewer system.
- Develop a solution for the Deming Ranchettes, which are subdivided into lots too small to accommodate traditional septic systems under state regulations.
- Monitor water quality in high density areas and plug contamination pathways.
- Conduct water sampling in high density areas with a risk of contamination.

The Luna County Subdivision Regulations regulate water use as follows:

- §14.1.1(b): Low-water-use landscaping techniques (xeriscaping) are encouraged.
- §14.1.2(a): The maximum water requirement for both indoor and outdoor purposes for each residential parcel is 0.75 acre-foot per year per lot, unless a water demand analysis approved by the State Engineer justifies use of a different figure.
- §14.1.3: Before approving the final plat for a subdivision containing 20 or more parcels, any one of which is 2 acres or less in size, or a subdivision located within a declared UWB, the Board of County Commissioners shall require the subdivider to provide a permit from the State Engineer determining whether the amount permitted is sufficient to fulfill the annual requirements of the subdivision.
- §14.1.4: If water will be supplied from a community water system, the subdivider is required to provide preliminary plans for the water production, storage, and distribution systems. Residential service connections to community water systems shall be required where such systems have been designed and constructed for use within the subdivision.

4.1.5.8 City of Deming

The City of Deming set forth its policy on water use through the *City of Deming Comprehensive Plan Update* (Sites Southwest, 2010) and regulates water use through its City Code.

The Comprehensive Plan recognizes that a new production source will be required to meet future water demand and provide for growth. The Comprehensive Plan sets the following policy goals: (1) ensure that water and wastewater systems are expanded or improved to accommodate future growth, (2) continue to obtain water rights for future growth, (3) require that subdivisions have an adequate supply of water for each lot for at least 70 years, and (4) enhance the quality of life by providing safe, efficient, affordable, and responsible use of water by encouraging voluntary water conservation and expanding uses of wastewater effluent irrigation.

The Deming City code restricts water use through Section 9-4-7 of the Code. That section includes outdoor water conservation measures (§ 9-4-7(D)), time of day and day of week watering restrictions (§ 9-4-7(C)), waste of water prohibition (§ 9-4-7(E)), and restrictions on water use during water emergencies (§ 9-4-7(H)). In addition, Section 13-4-5 of the Code requires that subdivisions have an adequate supply of water (§13-4-5).

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.* The ESA is discussed at length in the 2005 plan, Section 4.2.3 and Appendix C, Section C.3.6.2.

The species in the Southwest New Mexico Water Planning Region that are subject to protection under the ESA are the following:

- Spikedace (endangered; recovery team preparing plan): Catron, Grant, and Hidalgo counties.
- Loach minnow (endangered; recovery team preparing plan): Catron, Grant, and Hidalgo counties
- Gila chub (endangered; recovery team preparing plan): May occur in Grant County
- Southwestern willow flycatcher (endangered; implementation of final recovery plan): Catron and Grant counties
- Chiricahua leopard frog (threatened; implementation of recovery plan): Catron, Grant, and Hidalgo counties
- Mexican garter snake (threatened): Grant and Hidalgo counties
- Narrow-headed garter snake (threatened): Catron, Grant, and Hidalgo counties
- Yellow-billed cuckoo (threatened): Catron, Grant, Hidalgo, and Luna counties
- Mexican spotted owl (threatened; implementation of final recovery plan): Catron, Grant, and Hidalgo counties
- Gila trout (threatened): Grant and Catron counties
- Headwater chub (threatened): Grant and Catron counties
- Roundtail chub, distinct population segment (threatened): Grant County
- Sprague's pipit (candidate): Grant, Hidalgo, and Luna counties

Many of the above-listed species (spikedace, loach minnow, Mexican garter snake, narrow-headed garter snake, yellow-billed cuckoo, headwater chub, roundtail chub) were listed recently (2012 on) and had critical habitat declared at the time of listing. For the fish species, critical habitat encompasses most or all of the Gila River and the San Francisco River. Any actions that are likely to harm the habitat used by these species will be subject to strict review and possible limitation.

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).

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.* In the Southwest New Mexico Water Planning Region, all of the federally listed species discussed above are protected also under the New Mexico Act, along with several others.

4.2.2 Water Quality Laws

4.2.2.1 Federal 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 the U.S. Environmental Protection Agency (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). In the Southwest New Mexico planning region, numerous segments of the Mimbres, Upper Gila, Upper Gila-Mangas, and San Francisco rivers 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. 40 C.F.R. §§ 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 20.6.2.3101 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

The Clean Water Act, discussed in Section 4.2.2.1, affords Native American tribes the same status as states for purposes of implementing the Act's regulatory and permitting programs. Thus, a tribe can receive from EPA delegated authority to implement the Section 402 NPDES permit program and the Section 404 dredge and fill permit program (33 U.S.C. § 1377(e)). A tribe can also adopt water quality standards for EPA approval (33 U.S.C. § 1377(e)).

Acoma Pueblo, a small portion of which is located in the Southwest New Mexico region, adopted water quality standards in 1998, which were subsequently revised in 2005. See *Pueblo of Acoma Water Quality Standards* (2005). The EPA approved the standards in 2001.

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

The region is affected by a deficit of water. The AWSA was enacted by Congress with the intent to soften the local impacts of the U.S. Supreme Court decision in *Arizona v. California*, 376 U.S. 340 (1964). However, implementation of a project is still years away.

While the AWSA was enacted to help water supply in the region, the possible construction of a New Mexico Unit of the CAP pursuant to the AWSA is a controversial topic. As discussed in Sections 4.1.3.4 and 5, the NMISC and 13 local governments and entities have signed the Joint Powers Agreement creating the New Mexico CAP Entity. Any potential diversion and storage project built pursuant to the AWSA will have to undergo evaluation under the National Environmental Policy Act (NEPA) and other environmental laws.

5. Water Supply

This section provides an overview of the water supply in the Southwest New Mexico 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 *Southwest New Mexico 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 Southwest New Mexico region are:

- Drought is a major concern. For the two climate divisions in the planning region, 2011, 2012, and 2013 were all severe to extreme drought years (NCDC, 2014), and the winter snowpack for 2014 was also very low (Section 5.1.1). This is a particular concern for agricultural users that are dependent on surface water, but drought preparedness (developing drought contingency plans and shortage sharing agreements) is important for every community and irrigation system in the region.

- Due to the large amount of forested land within the region, coupled with the recent drought conditions, the threat of wildfire and subsequent sedimentation impacts on streams remains a key planning issue. The 2012 Whitewater Baldy Complex Fire and the 2013 Silver Fire burned large portions of the watersheds in the Southwest New Mexico region. 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.

- Protection of the natural environment of the Gila and San Francisco rivers (which supply agricultural demands in the northern to central part of the region) to support recreation uses and endangered species is an important issue for the region.

- Declining groundwater levels in parts of the Animas, Mimbres, and Nutt Hockett basins (central and southern part of the region) due to heavy pumping for municipal and agricultural use present an issue for long-term sustainability of groundwater resources in the region. One study found that efforts to improve irrigation efficiency in the Mimbres area have increased crop yields, but have also increased the amount of water consumption. Groundwater level recovery has been observed in some areas where pumping has diminished (Intera, 2013).

- Development of water resources in the region is limited by a number of legal decrees and federal statutes:

    - The Globe Equity Decree of 1935 adjudicated most of the water rights to irrigators in the Virden Valley. However, there is often insufficient river water for these irrigators by late summer.

    - The U.S. Supreme Court, in its 1964 Arizona v. California Decree, limited New Mexico's consumptive use from the Gila and San Francisco rivers and San Simon Creek to about 30,000 acre-feet per year, with no consideration for future growth. The 1964 Decree also limits the amount of water use in each of New Mexico's three sub-basins in the Gila Basin. Any unused amount in one sub-basin cannot be added to the limit imposed on another sub-basin.

    - Water rights in the sub-basins subject to the 1964 Arizona v. California Decree were adjudicated in 1967 (*New Mexico ex rel Reynolds v. Anderson*, Cause No. 16290) in the Sixth Judicial Court, which enjoined the State Engineer from "permitting new uses of water within the Gila River Stream System, which would cause the total uses therefrom to exceed the limitations decreed by the U.S. Supreme Court in Arizona v. California . . .." *State ex rel. Reynolds v. Anderson*, No. 16290, Final Judgment and Decree at 5 (Dist. Ct. of Grant County, Sept. 14, 1967).

    - State Engineer Steve Reynolds found, based on the 1964 Supreme Court Decree and the subsequent adjudications in the region, that New Mexico was at about 93 percent of the consumptive use limit and about 92 percent of the acreage limit in the Gila sub-basin, was already over both limits in the San Francisco sub-basin, and was at about 60 percent of the consumptive use limit and about 85 percent of the acreage limit in the San Simon sub-basin (Reynolds, 1969). State Engineer permits for the remaining available acres in the Gila and San Simon sub-basins have since been issued.

- Annual accounting compiled by the NMISC of consumptive use in the sub-basins subject to the 1964 *Arizona v. California* Decree shows that consumptive use by New Mexico in the Gila and San Francisco sub-basins has varied considerably from year to year, but that in some recent years New Mexico has used up to 95 percent of the Decree's average yearly limits (NMISC, 2015). Consumptive use in the San Simon sub-basin has been less than 10 percent of the Decree's average yearly limit in recent years. However, water use in the San Simon sub-basin is all or almost all from groundwater, since the basin has little surface water, and the unused portion of the consumptive use is not transferrable to the other sub-basins.
- Thus, while New Mexico is not consuming all of the water allocated to the state in the 1964 *Arizona v. California* Decree, the Decree effectively limits new or large water development projects in the Gila or San Francisco sub-basins.
- The 1968 Colorado River Basin Project Act allocated an additional 18,000 acre-feet per year to New Mexico's Gila and San Francisco River basins, allowing for a total of approximately 48,000 acre-feet per year of consumptive use. This act also authorized the Central Arizona Project (CAP).
- The 2004 Arizona Water Settlements Act (AWSA) reduced the 1968 allocation from 18,000 to 14,000 acre-feet per year of annual average consumptive use, resolved the issue of New Mexico's junior priority, and included funding of up to $128 million. The AWSA provides that, "in the operation of the Central Arizona Project, the Secretary shall offer to contract with water users in the State of New Mexico, with the approval of its Interstate Stream Commission, or with the State of New Mexico, through its Interstate Stream Commission, for water from the Gila River, its tributaries and underground water sources in amounts that will permit consumptive use of water in New Mexico of not to exceed an annual average in any period of 10 consecutive years of 14,000 acre-feet, including reservoir evaporation, over and above the consumptive uses provided for by article IV of the decree of the Supreme Court of the United States in *Arizona v. California* (376 U.S. 340). Such increased consumptive uses shall continue only so long as delivery of Colorado River water to downstream Gila River users in Arizona is being accomplished in accordance with the AWSA, in quantities sufficient to replace any diminution of their supply resulting from such diversion from the Gila River, its tributaries and underground water sources. In determining the amount required for this purpose, full consideration shall be given to any differences in the quality of the water involved."
- The AWSA also gave New Mexico $66 million to finance a New Mexico Unit or other water utilization project in the Southwest New Mexico region. Initial funding became available beginning in 2012 and is being paid to the New Mexico Unit Fund in annual increments.

- In November, 2014, in accordance with the AWSA, the NMISC provided notice to the Secretary of the Interior that New Mexico intends to have a New Mexico Unit of the CAP constructed or developed. In 2014 and 2015, the NMISC also voted to partially fund additional water-use projects in the region:
    - Municipal water conservation: $3 million
    - Gila Basin Irrigation Commission diversion structure: $1.25 million
    - Catron County Community Ditch Permanent Points of diversion: $500,000
    - Deming effluent reuse: $1.75 million
    - Pleasanton East-Side Ditch Company ditch improvement: $200,000
    - Sunset Canal and New Mexico New Model Canal ditch improvements: $200,000 (in 2016 Sunset Canal renounced its share of the funding and asked that it be transferred to New Model)
    - 1892 Luna Irrigation Ditch Association permanent diversion structure: $100,000
    - Grant County Regional Water Supply Project: $2.1 million
- The AWSA provides for the designation of a New Mexico CAP Entity to own and hold title to the New Mexico Unit of the CAP. The Entity was designated by the NMISC and created through a Joint Powers Agreement among the participating local governments in July 2015.
- The New Mexico CAP Entity is continuing to plan for the development of a New Mexico Unit project, which must be designed to comply with the terms of the AWSA. Environmental and planning studies, including preparation of an environmental impact statement by the NMISC and the USBR, must be completed before construction. The AWSA allows New Mexico to be a joint lead in the NEPA process. Information on the process is available on the New Mexico AWSA website (http://nmawsa.org/). Steering committee support for this project is mixed, with some strong supporters but others in the group voicing strong opposition (Section 8.2). Even if no New Mexico CAP Unit is built, up to $66 million of the $128 million may be used for projects that meet a water supply demand in the Southwest New Mexico region.
- There are many small rural drinking water systems within the region (Section 6.4). 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 can be a financial and logistical challenge for these small systems.

- The many agricultural water users in the region also face challenges in obtaining full water supplies and financing for maintaining their infrastructure.

- Portions of the Southwest New Mexico region are vulnerable to flooding, particularly Santa Clara and those areas downstream of large forest fire burn scars. The Federal Emergency Management Administration (FEMA) provides floodplain maps for New Mexico (https://www.fema.gov/states/new-mexico) that define hazard areas and indicate flood insurance rate boundaries. These maps can help to define areas and infrastructure that are vulnerable to flooding during extreme climate events, helping the region prepare for extreme precipitation. These maps do not consider the impact of climate change, which is predicted to cause more extreme precipitation events and even greater flooding impacts than presented on the FEMA maps. Existing infrastructure is not adequate to withstand peak flow events.

- Silver City and Deming have completed updated water conservation plans in the last few years and are actively implementing water conservation projects.

- Since the 2005 *Southwest New Mexico Regional Water Plan* was developed, the NMOSE has released new administrative criteria for the Mimbres Basin, as discussed in Section 4.1.2.2.

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 Southwest New Mexico 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 Catron, Grant, Hidalgo, and Luna counties and identifies four stations that were used for analysis of weather trends. These 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 ten snow course and/or snowpack telemetry (SNOTEL) stations and were used to document snowfall at higher elevations in the planning region (Table 5-1). The locations of the climate stations for which additional data were analyzed are shown in Figure 5-1.

Table 5-1. Southwest New Mexico Climate Stations

Page 1 of 4

Climate Stations [a]	Latitude	Longitude	Elevation	Precipitation		Temperature	
				Data Start	Data End	Data Start	Data End
Catron County							
Adobe Ranch	33.57	–107.90	7,418	12/1/1941	2/28/1994	12/1/1941	2/28/1994
Alma	33.38	–108.90	4,850	4/1/1894	1/31/1926	4/1/1894	1/31/1926
Beaverhead R S	33.43	–108.10	6,670	6/1/1916	9/30/2008	3/1/1939	8/31/2008
Birmingham Ranch	33.80	–108.33	6,804	9/1/1939	11/30/1974	1/1/1948	11/30/1974
Danley Ranch	33.80	–108.33	6,804	9/1/1939	11/30/1974	1/1/1948	11/30/1974
Datil	34.15	–107.85	7,106	9/1/1905	8/31/1951	9/1/1905	8/31/1951
Glenwood	33.32	–108.88	4,725	9/1/1937	Present	9/1/1937	Present
Hedrick Ranch	33.30	–108.13	6,204	6/1/1948	7/23/1959	—	—
Hickman	34.52	–107.93	7,805	9/1/1943	1/31/1985	5/1/1957	1/31/1985
Hood/Reserve Ranger Stn	33.72	–108.78	5,833	12/1/1906	Present	3/1/1944	Present
Horse Springs	33.93	–108.18	6,946	9/1/1929	8/31/1938	9/1/1929	8/31/1938
Jewett Ranger Stn	33.98	–108.63	7,405	6/1/1923	9/13/1967	6/1/1946	6/30/1967
Luna Ranger Stn	33.82	–108.94	7,050	2/1/1903	Present	2/1/1903	Present
Mogollon	33.38	–108.78	6,804	4/1/1916	9/30/1951	3/1/1937	4/30/1948
Pietown 19NE	34.49	–107.89	7,961	9/1/1988	Present	9/1/1988	Present
Quemado	34.34	–108.49	6,878	7/1/1915	Present	10/1/1918	Present
Quemado Lake	34.13	–108.52	7,660	11/1/1986	8/31/1993	11/1/1986	8/31/1993
Salt Lake 4 NE	34.47	–108.70	6,585	9/1/1951	3/31/1962	—	—

Source: WRCC, 2014

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

[b] Only one value reported for entire year.

— = Information not available

NR = Temperature is not recorded at SNOTEL stations.

Table 5-1. Southwest New Mexico Climate Stations

Climate Stations [a]	Latitude	Longitude	Elevation	Precipitation		Temperature	
				Data Start	Data End	Data Start	Data End
Grant County							
Bear Creek Ranch	32.95	–108.42	5,305	1/1/1940	12/31/1959	—	—
Buckhorn	33.04	–108.71	4,800	1/1/1948	10/30/2012	—	—
Cliff 11 SE	32.83	–108.50	4,776	5/1/1944	12/31/2010	5/1/1947	11/30/2012
Cliff 2 NW	32.98	–108.63	4,803	5/1/1905	6/30/1947	5/1/1905	12/31/1913
Cureton Ranch	32.53	–108.63	5,199	11/1/1942	11/30/2002	—	—
Faywood	32.63	–107.86	5,222	6/1/1946	10/31/2013	1/1/1962	10/31/2013
Fort Bayard	32.79	–108.15	6,142	1/1/1897	3/31/2011	1/1/1897	3/31/2011
Gila 6 NNE	33.03	–108.53	4,652	1/1/1897	12/31/1959	1/1/1897	12/31/1959
Gila Hot Springs	33.20	–108.21	5,636	6/1/1957	Present	6/1/1957	Present
Hachita	31.92	–108.32	4,515	7/1/1909	Present	10/1/1911	Present
Mimbres Ranger Stn	32.93	–108.01	6,238	5/1/1905	2/28/2011	11/1/1956	2/28/2011
Pinos Altos	32.87	–108.22	7,005	7/1/1911	1/31/1973	—	—
Redrock 1 NNE	32.70	–108.73	4,154	3/1/1905	Present	2/1/1958	Present
Silver City	32.78	–108.27	5,920	4/1/1901	10/31/1964	4/1/1901	10/31/1964
Silver City Wb Ap	32.63	–108.17	5,377	5/1/1960	Present	5/1/1960	Present
Thompson Canyon Ranch	32.54	–108.64	5,200	11/1/1942	11/30/2002	—	—
Tyrone	32.63	–108.33	6,065	9/1/1914	5/31/1930	4/1/1927	5/31/1930
White Signal	32.56	–108.37	6,068	11/1/1942	11/30/2012	5/1/1960	11/30/2012
Whitewater	32.56	–108.13	5,020	6/1/1948	12/31/2003	—	—

Source: WRCC, 2014

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

[b] Only one value reported for entire year.

— = Information not available

NR = Temperature is not recorded at SNOTEL stations.

Table 5-1. Southwest New Mexico Climate Stations

Climate Stations [a]	Latitude	Longitude	Elevation	Precipitation		Temperature	
				Data Start	Data End	Data Start	Data End
Hidalgo County							
Animas 3 ESE	31.94	–108.77	4,437	5/1/1923	Present	6/1/1923	Present
Antelope Wells	31.33	–108.53	4,687	4/1/1990	Present	4/1/1990	Present
Culberson Ranch	31.38	–108.60	4,892	1/1/1929	7/31/1946	—	—
Eicks Ranch	31.48	–108.93	5,305	2/1/1916	10/31/1961	1/1/1933	10/31/1961
Gray Ranch	31.52	–108.87	5,105	10/1/1962	8/31/1969	11/1/1962	8/31/1969
Lordsburg 4 SE	32.31	–108.65	4,244	1/1/1892	9/30/2012	11/1/1904	12/31/2012
Road Forks	32.22	–108.97	4,203	11/1/1942	6/30/1957	—	—
Rodeo	31.83	–109.03	4,114	7/1/1909	4/30/1978	8/1/1932	4/30/1978
Rodeo CAA Airport	31.93	–108.98	4,117	3/1/1940	12/31/1953	3/1/1940	12/31/1953
Virden	32.68	–108.98	3,783	1/1/1941	9/30/1974	—	—
Luna County							
Cambray	32.23	–107.33	4,232	5/1/1899	8/31/1940	—	—
Columbus	31.83	–107.64	4,050	7/1/1909	12/31/1945	6/1/1927	12/31/1945
Columbus FAA Ap / Columbus, NM	31.83	–107.65	4,160	8/1/1909	5/31/2011	7/1/1923	5/31/2011
Deming	32.25	–107.75	4,300	10/1/1892	10/31/2010	9/1/1904	10/31/2010
Deming FAA Airport	32.25	–107.70	4,302	5/1/1920	Present	4/1/1961	Present
Florida	32.43	–107.48	4,450	6/1/1929	5/31/1992	8/1/1938	5/31/1992
Gage 4 ESE	32.22	–108.02	4,410	6/1/1899	1/31/2007	4/1/1905	1/31/2007
Hermanas	31.85	–107.98	4,544	7/1/1909	12/31/1959	1911 [b]	1912 [b]

Source: WRCC, 2014

— = Information not available

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

NR = Temperature is not recorded at SNOTEL stations.

[b] Only one value reported for entire year.

Table 5-1. Southwest New Mexico Climate Stations

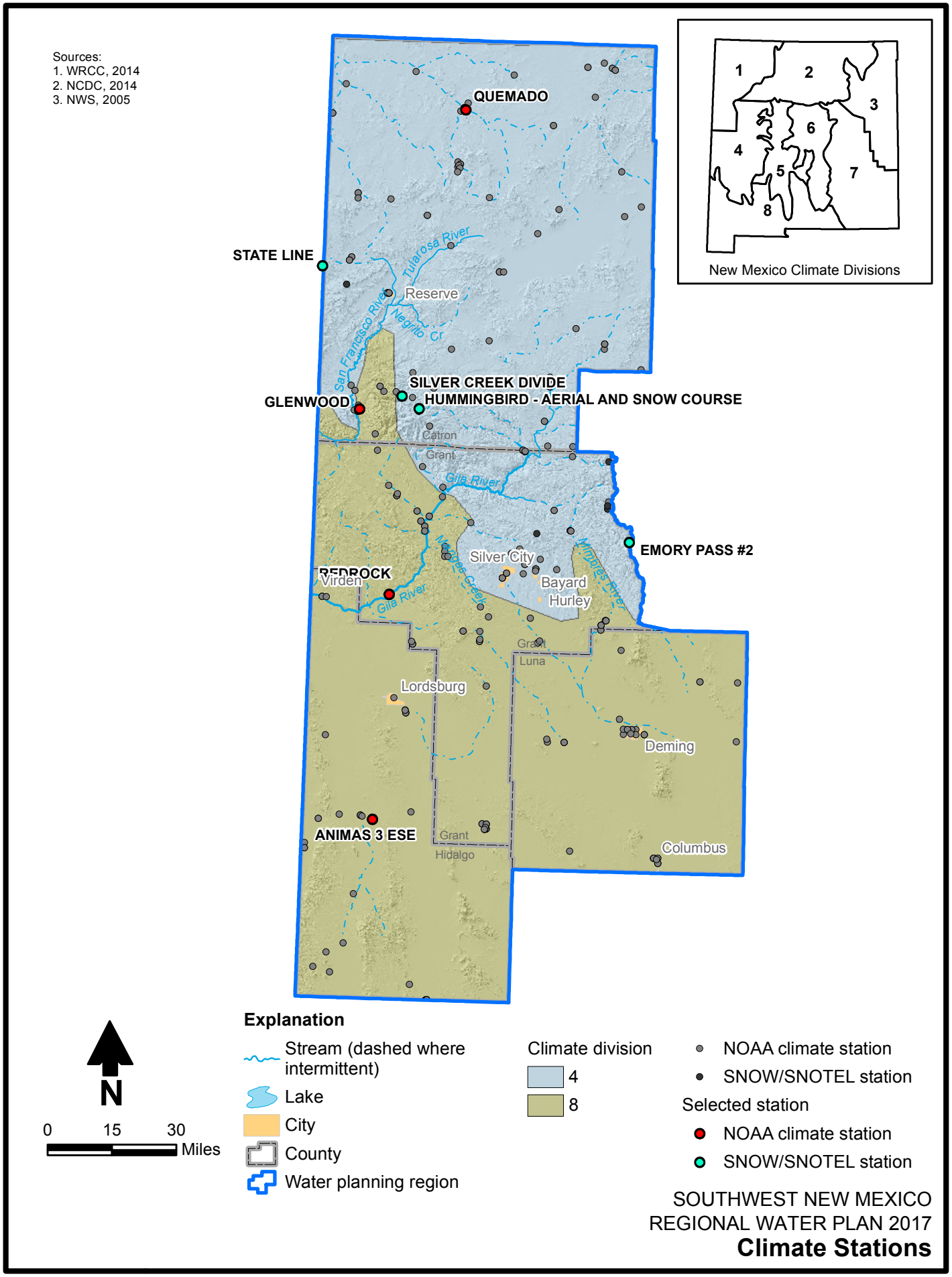
Climate Stations [a]	Latitude	Longitude	Elevation	Precipitation		Temperature	
				Data Start	Data End	Data Start	Data End
SNOTEL Stations							
Frisco Divide - SNTL	33.74	–108.95	8,000	11/1/1978	present	NR	NR
Hummingbird - Aerial and Snow Course - Snow	33.33	–108.64	10,550	1964	2013	NR	NR
Silver Creek Divide - SNTL	33.37	–108.71	9,000	10/1/1978	present	NR	NR
State Line - Snow	33.80	–109.05	8,000	1938	present	NR	NR
Whitewater - Aerial and Snow Course - Snow	33.32	–108.64	10,750	1964	2013	NR	NR
Emory Pass #2 - Snow	32.90	–107.78	7,800	1967	2013	NR	NR
McKnight Cabin - SNTL	33.01	–107.87	9,240	9/25/2003	present	NR	NR
McKnight Cabin Aerial Marker - Snow	33.02	–107.87	9,300	1967	2011	NR	NR
McKnight Cabin Snow Course - Snow	33.17	–107.87	9,300	2000	2013	NR	NR
Signal Peak - SNTL	32.92	–108.15	8,360	11/1/1978	present	NR	NR

Source: WRCC, 2014

— = Information not available

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

NR = Temperature is not recorded at SNOTEL stations.



S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-1_CLIMATE_STATIONS.MXD 12/21/2016

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.

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. Total annual precipitation for the selected climate stations is shown in Figures 5-4a and 5-4b.

The Natural Resources Conservation Service (NRCS) operates four SNOTEL stations and six snow course stations in the planning region; all ten stations provide snow depth and snow water equivalent data (Figure 5-5) (NRCS, 2014a).

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 four of the ten stations is provided on Figure 5-5. As shown in Figure 5-5, early April snowpack has been very low in many years in the last decade.

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.

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.

Table 5-2. Temperature and Precipitation for Selected Climate Stations Southwest New Mexico Water Planning Region

Station Name	Precipitation (inches)				Temperature			
					Average (°F)			
	Average Annual [a]	Minimum [b]	Maximum [b]	% of Possible Observations [c]	Annual [d]	Minimum [e]	Maximum [e]	% of Possible Observations [c]
Glenwood	15.88	6.90	25.57	82.3	57.5	40.2	74.9	80.2
Quemado	10.82	3.82	21.48	76.1	48.2	29.8	66.5	66.6
Redrock	12.55	4.36	21.31	92.8	59.2	41.2	77.2	48.7
Animas 3 ESE	10.87	4.73	19.67	97.2	60.7	44.1	77.1	62.9

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.

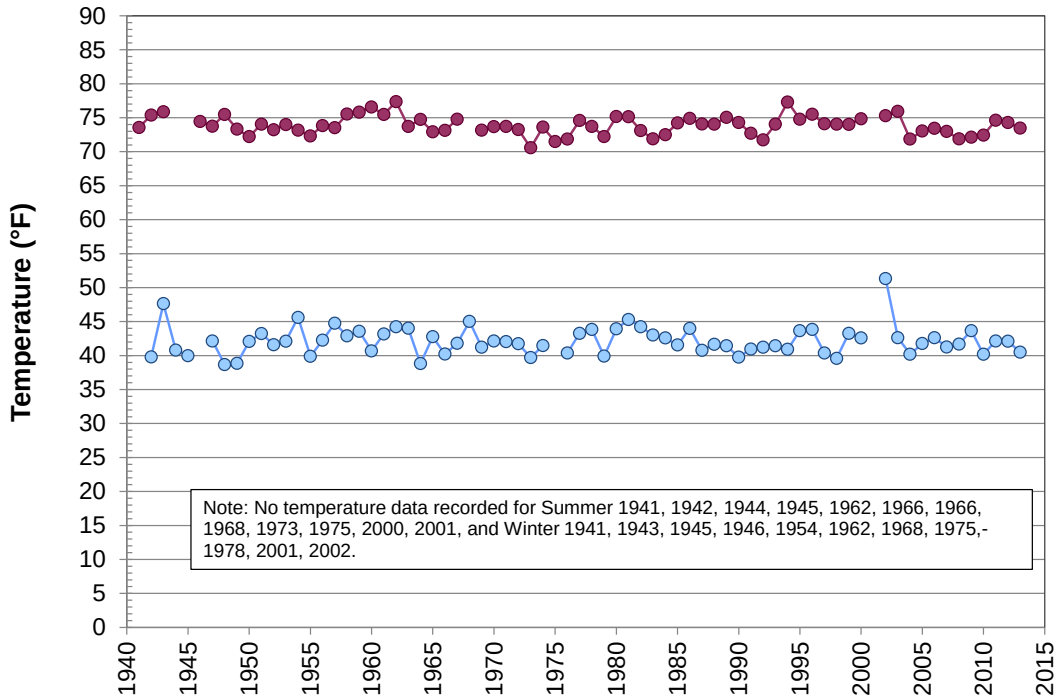
[b] Minimum and maximum recorded annual precipitation amounts for each station.

[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).

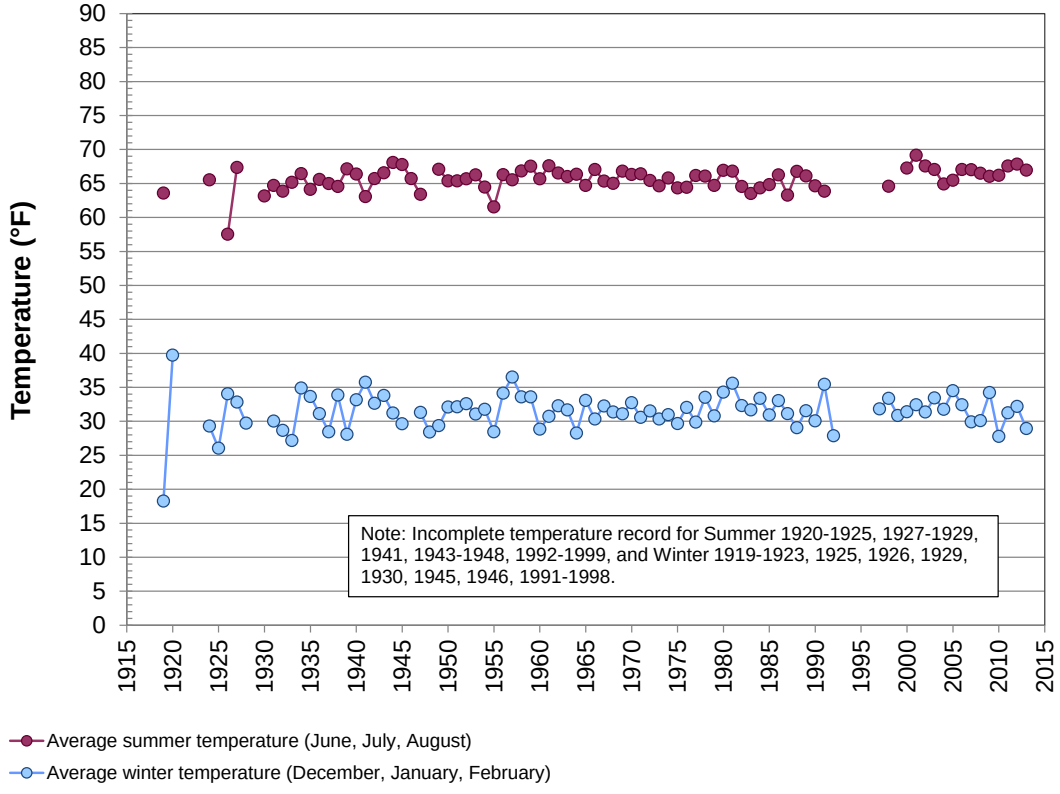
[d] Average of the daily average temperatures calculated for each station.

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

Glenwood



Quemado



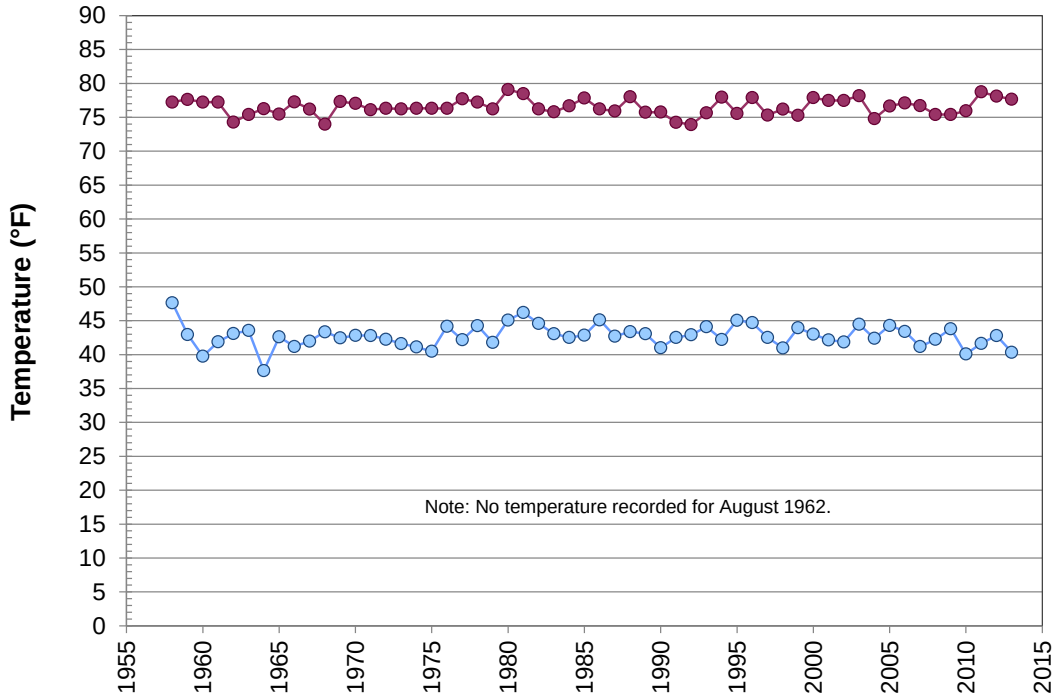
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Average Temperature
Glenwood and Quemado Climate Stations

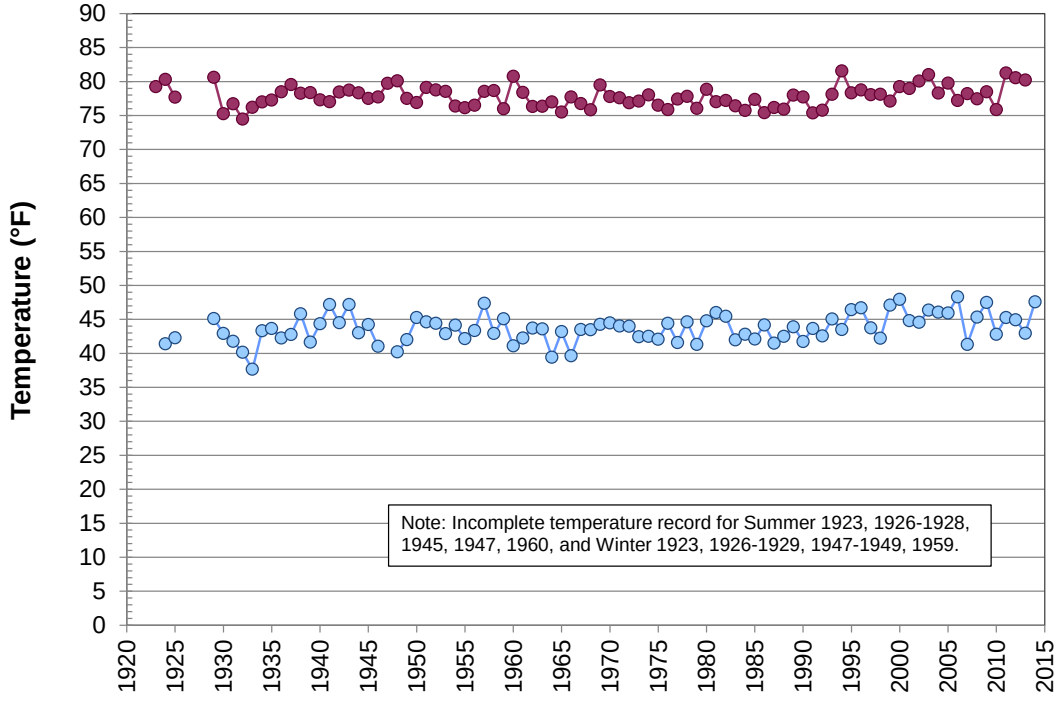
Figure 5-2a

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word\Fig5-02a_Reg 4_Temp.docx 2/9/17

Redrock 1 NNE



Animas 3 ESE



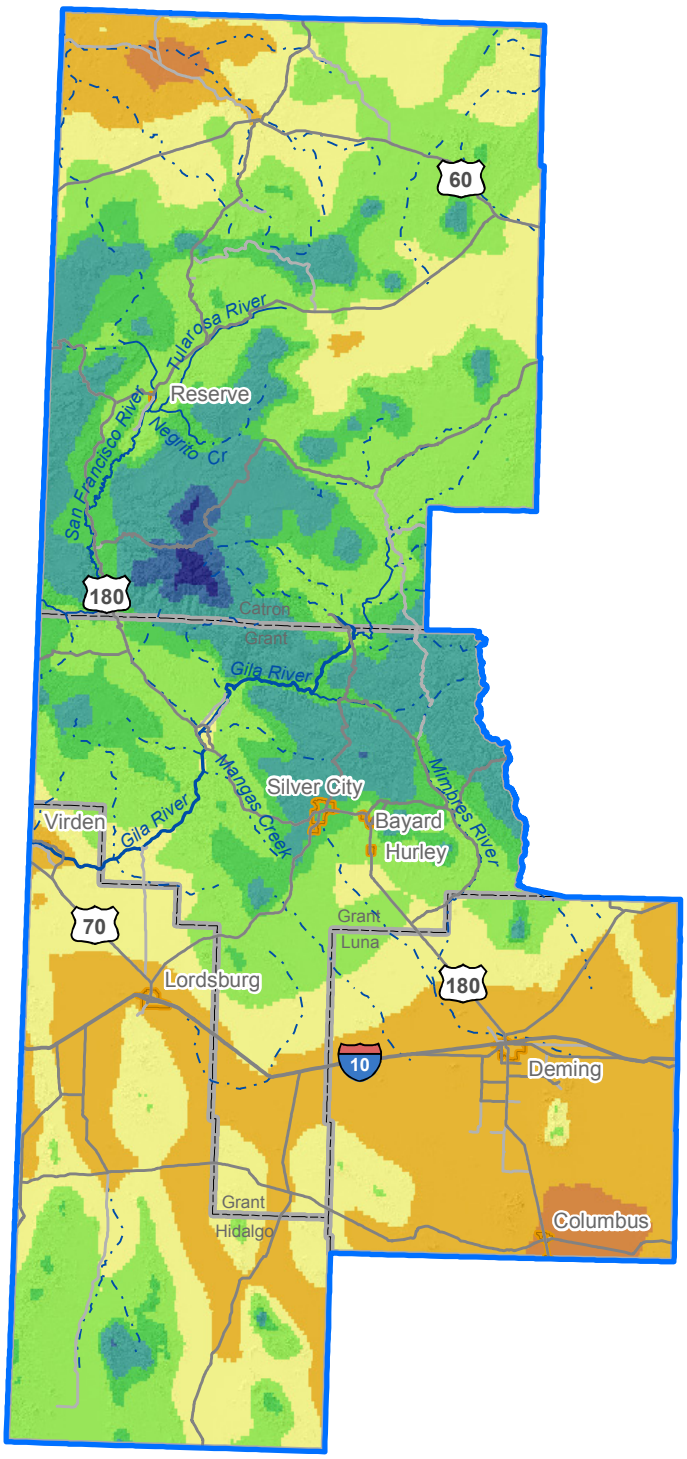
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Average Temperature
Redrock 1 NNE and Animas 3 ESE Climate Stations

Figure 5-2b

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word\Fig5-02b_Reg 4_Temp_Redrock-Animas.docx 2/9/17

Source: PRISM, 2012



Explanation

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

Normal annual precipitation (in/yr)

9 - 10	18- 20
10 - 12	20 - 30
12 - 14	30 - 40
14 - 18	40 - 48

N

0 15 30 Miles

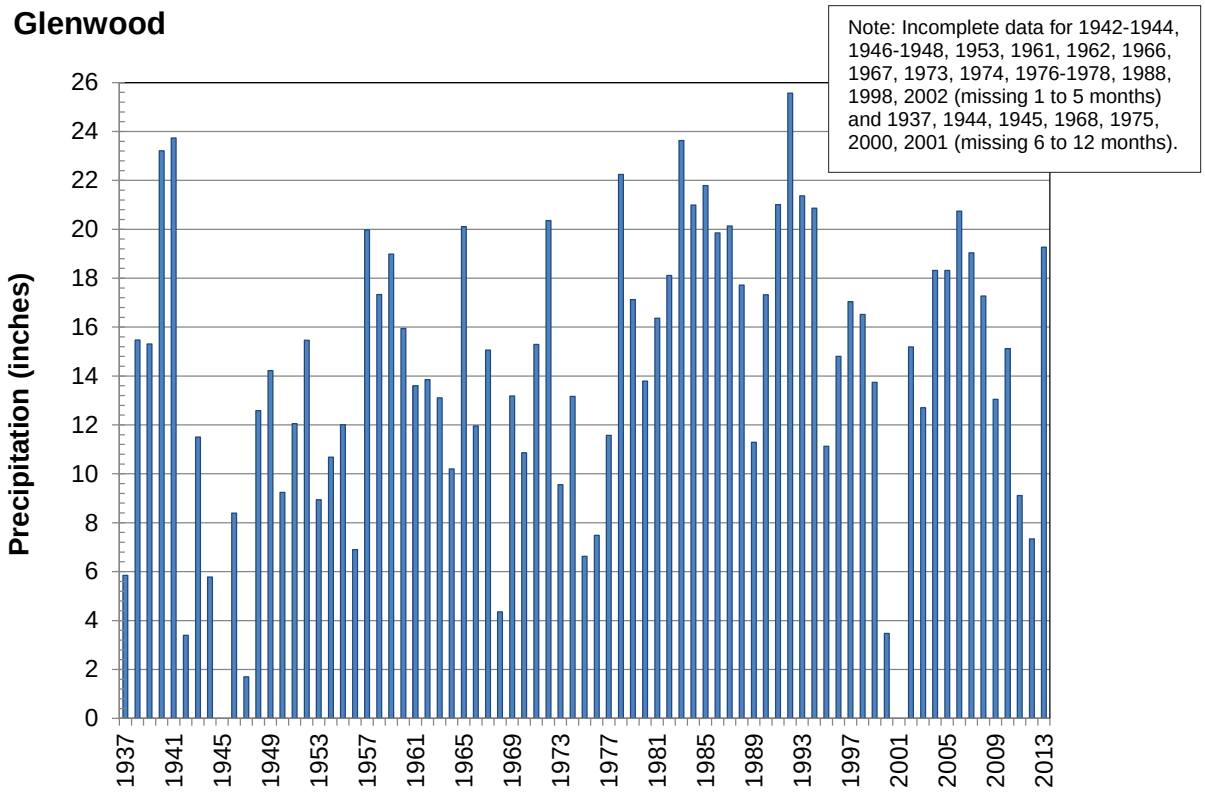
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Average Annual Precipitation (1980 to 2010)

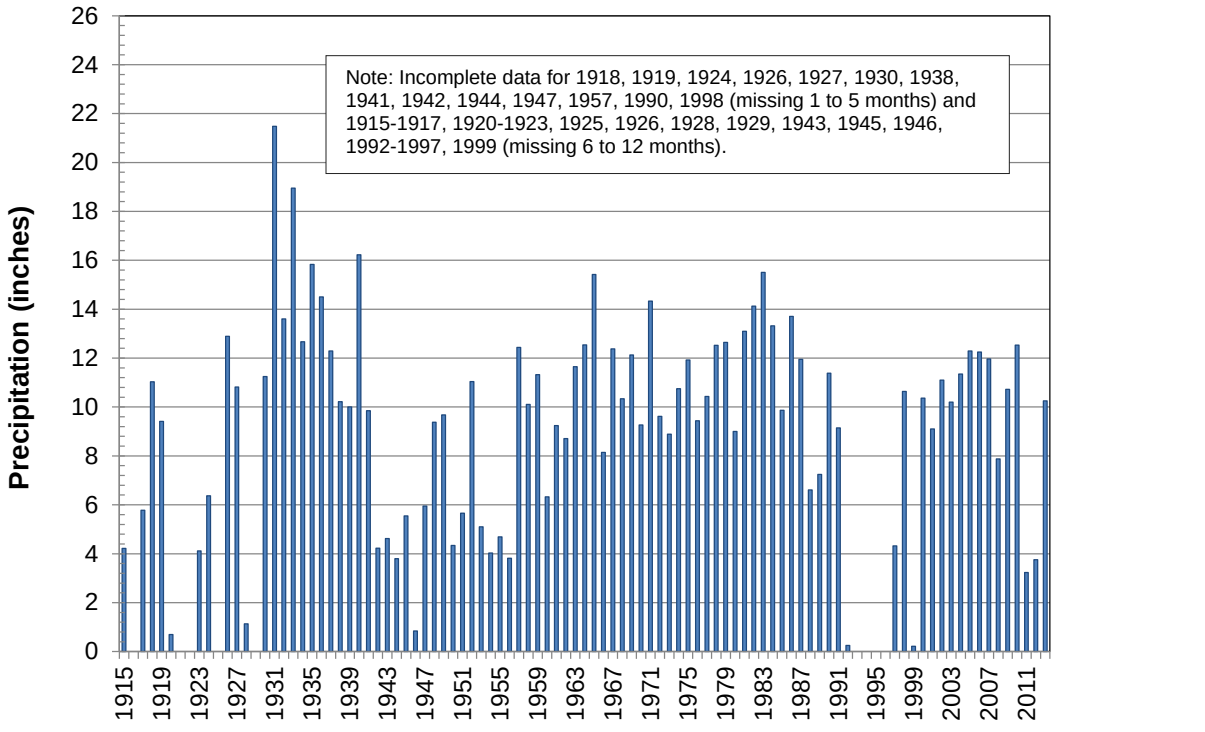
Figure 5-3

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-3_PRECIP.MXD 12/21/2016

Glenwood



Quemado



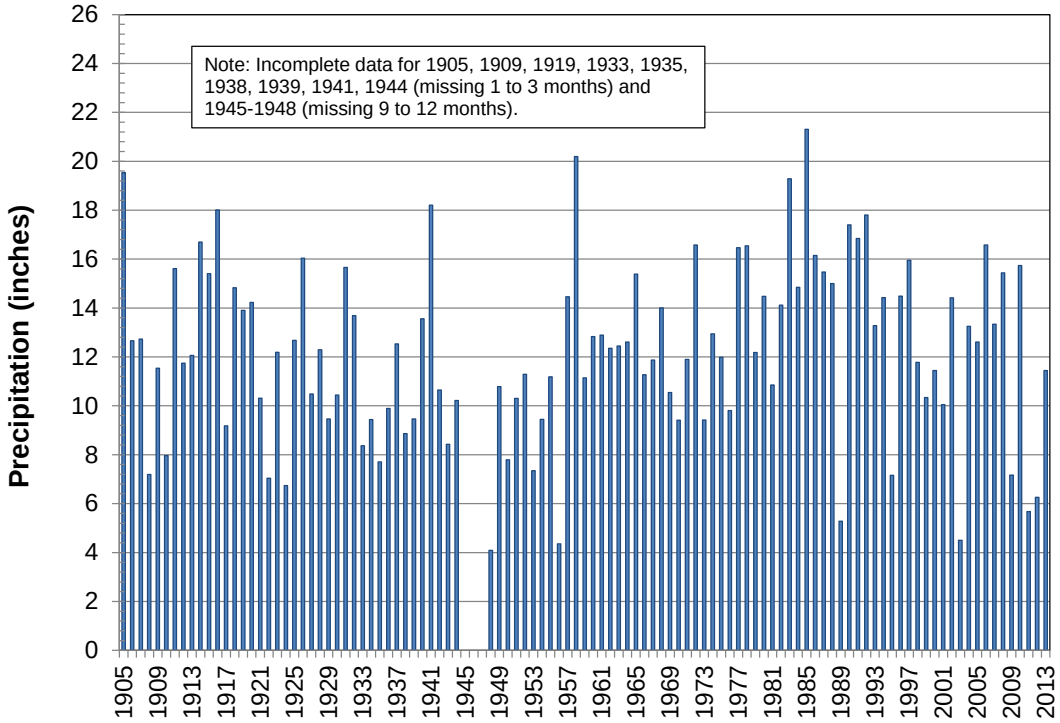
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Annual Precipitation
Glenwood and Quemado Climate Stations

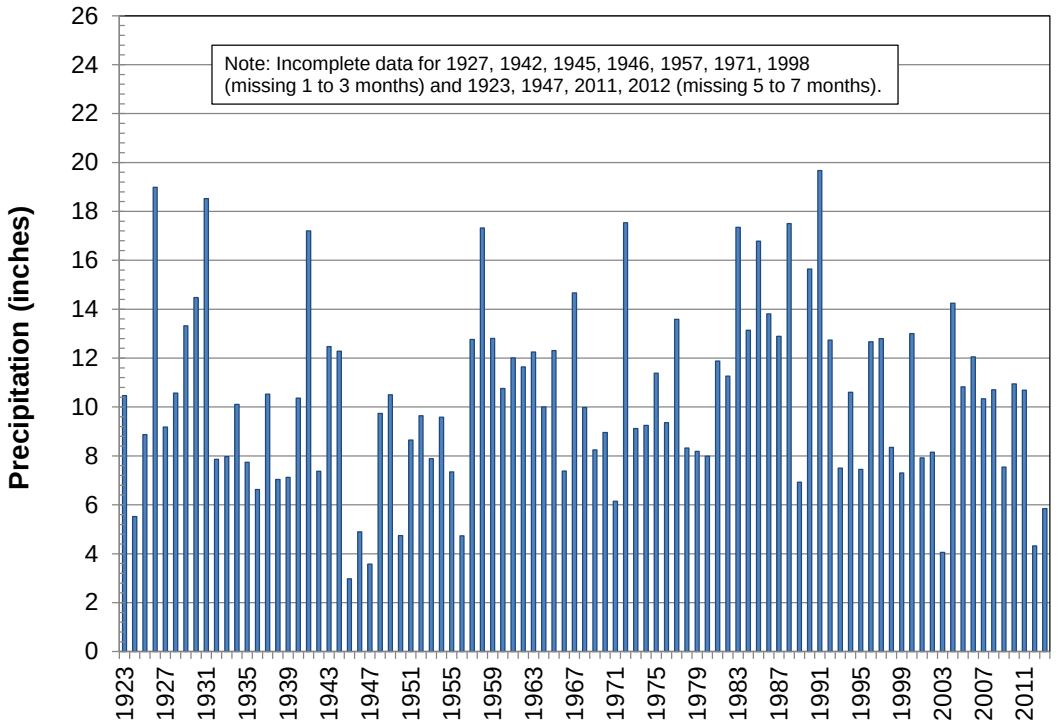
Figure 5-4a

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word\Fig5-04a_Precip_Glenwood-Quemado.docx 2/9/17

Redrock 1 NNE



Animas 3 ESE



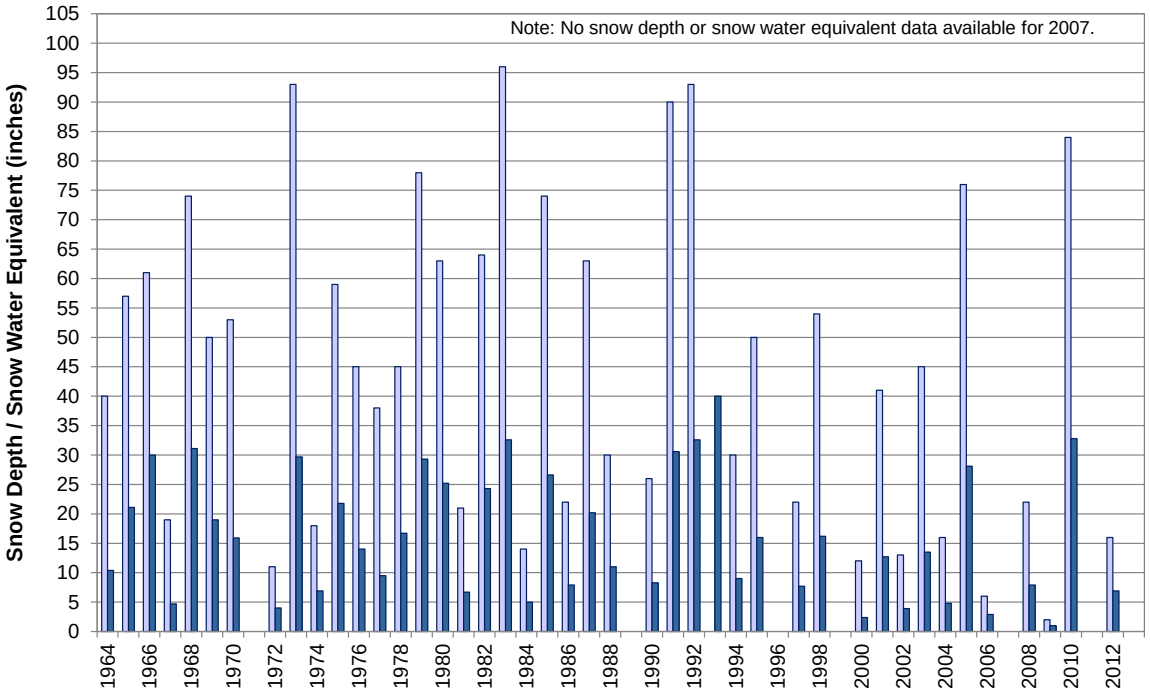
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Annual Precipitation
Redrock and Animas Climate Stations

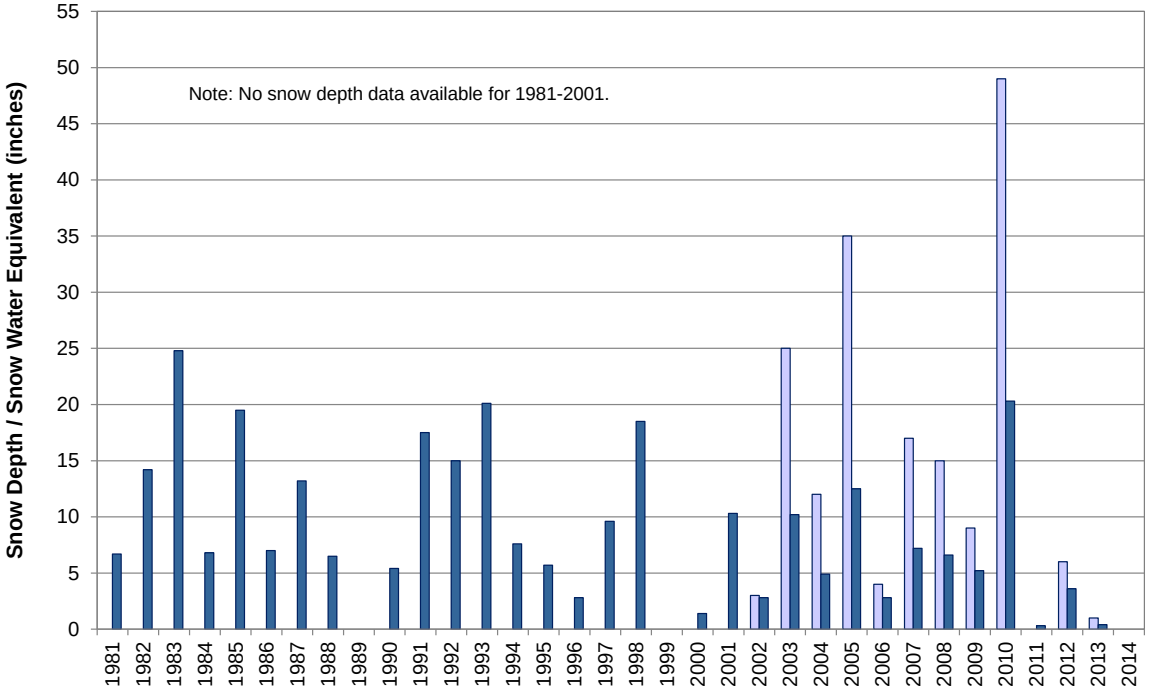
Figure 5-4b

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word\Fig5-04b_Precip_Redrock-Animas.docx 2/9/17

Hummingbird Snow and Aerial Marker



Silver Creek 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).

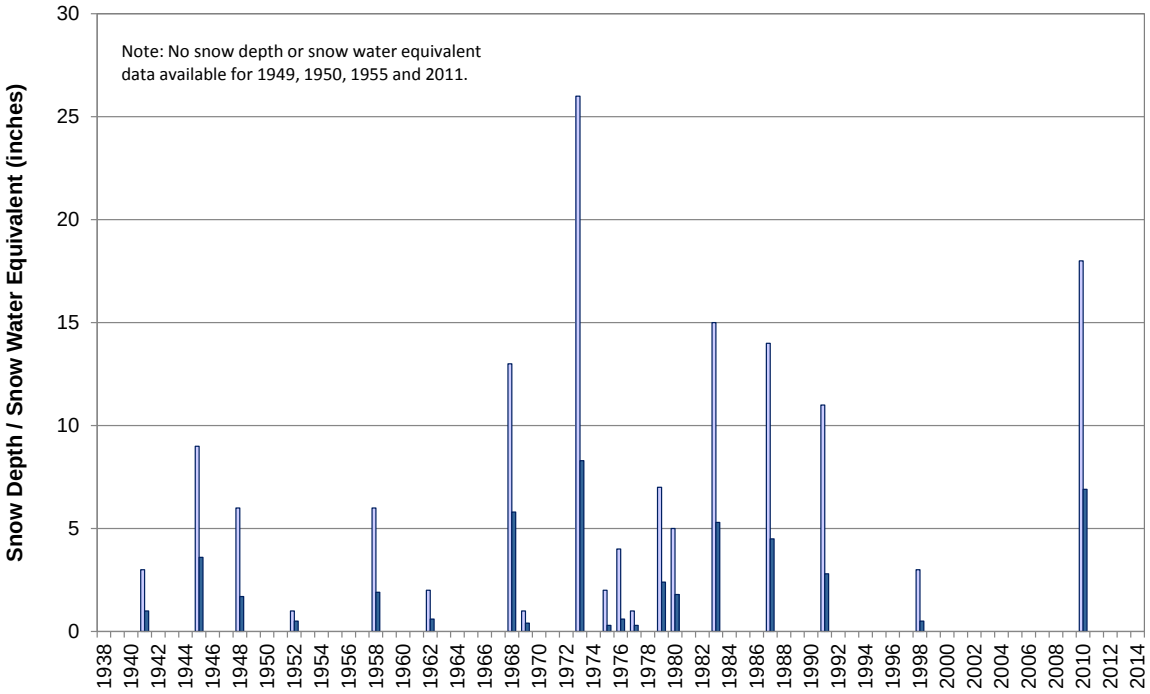
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Snow Depth and Snow Water Equivalent for April

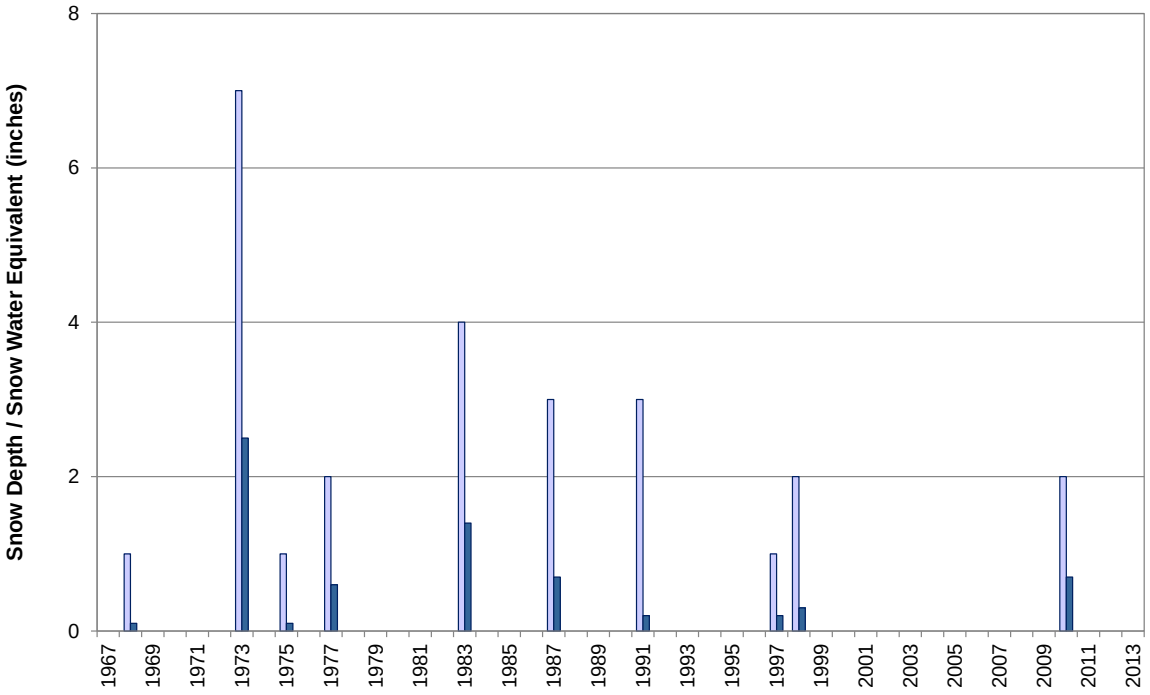
Figure 5-5a

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word\Fig5-05a_SNOTEL_Hummingbird-Silver

Stateline Snow Course with Aerial Marker



Emory Pass #2 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).

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Snow Depth and Snow Water Equivalent for April

Figure 5-5b

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word\Fig5-05b_SNOTEL_Stateline-Emory Pass.docx

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

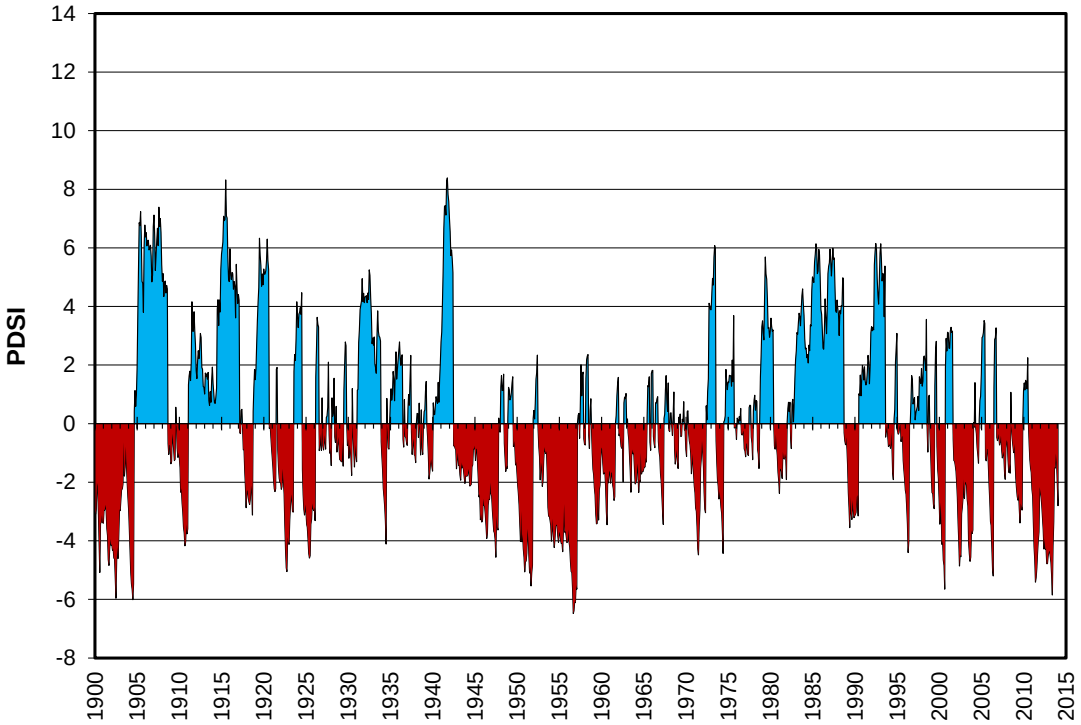
The PDSI is calculated for climate divisions throughout the United States. Catron County and northeastern Grant County fall primarily within New Mexico Climate Division 4 (the Southwestern Mountains Climate Division), while the remainder of Grant County and Hidalgo and Luna counties fall within Division 8 (the Southern Desert Climate Division) (Figure 5-1). Figure 5-6 shows the long-term PDSI for these two regions. Of interest are the large variations from year to year in both divisions, which show similar patterns.

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) (Figure 5-6). The likelihood of drought conditions developing in New Mexico is influenced by several weather patterns:

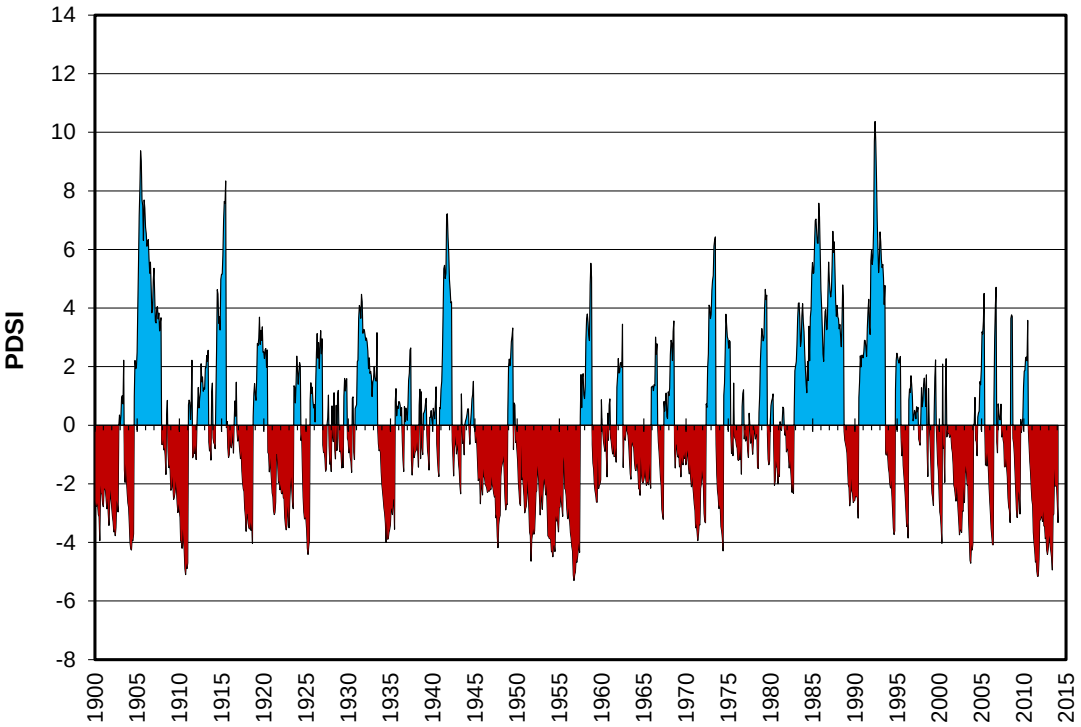
- *El Niño/La Niña:* El Niño and La Niña are characterized by a periodic warming and cooling, respectively, of sea surface temperatures across the central and east-central equatorial Pacific. Years in which El Niño is present are more likely to be wetter than average in New Mexico, and years with La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

Climate Division 4



Climate Division 8



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

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Palmer Drought Severity Index
New Mexico Climate Divisions 4 and 8

Figure 5-6

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word \Fig5-06_Reg 4_PDSI Div 4&8.docx 2/9/17

- 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.

- *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 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 the Gila River Basin in the Southwest New Mexico region, snowpack is expected to be lower and snowmelt is expected to be earlier (Gutzler, 2013; Gori et al., 2014).

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 and forested 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) 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.

An additional concern in the Southwest New Mexico region is the vulnerability of forest habitat 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 also increase insect survivability and fire risk.

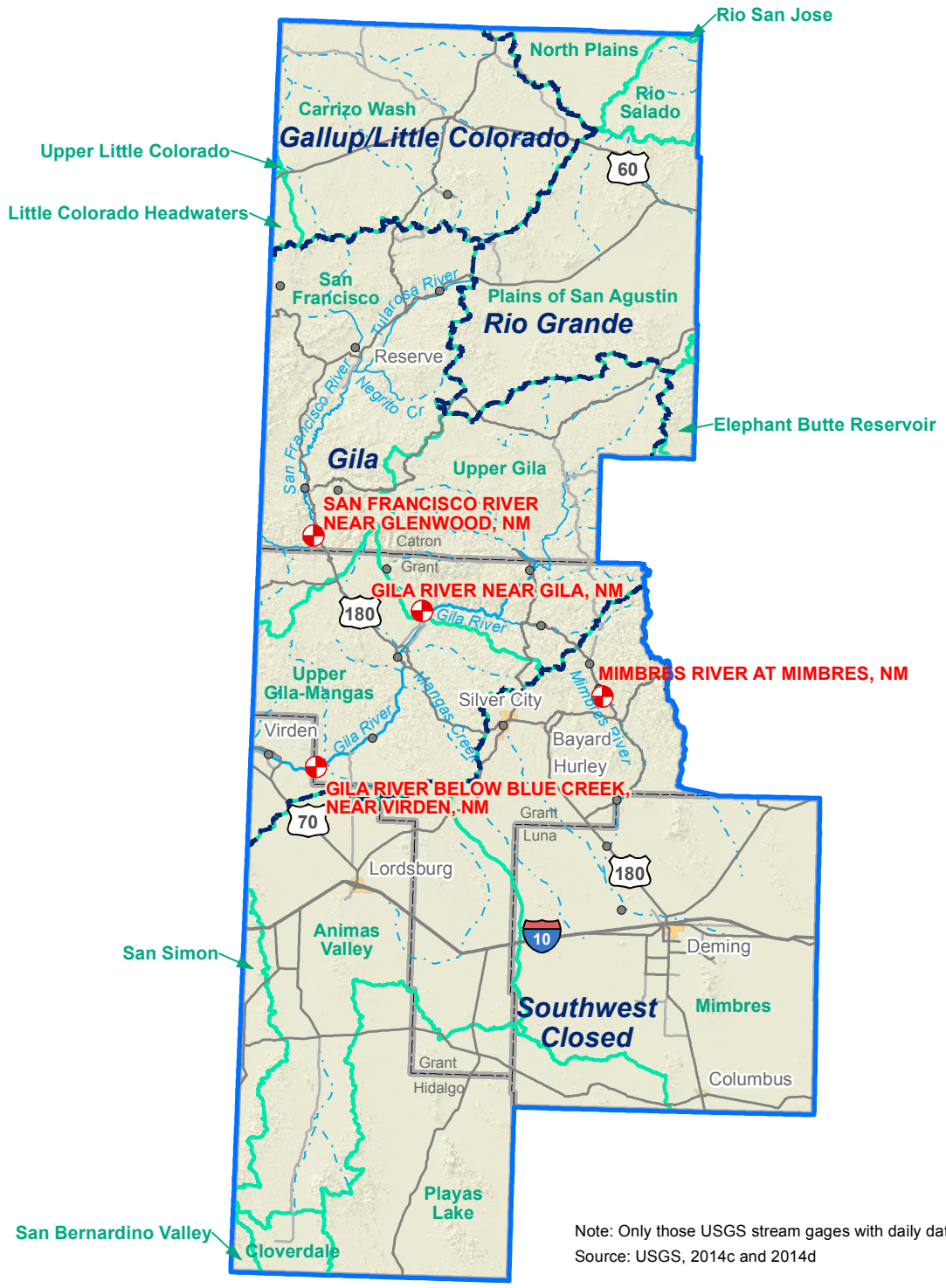
To minimize the impact of these changes, it is imperative that New Mexico plan for variable water supplies, including focusing on drought planning and being prepared to maximize storage from extreme precipitation events while minimizing their adverse impacts.

5.2 Surface Water Resources

Surface water supplies approximately 40 percent of the water currently diverted in the Southwest New Mexico Water Planning Region, with its primary uses being for irrigated agriculture and mining. The dominant waterways flowing in the region are the Gila, San Francisco, and Mimbres rivers. 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 and U.S. Supreme Court decree (*Arizona v California*) limitations. The administrative water supply discussed in Section 5.5 is intended to represent supply considering both physical and legal limitations, but excluding potential compact 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 U.S. Geological Survey (USGS) and various cooperating agencies at stream gage sites in the planning region. 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.

For this water planning update, four 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 and 5-9b show the annual water yield from the beginning of the period of record through 2013 for the four gages. As shown in these figures, there is a very high degree of variability between the low and the high flow years.



Note: Only those USGS stream gages with daily data are shown.
Source: USGS, 2014c and 2014d

N

0 15 30 Miles

Explanation

- Selected USGS stream gage
- USGS stream gage
- Stream (dashed where intermittent)
- Lake
- River basin
- Watershed
- City
- County
- Water planning region

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Major Surface Drainages, Stream Gages, Reservoirs, and Lakes

Figure 5-7

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-7_SURFACE_WATER.MXD 12/21/2016

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
Catron County								
Largo Creek Nr Mangas, NM	09386050	34.1417172	–108.502007	7,600	63	—	10/1/1960	9/30/1966
Trout Creek Nr Luna, NM	09442653	33.8900522	–109.011185	8,050	27	—	12/17/1968	1/11/1973
San Francisco River Near Reserve, NM	09442680	33.7367194	–108.771175	5,820	350	280	3/1/1959	Present
Tularosa River Above Aragon, NM	09442692	33.8914412	–108.515617	6,750	94	0	7/1/1966	9/30/1996
San Francisco R Nr Alma, NM	09443000	33.3681169	–108.910342	4,842	1,546	1600 [d]	2/1/1964	9/30/1986
Whitewater Cr Nr Mogollon, NM	09443500	33.3667287	–108.808951	—	34	— [e]	10/1/1909	6/30/1923
San Francisco River Near Glenwood, NM	09444000	33.2471667	–108.88	4,560	1,653	2,000	10/1/1927	Present
Grant County								
Mimbres R at McKnight Ds Nr Mimbres, NM	08476300	32.9372956	–108.015874	6,237	97	—	11/1/1963	10/31/1972
Mimbres River Near Mimbres, NM	08477000	32.8745191	–107.985317	5,972	152	300	10/1/1930	9/30/1976
Mimbres River at Mimbres, NM	08477110	32.854675	–107.973789	5,920	184	NA	3/1/1978	6/2/2013
San Vicente Arroyo at Silver City, NM	08477600	32.7709084	–108.275604	5,863	27	NA	10/1/1953	9/30/1965
Gila R Nr Silver City, NM	09430000	33.1750693	–108.208938	5,530	1,600	—	7/1/1912	5/31/1919
Sapillo Creek Below Lake Roberts, NM	09430150	33.0322931	–108.168936	5,990	78	—	6/1/1964	10/1/1971
Gila River Near Gila, NM	09430500	33.0615028	–108.537386	4,655	1,864	500	12/1/1927	Present
Mogollon Creek Near Cliff, NM	09430600	33.1666667	–108.649722	5,440	69	NA	2/21/1967	Present
Gila River Near Cliff, NM	09431000	32.9389591	–108.606165	4,455	2,438	—	1/1/1942	9/30/1951

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

[d] Station not active, unable to confirm acreage.

[e] Station closed before these data were routinely recorded.

USGS = U.S. Geological Survey

ft amsl = Feet above mean sea level

sq mi = Square miles

NA = Not available

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

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
Grant County (cont.)								
Gila River Near Redrock, NM	09431500	32.7269444	–108.675556	4,090	2,829	5,000	10/1/1930	Present
Gila River Below Blue Creek, Near Virden, NM	09432000	32.648132	–108.845891	3,875	3,203	6,200	7/1/1927	Present
Hidalgo County								
New Model Ca Nr Virden, NM	09436000	32.6750736	–108.992283	—	—	—	10/1/1960	12/31/1967
Luna County								
Mimbres River Near Faywood, NM	08477500	32.5861928	–107.920034	5,033	440	1,750	10/1/1930	9/30/1968
Mimbres R Nr Spalding, NM	08477530	32.4653621	–107.947812	4,750	472	—	10/1/1963	9/30/1968
Mimbres R Bl Wamel Ca Nr Deming, NM	08478400	32.3014754	–107.896422	4,469	1,101	—	10/1/1963	9/30/1968

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

NA = Not available

— = 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	
Catron County				
San Francisco River Near Reserve, NM	3,504	13,031	62,768	53
Tularosa River Above Aragon, NM	1,976	2,288	4,011	29
San Francisco River Near Alma, NM	5,249	54,008	238,402	21
San Francisco River Near Glenwood, NM	8,688	42,823	271,415	86
Grant County				
Mimbres River Near Mimbres, NM	2,100	6,451	23,239	45
Mimbres River at Mimbres, NM	2,244	11,873	30,189	34
San Vicente Arroyo at Silver City, NM	324	518	1,216	11
Gila River Near Gila, NM	31,058	86,152	299,505	85
Mogollon Creek Near Cliff, NM	3,120	19,981	61,682	45
Gila River Near Redrock, NM	53,067	144,866	460,153	50
Gila River Below Blue Creek, Near Virden, NM	23,746	118,441	521,473	78
Luna County				
Mimbres River Near Faywood, NM	1,187	7,529	37,791	27

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
Catron County													
San Francisco River Near Reserve, NM	53	1,204	1,984	3,923	2,619	1,010	347	478	1,040	1,115	1,469	984	1,065
Tularosa River Above Aragon, NM	29	202	230	307	290	186	172	186	183	178	205	180	210
San Francisco R Nr Alma, NM	21	4,227	7,034	12,871	7,732	2,649	342	981	2,943	2,997	9,259	2,498	8,365
San Francisco River Near Glenwood, NM	86	6,061	7,040	11,103	8,015	4,309	1,626	2,308	4,951	4,284	5,035	2,991	4,873
Grant County													
Mimbres River Near Mimbres, NM	45	531	673	1,282	1,099	690	328	416	785	804	628	430	497
Mimbres River At Mimbres, NM	34	1,391	1,497	1,596	1,235	809	432	625	1,882	916	715	667	1,437
San Vicente Arroyo At Silver City, NM	11	20	4	13	3	2	26	167	232	61	39	5	10
Gila River Near Gila, NM	85	10,745	13,348	18,628	12,737	8,166	3,361	4,037	9,204	10,386	7,039	5,908	9,760
Mogollon Creek Near Cliff, NM	45	2,332	3,200	4,016	2,896	1,361	164	612	1,306	1,457	1,228	942	2,205
Gila River Near Redrock, NM	50	18,561	22,418	27,318	17,462	10,331	3,257	4,983	14,054	15,321	11,081	8,896	17,581
Gila River Below Blue Creek, Near Virden, NM	78	18,673	20,791	24,273	15,723	8,740	2,812	4,715	13,334	12,826	9,420	7,879	14,475
Luna County													
Mimbres River Near Faywood, NM	27	872	1,108	1,784	923	470	264	671	2,018	1,062	348	231	697

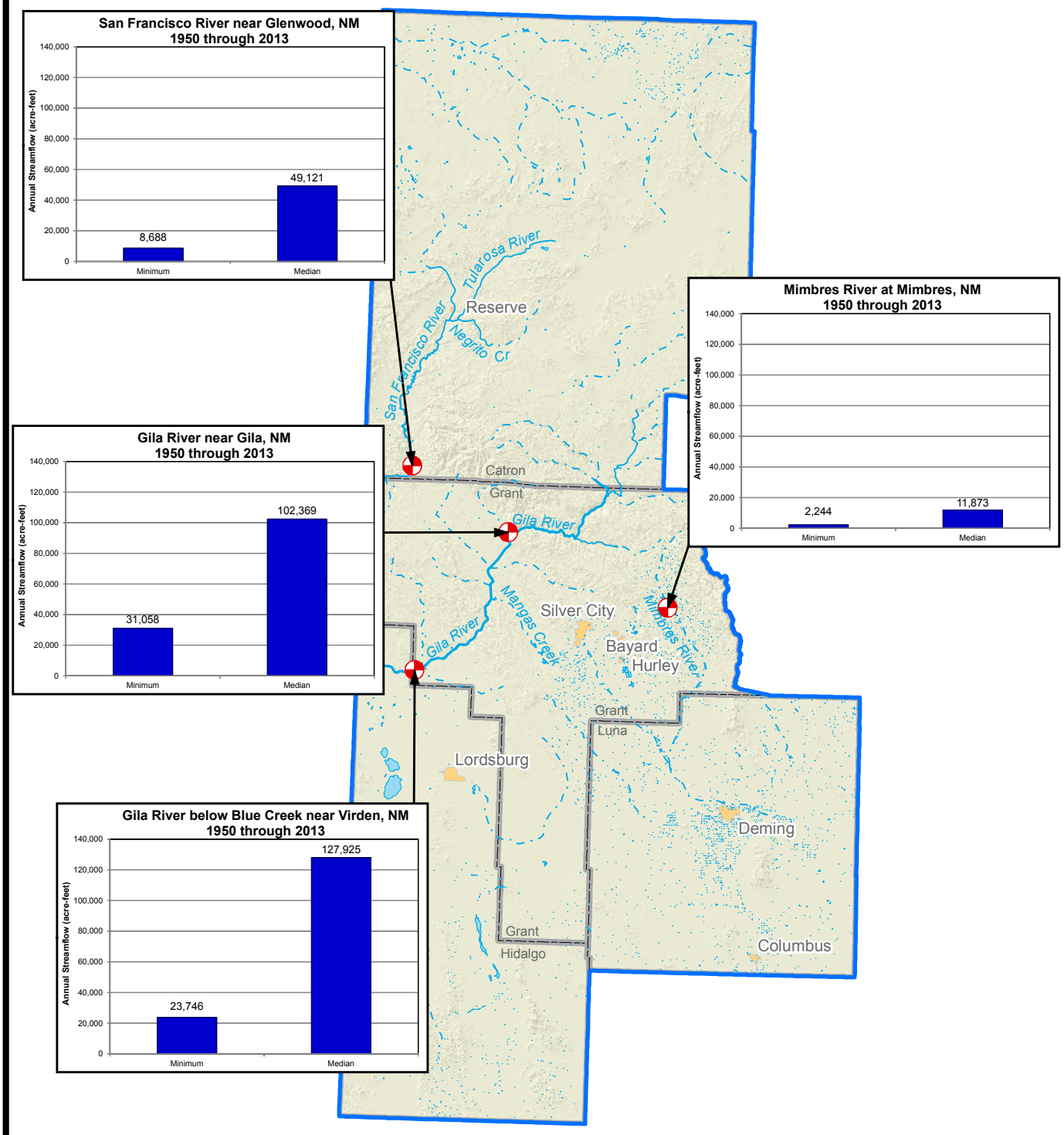
Source: USGS, 2014c

[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



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

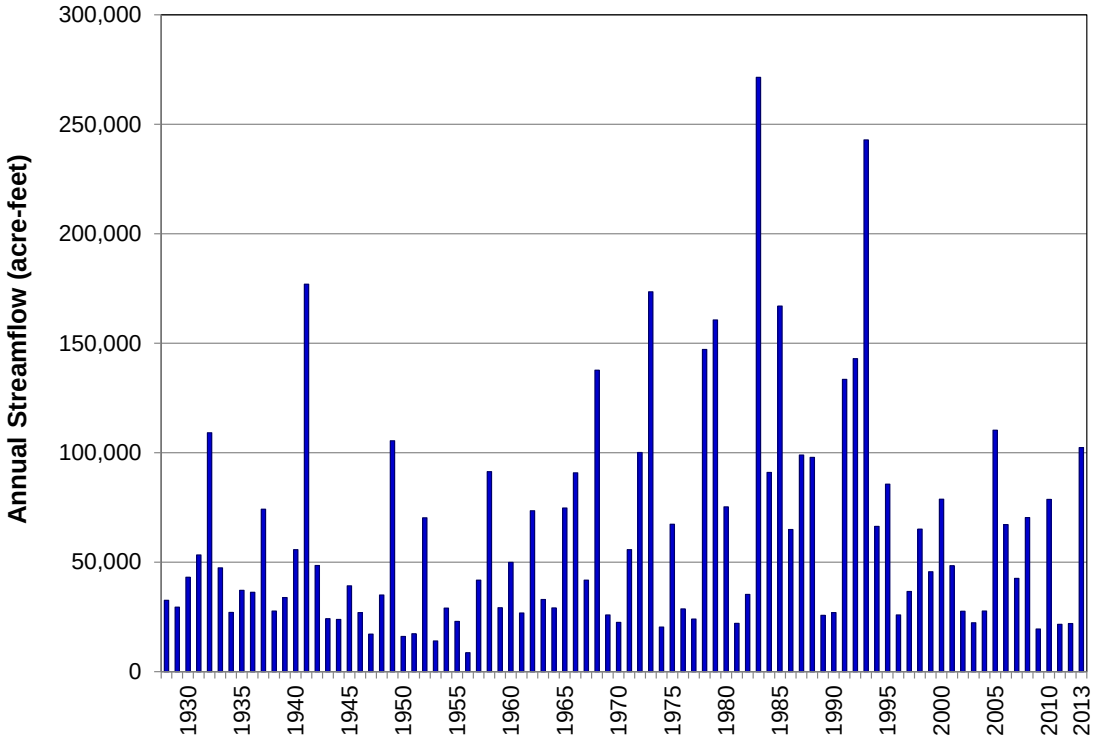
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Minimum and Median Yield
1950 through 2013

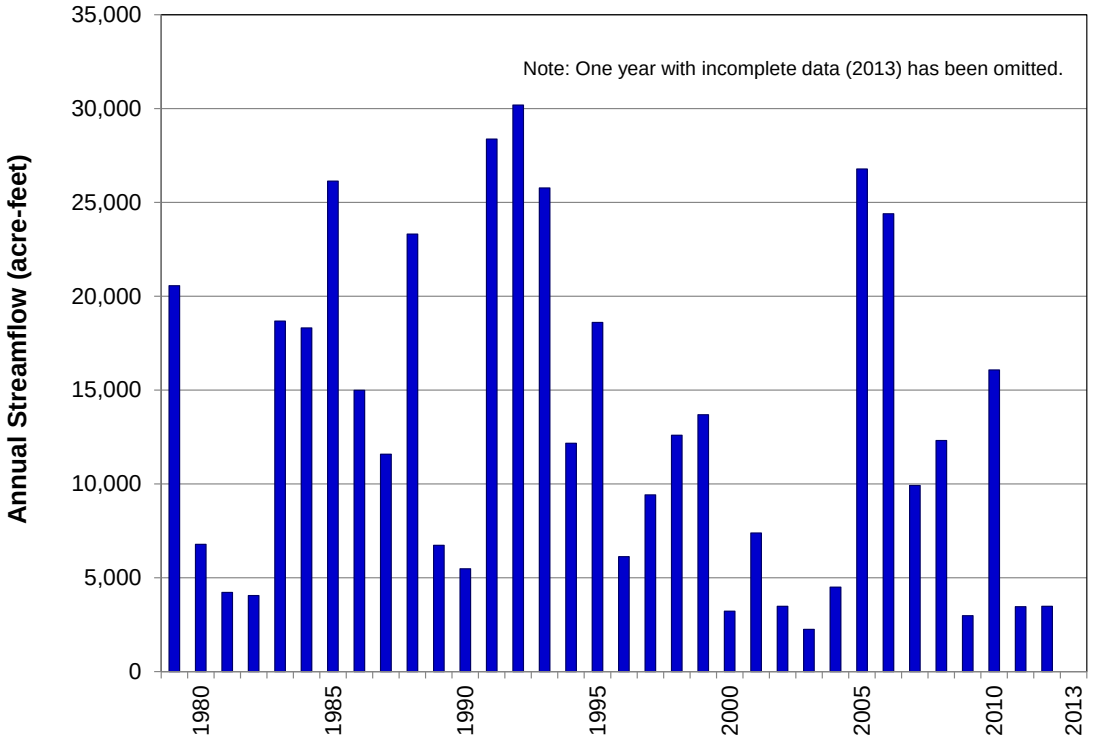
Figure 5-8

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-8_STREAMFLOW.MXD 12/21/2016

San Francisco River near Glenwood, NM



Mimbres River at Mimbres, NM



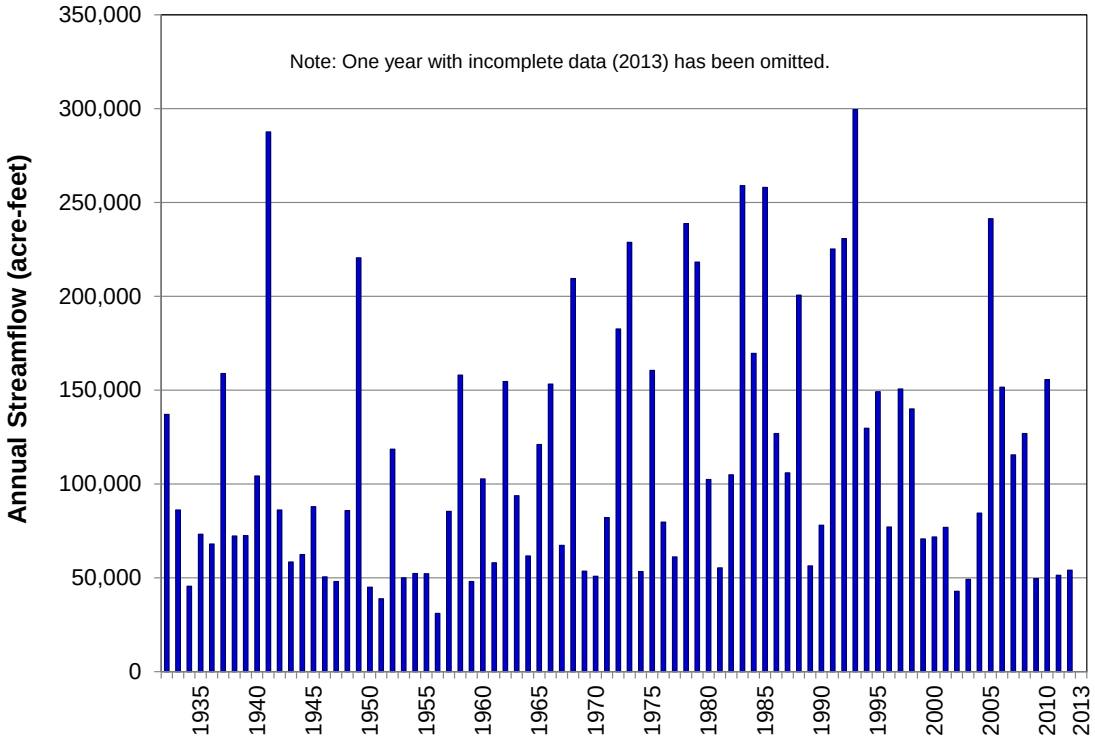
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Annual Streamflow for Selected Gaging Stations on the San Francisco and Mimbres Rivers

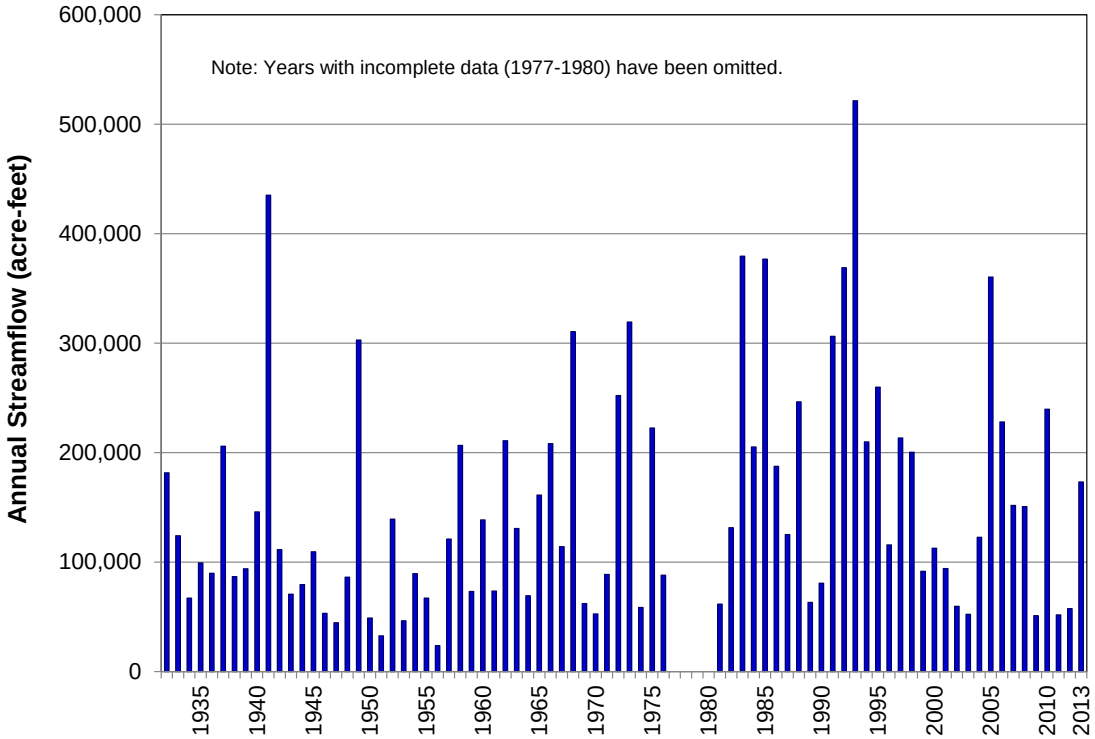
Figure 5-9a

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word\Fig5-09a_San Francisco-Mimbres.docx 2/9/17

Gila River near Gila, NM



Gila River below Blue Creek near Virden, NM



SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Annual Streamflow for Selected Gaging Stations on the Gila River

Figure 5-9b

P:_NM15-203\RWPs_2016\4_Southwest NM\Figures\Word\Fig5-09b_Gila.docx 2/9/17

A few small lakes and reservoirs are present in the planning region (Figure 5-7), although some of them are playa lakes that are dry most of the time. Information on these smaller reservoirs was included in the accepted plan (DBS&A, 2005). However, the NMOSE Water Use and Conservation Bureau tracks evaporation only for reservoirs greater than 5,000 acre-feet, and none of the lakes in the Southwest New Mexico region are that large.

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.

5.3 Groundwater Resources

Groundwater accounted for about 60 percent of all water diversions in the year 2010. It provides an important source of agricultural supply in Luna and Hidalgo counties and supplies drinking water throughout the region.

5.3.1 Regional Hydrogeology

The geology that controls groundwater occurrence and movement within the planning region was described in detail in the accepted *Southwest New Mexico Regional Water Plan* (DBS&A, 2005), based on studies by numerous researchers, beginning in the early 20th century. According to Hawley et al. (2000), the first detailed geologic mapping and hydrologic investigations in the area that encompasses the Southwest New Mexico region were conducted by a number of investigators, including N.H. Darton (1916), W.T. Lee (1907), O.E. Meinzer (1911, 1916), S. Paige (1916), and A.T. Schwennesen (1918). These early investigations focused primarily on understanding the general geologic boundaries and controls on groundwater occurrence. More recent investigations (e.g., Reeder, 1957; Doty, 1960; Trauger and Herrick, 1962; Trauger and Doty, 1965; Trauger, 1972; McLean, 1977; O'Brien and Stone, 1981; Wilkins, 1986; Kernodle, 1992; Hanson et al., 1994; Meyers et al., 1994; Hawley et al., 2000; Johnson et al., 2002; Finch et al., 2008) have helped quantify groundwater supply, rates of movement, recharge, and quality.

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.

Table 5-7. Dams with Dam Safety Deficiency Rankings

Page 1 of 2

Dam	Condition Assess-ment [a]	Deficiency	Hazard Potential [b]	Estimated Cost to Repair ($)
Catron County				
Wall Lake Dam	Poor	Lack of design information	Low	50,000
Grant County				
Bear Canyon Dam	Poor	Spillway capacity 20% of required flood	High	6,000,000
		Lack of design information		
Lake Roberts Dam	Poor	Spillway capacity 30% of required flood	High	7,700,000
		Spillway deteriorated		
		Seepage		
Magnetite Tailings Dam	Fair	Freeboard contains 50% of required flood	High	
Upper Gila Valley Site No. 1 Dam	Poor	Spillway capacity 17% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 10 Dam	Poor	Spillway capacity 28% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 11 Dam	Poor	Spillway capacity 24% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 12 Dam	Poor	Spillway capacity 18% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 3 Dam	Poor	Spillway capacity 25% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 4 Dam	Poor	Spillway capacity 27% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 6 Dam	Poor	Spillway capacity 26% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 7 Dam	Poor	Spillway capacity 22% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 8 Dam	Poor	Spillway capacity 14% of required flood	High	2,500,000
		Lack of design information		
Upper Gila Valley Site No. 9 Dam	Poor	Spillway capacity 14% of required flood	High	2,500,000
		Lack of design information		

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.

PMF = Probable maximum flood

Table 5-7. Dams with Dam Safety Deficiency Rankings

Dam	Condition Assess-ment [a]	Deficiency	Hazard Potential [b]	Estimated Cost to Repair ($)
Hidalgo County				
Lordsburg WWTP Pond 2 Dam	Fair	Lack of maintenance	Significant	100,000
Lordsburg WWTP Pond 3 Dam	Fair	Lack of maintenance	Significant	100,000
Luna County				
Luna Energy Facility Evaporation Ponds 1 & 2	Fair	Lack of design information	Low	100,000

[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.

[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

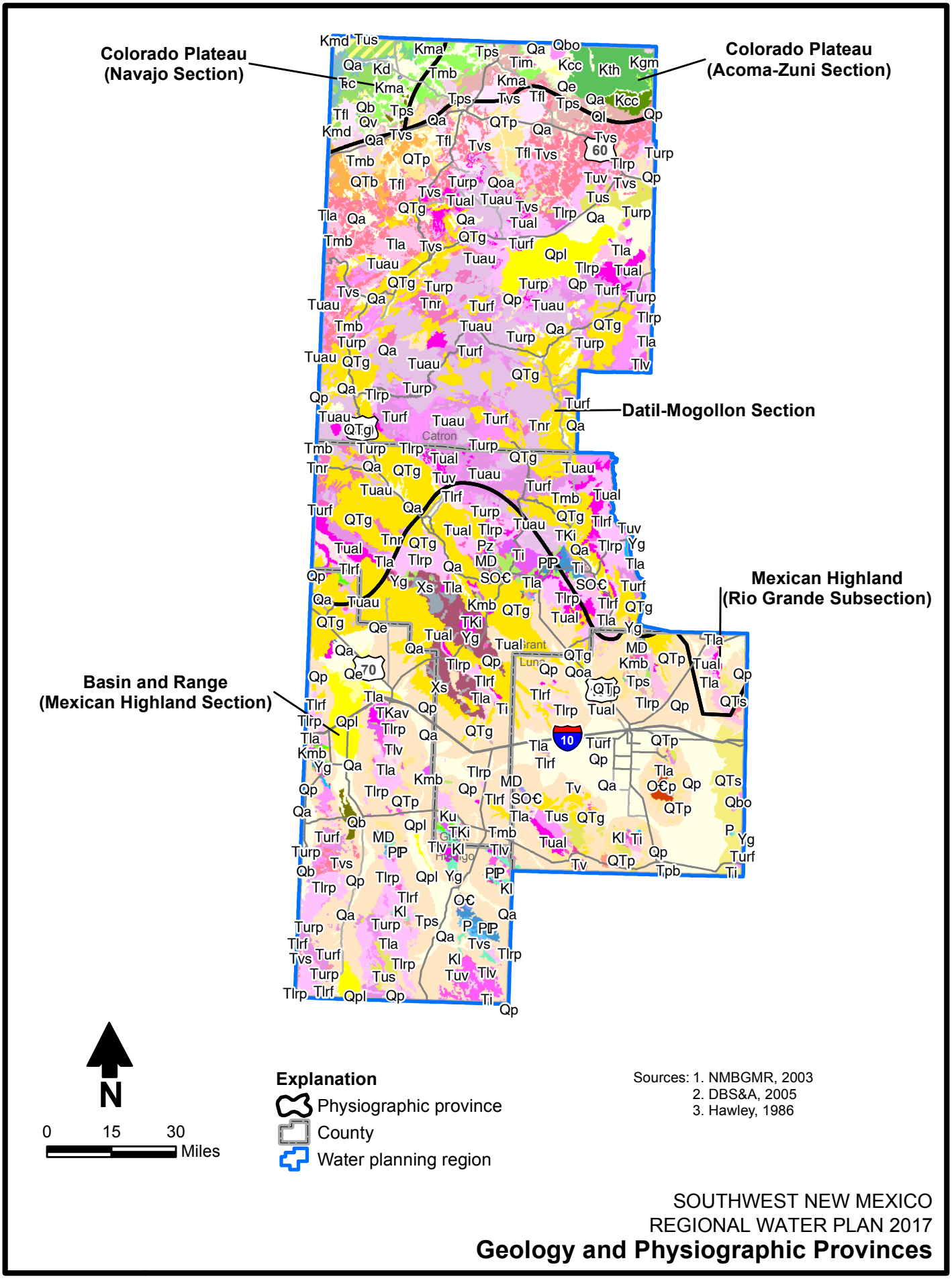

Colorado Plateau
(Navajo Section)
Colorado Plateau
(Acoma-Zuni Section)
Datil-Mogollon Section
Mexican Highland
(Rio Grande Subsection)
Basin and Range
(Mexican Highland Section)
Catron
N
0
15
30
Miles
Explanation
Physiographic province
County
Water planning region
Sources: 1. NMBGMR, 2003
2. DBS&A, 2005
3. Hawley, 1986
SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017
Geology and Physiographic Provinces
S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-10A_GEOLOGY.MXD 12/21/2016

Figure 5-10a

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-10B_GEOLOGY_EXPLANATION.MXD 12/21/2016

Figure 5-10b

Three main physiographic regions exist within the planning region. From the north to the south, these are:

- Colorado Plateau (Navajo and Acoma-Zuni Sections)
- Datil- Mogollon Section (referred to as the Transition Zone Province in the accepted water plan)
- Basin and Range

Figure 5-10 shows the approximate extents of these areas within the planning region.

The different provinces have distinct geologies that control to a large extent the groundwater quantity, depth, quality, and recharge rates. The geology and lithology of these provinces was described in the accepted water plan (DBS&A, 2005) and is summarized in the following subsections.

5.3.1.1 Colorado Plateau Province

The northwestern corner of the Southwest New Mexico region (northern Catron County) lies within the Colorado Plateau Province (RTI, 1991). The Colorado Plateau topography is characterized by large flat plateaus and buttes separated by wide valleys and locally incised canyons (RTI, 1991). The Colorado Plateau Province is comprised mainly of numerous sedimentary rock formations that were deposited in shallow marine and fluvial environments between 65 and 250 million years ago (Cretaceous-Permian) (Basabilvazo, 1997). Sedimentary formations of the Colorado Plateau are locally overlain by Quaternary alluvium and basalt. The primary water bearing units in the region are:

- Quaternary alluvium, found in arroyos, washes, and stream channel, supplies limited water for stock wells, but does not form important regional aquifers as it does in the southern part of the planning region.
- The Cretaceous Mesaverde Group formations may provide water for domestic or stock uses (U.S. BLM, 1990). Yields from the Crevasse Canyon Formation of the Mesaverde Group range from 0.5 to 1.5 gallons per minute (gpm) (Basabilvazo, 1997).
- The Mancos Shale consists of three members separated by thin sandstone layers containing limited water that may provide water for stock wells in the area.
- The Dakota Sandstone, which is approximately 50 feet thick and consists of cross-bedded sandstone, carbonaceous siltstones, shales, and coal. The Dakota Sandstone was produces generally good water quality in northern Catron County, as much as 200 gpm within the vicinity of Fence Lake, even though it is between 400 and 600 feet deep in that area (U.S. BLM, 1990).
- The Zuni Sandstone is a thin aeolian sandstone that underlies the Dakota Sandstone in parts of the region. The hydrologic properties of the Zuni Sandstone are not clear, but it

is likely not a significant source of water because it is not areally extensive and is only approximately 15 feet thick (U.S. BLM, 1990).

- The Chinle Formation underlies the Zuni Sandstone in northwest Catron County, where it is approximately 1,500 feet thick. In northwestern Catron County it consists of claystones, shales, siltstones, and mudstones interbedded with thin lenses of sandstone and conglomerates (Willard and Weber, 1958; Foster, 1964; and McClellan et al., 1984, as cited in Basabilvazo, 1997). A few wells completed in the sandstone lenses supply small amounts of water with generally high total dissolved solids (TDS) contents.

- Beneath the Chinle Formation lie several Triassic and Permian units, including the Moenkopi Formation, Kaibab Limestone, and Coconino Sandstone. The Kaibab Limestone and the Coconino Sandstone are both known to produce good amounts of water in parts of the Colorado Plateau Province to the west, but little is known of their hydrologic characteristics within New Mexico, and no wells completed in these units are known to exist in Catron County, due to the fact that the Dakota Sandstone provides an ample water supply much closer to the surface.

In summary, groundwater within the Colorado Plateau portion of the planning region exists primarily in sedimentary formations, most predominantly the Dakota Sandstone (Basabilvazo, 1997). Although groundwater is known to exist in older (Permian) formations such as the Coconino Sandstone and Kaibab Limestone, the depth of these units (1,000 to 2,000 feet below ground surface) (U.S. BLM, 1990) largely deters their use for groundwater supply. Tertiary volcanics and Quaternary alluvium also contain localized groundwater, but they are not extensive enough to be considered a regionally important groundwater source.

5.3.1.2 Datil-Mogollon Section

The remainder of Catron County and much of Grant County lie within the Datil-Mogollon Section. This area is a transitional zone between the Colorado Plateau Province and the Basin and Range Province to the south (RTI, 1991). The water-bearing units that supply water to users in the Southwest region include:

- Alluvial waters are used for domestic, stock, irrigation, and public supply purposes near Glenwood (Basabilvazo, 1997). Alluvium deposits are also found along the Gila-San Francisco River system, but have not yet been developed for water supply purposes.

- The Gila Group underlies the alluvium in parts of the Datil-Mogollon Section and represents the infilling of the intermontane basins by alluvial fan processes. The thickness of the Gila Group varies depending upon where it was deposited, but is reported to be as much as 600 feet near Reserve and 750 feet near Beaverhead (Basabilvazo, 1997). While the upper part of the Gila Group supplies small to moderate amounts of water to wells, the lower part is a poor aquifer due to cementation and

compaction. Wells completed in the Gila Group can yield anywhere from 10 gpm to 1,000 gpm (Johnson et al., 2002).

- The Bearwallow Mountain Andesite has only recently been determined to contain enough water to supply wells. Three wells that reportedly yield adequate water for domestic and livestock use are known to be completed in the unit (Basabilvazo, 1997).

- The Datil Group, which contains many interbedded igneous, volcanic, and sedimentary rocks, is present in the Little Colorado, San Agustin, San Francisco, and Gila geologic basins. Typical well yields are 1 to 15 gpm. The Datil Aquifer south of the Plains of San Agustin receives inflow from the bolson fill in the San Agustin Graben (Meyers et al., 1994). Additional studies regarding the San Agustin Basin and the Gila geologic basins are ongoing to help inform water development decisions in the San Agustin Basin.

- The Baca Formation consists of a redbed sequence of mudstone, sandstone, and conglomerate (Johnson, 1978; Cather, 1980 [as cited in Basabilvazo, 1997]). Yields from wells completed in the Baca Formation range between 5 and 20 gpm.

- A number of wells are completed in the Mesaverde Group and subsequent Cretaceous sedimentary units, which exist near the margin with the Colorado Plateau. These wells are discussed in Section 5.3.1.1.

5.3.1.3 Basin and Range Province

South of the Datil Mogollon Section lies the Mexican Highland Section of the Basin and Range Province (Figure 5-13), which covers the remainder of the Southwest region. The province is characterized by north-south trending mountain ranges separated by basins that have been partially filled with sediment eroded from the mountains. The mountains are comprised of bedrock that provides limited localized fracture flow (Hawley et al., 2000).

The basin fill within the Basin and Range Province contains most of the readily available (i.e., economically viable) groundwater resources within the Southwest New Mexico region. In general, the water table in the basin fill is within 200 feet of ground surface, the basin aquifers are moderately to highly permeable, and the water is of good quality.

In the Mimbres Basin, basaltic volcanics interbedded with basin fill can be locally important aquifers some Mimbres sub-basins. The Mimbres Basin system contains unconfined, semiconfined, and confined aquifers, depending on location.

The Animas Basin contains four interconnected sub-basins: Lordsburg, Lower Animas, Upper Animas, and Cloverdale:

- *Lordsburg Sub-basin:* The principal groundwater-bearing geologic unit of the Lordsburg Sub-basin is the Gila Group (Johnson et al., 2002). Available data indicate that the depth to the water table ranges between 80 and 125 feet (Johnson et al., 2002) and the average

saturated thickness of the productive zone is approximately 360 feet (Hawley et al., 2000).

- *Upper and Lower Animas Sub-basins:* Groundwater in these sub-basins exists primarily within two units, Quaternary alluvium and the Tertiary Gila Group, which together are often referred to as basin fill. The most productive zone of the basin fill material is generally found from ground surface to depths of 1,000 feet, within the Quaternary alluvium and the Upper Gila Group (Hawley et al., 2000).

- *Cloverdale Sub-basin:* The Cloverdale Sub-basin is small relative to the other three, but is important because it exists on both sides of the U.S.-Mexico border and because there is a groundwater divide beneath it. Water in the southern portion of the Cloverdale flows toward Mexico, and water in the northern portion flows into the U.S.

Additional detail on the geology and aquifer properties of each basin in the Southwest New Mexico region is included in the accepted regional water plan (DBS&A, 2005).

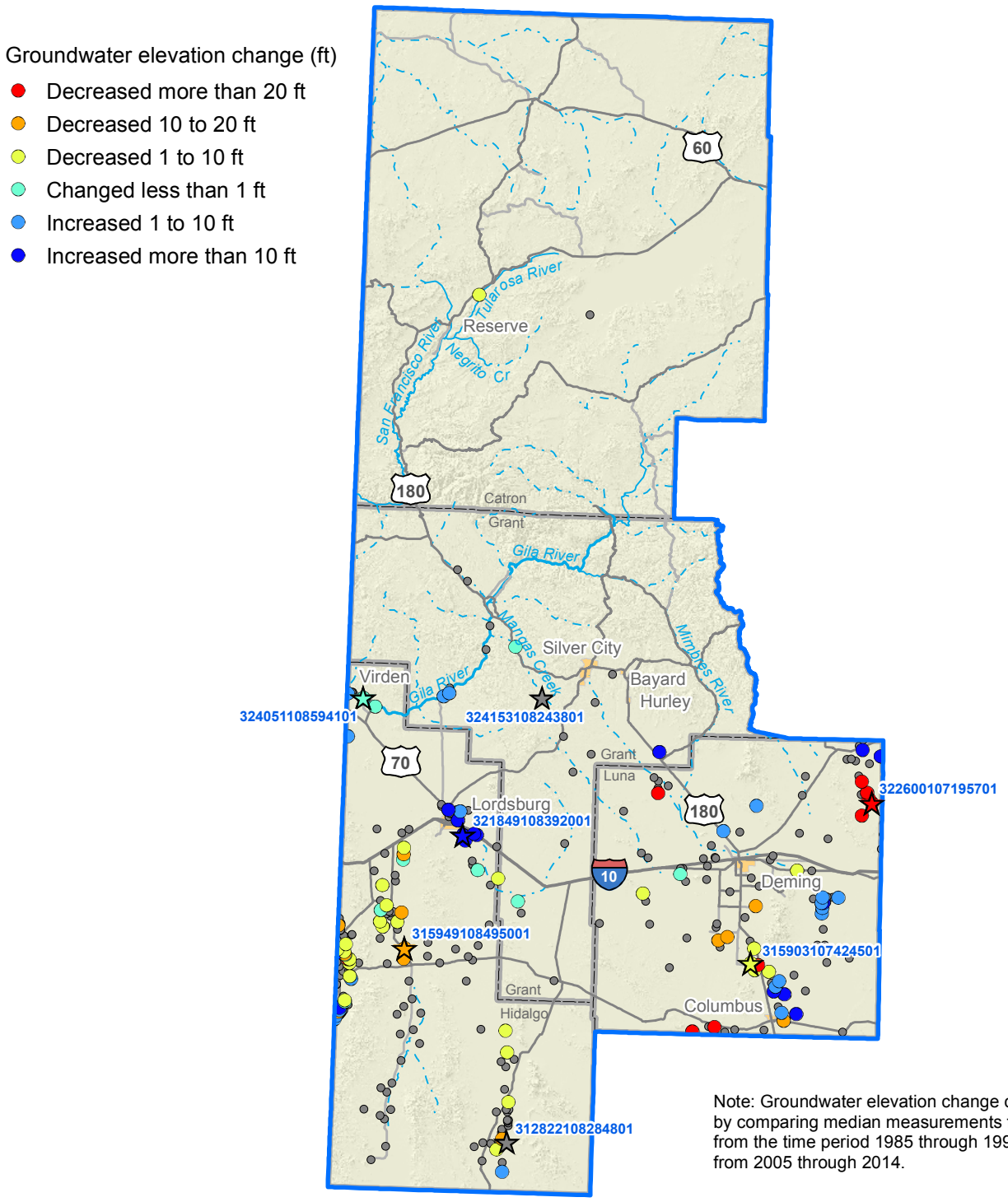
5.3.2 Aquifer Conditions

Water bearing characteristics of aquifers are summarized in Section 5.3.1, and details of aquifer properties are included in the accepted regional water plan (DBS&A, 2005). As reported in the accepted regional water plan (DBS&A, 2005), productive aquifers in the Basin and Range Province in the southern part of the planning region have led to a large amount of groundwater extraction, primarily for agricultural use.

Since the accepted plan was completed, a new groundwater model of the Mimbres Basin has been developed by the NMOSE (Cuddy and Keyes, 2011) to replace a previous numerical model that was used for water rights administration. The new model includes improved definition of basin geometry, geology, and pumping history and is better calibrated and more accurate. The model also includes a summary of aquifer property information and observed water level declines in a number of wells with over 50 feet of drawdown in a 40-year time period.

Also since the accepted plan was published, a more detailed analysis of Mimbres Basin groundwater conditions, based on modeling completed for Chino Mines Company, has been completed. This analysis defines hydrogeologic regions and presents recharge, discharge, and storage estimates for each sub-region (Finch et al., 2008).

In order to evaluate changes in water levels over time, the U.S. Geological Survey (USGS) monitors groundwater wells throughout New Mexico. Recent groundwater elevation changes based on available USGS water level data throughout the region are shown on Figure 5-11. Hydrographs illustrating groundwater levels versus time, as compiled by the USGS (2014b), were selected for nine monitor wells with longer periods of record and are shown on Figure 5-12. Steady water level declines have been observed in the portions of the Lordsburg and Deming areas of the region, where pumping withdrawals are high.



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.

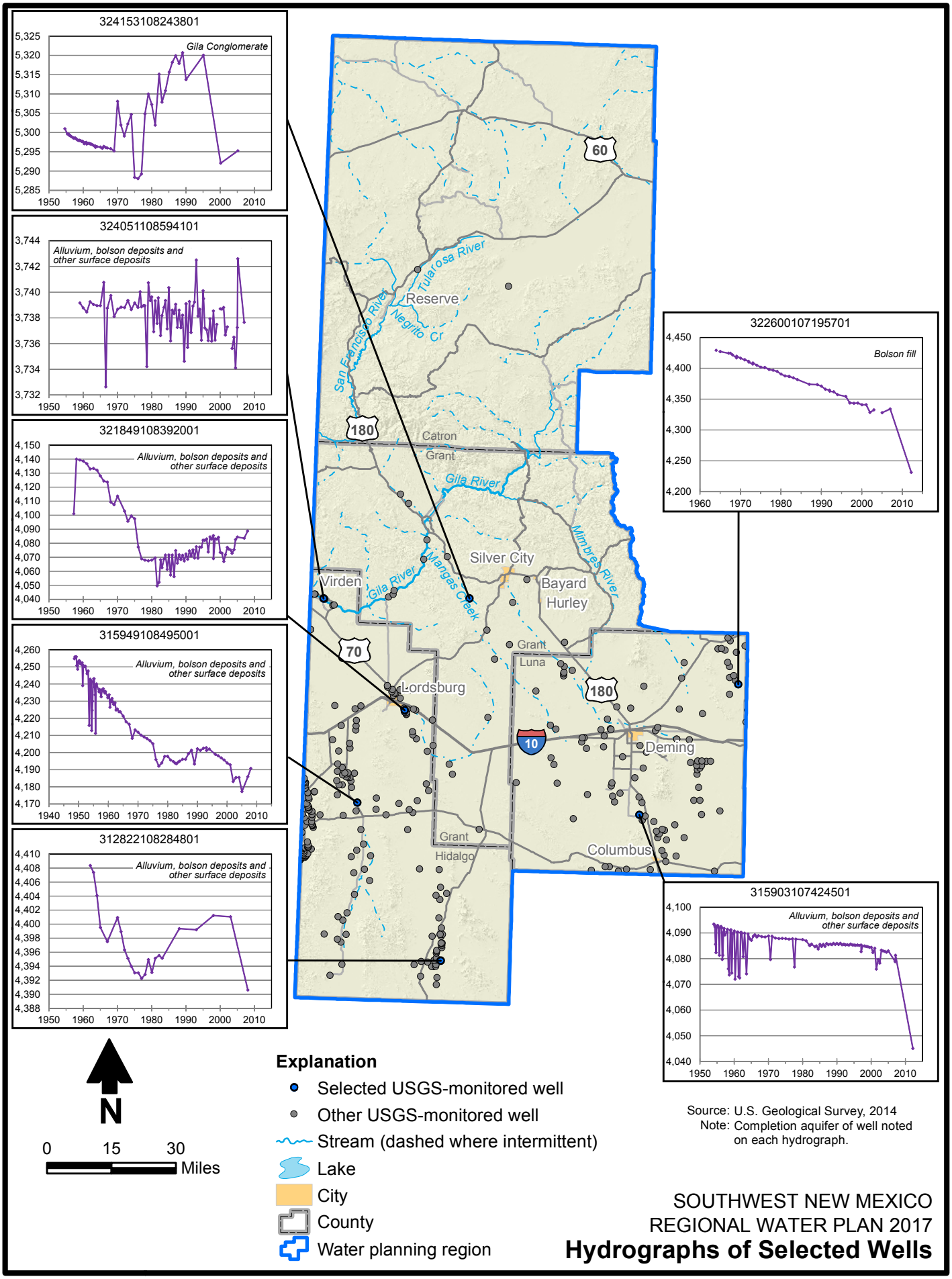
Source: USGS, 2014b

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

U.S. Geological Survey Wells and Recent Groundwater Elevation Change

Figure 5-11

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-11_USGS_WELLS.MXD 12/21/2016



Source: U.S. Geological Survey, 2014
Note: Completion aquifer of well noted on each hydrograph.

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Hydrographs of Selected Wells

Figure 5-12

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-12_USGS_WELLS_HYDROGRAPHS.MXD 12/21/2016

The aquifers in the planning region are generally recharged through stream loss and mountain front recharge. The accepted regional water plan provided published estimates of recharge in the region as well as calculated estimates for areas within the region for which no published recharge estimates were available. These estimates indicated that recharge was generally about 1 to 3 percent of precipitation.

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

- Lordsburg (Animas Basin)
- Lordsburg Power Plant (Animas Basin)
- Pyramid facility (Animas Basin)
- Santa Clara (Mimbres Basin)
- Bayard (Mimbres Basin)
- Deming (Mimbres Basin)
- Columbus (Mimbres Basin)
- Silver City municipal well fields, including Franks, Woodward, Anderson, and Hayes (Mimbres and Gila basins)

In addition, numerous agricultural wells pump from the Basin and Range Province in the southern part of the planning region, and domestic and livestock wells are located throughout the region.

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 Southwest New Mexico Water Planning Region is evaluated through periodic monitoring and comparison of sample results to pertinent water quality standards. Several reaches of rivers within the region 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 with impaired water quality included in the 303(d) list; Table 5-8 provides details of impairment for those reaches. Common causes of impairment in the Southwest New Mexico region are temperature, turbidity, nutrients, and biological indicators.

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.

Generally the quality of groundwater in the planning region is suitable for agriculture and domestic purposes except where there are specific concerns, as discussed in Section 5.4.1.

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.

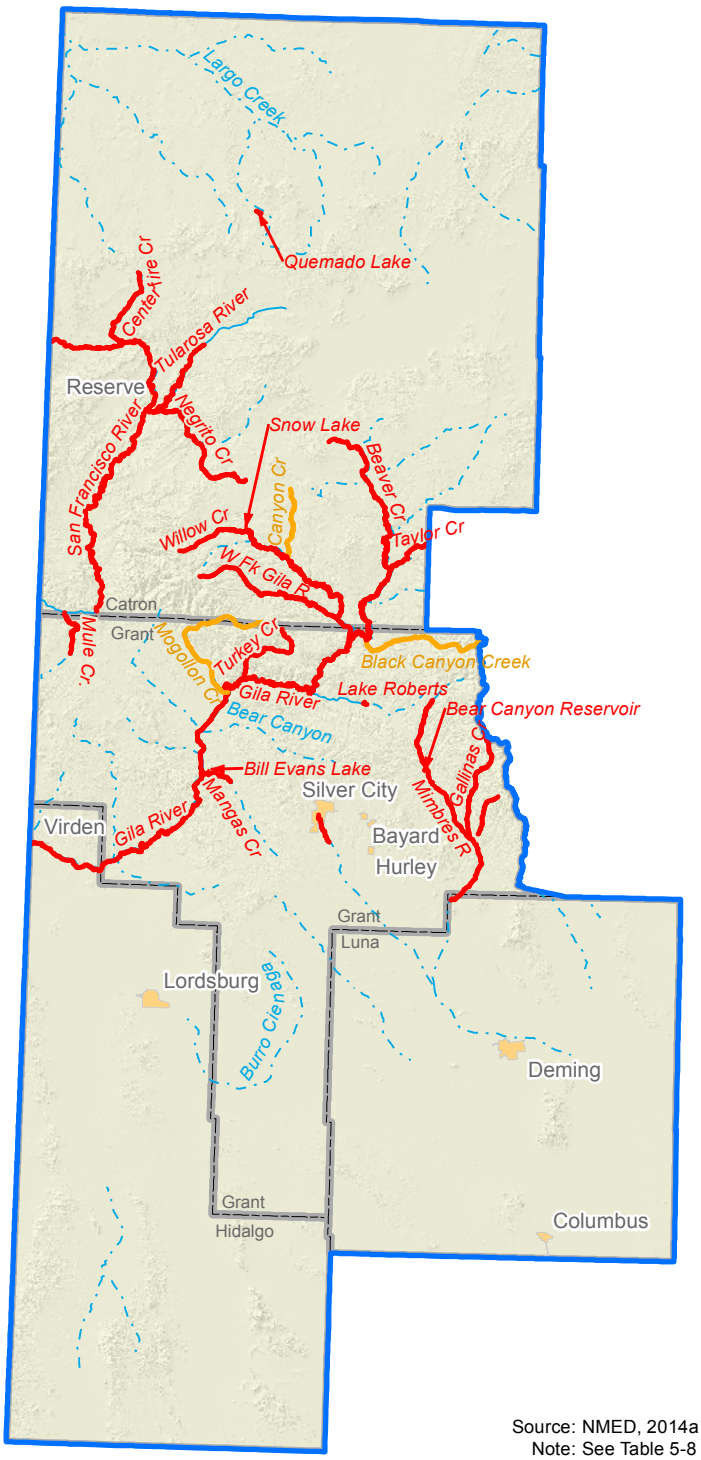
5.4.1 Potential Sources of Contamination to Surface and Groundwater

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/).



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 15 30 Miles

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Water Quality-Impaired Reaches

Figure 5-13

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-13_WQ_IMPAIRED_REACHES.MXD 12/21/2016

Table 5-8. Total Maximum Daily Load Status of Streams in the Southwest New Mexico 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]
Catron County						
Beaver Creek (perennial reaches Taylor Ck to headwaters)	NM-2503_25	38.94	Source unknown	HQColdWAL	Temperature, water	5/5B
Canyon Creek (Middle Fork Gila River to headwaters)	NM-2503_43	14.16	Loss of riparian habitat Rangeland grazing Streambank modifications/destabilization	HQColdWAL	Nutrient/eutrophication Biological indicators Turbidity	4A
Centerfire Creek (San Francisco R to headwaters)	NM-2603.A_50	16.13	Source unknown Recreational pollution sources Silviculture fire suppression Rangeland grazing Natural sources	PC HQColdWAL	Escherichia coli Nutrient/eutrophication Biological indicators Sedimentation/siltation Specific conductance Temperature, water Turbidity	5/5A
Diamond Ck (perennial prt East Fork Gila R to Bailey Ck)	NM-2503_22	13	Not assessed	—	—	3/3A
Dry Blue Creek (AZ bnd to headwaters)	NM-2603.A_70	9.52	Not assessed	—	—	3/3A
East Fork Gila River (Gila River to headwaters)	NM-2503_20	26.15	Source unknown	HQColdWAL	Benthic-macroinvertebrate bioassessments	5/5C
Gilita Creek (Middle Fork Gila R to Willow Creek)	NM-2503_45	6.27	Source unknown	HQColdWAL	Temperature, water	5/5A

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] ColdWAL = Coldwater aquatic life
CoolWAL = 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 Southwest New Mexico 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]
Catron County (cont.)						
Gilita Creek (perennial reaches abv Willow Creek)	NM-2503_48	6.57	Not assessed	—	—	3/3A
Glenwood Pond	NM-2603.B_10	1.67 [e]	Not assessed	—	—	3/3A
Hoyt Creek (Wall Lake to headwaters)	NM-2503_26	19.95	Not assessed	—	—	3/3A
Largo Creek (Carrizo Wash to headwaters)	NM-9000.A_906	79.8	Not assessed	—	—	3/3A
Little Creek (West Fork Gila River to headwaters)	NM-2503_31	16.46	Not assessed	—	—	3/3A
Little El Caso Lake	NM-9000.B_075	10 [e]	Not assessed	—	—	3/3A
Middle Fork Gila River (Canyon Creek to headwaters)	NM-2503_41	12.46	Source unknown	HQColdWAL	Temperature, water	5/5B
Middle Fork Gila River (West Fork Gila R to Canyon Creek)	NM-2503_40	24.3	Source unknown	HQColdWAL	Temperature, water	5/5B
Mogollon Creek (perennial reaches abv USGS gage)	NM-2503_02	29.43	Mill tailings Silviculture fire suppression Off-road vehicles Streambank modifications/destabilization	HQColdWAL	Aluminum	4A
Mule Creek (San Francisco R to Mule Springs)	NM-2601_01	10.5	Source unknown	MCWAL	Oxygen, dissolved	5/5C

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] ColdWAL = Coldwater aquatic life
CoolWAL = 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 Southwest New Mexico 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]
Catron County (cont.)						
Negrito Creek (Tularosa River to confl of N and S forks)	NM-2603.A_42	12.42	Source unknown	HQColdWAL	Temperature, water	5/5B
Pine Lake	NM-9000.B_095	80 [e]	Not assessed	—	—	3/3A
Quemado Lake	NM-9000.B_096	111.4 [e]	Source unknown	CoolWAL	Nutrient/eutrophication Biological indicators	5/5A
S A Creek (perennial prt of Centerfire Creek to headwaters)	NM-99.A_002	13.63	Not assessed	—	—	3/3A
San Francisco River (AZ border to Box Canyon)	NM-2601_00	17.76	Not assessed	—	—	3/3A
San Francisco River (Box Canyon to Whitewater Creek)	NM-2601_10	6.26	Source unknown	MCWAL	Benthic-macroinvertebrate bioassessments	5/5C
San Francisco River (Centerfire Creek to AZ border)	NM-2602_20	14.73	Source unknown Silviculture fire suppression Rangeland grazing	ColdWAL	Benthic-macroinvertebrate bioassessments Temperature, water	5/5C
San Francisco River (NM 12 at Reserve to Centerfire Creek)	NM-2602_10	16.02	Source unknown	ColdWAL PC	Escherichia coli Temperature, water Turbidity	5/5A
San Francisco River (Pueblo Ck to Willow Springs Cyn)	NM-2601_21	22.43	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
CoolWAL = 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 Southwest New Mexico 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]
Catron County (cont.)						
San Francisco River (Whitewater Ck to Pueblo Ck)	NM-2601_20	14.42	Source unknown	MCWAL	Sedimentation/siltation	5/5A
San Francisco River (Willow Springs Cyn to NM 12 at Reserve)	NM-2601_22	10.41	Source unknown	PC	Escherichia coli	5/5A
Snow Lake	NM-2504_40	100.1 [e]	Source unknown	ColdWAL	Nutrient/eutrophication Biological indicators	5/5A
South Fork Negrito Creek (Negrito Creek to headwaters)	NM-2603.A_43	14.49	Source unknown Recreational pollution sources Loss of riparian habitat Silviculture fire suppression Road/bridge runoff Rangeland grazing	PC HQColdWAL	Escherichia coli Temperature, water	5/5B
Taylor Creek (perennial reaches Beaver Creek to headwaters)	NM-2503_23	22.37	Source unknown Silviculture fire suppression Rangeland grazing	HQColdWAL	Nutrient/eutrophication Biological indicators Temperature, water	5/5C
Tularosa River (Apache Creek to headwaters)	NM-2603.A_41	17.7	Not assessed	—	—	3/3A
Tularosa River (San Francisco R to Apache Creek)	NM-2603.A_40	21.97	Source unknown	HQColdWAL PC	Escherichia coli Temperature, water Turbidity	5/5A

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] ColdWAL = Coldwater aquatic life
CoolWAL = 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 Southwest New Mexico 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]
Catron County (cont.)						
West Fork Gila R (East Fork to Middle Fork)	NM-2503_10	4.85	Source unknown	HQColdWAL	Temperature, water	5/5B
West Fork Gila R (Middle Fork to headwaters)	NM-2503_30	31.47	Source unknown	HQColdWAL	Temperature, water	5/5B
White Creek (West Fork Gila River to headwaters)	NM-2503_32	8.94	Not assessed	—	—	3/3A
Willow Creek (Gilita Creek to headwaters)	NM-2503_47	7.21	Source unknown	HQColdWAL	Aluminum, chronic Temperature, water	5/5A
Grant County						
Allie Canyon (Mimbres River to headwaters)	NM-2804_20	8.82	Not assessed	—	—	3/3A
Bear Canyon (Mimbres River to headwaters)	NM-2804_10	9.96	Not assessed	—	—	3/3A
Bear Canyon Reservoir	NM-2504_30	8.63 [e]	Source unknown	ColdWAL	Mercury in fish tissue Nutrient/eutrophication Biological indicators Temperature, water	5/5A
Beaver Creek (perennial reaches Taylor Ck to headwaters)	NM-2503_25	38.94	Source unknown	HQColdWAL	Temperature, water	5/5B

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] ColdWAL = Coldwater aquatic life
CoolWAL = 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 Southwest New Mexico 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]
Grant County (cont.)						
Bill Evans Lake	NM-2502.B_00	69.9 [e]	Source unknown	CoolWAL WWAL	Mercury in Fish Tissue	5/5C
Black Canyon Creek (East Fork Gila River to headwaters)	NM-2503_21	25.14	Source unknown	HQColdWAL	Temperature, water	4A
Burro Cienaga (Lordsburg Playa to headwaters)	NM-98.A_010	52.02	Not assessed	—	—	3/3A
Cold Springs Creek (Hot Springs Creek to headwaters)	NM-2803_11	7.56	Source unknown	ColdWAL	Cadmium Lead	5/5A
East Fork Gila River (Gila River to headwaters)	NM-2503_20	26.15	Source unknown	HQColdWAL	Benthic-macroinvertebrate bioassessments	5/5C
Gallinas Creek (Mimbres River to headwaters)	NM-2803_20	20.19	Source unknown	ColdWAL	Nutrient/eutrophication Biological indicators	5/5C
Gila River (AZ border to Red Rock)	NM-2501_00	26.33	Source unknown	MWWAL	Temperature, water	5/5A
Gila River (Mangas Creek to Mogollon Creek)	NM-2502.A_10	15.91	Source unknown	MCWAL	Temperature, water	5/5B
Gila River (Mogollon Ck to East and West Forks of Gila R)	NM-2502.A_30	41.51	Source unknown	MCWAL	Temperature, water	5/5B

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] ColdWAL = Coldwater aquatic life
CoolWAL = 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 Southwest New Mexico 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]
Grant County (cont.)						
Gila River (Red Rock to Mangas Creek)	NM-2502.A_00	19.57	Source unknown	MCWAL WWAL	Nutrient/eutrophication Biological indicators Temperature, water	5/5C
Hot Springs Ck (perennial prt of Mimbres R to headwaters)	NM-2803_10	10.51	Not assessed	—	—	3/3A
Lake Roberts	NM-2504_20	68.37 [e]	Source unknown	ColdWAL	Nutrient/eutrophication Biological indicators	5/5A
Little Creek (West Fork Gila River to headwaters)	NM-2503_31	16.46	Not assessed	—	—	3/3A
Mangas Creek (Gila River to Mangas Springs)	NM-2502.A_21	6.39	On-site treatment systems (septic) Recreational pollution sources Source unknown Loss of riparian habitat Abandoned mine lands Natural sources Rangeland grazing	MCWAL WWAL	Nutrient/eutrophication Biological indicators Temperature, water	5/5A
Mimbres R (perennial reaches downstream of Willow Springs)	NM-2803_00	25.18	Source unknown	ColdWAL PC	Escherichia coli Temperature, water	5/5B
Mimbres R (perennial reaches Willow Springs to Cooney Cny)	NM-2804_00	15.34	Source unknown	HQColdWAL	Temperature, water	5/5B

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] ColdWAL = Coldwater aquatic life
CoolWAL = 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 Southwest New Mexico 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]
Grant County (cont.)						
Mogollon Creek (perennial reaches abv USGS gage)	NM-2503_02	29.43	Mill tailings Silviculture fire suppression Off-road vehicles Streambank modifications/destabilization	HQColdWAL	Aluminum	4A
Mule Creek (San Francisco R to Mule Springs)	NM-2601_01	10.5	Source unknown	MCWAL	Oxygen, dissolved	5/5C
San Vicente Arroyo (Mimbres R to Maudes Cny)	NM-9000.A_026	32	Not assessed	—	—	3/3A
San Vicente Arroyo (perennial prt Maudes Cny to headwaters)	NM-9000.A_025	9.8	Source unknown	WWAL	Nutrient/eutrophication Biological indicators	5/5C
Turkey Creek (Gila River to headwaters)	NM-2503_03	16.94	Source unknown	HQColdWAL	Temperature, water	5/5B
West Fork Gila R (East Fork to Middle Fork)	NM-2503_10	4.85	Source unknown	HQColdWAL	Temperature, water	5/5B
Whitewater Creek (Mimbres River to headwaters)	NM-2803_30	17.08	Not assessed	—	—	3/3A
Hidalgo County						
Burro Cienaga (Lordsburg Playa to headwaters)	NM-98.A_010	52.02	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
CoolWAL = 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 Southwest New Mexico 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]
Hidalgo County (cont.)						
Gila River (AZ border to Red Rock)	NM-2501_00	26.33	Source unknown	MWWAL	Temperature, water	5/5A
North Lordsburg Playa	NM-9000.B_091	2880 [e]	Not assessed	—	—	3/3A
Sacaton (No Name) Playa	NM-9000.B_097	600 [e]	Not assessed	—	—	3/3A
South Lordsburg Playa	NM-9000.B_099	7040 [e]	Not assessed	—	—	3/3A
Luna County						
Mimbres R (perennial reaches downstream of Willow Springs)	NM-2803_00	25.18	Source unknown	ColdWAL PC	Escherichia coli Temperature, water	5/5B

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 Southwest New Mexico 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, 2013) 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 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.

Table 5-9. Municipal and Industrial NPDES Permittees in the Southwest New Mexico Water Planning Region

Permit No	Municipality/Industry [a]	Permit Type [b]
Catron County		
NM0030163	NMG&FD/Glenwood Fish Hatchery	Fish hatchery
NM0024163	Reserve, Village of/Mutual Sewer Association	Municipal (POTW)
Grant County		
NM0020231	Bayard, Village of/WWTP	Municipal (POTW)
NM0027375	Rio de Arenas LLC	Private domestic
NM0020109	Silver City, Town of/WWTP [c]	Municipal (POTW)

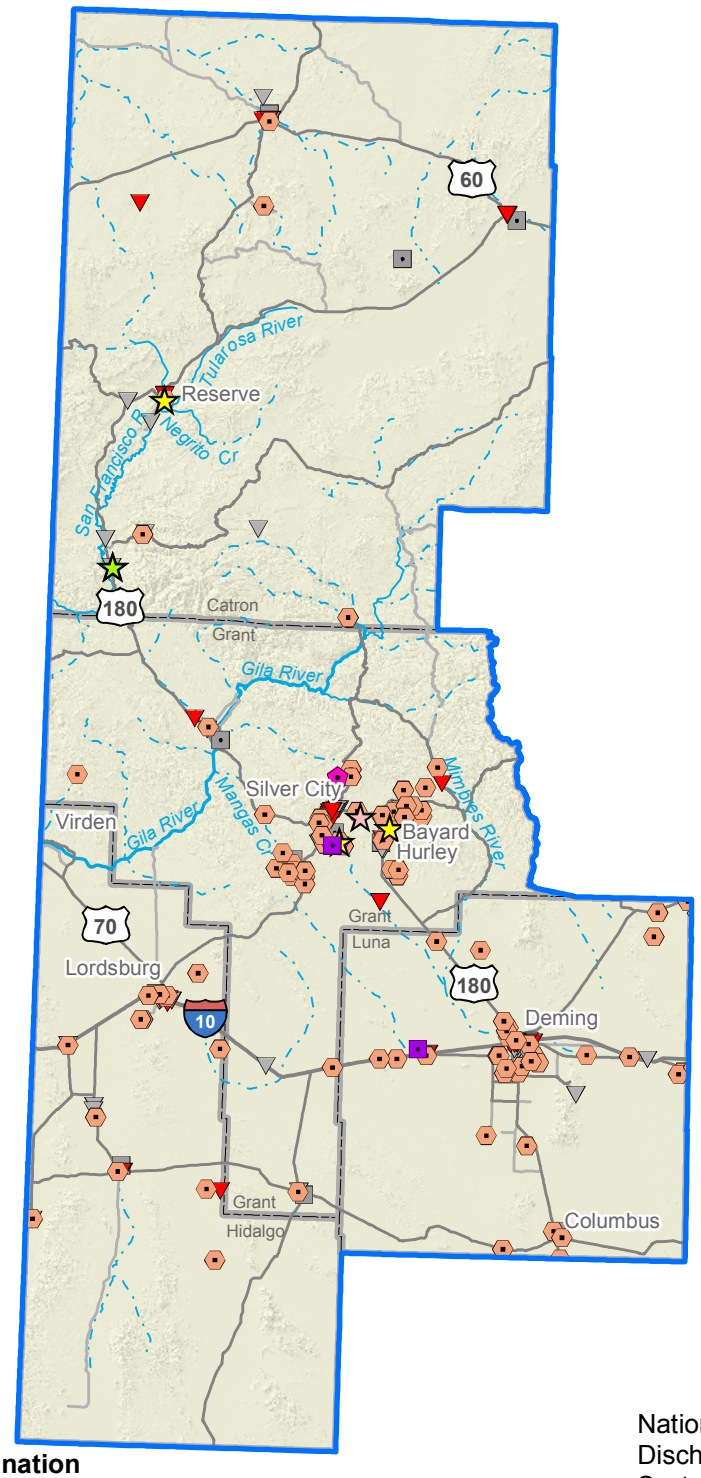
Source: NMED, 2016c

[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
NMG&FD = New Mexico Game and Fish
POTW = Publicly owned treatment works
WWTP = Wastewater treatment plant
U.S. EPA = U.S. Environmental Protection Agency



Sources:
NMED, 2014b
NMED, 2015a
NMED, 2015b
NMED et al., 2017
NMED, 2017a
NMED, 2017b
NMED, 2017c
U.S. EPA, 2013
U.S. EPA, 2017a
U.S. EPA, 2017b

Explanation

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

Leaking underground storage tank site
- Active
- No further action

- Superfund site
- Groundwater discharge permit
- Permitted active landfill
- Closed landfill

National Pollutant Discharge Elimination System (NPDES) permit
- Fish hatchery
- Municipal (publicly owned treatment work)
- Domestic

N

0 15 30 Miles

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Potential Sources of Contamination

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG5-14_CONTAM_SOURCES.MXD 12/21/2016

Figure 5-14

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

As discussed in the accepted regional water plan (DBS&A, 2005), groundwater issues with sulfates, metals, total dissolved solids (TDS), and low pH have occurred in Luna and Hidalgo counties and southeastern parts of Grant County. The primary sources for these contaminants are heap-leach, copper milling, and lead milling operations.

Many more abandoned mining operations are scattered throughout the mining districts of the Southwest New Mexico planning region. These mines present a potential threat to surface and groundwater quality because of some of the toxic compounds used in mineral extraction, including mercury and cyanide. Abandoned mines can also generate poor water quality due to groundwater flow through mine workings and stormwater flow and seepage through waste rock, tailings, and slag. The Cleveland Mill site north of Silver City was previously listed as a Superfund site, but it is no longer included on the National Priorities List because it was reclaimed (Table 5-11).

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).

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 Southwest New Mexico 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).

Table 5-10. Groundwater Discharge Permits in the Southwest New Mexico Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Catron	Gila Cliff Dwellings National Monument	DP-1387	Active	5,000
	Pueblo Largo Subdivision	DP-608	Active	6,160
	Quemado Mutual Water And Sewage Work Association	DP-1380	Active	58,950
	Reserve (Village of) - Wastewater Treatment Plant	DP-1275	Active	75,000
Grant	American Mobile Home Park	DP-830	Active	9,500
	Chino Mine	DP-376	Active	23,040,000
	Chino Mine	DP-591	Active	23,000,000
	Chino Mine	DP-213	Active	15,600,000
	Chino Mine	DP-526	Active	24,480,000
	Chino Mine	DP-214	Active	0
	Chino Mine	DP-2483	Active	—
	Chino Mine	DP-459	Active	7,128,000
	Chino Mine	DP-484	Active	19,274,400
	Chino Mine	DP-493	Active	10,000
	Chino Mine	DP-1340	Active	—
	Chino Mine	DP-1568	Active	22,000,000
	Cliff School	DP-1523	Active	7,400
	Cobre Consolidated Schools	DP-1825	Active	54,400
	Continental Divide RV Park	DP-847	Active	4,375

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 Southwest New Mexico Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Grant (cont.)	Freeport McMoRan Cobre Mining Company	DP-1056	Active	17,280,000
	Freeport McMoRan Cobre Mining Company	DP-181	Active	12,000,000
	Freeport McMoRan Cobre Mining Company	DP-1403	Active	—
	Georgetown Mill and Mine Site	DP-148	Active	0
	Mimbres Christian Camp	DP-5	Active	3,000
	North Hurley Wastewater Treament Plant	DP-1059	Active	22,800
	Peaceful Valley Trailer Park	DP-1089	Active	8,625
	Royal Minerals - Center Mine No.2033	DP-1177	Active	38,390
	Sedonia Development	DP-890	Active	5,250
	Silver City (Town of) - Wastewater Treatment Plant	DP-35	Active	3,200,000
	Tyrone Little Rock	DP-1236	Active	1,440,000
	Tyrone Mine	DP-383	Active	16,488,000
	Tyrone Mine	DP-396	Active	30,000
	Tyrone Mine	DP-1341	Active	—
	Tyrone Mine	DP-27	Active	—
	Tyrone Mine	DP-496	Active	—
	Tyrone Mine	DP-363	Active	16,488,000
	Tyrone Mine	DP-455	Active	17,280,000
	Tyrone Mine	DP-435	Active	17,280,000

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 Southwest New Mexico Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Grant (cont.)	Tyrone Mine	DP-286	Active	—
	Tyrone Mine	DP-670	Active	7,200,000
	Tyrone Mine	DP-896	Active	3,000
	Tyrone Property Owners Association	DP-28	Active	128,000
Hidalgo	Animas School	DP-1603	Active	9,000
	Banner Mill Site	DP-1651	Active	200,000
	Hidalgo Smelter	DP-311	Active	2,160,000
	Lordsburg (City of) - Wastewater Treatment Plant	DP-625	Active	325,000
	Lordsburg Generating Station	DP-1474	Active	2,500
	Playas Training and Research Center	DP-688	Active	14,400
	Pyramid Generating Station	DP-1366	Active	250,000
Luna	American Minerals Deming	DP-1234	Active	72,000
	Bowlin's Butterfield Station	DP-610	Active	3,750
	Columbus - Industrial Park	DP-120	Active	6,300
	Columbus (Village of) - Wastewater Treatment Plant	DP-1193	Active	144,000
	Deming (City of) - Wastewater Treatment Plant	DP-209	Active	3,000,000
	Deming (City of) - Wastewater Treatment Plant	DP-1795	Active	8,501,086
	Deming Chili Jalapeno Processing Plant	DP-1058	Active	1,100,000
	GH Dairy Deming	DP-1331	Active	60,000

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 Southwest New Mexico Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Luna (cont.)	Las Uvas Valley Dairies Dairy 8	DP-1790	Active	85,000
	Low-Hi RV Ranch	DP-1478	Active	4,450
	Luna Energy Facility	DP-1305	Active	150,000
	M and I Portable Toilet Rental	DP-783	Active	1,600
	New Mexico Chile Products Inc	DP-877	Active	16,000
	Pueblo De Luna Trailer Park	DP-81	Active	9,000
	Sapphire Energy Integrated Algal Biorefinery (IABR)	DP-1785	Active	538,000
	Savoy Truck Stop	DP-1204	Active	10,000
	Stetson Dairy	DP-1418	Active	120,000
	Sun Foundation Wastewater Treatment Plant	DP-431	Active	6,000
	Sundance Chile	DP-842	Active	<10,000
	Zia Nitrate Systems	DP-1792	Pending	9,000

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

gpd = Gallons per day

— = Not listed on GWQB web site

[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.

Table 5-11. Superfund Sites in the Southwest New Mexico Water Planning Region

Site Location	Site Name [a]	Site ID	EPA ID	Status [b]
Grant County				
North of Silver City, NM	Cleveland Mill	NMD981155930	600952	Deleted from NPL

Sources: U.S. EPA, 2016a, 2016b

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

[b] NPL = National Priorities List

Table 5-12. Leaking Underground Storage Tank Sites in the Southwest New Mexico Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Catron County					
Quemado	J and Y Auto Service	4038	51712	Hwy 60 West	Cleanup, Responsible Party
	NMDOT Quemado Patrol Yard	4658	29671	US 60 MM 32	Investigation, Responsible Party
Datil	Navajo Lodge & Gas	2606	29578	Interchange of Hwy 60	Cleanup, Responsible Party
	Ray's Garage	2281	30165	Interchange of Hwy 60	Cleanup, Responsible Party
	Datil General Store	4392	51739	US Hwy 60	Investigation, Responsible Party
Apache Creek	Apache Creek Store #2	4507	47957	Corner of NM 12 and 32	Investigation, Responsible Party
Reserve	Black Gold Service Sta	2676	26960	98 Main Street	Aggr Cleanup Completed, Resp Party
	Martinez 66	2739	29275	109 Main St	Cleanup, Responsible Party
	Reserve Conoco	3524	30198	SR 435	Investigation, Responsible Party
Grant County					
Cliff	NMSHTD-Cliff	1869	29647	8157 Hwy 180	Aggr Cleanup Completed, Resp Party
Mimbres	Mimbres Store 2	4675	29427	3090 Hwy 35	Pre-Investigation, Confirmed Release
	Mimbres Store 2	3046	29427	3090 Hwy 35	Pre-Investigation, Confirmed Release
Silver City	A&R Garage	205	26319	101 W College	Aggr Cleanup Completed, Resp Party
	The Price Company	2037	31084	803 S Bard	Aggr Cleanup Completed, Resp Party
	Victory Selfservice Minimart	3158	31495	602 Silver Heights Blvd	Aggr Cleanup Completed, Resp Party
	Fuel Center Plus 1	3596	28194	855 E Silver Heights Blvd	Cleanup, 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
CAF: Corrective action fund

Table 5-12. Leaking Underground Storage Tank Sites in the Southwest New Mexico Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Grant County (cont.)					
Silver City (cont.)	Housley Distributing Inc	4093	28609	785 S Mill Rd	Cleanup, Responsible Party
	Silvercrest Tex	1167	28772	1510 Silver Heights Blvd	Cleanup, Responsible Party
	Snappy Mart #19	2620	30653	1810 SouthwestAN St	Cleanup, Responsible Party
	BNSF Mill Street	4653	54742	784 South Mill Street	Pre-Investigation, Confirmed Release
Bayard	Al's Transmission	1812	26552	310 N Central	Aggr Cleanup Completed, Resp Party
	Buttermilks Shamrock Serv	3316	27181	314 Tom Foy Blvd	Aggr Cleanup Completed, Resp Party
	Hwy Texaco/Food Mart	2760	28538	801 Tom Foy Blvd	Aggr Cleanup Completed, Resp Party
	Bayard Chevron	4458	26867	309 Central Ave	Investigation, Responsible Party
	Porter Oil Bulk	938	26866	1400 N Central Ave	Pre-Investigation, Confirmed Release
	Bayard Bulk Plant	2443	26866	1400 N Central Ave	Pre-Investigation, Confirmed Release
	Bayard Bulk Plant	4655	26866	1400 N Central Ave	Pre-Investigation, Confirmed Release
Hurley	Gila Mill Works	2997	28333	120 N Hurley Rd	Cleanup, Responsible Party
Tyrone	Tyrone Chevron	4468	31265	US Hwy 90	Investigation, Responsible Party
Hachita	Hachita Cafe and Store	4454	6036	PO Box 95	Pre-Investigation, Suspected Release
Hidalgo County					
Lordsburg	Border Cowboy T-Stop	2430	27014	992 E Railroad	Cleanup, Responsible Party
	Loves Country Store 276	4496	29165	900 W Motel Dr	Cleanup, 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
CAF: Corrective action fund

Table 5-12. Leaking Underground Storage Tank Sites in the Southwest New Mexico Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Hidalgo County (cont.)					
Lordsburg (cont.)	Save Gas 1, Lordsburg	4447	30498	1001 S Main St	Cleanup, Responsible Party
	Westside Texaco	937	28307	400 W Motel Dr	Cleanup, Responsible Party
	Border Cowboy Restrt	2433	27013	984 E Railroad	Investigation, Responsible Party
	Lordsburg (City of) - Airport	4449	29139	1000 E Airport Rd	Investigation, Responsible Party
	Quick Shop/Calico Graphics	3407	30096	628 E Motel Dr	Investigation, Responsible Party
Animas	Lindas	4419	51653	61 E Highway 9	Investigation, Responsible Party
Playas	Playas Store	4712	7630	3 Market St	Investigation, Responsible Party
Luna County					
Deming	Beacon Truck Stop #658	1902	9762	14150 Highway 418 Southwest	Cleanup, Responsible Party
	Cano's Restaurant	4654	54744	1200 W Pine	Cleanup, Responsible Party
	Deming Bulk Plant	4559	30038	2701 E Pine	Cleanup, Responsible Party
	Gonzales Self Serve	2014	31494	422 W Pine	Cleanup, Responsible Party
	On Sale Tire Co	3042	27082	101 W Pine St	Cleanup, Responsible Party
	Save Gas - No3	4089	27658	1312 W Pine	Cleanup, Responsible Party
	Stuckeys Deming	2966	1843	15 Miles W of Deming On I	Cleanup, Responsible Party
	Triangle Truck Stop	3401	31200	1300 W Pine	Cleanup, Responsible Party
	Sandis Save Gas	4707	30835	4301 East Pine Street	Pre-Investigation, Confirmed Release

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
CAF: Corrective action fund

Table 5-12. Leaking Underground Storage Tank Sites in the Southwest New Mexico Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Luna County (cont.)					
	Country Club Food Mart	4443	51556	2319 E Motel Dr	Investigation, Responsible Party
	Sav-O-Mat C	3521	30493	321 W Pine St	Investigation, Responsible Party
	Savoy Truck Stop	3060	9762	14150 Highway 418 Southwest	Investigation, Responsible Party
	Savoy Truck Stop	4073	9762	14150 Highway 418 Southwest	Investigation, Responsible Party
	Sun Mart 681	4600	51556	2319 E Motel Dr	Investigation, Responsible Party
	Snappy-Mart #258	2892	1805	306 E Pine	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
CAF: Corrective action fund

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 are 2 operating landfills and 24 closed landfills (Table 5-13, Figure 5-14).

5.4.1.5 Nonpoint Sources

Southwest New Mexico has experienced a number of very large forest fires in recent years, and post-fire flooding and erosion is a key nonpoint source issue. Other potential nonpoint sources of pollutants in the planning region include silviculture, rangeland grazing, road/bridge runoff, off-road vehicles, streambank modifications, loss of riparian habitat, and recreational pollutant 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). In the Southwest New Mexico region, the following watershed restoration and planning efforts have occurred since acceptance of the original water plan

- A 2009 *Gila River Watershed Improvement Plan and Strategies* provided an inventory and data resource in support of a science-based approach to watershed resource planning (NMED, 2009). Recommended management practices by land use category (i.e., agriculture, construction, recreation, mining, timber/forest management) were included in the plan.

- The 2006 Mimbres River Watershed Restoration Action Strategy identified management measures including upland treatments, streambank stabilization, landscape fire management, wildfire management, prescribed burn strategy, pre- and post-fire strategies, and road management. Several erosion control projects were recommended. (Meridian Institute et al., 2006).

Another 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)

Table 5-13. Landfills in the Southwest New Mexico Water Planning Region

County	Landfill Name [a]	Landfill Operating Status	Landfill Closure Date
Catron	Datil Landfill	Closed	1989,1996
	Glenwood	Closed	—
	Last Frontier Subdivision Land	Closed	1993
	Pie Town	Closed	—
	Quemado Landfill	Closed	1995
	Reserve	Closed	—
Grant	Chino Mines Co.	Closed	2005
	Cliff/Gila Landfill	Closed	—
	Gila	Closed	1994
	Hachita Landfill	Closed	1994
	Hurley Smelter	Closed	—
	Old Silver City Landfill	Closed	1995
	Santa Rita	Closed / Inactive [b]	—
	Silver City Landfill	Closed	— [c]
	Southwest New Mexico Regional	Open	NA
	Tri City	Closed	1995
	Tyrone Branch	Closed	— [c]
Hidalgo	Animas Landfill	Closed	1997
	Cotton City	Closed	1989
	Lordsburg Landfill	Closed	1997
	Rodeo	Closed	1989
	Virden North	Closed	1989
	Virden South	Closed	1989
Luna	Butterfield Trail Regional Landfill	Open	NA
	Columbus Landfill	Closed	1998
	Deming Landfill	Closed	2016 [d]

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

NA = Not applicable

— = Information not available

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

[b] No indication as recently open or active, but listed as active in accepted regional water plan.

[c] Final closure completed between 2008-2015.

[d] Scheduled for closure (registered gated unpermitted landfills— surface water quality working with owners to finalize closure by fiscal year 2016 or 2017).(reference to state map landfill closure status Aug 2015.)

- Nitrate
- Potentially toxic organic chemicals
- Bacteria, viruses, and parasites (microbiological contamination)

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 the shallow water table areas. In the Southwest New Mexico region, septic tanks are an issue of concern primarily in rural areas with shallow water tables. Lordsburg and Deming are at risk due to a shallow water table and high septic tank density. Nitrate contamination has been found in both cities, as is typical with a high density of septic tanks and publicly owned sewage facilities (DBS&A, 2005). Rural locations surrounding Silver City and the Arenas Valley may also be at an increased risk (Town of Silver City, 2004).

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 and 2060 Administrative Water Supply

The total withdrawals in 2010 for the Southwest New Mexico region, as reported in the *New Mexico Water Use by Categories 2010* report (Longworth et al., 2013), were 266,869 acre-feet.

However, a review by the NMOSE's Water Use and Conservation Bureau in November 2015 (Appendix 5-A) determined that the consumptive irrigation requirement (CIR) for acreage irrigated with surface water in Luna County for "Mimbres–Wild Flooding" that was published in Table 8, Irrigated Agriculture, in the *New Mexico Water Use by Categories 2010* report (Longworth et al., p. 104) is incorrect. Whereas the surface water CIR (CIRSW) for the Mimbres–Wild Flooding in Luna County (county number [CN] 29) was computed to be 2.65 acre-feet, the CIRSW should have been 0.75 acre-feet. As a result the total farm withdrawal surface water (TFWSW) should have been 17,500 acre-feet (Appendix 5-A, Table 2) instead of the 61,833 published in the *New Mexico Water Use by Categories 2010* report. Therefore, the administrative water supply used for planning purposes in this regional water plan update was adjusted to 222,535-acre-feet.

Of the 222,535-acre-foot total, 87,693 acre-feet were surface water withdrawals and 134,842 acre-feet were groundwater withdrawals. 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.

However, for regions such as the Southwest New Mexico region, where some aquifers (i.e., the non-stream-connected Animas, Lordsburg, Mimbres, Nutt-Hockett, and Playas Valley UWBs) are being depleted, the administrative water supply may not be sustainable in the future. In these cases the future available supply was adjusted to account for the estimated decline in water availability in these aquifers, as described in the following subsections.

5.5.1.1 Model Predicted Decline

Non-stream-connected groundwater basins with available NMOSE administrative models were used to predict the water level declines in the year 2060 based on estimated groundwater diversions (Table 5-14a):

- In the Southwest New Mexico planning region, two three-dimensional NMOSE administrative models that cover portions of the southern basins—the Animas-Lordsburg and the Mimbres models within Grant and Luna counties (Figure 4-1)—were used to predict water level declines (Johnson and Rappuhn, 2002, Cuddy and Keyes, 2011).
- The model-predicted declines were then compared to the available water column in wells in the region to assess the potential impact on future pumping.
- The predicted drawdown in 2060 from a model cell in a heavily stressed area was selected and compared to the available water column in existing wells to calculate the percentage of wells impacted by the drawdown. This percentage of impacted wells was assumed to approximate a percentage reduction in the available supply. This approach is conservative and ensures that the gap between water supply and water demand is not underestimated.

Table 5-14a. Projected Groundwater Supply in Animas, Lordsburg, and Mimbres Basins Modeled Areas in 2060, Based on Modeled Drawdown

Row	Calculation Step	Underground Water Basin				Explanation/Source
				Mimbres		
		Animas	Lordsburg	Grant County	Luna County	
1	Estimated groundwater diversions in 2010 (ac-ft/yr)	15,291	16,477	10,928	40,164	Longworth et al., 2013
2	Modeled pumping in future decades (ac-ft/yr)	28,890		37,850		Keyes, 2015c
3	Ratio of administrative supply to modeled pumping	1.10		1.35		Total of Row 1 basins within modeled area divided by Row 2
4	Median water column (feet)	165	260	83.5	200	Difference between water level at the top of the well and total depth of the well, based on wells in WATERS database with post-1997 water level: • 33 in Animas UWB • 19 in Lordsburg UWB • 120 in Mimbres UWB within Grant County • 44 in Mimbres UWB within Luna County
5	Available water column (feet)	116	182	58.5	140	NMISC Handbook (2013) guideline (70% of median water column)
6	Predicted drawdown from model into 2060 (feet)	55.0	20.0	30.0		Greatest decline in the modeled area (Keyes, 2015b)
7	Adjusted model-predicted drawdown in 2060 (feet)	60.5	22.0	40.5		Row 3 times Row 6
8	Percentage of wells impacted (percentage reduction in supply)	26%	6%	35%	14%	Row 7 divided by Row 5 times 50%
9	Revised groundwater supply by 2060 due to continued pumping (ac-ft/yr)	11,288	15,481	7,142	34,355	Row 1 reduced by Row 8

ac-ft/yr = Acre-feet per year UWB = Underground Water Basin

The regional approach used in the plan involved the selection of a model-predicted drawdown in a heavily stressed section within the area covered by the NMOSE model of the Mimbres Basin (Cuddy and Keyes, 2011). Decline in the Deming area was selected as it was the maximum decline predicted by the model. Heavily stressed areas represent the locations most likely to be impacted in the future. While there is uncertainty using this method, it does recognize that there will be reductions in supply and that continued pumping at 2010 levels will not be likely without relocating wells to new sources of supply away from heavily stressed areas, subject to the NMOSE permitting process. Identifying new well locations is beyond the scope of the regional water planning effort.

Using this method, the administrative supply for the four basins in a normal (i.e., no drought) year during decade 2060 was calculated as:

- Animas: 26 percent less than the 2010 supply, reduced from 15,300 acre-feet per year (ac-ft/yr) to 11,300 ac-ft/yr
- Lordsburg: 6 percent less than the 2010 supply, reduced from 16,500 ac-ft/yr to 15,500 ac-ft/yr.
- Mimbres in Grant County: 35 percent less than the 2010 supply, reduced from 10,900 ac-ft/yr to 7,100 ac-ft/yr
- Mimbres in Luna County: 14 percent less than the 2010 supply, reduced from 40,200 ac-ft/yr to 34,400 ac-ft/yr

5.5.1.2 Observed Rate of Decline

Another method to predict the future decline of the saturated thickness and thus available supply is to use existing wells with water level hydrographs and compare the predicted decline with the available water column in existing wells:

- Using the average rate of water level decline calculated from USGS monitor wells within the non-stream-connected groundwater and assuming that this rate will continue, the water level decline to 2060 in each of the non-stream-connected basins was predicted as shown in Table 5-14b.
- The percentage of impacted wells was estimated by comparing the predicted drawdown to the available water column in existing wells, and the percentage of impacted wells was assumed to represent the reduction in supply by 2060. For three of the closed basins—Cloverdale, Hatchita, and Yaqui—available information was insufficient to predict the water level decline.

Table 5-14b. Projected Groundwater Supply in Southwest New Mexico Water Planning Region in 2060, Based on Observed Rate of Decline

Row	Calculation Step	Underground Water Basin						Explanation/Source
				Mimbres				
		Animas	Lordsburg	Grant County	Luna County	Nutt-Hockett	Playas Valley	
1	Estimated ground-water diversions in 2010 (ac-ft/yr)	15,291	16,477	10,928	40,164	16,084	20,595	Longworth et al., 2013
2	Median water column (feet)	165	260	83.5	200	116	16.0	Difference between water level at the top of the well and total depth of the well, based on wells in WATERS database with post-1997 water level: • 33 in Animas UWB • 19 in Lordsburg UWB • 120 in Mimbres UWB within Grant County • 44 in Mimbres UWB within Luna County • 27 in Nutt Hockett UWB within Luna County • 24 in Playas Valley UWB
3	Available water column	116	182	58.5	140	81.2	11.2	NMISC Handbook (2013) guideline (70% of median water column)
4	Rate of water level decline (ft/yr)	0.58	0.44	0.15	1.18	2.49	0.54	Using the water level data for USGS monitor wells within the non-stream-connected groundwater basin with decreasing water levels (Figure 5-11), the change in water level from the 1980s to the most recent measurement date was calculated and divided by the elapsed time. The results were averaged to determine a single rate.

ac-ft/yr = Acre-feet per year
UWB = Underground Water Basin

Table 5-14b. Projected Groundwater Supply in Southwest New Mexico Water Planning Region in 2060, Based on Observed Rate of Decline

Row	Calculation Step	Underground Water Basin						Explanation/Source
				Mimbres				
		Animas	Lordsburg	Grant County	Luna County	Nutt-Hockett	Playas Valley	
5	Estimated decline in 50 years (feet)	29.0	22.0	7.50	59.0	125	27.0	The average rate of water level decline was multiplied by 50 years to predict the average drawdown by 2060.
6	Percentage of wells impacted	13%	6%	6%	21%	77%	121%	Row 5 divided by Row 3 and multiplied by 50%
7	Groundwater supply from mined sub-basins by 2060 due to continued pumping (ac-ft/yr)	13,371	15,481	10,227	31,701	3,754	0	Row 1 reduced by Row 6

ac-ft/yr = Acre-feet per year
UWB = Underground Water Basin

The predicted water level declines in the basin-fill aquifers of the Animas, Lordsburg, Mimbres, Nutt-Hockett, and Playas UWBs are about 7 to 125 feet by 2060, assuming an average water level decline of between 0.15 and 2.5 feet per year:

- A predicted decline of 29 feet in the Animas Basin would impact about 13 percent of the wells, about half of the impact predicted by the groundwater model.
- In the Lordsburg Basin, the predicted drawdown is 22 feet, equal to the model-predicted value.
- In the Mimbres Basin within Grant County, projecting the observed rate of decline results in only 7.5 feet of drawdown after 50 years, whereas the model estimate is 40 feet.
- The predicted decline in the Mimbres Basin within Luna County based on the observed rate of decline is 59 feet by 2060, almost 50 percent more than the model-predicted decline of 40 feet.
- The predicted decline in the Nutt-Hockett, within Luna County is 125 feet, impacting 77 percent of the wells.
- In the Playas Valley basin, the impact from the 27 feet of drawdown is more than 100 percent because the median water column is only 16 feet.

Assuming that the percentage of impacted wells results in an equal impact on water supply, then the estimated supply in 2060 is reduced proportionally in each of the UWBs as shown in Table 5-14b.

The decline predicted based on observed rates of decline can be compared to the model-predicted decline for the Animas, Lordsburg, and Mimbres basins in Grant and Luna counties (for which models are available) (Table 5-14a). The 2010 diversions from these four modeled areas total 82,860 acre-feet. The decline predicted by the models resulted in a 2060 groundwater supply of 68,267 acre-feet and the decline based on observed rates resulted in a 2060 groundwater supply of 70,780 acre-feet. Thus the two methods yielded similar results. When combined with the 2010 administrative surface water supply of 87,693 acre-feet, the predicted 2060 administrative supply is 175,016 acre-feet.

5.5.1.3 Other Considerations

Both of these approaches are simplifications used to obtain order of magnitude expected changes in supply within budget and time constraints. They represent an approximation of the impact on existing wells by 2060. Factors that may affect the accuracy of these predictions include:

- The water columns may not represent the available supply because some existing wells could possibly be drilled deeper.

- The shallowest wells that are most impacted may not proportionally represent the distribution of pumping (the deeper wells most likely pump more than the shallow wells).
- New wells could be drilled in other parts of the aquifer, although doing so would require a water right permit.

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, the PDSI is an indicator of whether drought conditions exist and if so, what the relative severity of those conditions is. For the two main climate divisions present in the Southwest New Mexico region, the PDSI classifications for 2010 were near normal (Climate Division 4) and incipient wet spell (Division 8). Given that the water use data for 2010 represent a near normal to slightly wetter than normal 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 Southwest New Mexico region, the gage with the minimum ratio of annual yield to 2010 yield is the Gila River below Blue Creek near Virden, with a ratio of 0.10 for minimum annual yield (23,746 acre-feet in 1956) to 2010 yield (239,705.5 acre-feet). Based on the

region's administrative surface water supply of 87,693 acre-feet (Section 5.5.1), the drought-adjusted surface water supply is 8,769 acre-feet.

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. Also, due to the large area of the Southwest New Mexico region, surface water irrigators are often far removed from developed groundwater sources, so drought may result in a much larger reduction from normal year supplies in those areas. Nonetheless, the adjusted drought supply provides a rough estimate of what may be available during a severe to extreme drought year.

In non-stream-connected basins, the change in recharge during a drought is also important, possibly even more so. To estimate the vulnerability of the closed basins within a planning region to a prolonged drought, groundwater models were used, where available, to predict the potential impact by 2060 of a 20-year drought.

The method adopted by the State for estimating drought supplies for non-stream connected aquifers is as follows:

- The drought adjustment is applied only to the portion of the administrative water supply that derives water from the mined aquifer.
- In basins for which NMOSE has an administrative model, the simulation period is from 2010 to 2060 as described above, with no recharge from 2020 to 2040.
- For a conservative approximation, the drawdown predicted during the drought period is derived from a model cell in a heavily stressed area at the end of the simulation period (2060) to represent the water column that will be lost due to drought and pumping (Table 5-15). For those basins where no model is available or model results were not available, a drought adjustment of 12 percent was used, based on the average of the modeled drawdown from all the NMOSE administrative models for other regions of the state.
- This adjusted predicted drawdown is then compared to the median available water column in 2010 (as described in Section 5.5.1.1) to determine the percentage of wells that are impacted by the 20-year drought and continued pumping.
- The reduction in supply due to drought is estimated by multiplying the percentage by the 2060 administrative supply.

Table 5-15. Projected Drought Groundwater Supply in the Southwest New Mexico Water Planning Region in 2060

Row	Calculation Step	Underground Water Basin						Explanation/Source
				Mimbres				
		Animas	Lordsburg	Grant County	Luna County	Nutt-Hockett	Playas Valley	
1	Estimated ground-water diversions in 2010 (ac-ft/yr)	15,291	16,477	10,928	40,164	16,084	20,595	Longworth et al., 2013
2	Modeled pumping (ac-ft/yr)	28,890		37,850		NA	NA	Keyes, 2015c
3	Ratio of administra-tive supply to modeled pumping	1.10		1.35		NA	NA	Total of Row 1 basins within modeled area divided by Row 2
4	Available water column (feet)	116	182	58.5	140	81.2	11.2	Row 3 of Table 5-14b
5	Predicted additional drawdown from 20 year drought (feet)	10.0	1.0	10.0		NA	NA	Keyes, 2015a
6	Adjusted predicted drawdown in 2060 due to drought (feet)	11.0	1.1	13.5		NA	NA	Row 5 times Row 3
7	Total drawdown due to pumping and drought	71.5	23.1	54.0		NA	NA	Row 7 of Table 5-14a plus Row 6

ac-ft/yr = Acre-feet per year
UWB = Underground Water Basin

Table 5-15. Projected Drought Groundwater Supply in the Southwest New Mexico Water Planning Region in 2060

Row	Calculation Step	Underground Water Basin						Explanation/Source
				Mimbres				
		Animas	Lordsburg	Grant County	Luna County	Nutt-Hockett	Playas Valley	
8	Reduction in supply due to drought and pumping	31%	6%	46%	19%	77% + 12% = 89%	121% + 12% = 133%	Row 7 divided by Row 4 times 50% for Animas, Lordsburg, and Mimbres UWBs. For the non-modeled basins, the highest estimated increased reduction (12%) from modeled drought was added to the predicted water level decline rate (Row 6 of Table 5-14b).
9	Revised ground-water supply by 2060 with 20-year drought (ac-ft/yr)	10,560	15,432	5,881	32,419	1,824	0	Row 1 reduced by the Row 8 total percentage

ac-ft/yr = Acre-feet per year
UWB = Underground Water Basin

The estimated 2060 administrative supply in the six closed basins due to continued pumping and one 20-year drought with no recharge over the 50-year planning period, is about 55 percent of the 2010 groundwater supply, for a total of 66,100 ac-ft/yr in 2060. Combined with the 8,800 ac-ft/yr of surface water supplies that are projected to be available during a drought and 15,300 ac-ft/yr of groundwater provided from outside of the six closed basins, the drought water supply in 2060 is estimated to be 41 percent of the 2010 administrative water supply, or about 90,200 ac-ft/yr.

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 6-1a through 6-1f.

The predominant water use in 2010 in the Southwest New Mexico region was for irrigated agriculture, with 87 percent of total water use from that sector. The second and third largest water use sectors were mining and public water supply, at 5 and 3 percent, respectively of total water use. Surface and groundwater each supplied about half of the water used in the region, though the public water supply sector was supplied almost entirely by groundwater. Groundwater points of diversion are shown in Figure 6-2.

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.

Table 6-1. Total Withdrawals in the Southwest New Mexico Water Planning Region in 2010

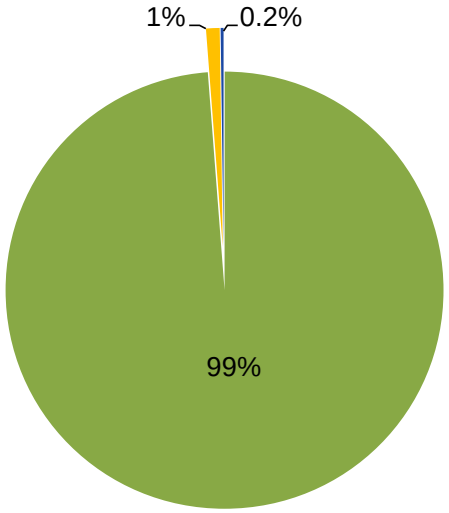
Water Use Category	Withdrawals (acre-feet) [a]														
	Catron County			Grant County			Hidalgo County			Luna County			Planning Region		
	Surface Water	Ground-water	Total	Surface Water	Ground-water	Total	Surface Water	Ground-water	Total	Surface Water	Ground-water	Total	Surface Water	Ground-water	Total
Commercial (self-supplied)	0	235	235	0	163	163	0	204	204	0	314	314	0	916	916
Domestic (self-supplied)	0	161	161	0	185	185	0	131	131	0	868	868	0	1,346	1,346
Industrial (self-supplied)	0	0	0	0	0	0	0	783	783	1	12	13	1	795	796
Irrigated agriculture	21,056	327	21,384	31,709	4,461	36,170	6,754	58,615	65,369	22,300 [b]	49,132 [b]	71,432 [b]	81,820	112,535	194,355
Livestock (self-supplied)	214	241	455	149	175	324	54	227	281	47	523	570	464	1,166	1,630
Mining (self-supplied)	0	15	15	3,662	7,882	11,544	1,689	0	1,689	12	154	166	5,363	8,051	13,414
Power (self-supplied)	0	0	0	0	4	4	0	47	47	0	1,219	1,219	0	1,270	1,270
Public water supply	46	160	206	0	3,919	3,919	0	629	629	0	4,055	4,055	46	8,763	8,809
Reservoir evaporation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	21,316	1,139	22,456	35,520	16,789	52,309	8,497	60,637	69,134	22,360	56,276	78,636	87,693	134,842	222,535

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.

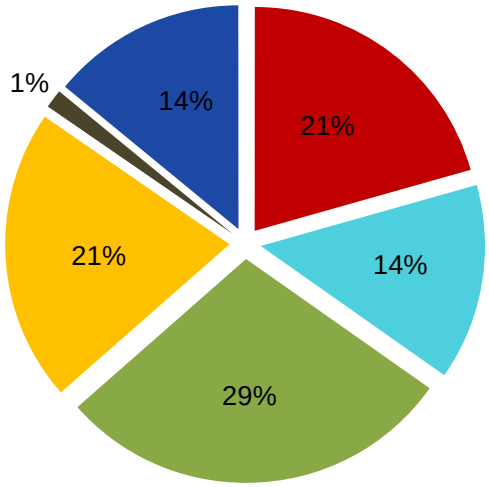
[b] Data amended by NMOSE Water Use and Conservation Bureau in November 2015 (NMOSE, 2015).

Surface Water



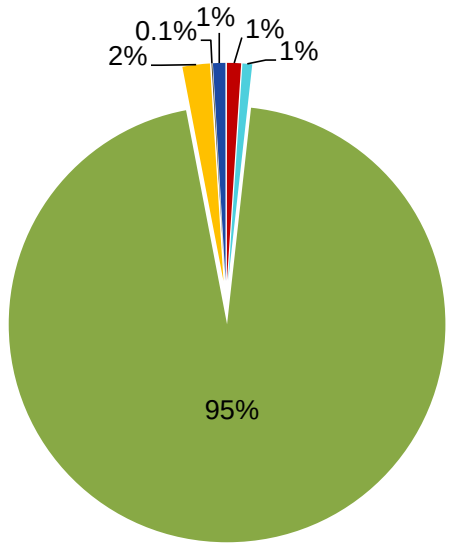
Total usage: 21,316 acre-feet

Groundwater



Total usage: 1,139 acre-feet

Total



Total usage: 22,456 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

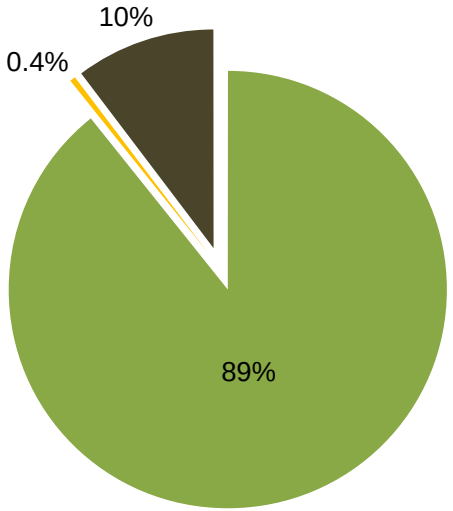
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Catron County Water Demand, 2010

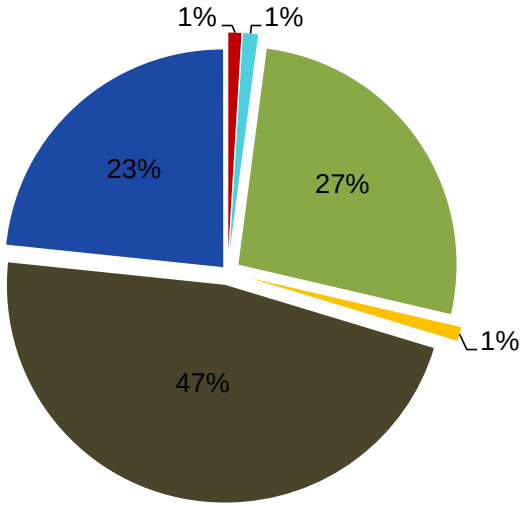
Figure 6-1a

Surface Water



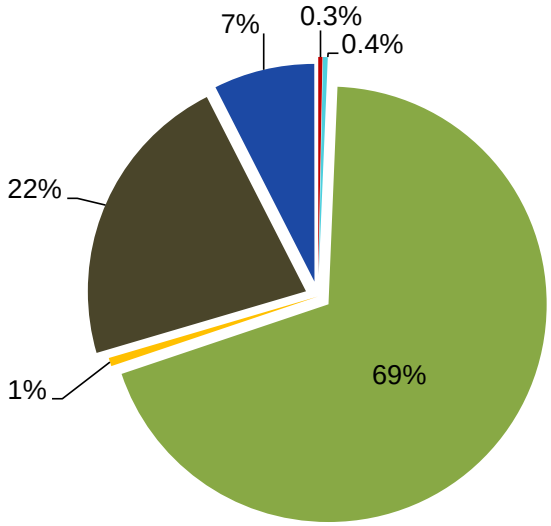
Total usage: 35,520 acre-feet

Groundwater



Total usage: 16,789 acre-feet

Total



Total usage: 52,309 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

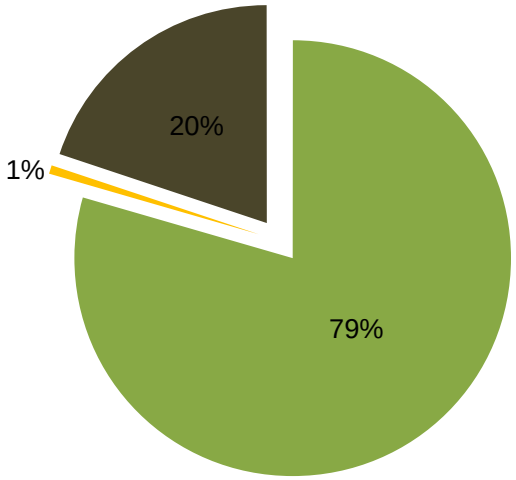
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Grant County Water Demand, 2010

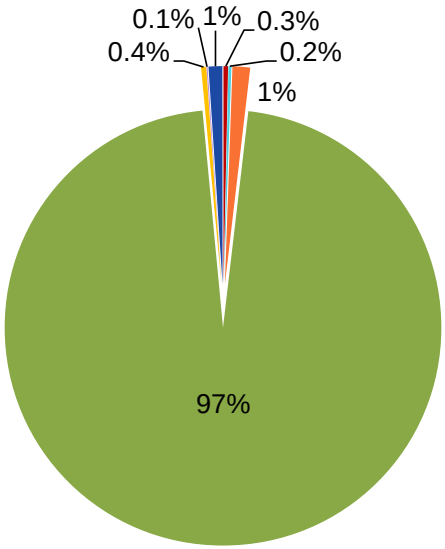
Figure 6-1b

Surface Water



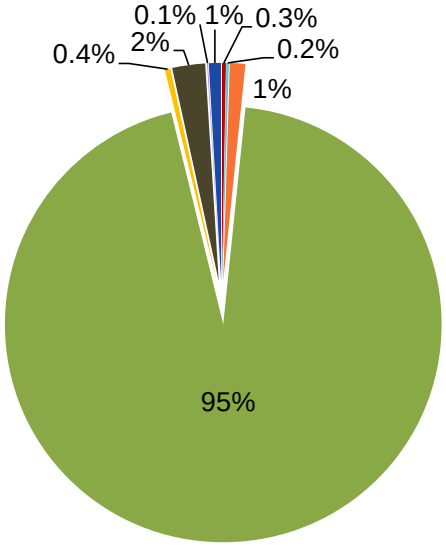
Total usage: 8,497 acre-feet

Groundwater



Total usage: 60,637 acre-feet

Total



Total usage: 69,134 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

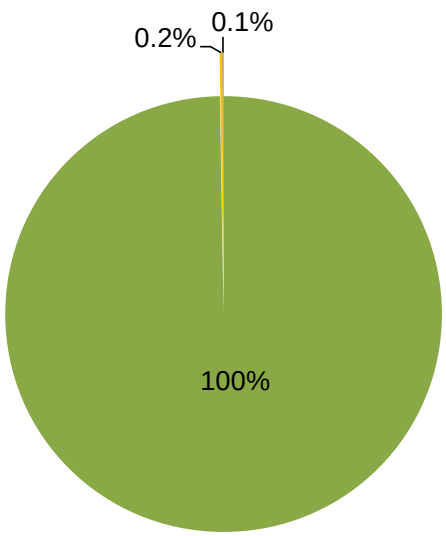
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Hidalgo County Water Demand, 2010

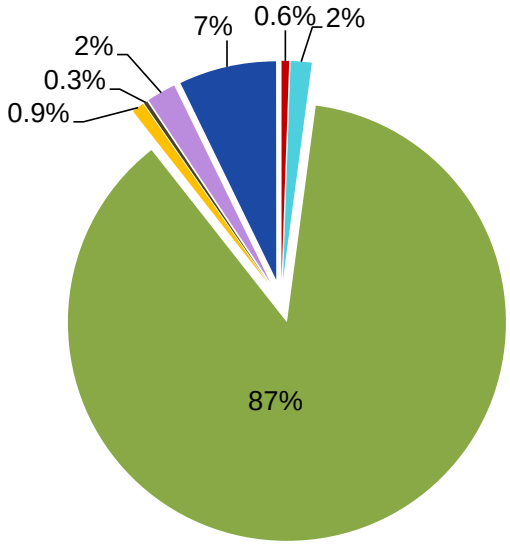
Figure 6-1c

Surface Water



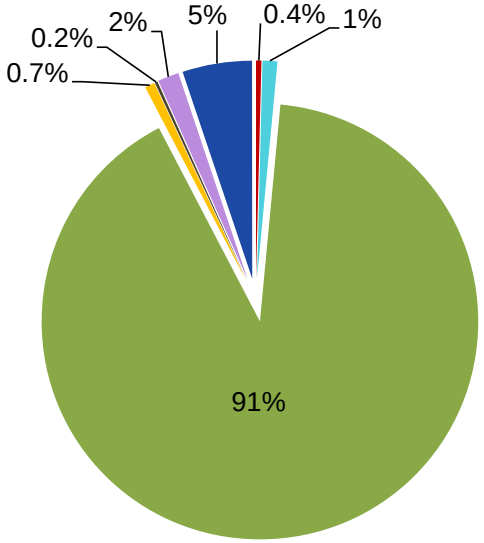
Total usage: 22,360 acre-feet

Groundwater



Total usage: 56,276 acre-feet

Total



Total usage: 78,636 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; NMOSE, 2015

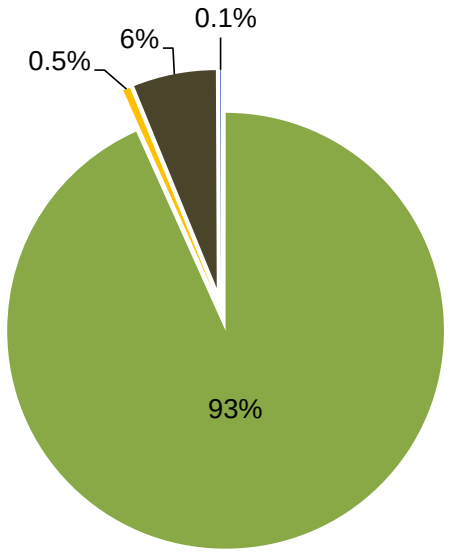
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Luna County Water Demand, 2010

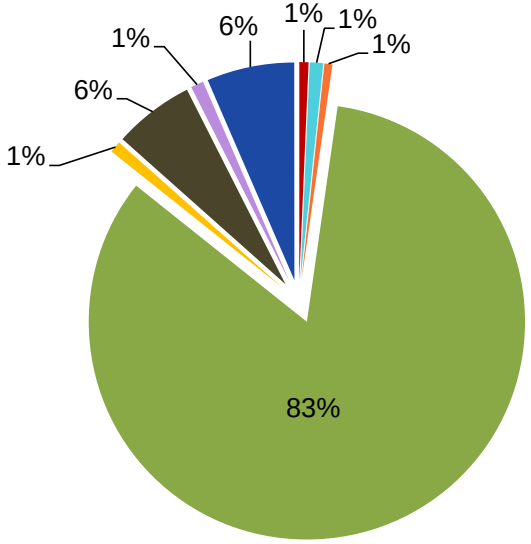
Figure 6-1d

Surface Water



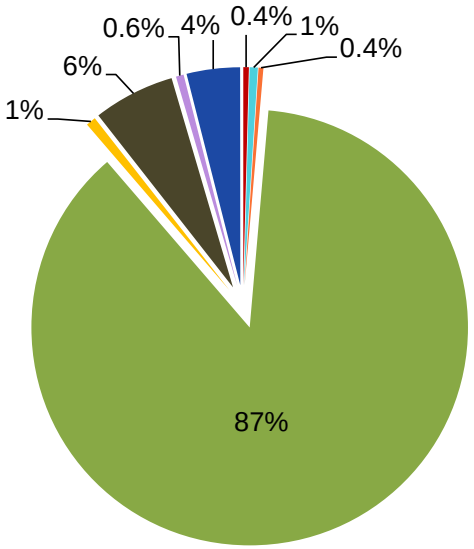
Total usage: 87,693 acre-feet

Groundwater



Total usage: 134,842 acre-feet

Total



Total usage: 222,535 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

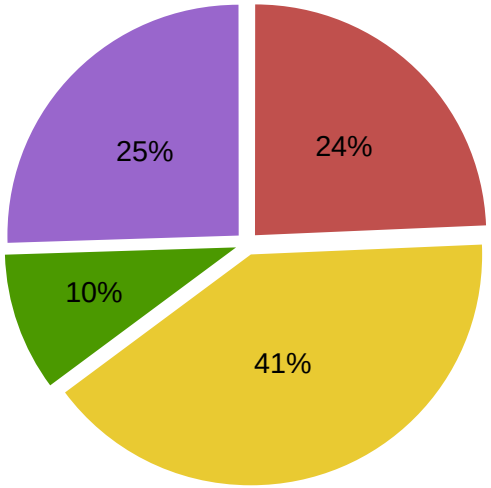
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Total Regional Water Demand by Sector, 2010

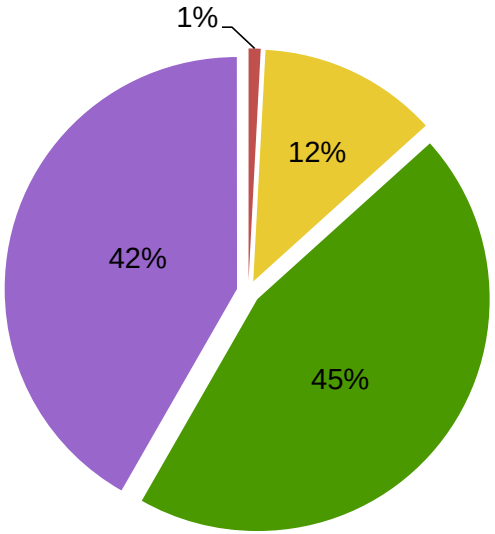
Figure 6-1e

Surface Water



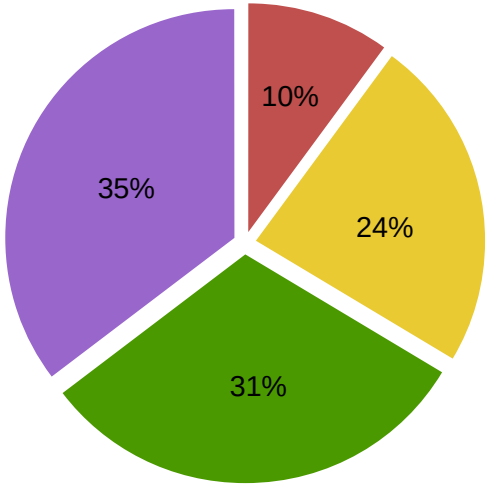
Total usage: 87,693 acre-feet

Groundwater



Total usage: 134,842 acre-feet

Total



Total usage: 222,535 acre-feet

Explanation

- Catron
- Grant
- Hidalgo
- Luna

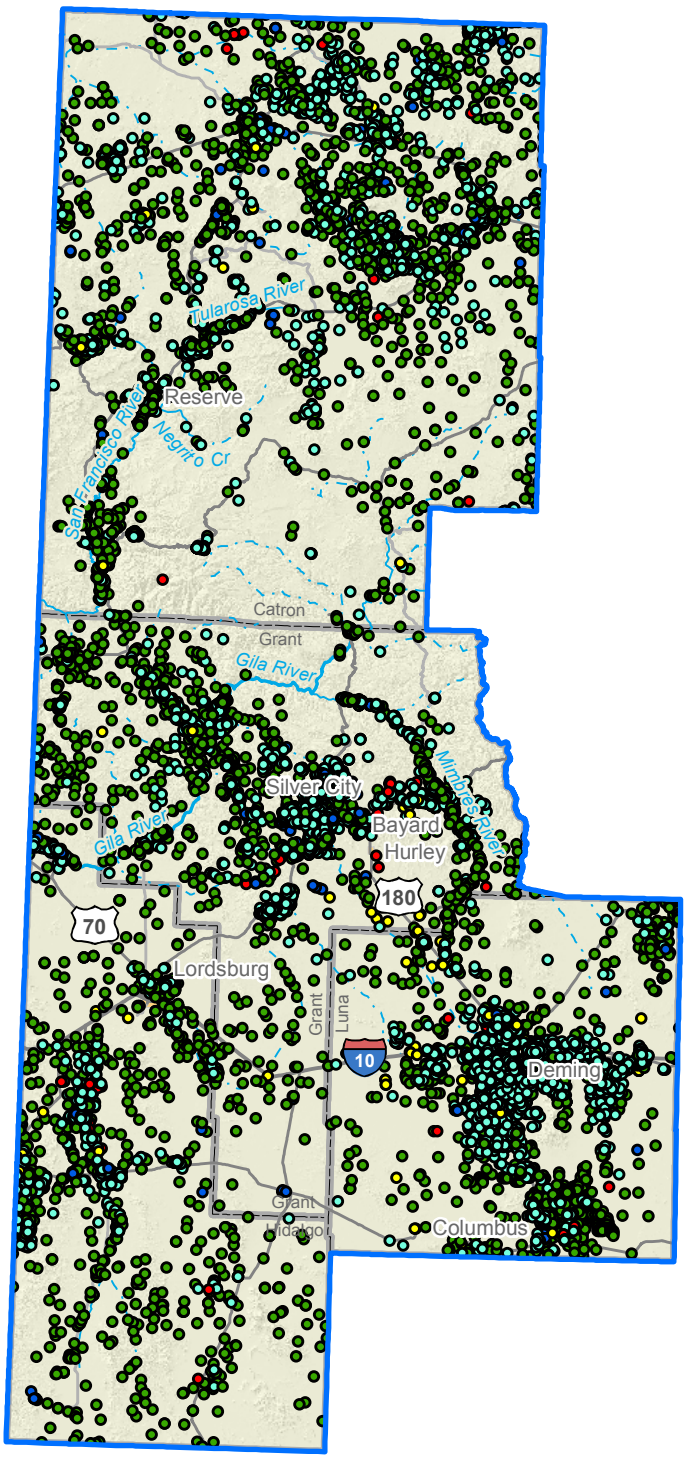
Source: Longworth et al., 2013; NMOSE, 2015

Notes:
1. Due to rounding, the percentages may not add to 100%.
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.

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Total Regional Water Demand by County, 2010

Figure 6-1f



N

0 15 30 Miles

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

Source: NMOSE, 2014d

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

Groundwater Points of Diversion

Figure 6-2

S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\SOUTHWEST_NEW_MEXICO\FIG6-2_POINTS_OF_DIVERSION.MXD 12/21/2016

- *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, 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 the counties in the Southwest New Mexico region are (U.S. Census Bureau, 2014a):

- Catron: 3,607
- Hidalgo: 4,809
- Grant: 29,364
- Luna: 24,967

As shown in Table 3-1, Catron and Luna counties experienced small increases in population from 2000 to 2010, while Grant and Hidalgo (the centers of copper mining within the region) experienced declines. All four counties experienced small declines from 2010 to 2013.

The economy of the region has traditionally been driven by mining and tourism. The largest employment categories in the region are education/healthcare, agriculture and mining, retail trade, and tourism-related services (arts, entertainment, recreation, hospitality, and food services).

The largest cities in the region are Deming (in Luna County) and Silver City (in Grant County). Deming benefits from traffic on I-10, while Silver City is the home of Western New Mexico University and provides access to the Gila Cliff Dwellings National Monument and the Gila Wilderness, the first designated wilderness area in the United States.

As shown in Table 3-1d, cattle and calves are the most important agricultural commodities, followed by other crops and hay, and fruit, nuts, and berries.

Specific information regarding the population and economic trends by county is provided in Sections 6.2.1 through 6.2.4. 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; the list of interviewees is provided in Appendix 6-A. This information was used to project population and economic growth, and future water demand, as presented in Sections 6.3 and 6.5.

6.2.1 Catron County

The Village of Reserve is the county seat and the only incorporated community within Catron County, with a population of 289. The entire county had a peak population of 4,881 in 1940. Population dropped to less than half of that amount (2,198) by 1970, before experiencing growth to 3,725 residents in 2010. Since 2010, the county has lost 3.2 percent of its population, with the population in 2013 estimated to be 3,607 (Table 3-1) (U.S. Census Bureau, 2014a).

Wage and salary employment declined in 2011, but has since grown to 1,462 in 2013, slightly more than in 2010. The largest employment categories are retail trade, educational and health services, agriculture, mining, forestry, and construction.

The Arrowhead Center at New Mexico State University (NMSU) analyzed the economy of Catron County and identified the basic industries that support the economy (Arrowhead Center, 2013). Basic industries bring outside dollars into the economy. A basic industry frequently has a location quotient (LQ) greater than 1.0, which means that its relative share of the local economy is greater than that industry's relative share of the state economy. In Catron County, the primary basic industries in 2011 were agriculture with 281 jobs and an LQ of 5.62, forestry and fishing with 95 jobs and an LQ of 9.32, mining with 160 jobs and an LQ of 2.71, and federal civilian employment with 100 jobs and an LQ of 1.61.

Some economic development is occurring within the county, driven by sawmills, recreation, and subdivision development in the north. An internet broadband implementation plan will support development within Catron and the other counties within the region.

According to the Census of Agriculture, by far the most valuable agricultural commodities in Catron County are cattle and calves (USDA NASS, 2014). The number of farms and ranches increased by 36 percent, from 259 in 2007 to 351 in 2012, while the amount of land in farms and ranches decreased by 27 percent, from 1,482,579 acres to 1,077,534 acres. This led to a large decrease in average farm size, from 5,724 acres to 3,070 acres in 2012. Between 2007 and 2012 irrigated acreage increased from 3,063 acres to 5,432 acres, a gain of 77 percent. In 2012, farmers participating in governmental agricultural support programs received an average of

$12,764, up 8 percent from 2007, with a total of $613,000 in government payments going to farmers in Catron County. The average farm had a net cash operating loss of $3,922. The average age of a farmer in 2012 was 62.6.

The county includes a number of large ranches, with irrigation mostly for pasture grass, hay, and alfalfa. Because of recent drought, orchards are now largely gone, and ranchers have been culling their herds substantially. Some water rights are being sold, mostly to developers planning small subdivisions. The average rancher is over 60, and many younger people are not going into ranching, instead leaving the area to find employment.

6.2.2 Grant County

The population of Grant County has generally increased over time, but has fluctuated due to booms and busts in the copper mining industry. During the first half of the last century population increased, from 12,883 in 1900 to 21,649 in 1950. The population then declined to 18,700 in 1960, before showing steady growth from 1960 to 2000, during which time it increased by 65.8 percent to 31,002. Since 2000, population has declined to 29,364 in 2013, a loss of 5.3 percent (U.S. Census Bureau, 2014a).

Wage and salary employment has generally increased since 2010 and stood at 10,996 in 2013. During this time, the unemployment rate dropped from 10.2 percent in 2010 to 7.3 percent in 2013.

Silver City, with a population of just over 10,000, is the largest community within Grant County. The economy of Grant County has traditionally been driven by mining and tourism, as well as the presence of Western New Mexico University, which has an enrollment of more than 3,000 students at the Silver City campus. The largest employment categories are education/healthcare, agriculture, forestry, and mining, retail trade, and tourism-related services (arts, entertainment, recreation, hospitality, food services).

While subject to fluctuation, when copper prices increase they can positively impact jobs in the mining industry. World copper prices peaked in 2011 at approximately $4.50 per pound, but have since declined to $2.07 in May 2016 (TradingEconomics.com, May 13, 2016). Capital improvements are planned at Western New Mexico University in Silver City. An assisted living facility and other new housing are planned for Silver City. Ft. Bayard offers future development opportunities at the former hospital campus; however, there are no current plans for reuse of the state-owned facilities, aside from demolishing the hospital.

Silver City has begun to diversify its economy so that it will be less dependent on the mining industry. Both the Gila Regional Medical Center and the university help support the economy. Baby boomers have been retiring there, which has helped support Main Street development in the downtown, where a movie theater is opening. Growth has also been occurring in the area

surrounding Silver City, and the tourism industry has been growing as well. The reopening of Faywood Hot Springs near Hurley provides another asset for the tourism industry.

County planners see potential development occurring outside of Silver City, where five subdivisions with large lots have been platted. The in-migration of retirees and the creation of home businesses are expected to support such growth. Two industrial parks near the airport also offer development potential. Santa Clara has another industrial park, while Bayard and Hurley are also pursuing economic development. The construction of the SunZia transmission line could create 110 construction jobs within the county (Charney et al., 2012).

Angelou Economics produced an Economic Development Master Plan for Grant County in 2012. The plan targets the following industries:

- Natural resources and mining
- Renewable energy
- Regional goods and services
- Tourism and recreation
- Small business/entrepreneurship

The plan presents goals, strategies, and actions to support economic growth.

The Arrowhead Center at NMSU analyzed the economy of Grant County and identified the basic industries that support the economy (Arrowhead Center, 2013). In Grant County, the primary basic industries in 2011 were mining (LQ of 3.41), agriculture (LQ of 1.04), forestry and fishing (LQ of 1.38), retail trade (LQ of 1.10), and state government (LQ of 1.95). (State government employment receives a boost from Western New Mexico University.) Agriculture now accounts for less than 3 percent of all employment within the county.

According to the Census of Agriculture, the most valuable agricultural commodities in Grant County are cattle and calves and other crops and hay (USDA NASS, 2014). From 2007 to 2012 the number of farms and ranches increased by 24 percent, from 327 to 407, while the amount of land in farms and ranches declined by 12 percent, from 1,213,349 acres to 1,064,487 acres. As a result, the average farm size decreased from 3,711 acres to 2,615 acres, a decline of 30 percent. During that same five-year period, the amount of irrigated acreage increased from 3,405 acres to 3,978 acres, a gain of about 17 percent. In 2012, farmers participating in governmental agricultural support programs received an average of $21,795, up 242 percent from $6,370 in 2007, with a total of $1,329,000 in government payments going to farmers in Grant County. The average farm had a net cash income of $1,974. The average age of a farmer in 2012 was 60.0.

Drought has had a significant impact on cattle herds in Grant County, with some ranchers selling off their herds. Other ranchers are transporting in water and feed to maintain operations. While

ranchers tend to be in their 50s and 60s, some younger people are interested in maintaining the family ranch, and others are pursuing professional careers in agriculture.

6.2.3 Hidalgo County

Hidalgo is a rural county in the southwestern corner of New Mexico. The largest incorporated community is Lordsburg, with a population of about 2,800, comprising over half of the residents within the county. Between 1920 and 1970, county population fluctuated between 3,400 and 5,100 people. Population increased to about 6,000 during the period of 1980 to 2000, before declining to 4,894 in 2010. Since 2010, the population has declined by 1.7 percent, with the population in 2013 estimated at 4,809 (U.S. Census Bureau, 2014a). Wage and salary employment has held steady since 2010. The largest employment sectors are education and health services, agriculture and mining, and tourism-related services. Agriculture accounts for 8 percent of total employment.

The Arrowhead Center at NMSU analyzed the economy of Hidalgo County and identified the basic industries that support the economy (Arrowhead Center, 2013). In Hidalgo County, the primary basic industries in 2011 were farm employment (LQ of 3.38), transportation and warehousing (LQ of 1.88), and federal civilian employment (LQ of 3.72). The high numbers for transportation are due to Lordsburg's location on I-10, while the high federal employment numbers are attributable to the federal training facility at Playas.

Economic activity in the county includes:

- An affordable housing plan was recently developed for the City of Lordsburg.
- A new Mennonite community has been created in the Animas area on 4,000 acres; pecans and other crops will be grown there.
- There is also chile processing within the county, and a vineyard may be developed.
- The Playas Training & Research Center is an important employer in the county; however, no increase in staffing is planned over the next five to ten years.
- A border trade zone has been created for an area 15 to 55 miles from the Mexican border, which will facilitate retail activity by Mexican shoppers.
- The construction of the SunZia transmission line could create 345 construction jobs within the county (Charney et al., 2012).
- The four-megawatt Lightning Dock geothermal plant opened in December 2013 and is providing power to PNM (Silver City Daily Press, 2014).

According to the Census of Agriculture, the most valuable agricultural commodities in Hidalgo County are cattle and calves (although sales data are suppressed to avoid disclosure) and other crops and hay (USDA NASS, 2014). The number of farms and ranches increased by 6 percent, from 162 in 2007 to 171 in 2012, while the amount of land in farms and ranches declined by 10 percent, from 1,028,547 acres to 930,271 acres. As a result, the average farm size decreased from 6,349 acres to 5,440 acres, a decline of 14 percent. During that same five-year period, the amount of irrigated acreage declined from 11,917 acres to 9,640 acres, a decrease of 19 percent. In 2012, farmers participating in governmental agricultural support programs received an average of $15,550, up 144 percent from $10,702 in 2007, with a total of $1,228,000 in government payments going to farmers in Hidalgo County. The average farm had a net cash income of $10,407. The average age of a farmer in 2012 was 52.2.

Many of the old wells in the county have gone dry, so new deeper wells are being drilled, which is expensive. Ranchers have sold off most of their herds, as they have to bring in water in tankers. Some pecan farmers have been selling off their land to investors. Young people are not attracted to farming, although it is expected that ranching will be maintained. The new Mennonite community mentioned above will support the agricultural sector.

6.2.4 Luna County

Luna County is located along I-10. The largest incorporated community is Deming, with a population of nearly 15,000, comprising over half of the residents within the county. Luna County population has grown steadily, from 6,247 in 1930 to 9,839 in 1960, 15,585 in 1980, and 25,016 in 2000. Since 2000, there has been little change, with the population in 2013 estimated at 24,967 (U.S. Census Bureau, 2014a).

Wage and salary employment has increased by 3 percent since 2010. The largest employment sectors are education and health services, retail trade, tourism-related services, and agriculture and mining. Agriculture accounts for 4 percent of total employment.

The Arrowhead Center at NMSU analyzed the economy of Luna County and identified the basic industries in 2011 that support the economy (Arrowhead Center, 2013) as farm employment (LQ of 1.49), manufacturing (LQ of 3.02), retail trade (LQ of 1.39), accommodation and food services (LQ of 1.04), and federal civilian employment (LQ of 1.86).

The Peru Mill Industrial Park is being developed on 1,512 acres that were recently annexed by the City of Deming; the park has access to rail and to I-10. It is expected that 30 jobs will be created initially by one of the industrial park's tenants, with another 50 to 75 to follow.

Compass Components Manufacturing Service makes electrical components in Deming and hopes to add 30 to 50 jobs to its existing workforce of 103 under a new contract. There is also interest

in reusing an old food processing plant, which could add 50 jobs. Deming Luna Economic Development recently hired a new executive director, which could help spur further growth.

There is considerable potential for alternative energy within the county (DLED, 2015), as exemplified by a new solar plant in Deming that provides power to El Paso Electric. PNM derives 8 megawatts of power from a solar project south of Deming and could add another 10 megawatts. The Macho Springs Energy Facility in Northeast Luna County includes 50 megawatts of wind power and another 55 megawatts of solar power (Southern Power and Turner Enterprises, Inc., 2015). Sapphire Energy has liquefied petroleum gas plants in Columbus that could expand in the future.

Sapphire Energy also completed the first phase of a 100-acre algae farm located near Columbus. When fully operational, the commercial site will beneficially use carbon dioxide to produce omega oils and protein from algae.

The construction of the SunZia transmission line could create 530 construction jobs within the county (Charney et al., 2012). As in Hidalgo County, a border trade zone has been created for an area 15 to 55 miles from the Mexican border, which will facilitate retail activity.

The Fort Sill Apaches recently achieved reservation status and have 30 acres of land at Akela Flats on I-10 between Deming and Las Cruces. The site is currently used for a restaurant. There are plans for a 30,000-square-foot casino with 250 full-time employees if a gaming compact can be reached.

According to the Census of Agriculture and the NMSU Dairy Extension, the most valuable agricultural commodities in Luna County are vegetables (including chile), melons, and potatoes, milk from cows, cattle and calves (although sales data for cattle and milk are suppressed to avoid disclosure), and other crops and hay (USDA NASS, 2014; Hagevoort, 2013). There are some large ranches, as well as small ranchettes with homes on them. There are both large and small pecan orchards. The number of farms and ranches decreased by 6 percent, from 206 in 2007 to 190 in 2012, while the amount of land in farms and ranches declined by 16 percent, from 653,558 acres to 550,174 acres. As a result, the average farm size decreased from 3,173 acres to 2,896 acres, a decline of 9 percent. During that same five-year period, the amount of irrigated acreage declined from 23,221 acres to 20,558 acres, a decrease of 11.5 percent. In 2012, farmers participating in governmental agricultural support programs received an average of $14,718, down 29 percent from $20,793 in 2007, with a total of $1,472,000 in government payments going to farmers in Luna County. The average farm had a net cash income of $49,327. The average age of a farmer in 2012 was 58.5.

There are three dairies within the county that produce about 2.5 percent of the milk produced within the state (Hagevoort, 2013). More dairies could be developed in the future. Preferred Produce, which grows organic vegetables and pecans south of Deming, could add 20 to 30 jobs

per year over each of the next five years and could also add another 100 to 200 employees if plans for tilapia and shrimp farming become a reality. Border Foods provides 200 to 300 year-round jobs in Deming, with up to 1,000 workers at the peak of the chili season.

6.3 Projected Population Growth

The 2005 Southwest New Mexico RWP (DBS&A, 2005) provided high and low population projections through 2040 for each the four counties within the region. As shown in Table 6-2, building on data from the Bureau of Business and Economic Research (BBER) at the University of New Mexico, the plan projected a 2010 population range of 67,423 to 72,466 for the four counties; however, the actual population of the region was lower than either projection, at 63,228. The projections for Catron and Grant counties were quite accurate, while those for Hidalgo and Luna were too high. The lower rates of growth are attributable to the impact of the recession and temporary reductions in copper mining.

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	
Catron	3,999	3,567	3,725
Grant	29,563	29,563	29,514
Hidalgo	6,723	5,800	4,894
Luna	32,181	28,493	25,095
Total Region	72,466	67,423	63,228

[a] DBS&A, 2005

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

Since publication of the accepted plan, AMEC Earth & Environmental, Inc. prepared projections for each of the four counties for the Interstate Stream Commission (AMEC, 2010). These forecasts were released in October 2010 and did not have the benefit of using actual population data from the 2010 U.S. Census. AMEC examined previous forecasts for the region, including those made by BBER in 2008 and the forecasts in the 2005 water plan by DBS&A, and projected a 2010 population for the region of 65,988. This figure was somewhat higher than the regional population of 63,228 reported in the 2010 Census. AMEC's projections were too high for Luna County and too low for Catron County, but reasonably close for Hidalgo and Grant counties. Under AMEC's projections, county populations would be as follows in 2050:

- Catron: 3,796
- Grant: 41,406

- Hidalgo: 7,174
- Luna: 40,820

Population projections were also made for in the Luna County Comprehensive Plan Update (Sites Southwest, 2012). The plan projects an average growth rate of 1.2 percent through 2030, which would result in a population of 31,140 in 2030. The *Deming Municipal Water Supply Optimization Review* (Smith Engineering, 2014) included two population projections for Deming in 2040: 20,926 and 30,667. City officials believe that the annual growth rate could reach 3 percent.

The New Mexico Department of Workforce Solutions projected employment growth through 2020 for the Southwestern Workforce Investment Area, which includes the four counties within the Southwest New Mexico Water Planning Region, as well as Doña Ana, Sierra, and Socorro counties. The region is expected to add 15,830 jobs from 2010 to 2020, an increase of 14.9 percent. Healthcare and educational services are expected to account for over half of the growth. Other sectors expected to grow include accommodations and food services and retail trade. Declines are projected for agriculture and federal employment (New Mexico Department of Workforce Solutions, 2014).

For this water plan two population projections through 2060 (Table 6-3) were developed: one based on a moderately optimistic view of the economy for this region over the long-term and one that portrays a less optimistic picture. The current (2012) BBER statewide population projections through 2040 (Appendix 6-B) were used for the low population projections, extrapolated through 2060. The high forecasts for Grant and Hidalgo are the same as the AMEC forecasts through 2050, extrapolated through 2060. The growth rates for the AMEC Grant County high forecast were also used for the Catron County high projection. The Luna County high forecast reflects the projections in the 2012 county comprehensive plan update: 1.0 percent annual growth through 2020 and 1.5 percent annual growth after 2020.

The resulting 2060 population projections for the four counties are:

- Catron: 4,012 to 5,948
- Grant: 28,635 to 44,930
- Hidalgo: 3,911 to 7,792
- Luna: 40,108 to 50,289

Table 6–3. Southwest New Mexico 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
Catron	High	1.22	0.96	0.86	0.84	0.82
	Low	0.49	0.23	0.03	0.00	0.00
Grant	High	1.22	0.96	0.86	0.84	0.82
	Low	–0.02	–0.05	–0.07	–0.08	–0.09
Hidalgo	High	1.21	0.96	0.81	0.83	0.83
	Low	–0.16	–0.31	–0.59	–0.59	–0.59
Luna	High	1.00	1.50	1.50	1.50	1.50
	Low	1.11	1.16	1.24	1.24	1.24

b. Projected Population

County	Projection	Population					
		2010	2020	2030	2040	2050	2060
Catron	High	3,725	4,205	4,628	5,041	5,482	5,948
	Low	3,725	3,909	4,000	4,012	4,012	4,012
Grant	High	29,514	31,772	34,958	38,083	41,406	44,930
	Low	29,514	29,457	29,310	29,102	28,869	28,635
Hidalgo	High	4,894	5,538	6,093	6,601	7,174	7,792
	Low	4,894	4,818	4,671	4,403	4,150	3,911
Luna	High	25,095	27,717	32,168	37,335	43,331	50,289
	Low	25,095	28,024	31,465	35,595	37,784	40,108

Source: Poster Enterprises, 2014

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 Southwest New Mexico 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
Catron County					
Gallup	Coyote Creek Mutual Domestic WUA	213	0	0	0
	Pie Town MDWCA	100	110	0	12
	Quemado Municipal Water & SWA	300	53	0	18
Gila-San Francisco	Aragon Mutual Domestic	45	73	0	4
	Rancho Grande Water Assn. (Lower Colorado)	172	291	46	10
	Reserve Water Works	340	212	0	81
Rio Grande (Middle)	Homestead Landowners Association	100	51	0	6
NA	Mojave Academy	40	36	0	2
	Ponderosa Estates	357	70	0	28
	Catron County public water supply totals	1,667		46	160
	County-wide public water supply per capita use [c]		110		
Gallup Gila-San Francisco	Rural self-supplied homes (Lower Colorado)	1,826	70	0	143
Rio Grande (Middle)	Rural self-supplied homes (Rio Grande)	232	70	0	18
	Catron County domestic self-supplied totals	2,058		0	161
	County-wide domestic self-supplied per capita use [c]		70		
Grant County					
Gila-San Francisco	Heights Water Users Assoc.	40	48	0	2
	Lake Roberts Water Users/Subdivision	87	28	0	3
	Pinos Altos MDWCA	350	80	0	32

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).

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

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

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

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
Grant County (cont.)					
Gila-San Francisco	Trout Mountain Assoc, Inc	50	38	0	2
Hachita	Hachita Water System [d]	90	89	0	9
Mimbres	Arenas Valley MDWCA	1,756	53	0	104
	Bayard Municipal Water System	2,591	86	0	250
	Casas Adobes Water Company	400	99	0	44
	Hanover MDWCA	292	74	0	24
	Hurley Water Supply System	1,250	90	0	127
	North Hurley MDWCA	365	74	0	30
	Rio De Arenas, LLC	277	80	0	25
	Santa Clara Water System	2,000	230	0	515
	Tyrone MDWCA	100	62	0	7
	Tyrone Water System	795	80	0	71
	Whiskey Creek Mobile Ranch	138	45	0	7
Mimbres Gila-San Francisco	Silver City Water System [e]	16,870	141	0	2,668
	Rosedale MDWCA [e]	—	—	—	—
	Grant County public water supply totals	27,451		0	3,919
	County-wide public water supply per capita use [c]		128		
Gila-San Francisco Lordsburg	Rural self-supplied homes (Lower Colorado)	507	80	0	45
Hachita Mimbres Las Animas Creek	Rural self-supplied homes (Rio Grande)	1,556	80	0	139

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).

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

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

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

[e] Silver City also provides water to Rosedale MDWCA, which has a population of 285.

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
Grant County (cont.)					
	Grant County domestic self-supplied totals	2,063		0	185
	County-wide domestic self-supplied per capita use [c]		80		
Hidalgo County					
Lordsburg	Glen Acres Community Water System	237	173	0	46
	Lordsburg Water Supply System	2,900	168	0	546
Playas	New Mexico Tech, Playas Facility	65	80	0	6
San Simon	Rodeo WUA	77	133	0	12
Virden Valley	Virden Water System	152	114	0	19
	Hidalgo County public water supply totals	3,431		0	629
	County-wide public water supply per capita use [c]		164		
Animas Cloverdale Gila-San Francisco Lordsburg San Simon Virden Valley Yaqui	Rural self-supplied homes (Lower Colorado)	746	80	0	67
Hatchita Playas	Rural self-supplied homes (Rio Grande)	717	80	0	64
	Hidalgo County domestic self-supplied totals	1,463		0	131
	County-wide domestic self-supplied per capita use [c]		80		
Luna County					
Mimbres	Columbus Water System	2,100	97	0	227

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).

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

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

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

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
Luna County (cont.)					
Mimbres (cont.)	Deming Municipal Water System	15,000	226	0	3,794
	Pecan Park MDWCA	80	231	0	21
	Peoples Water Coop	80	100	0	9
NA	Gunter's Mobile Home Rentals	54	19	0	1
	Hidden Valley Water System	30	82	0	3
	Luna County public water supply totals	17,344		0	4,055
	County-wide public water supply per capita use [c]		209		
Hatchita Lordsburg Mimbres Nutt-Hockett	Rural self-supplied homes (Rio Grande)	7,751	100	0	868
	Luna County domestic self-supplied totals	7,751		0	868
	County-wide domestic self-supplied per capita use [c]		100		

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).

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

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

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

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 Southwest New Mexico region, current per capita use in Catron and Grant counties is under 130 gpcd (Table 6-4), so no additional conservation is assumed. Hidalgo County currently has 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. Luna County currently has per capita use between 200 and 300 gpcd (Table 6-4), so their future per capita use is assumed to be reduced to 150 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 the most 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 Southwest New Mexico 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 relatively low in the commercial, livestock and power categories within the region, no additional conservation savings are assumed in the water demand projections. As a more significant user, the mining sector is encouraged to explore conservation opportunities. However, no quantitative estimates of potential conservation savings are available at this time.

Reservoir evaporation. In many parts of New Mexico, reservoir evaporation is one of the highest consumptive water uses, but in the Southwest New Mexico region it is the there are no reservoirs greater than 5,000 acre-feet, so tracked water usage is zero and conservation savings are not relevant.

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 Southwest New Mexico region. The projections of future water demand determined using this consistent method, as applicable, for the Southwest New Mexico 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 methods 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 Southwest New Mexico 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.

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 use 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 use 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. Reservation usage is not tracked in the Southwest New Mexico regions since there are no reservoirs greater than 5,000 acre-feet in storage capacity.

6.5.2 Southwest New Mexico Projected Water Demand

Table 6-5 summarizes the projected water demands for each water use category for each of the four counties, which were developed by applying the methods discussed in Section 6.5.1. As discussed in Section 6.3, population is projected to grow in each of the counties under the high scenario. Under the low scenario, slight growth is expected in Catron County, slight declines are expected in Grant and Hidalgo counties, and moderate growth is anticipated in Luna County. The total projected water demand in the county in 2060 ranges slightly, from 212,631 to 239,531 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.

Demand in the *public water supply* category is projected to increase in all four counties under the high scenario, and in Catron and Luna counties under the low scenario, proportional to the increasing population projections. Population is projected to decline in Grant and Hidalgo counties under the low scenario. However, use 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.

Water use in all four counties occurs primarily in the *agricultural* category, and interviews (Section 6.2) indicated a declining trend. However, the recent drought and recession are 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 near or long-term 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 it is assumed that agriculture will begin to slowly recover.

Water demand in the agriculture category is projected to remain constant at 2010 levels under both scenarios in Catron County, which is more reliant on surface water, and under the high scenarios in the other counties, since some use will be found for all of the surface water that is available. Grant, Luna, and Hidalgo counties all use groundwater for agriculture and well levels have been dropping; thus agricultural water demand under the low scenarios in those counties is projected to decline in the short term, with a partial recovery by 2060. The decline is expected to be greatest in Hidalgo County, which is more dependent on groundwater than the other counties.

Table 6-5. Projected Water Demand, 2020 through 2060 Southwest New Mexico Water Planning Region

Use Sector	Projection	Water Demand (acre-feet) [a]					
		2010 [b]	2020	2030	2040	2050	2060
Catron County							
Public water supply	High	206	226	244	262	281	301
	Low	206	214	217	218	218	218
Domestic (self-supplied)	High	161	182	200	218	237	258
	Low	161	169	173	174	174	174
Irrigated agriculture	Low/High	21,384	21,384	21,384	21,384	21,384	21,384
Livestock (self-supplied)	High	455	273	318	455	455	455
	Low	455	182	228	273	318	364
Commercial (self-supplied)	High	235	265	292	318	346	375
	Low	235	246	252	253	253	253
Industrial (self-supplied)	Low/High	0	0	0	0	0	0
Mining (self-supplied)	Low/High	15	15	15	15	15	15
Power (self-supplied)	Low/High	0	0	0	0	0	0
Reservoir evaporation	Low/High	0	0	0	0	0	0
Grant County							
Public water supply	High	3,919	4,219	4,642	5,057	5,498	5,966
	Low [c]	3,919	3,919	3,919	3,919	3,919	3,919
Domestic (self-supplied)	High	185	199	219	239	259	281
	Low [c]	185	185	185	185	185	185
Irrigated agriculture	High	36,170	36,170	36,170	36,170	36,170	36,170
	Low	36,170	34,868	35,085	35,302	35,519	35,736
Livestock (self-supplied)	High	324	194	227	324	324	324
	Low	324	130	162	194	227	259
Commercial (self-supplied)	High	163	190	208	225	244	263
	Low	163	178	177	176	174	173
Industrial (self-supplied)	Low/High	0	0	0	0	0	0
Mining (self-supplied)	High	11,544	20,700	20,700	20,700	20,700	20,700
	Low	11,544	20,700	20,700	10,350	10,350	10,350

[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 Demand, 2020 through 2060
Southwest New Mexico Water Planning Region

Use Sector	Projection	Water Demand (acre-feet) [a]					
		2010 [b]	2020	2030	2040	2050	2060
Grant County (cont.)							
Power (self-supplied)	Low/High	4	4	4	4	4	4
Reservoir evaporation	Low/High	0	0	0	0	0	0
Hidalgo County							
Public water supply	High	629	708	768	815	862	925
	Low [c]	629	629	629	629	629	629
Domestic (self-supplied)	High	131	148	163	177	192	209
	Low [c]	131	131	131	131	131	131
Irrigated agriculture	High	65,369	65,639	65,639	65,639	65,639	65,639
	Low	65,369	47,916	50,870	53,824	56,778	59,731
Livestock (self-supplied)	High	281	169	197	281	281	281
	Low	281	112	140	169	197	225
Commercial	High	204	1,673	1,696	1,717	1,741	1,767
(self-supplied)	Low	204	1,643	1,637	1,626	1,615	1,605
Industrial (self-supplied)	High	783	834	911	984	1,034	1,089
	Low	783	811	834	859	884	911
Mining (self-supplied)	Low/High	1,689	50	50	50	50	50
Power (self-supplied)	High	47	60	65	70	75	80
	Low	47	50	50	50	50	50
Reservoir evaporation	Low/High	0	0	0	0	0	0
Luna County							
Public water supply	High	4,055	4,449	5,037	5,615	6,171	6,979
	Low	4,055	4,495	4,939	5,393	5,528	5,797
Domestic (self-supplied)	High	868	959	1,113	1,292	1,499	1,740
	Low	868	970	1,089	1,231	1,307	1,388
Irrigated agriculture	High	71,432 [d]	71,432	71,432	71,432	71,432	71,432
	Low	71,432 [d]	58,003	59,277	61,708	64,139	66,570
Livestock (self-supplied)	High	570	399	456	570	570	570
	Low	570	285	342	399	456	513

[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 demand in this sector. Where growth rates are negative, projected demand 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.

[d] Data amended by NMOSE Water Use and Conservation Bureau in November 2015 (NMOSE, 2015).

Table 6-5 Projected Water Demand, 2020 through 2060
Southwest New Mexico Water Planning Region
Page 3 of 3

Use Sector	Projection	Water Demand (acre-feet) [a]					
		2010 [b]	2020	2030	2040	2050	2060
Luna County (cont.)							
Commercial (self-supplied)	High	314	347	403	467	542	629
	Low	314	351	394	445	473	502
Industrial (self-supplied)	Low/High	13	15	17	20	25	30
Mining (self-supplied)	Low/High	166	166	166	166	166	166
Power (self-supplied)	High	1,219	1,450	1,450	1,450	1,450	1,450
	Low	1,219	1,300	1,300	1,300	1,300	1,300
Reservoir evaporation	Low/High	0	0	0	0	0	0
Total region							
Public water supply	High	8,809	9,602	10,691	11,749	12,813	14,171
	Low	8,809	9,257	9,705	10,159	10,294	10,564
Domestic (self-supplied)	High	1,346	1,488	1,696	1,925	2,188	2,488
	Low	1,346	1,455	1,578	1,721	1,797	1,877
Irrigated agriculture	High	194,355	194,625	194,625	194,625	194,625	194,625
	Low	194,355	162,171	166,616	172,218	177,820	183,421
Livestock (self-supplied)	High	1,630	1,035	1,198	1,630	1,630	1,630
	Low	1,630	709	872	1,035	1,198	1,361
Commercial (self-supplied)	High	916	2,475	2,598	2,727	2,872	3,034
	Low	916	2,418	2,459	2,500	2,515	2,533
Industrial (self-supplied)	High	796	849	928	1,004	1,059	1,119
	Low	796	826	851	879	909	941
Mining (self-supplied)	High	13,414	20,931	20,931	20,931	20,931	20,931
	Low	13,414	20,931	20,931	10,581	10,581	10,581
Power (self-supplied)	High	1,270	1,514	1,519	1,524	1,529	1,534
	Low	1,270	1,354	1,354	1,354	1,354	1,354
Reservoir evaporation	Low/High	0	0	0	0	0	0
Total regional demand	High	222,535	232,519	234,185	236,115	237,647	239,531
	Low	222,535	199,119	204,365	200,446	206,467	212,631

[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 demand in this sector. Where growth rates are negative, projected demand 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.

[d] Data amended by NMOSE Water Use and Conservation Bureau in November 2015 (NMOSE, 2015).

Water demand in the livestock category is projected to decline steeply by 2020, but to recover to 100 percent of 2010 water usage by 2040 under the high scenario and to 80 to 90 percent under the low. The decline is expected to be less severe in Luna County, due to the greater stability of its dairy industry. Some ranches could 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.

Growth is projected at the Tri-State Pyramid Generating Station in Lordsburg, which is classified as an *industrial* use. Industrial growth is also anticipated in Deming, but that growth will be supplied by the City and, for the most part, will not show up as industrial self-supplied use in Luna County.

In the *mining* category the New Mexico Department of Workforce Solutions reported that 212 workers were laid off in Grant County in November 2015 (Albuquerque Business First, April 26, 2016). Freeport-McMoRan reports that 46 employees were actually laid off, with the balance taking an incentivized retirement package or hired at other company locations. Some of the 46 employees were subsequently rehired during 2016. As a consequence of declining copper prices, there is considerable uncertainty regarding the future of mining activity in Grant County. According to Freeport-McMoRan, mining activity is expected to largely cease to exist in Hidalgo County by 2020.

Most of the new power generation in the region will be derived from solar and wind, which do not use water in producing power. Based on data from PNM, limited growth is expected in water consumption at the Luna Energy Facility.

The Southwest New Mexico region projections do not include *reservoir evaporation* because there are no reservoirs greater than 5,000 acre-feet in the Southwest New Mexico 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 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 5.5, though there are large groundwater reserves in the region, some locations are experiencing considerable water level declines, and current pumping levels are not sustainable indefinitely. In other parts of the region, water levels are stable or recovering. Local planning is needed to evaluate sustainability issues in more detail.

- As discussed in Section 4, there are considerable legal limitations on the development of new surface and groundwater resources, given that surface, surface-connected groundwater, and some non-surface connected 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, declining groundwater levels in some areas, 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. Future water demand projections range from moderate growth under the high scenario to slight declines under the low scenario, 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, due to two factors:

- The region is vulnerable to drought.

- Because a large part of the region is reliant on mined groundwater, the sustainability of that supply is also an issue.

As discussed in Section 5.5, the water level decline rates were examined to estimate the future supply with and without a 20-year drought where no recharge occurred in the mined basins. This analysis indicated that water availability in 2060 may be only 41 percent of the 2010 supply. Table 7-1 summarizes the estimated water use by basin and the projected water availability.

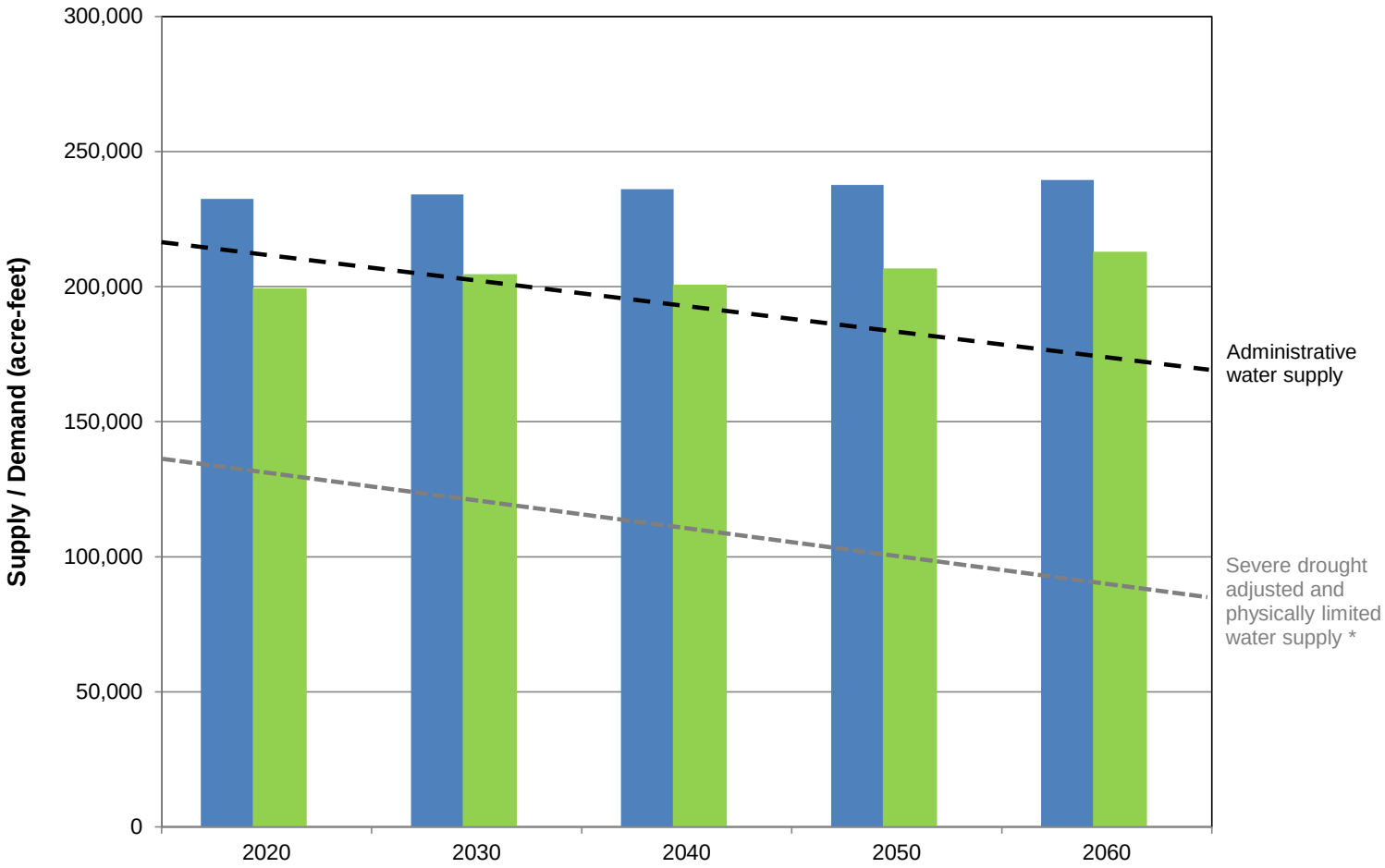
Table 7-1. Water Use and Estimated Availability in the Southwest New Mexico Water Planning Region

Source Type	Basin Area	2010 Estimated Water Use (ac-ft/yr)	2060 Estimated Water Availability (ac-ft/yr)	
			No Drought [a]	One 20-Year Drought
Groundwater (closed basins)	Animas	15,291	11,288	10,560
	Lordsburg	16,477	15,481	15,432
	Mimbres (Grant County)	10,928	7,142	5,881
	Mimbres (Luna County)	40,164	34,355	32,419
	Nutt-Hockett (Luna County)	16,084	3,754	1,824
	Playas Valley	20,595	0	0
Surface water	Six closed basins	29,617	29,617	2,962
Groundwater	All diversions outside of six closed basins	15,303	15,303	15,303
Surface water		58,076	58,076	5,808
Total		222,535	175,016	90,188
Water use as a percentage of 2010 administrative water supply			79%	41%

[a] Based on modeled declines or, where no model was available, observed water level declines, as detailed in Tables 5-14a, 5-14b, and 5-15.

ac-ft/yr = Acre-feet per year

Figure 7-1 illustrates the total projected regional water demand under the high and low demand scenarios, and also shows the administrative water supply, the drought-adjusted water supply, and the future administrative water supply that has been adjusted for groundwater mining. The adjustment for groundwater mining was based on the model-predicted declines where models were available (Animas, Lordsburg, and Mimbres in Grant and Luna counties) and on the observed level of decline elsewhere. As discussed in Section 5.5, these methods yielded similar results. As presented in Section 5.5, the region's 2010 administrative water supply is 222,535 acre-feet and the drought supply in 2060 is about 90,200 acre-feet, or 41 percent of a normal year administrative water supply. Given the vulnerability to drought and the declining groundwater levels, the estimated shortage in 2060 during a drought year is expected to range from 122,450 to 149,350 acre-feet. Consequently, 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 streamflow of record to the 2010 administrative water supply and modeling conducted by the New Mexico Office of the State Engineer.

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

SOUTHWEST NEW MEXICO
REGIONAL WATER PLAN 2017

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 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 Southwest New Mexico region considered a variety of strategies for addressing these water management challenges. As discussed in Sections 5 and 7, the planning region is very large with diverse water resources, and hence water supplies and demands in all areas of the region are not necessarily interchangeable without overcoming significant infrastructure and water rights challenges. Therefore strategies are needed to address sub-regional issues. For the areas that rely on surface water (approximately 50% of the 2010 water supply for the region) drought contingency planning is important.

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. Strategies from the 2005 RWP that have been implemented are discussed Section 8.1. Additional strategies recommended in this RWP update—including a comprehensive table of projects, programs, and policies, key collaborative projects, and recommendations for the state water plan —are discussed in Section 8.4.

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 support their implementation. To help address the implementation of new strategies, a review of the implementation of previous strategies was first completed.

The 2005 *Southwest New Mexico Regional Water Plan* recommended the following priority strategies for meeting future water demand:

- Municipal conservation and management
- Agricultural water conservation
- Watershed management
- Enhancement of surface recharge
- Provide water for natural riparian and aquatic habitat on the Gila and San Francisco rivers
- Aquifer Storage and Recovery of Gila River flows
- Water banking
- Groundwater development

Additionally, the 2005 plan recommended the following strategies for long-term planning in the region:

- Water quality protection
- Groundwater management planning
- U.S.-Mexico border groundwater management
- Rain harvesting
- Industrial conservation
- Restrictions on domestic wells

Actions that have been completed in order to implement the strategies identified in the 2005 plan are summarized on Table 8-1.

8.2 Arizona Water Settlements Act

In the Southwest New Mexico region, in addition to this RWP update, the AWSA, discussed in Section 4, also guides funding for water projects. The AWSA allocates to New Mexico an annual average of 14,000 acre-feet of water from the Gila Basin and up to $128 million in non-reimbursable federal funding for use in the Southwest New Mexico Water Planning Region of New Mexico. The AWSA requires that the NMISC approve uses of the water and funds. Recent funding for water projects in the region included (NMISC, 2016):

- Municipal water conservation: $3 million
- Gila Basin Irrigation Commission Diversion Structure: $1.25 million
- Catron County community ditch permanent points of diversion: $500,000
- Deming effluent reuse: $1.75 million
- Pleasanton East-Side Ditch Company ditch improvement: $200,000
- Sunset Canal and New Mexico New Model Canal ditch improvements: $200,000 (in 2016 Sunset Canal renounced its share of the funding)
- 1892 Luna Irrigation Ditch Association permanent diversion structure: $100,000
- Grant County Regional Water Supply Project: $2.1 million

As discussed in Section 4, to guide the allocation of water and funds, the NMISC formally adopted the following policy:

Table 8-1. Implementation Status of Strategies Identified in 2005 Plan Southwest New Mexico Water Planning Region

Strategy	Status
Municipal conservation and management	Silver City completed water conservation plan.
	Silver City Office of Sustainability is doing energy and water conservation.
	Silver City does leak detection twice a year.
	Lordsburg completed a municipal conservation plan.
	NMED Drinking Water Bureau is assisting municipalities with water loss planning.
	New Mexico Rural Water Association assists smaller systems with leak detection on an as needed basis.
	Deming completed a pilot water conservation project, and the data from that effort are in place.
	Deming has implemented water reuse projects.
	$3 Million in funding for municipal conservation was provided by AWSA.
Agricultural water conservation	NMISC and Environmental Quality Incentives Program funding used to convert 85% of Luna County irrigation to drip.
Watershed management	The Gila National Forest, New Mexico State Forestry, and soil and water conservation districts (SWCDs) have completed many projects since the 2005 plan.
Enhancement of surface recharge	Some watershed projects completed by the Gila National Forest and Grant County SWCD may help to enhance recharge.
Provide water for natural riparian and aquatic habitat on the Gila and San Francisco rivers	The Gila National Forest, New Mexico State Forestry, and Grant County SWCD have completed many projects since the 2005 plan.
Aquifer storage and recovery of Gila River flows	Joint Powers Agreement (JPA) for New Mexico Unit was developed, and 13 political subdivisions within the region signed the JPA.
Water banking	$850,000 was set aside for water banking credits under the AWSA.
Groundwater development	One of the 16 AWSA-funded projects includes construction of a new well field at the Grant County airport by the Grant County Water Commission. The new well field is offset by return flow credits. The contract expires in December 2018. The project includes an intercommunity water distribution pipeline. Hurley may no longer be able to rely on Freeport-McMoran water rights, so this provides alternative water supply.
	Projected sale of the San Agustin Plains water has been protested; the region would like to protect its water resources.
Water quality protection	Bayard and Santa Clara have a source water protection and education project.

Table 8-1. Implementation Status of Strategies Identified in 2005 Plan Southwest New Mexico Water Planning Region

Strategy	Status
Water quality protection (cont.)	Abandoned mine cleanup is occurring in the national forests.
	Outstanding National Resource Waters have been designated in national forest wilderness areas.
	Silver City watershed education helps protect water quality.
Groundwater management planning	The Grant County Regional Water Supply Project resulted from groundwater management planning.
U.S.-Mexico border groundwater management	In the Columbus area, a preliminary engineering report has been prepared for the Port of Entry area.
	Water Resources Research Institute (WRRI) is doing bi-national groundwater data collection and mapping.
	Border area master plans are being developed by the Border Authority and WRRI.
Rain harvesting	NMED has funded green infrastructure/stormwater management in the Silver City area. This involves using stormwater runoff to create recharge.
	The Southwest New Mexico Council ofGovernments is sponsoring Green Infrastructure training.
Industrial conservation	The Deming power plant is now using effluent.
Restrictions on domestic wells	Maximum withdrawals from domestic wells in the Mimbres Underground Water Basin changed from 3 acre-feet per year to 1 acre-foot per year (though this is a statewide policy, it directly affected the Mimbres Valley).

The Interstate Stream Commission recognizes the unique and valuable ecology of the Gila Basin. In considering any proposal for water utilization under Section 212 of the Arizona Water Settlements Act, the Commission will apply the best available science to fully assess and mitigate the ecological impacts on Southwest New Mexico, the Gila River, its tributaries and associated riparian corridors, while also considering the historic uses of and future demands for water in the Basin and the traditions, cultures and customs affecting those uses.

On November 24, 2014, the NMISC adopted a resolution to notify the Secretary of the Interior that New Mexico intends to construct or develop a New Mexico Unit of the Central Arizona Project (CAP). There is mixed support for the project from the Southwest New Mexico Regional Water Planning Steering Committee, with some strong supporters and some strong opposition. As there is a detailed separate process under the AWSA regarding implementation of a Gila diversion, the regional water planning process did not attempt to resolve diverse opinions on the subject.

8.3 Water Conservation

Municipal per capita water use in the Southwest New Mexico Water Planning Region varies, with many communities having relatively low per capita use and others exhibiting much higher use (Table 6-4). Silver City has developed a new water conservation plan, and many water conservation programs are already in place in communities throughout the region, as recommended in the 2005 plan (Section 8.1). Water providers in the region will continue to implement their existing water conservation programs and drought contingency ordinances. As shown in Table 8-1, several water conservation and water reuse projects have been completed since the original plan was accepted in 2005, and additional conservation measures are discussed in Section 8.4.

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

In addition to continuing with strategies from the previous plan, the Southwest New Mexico region discussed and compiled new project, program, and policy (PPP) information, identified key collaborative projects, and provided recommendations for the state water plan. The recommendations included in this section were prepared by the Southwest New Mexico 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 strategies included by the regional steering committee and other stakeholders.

8.4.1 Comprehensive Table of Projects, Programs and Policies

Over the two-year update process, eight meetings were held with stakeholders in the Southwest New Mexico 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 included in Appendix 8-A. Information was requested during several open meetings, and requests for input were also e-mailed to all stakeholders that 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, and those projects are also included in the PPP table (Appendix 8-A). The projects included are from the ICIP list (http://nmdfa.state.nm.us/ICIP.aspx, accessed March 2016), which is updated on an annual basis. Therefore, other infrastructure projects that are important to the region may be identified before this RWP is updated again. In general, the region is supportive of water and wastewater, dam safety, and other water-related infrastructure projects.

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 the PPPs that regional stakeholders are interested in pursuing. It includes projects both 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 Southwest New Mexico region, projects identified on the PPP table primarily include water system infrastructure, water conservation and efficiency, and watershed restoration projects.

8.4.2 Key Regional Strategies

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 projects that are identified in Appendix 8-A. However, identifying larger regional projects that

will involve multiple water user groups and organizations in the region or will be implemented at the regional scale is helpful to successful implementation of the regional plan. 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 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 projects and voting to determine the projects of greatest interest and to identify opposition to proposed projects. Key projects identified by the steering committee and Southwest New Mexico region stakeholders are shown on Table 8-2. As discussed previously, not all stakeholders support the Gila diversion project, and questions regarding its implementation will be resolved through the AWSA process.

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

8.4.3 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, rather than 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, Southwest New Mexico region identified the following recommendations for PPPs to be considered in the state water plan:

- Support for small drinking water systems through capacity, administration, rate analysis, and asset management
- Support for acequias through capacity building, administration, financial, audit, governance supports
- Support for water conservation, source water protection, drought mitigation, and RWP implementation

Table 8-2. Key Programs, Projects, and Policies
2017 Southwest New Mexico Regional Water Plan

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Grant County regional water supply project					
Improve and increase access to public water supplies that currently serve approximately 26,000 people in central Grant County, including developing a new well field and pipeline to Hurley.	Grant County Water Commission	• Hurley • Santa Clara • Bayard • North Hurley Mutual Domestic Water Consumers Association (MDWCA) • Hanover MDWCA • Arenas Valley Water Association • Tyrone • Rosedale MDWCA	• State appropriation • Colonias Infrastructure Fund • Water Trust Board • Community Development Block Grant (CDBG) • New Mexico Interstate Stream Commission – Arizona Water Settlements Act (NMISC-AWSA) • U.S. Department of Agriculture (USDA) Water Program • Drinking Water Revolving Loan Fund (DWRLF) • U.S. Economic Development Administration (EDA)	• Phase I – Hurley $6.6 Million • Phase II – Bayard $3.9 Million • Phase III – Bayard to Santa Clara $1.9 Million • Phase IV – Santa Clara to Hanover $2.8 Million	FMI contract for providing water to Hurley expires December 31, 2018.

Table 8-2. Key Programs, Projects, and Policies
2017 Southwest New Mexico Regional Water Plan
Page 2 of 6

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Watershed restoration / Erosion control / Water quality protection / Riparian restoration / Post–fire restoration					
Implement forest thinning, prescribed fire, stream restoration, riparian restoration, erosion control structures, grassland restoration, meadow restoration, wetland improvement / creation, post-fire rehabilitation, road decommissioning, road best management practices for drainage, rangeland recovery, trail improvement, noxious weed eradication, invasive species treatment, aquatic habitat improvement, and stream stabilization.	• U.S. Forest Service (USFS) • New Mexico Department of Game and Fish (NMG&F) • New Mexico State Forestry • Bureau of Land Management • State Land Office • Private landowners	• Nature Conservancy • Forest Industry Association • Conservation nonprofits • U.S. Bureau of Reclamation (USBR) • Fish and Wildlife Service • New Mexico Environment Department (NMED) • Local counties • Soil and water conservation districts (SWCDs)	• State • Federal • County • Wildlife non-profits • Office of Natural Resource Trustee	$20,000 to multimillions	• Time to get through National Environmental Policy Act (NEPA) process, including U.S. Fish and Wildlife Service (USFWS) consultation (wildlife) and State Historical Preservation Office (SHPO) process (archaeology). • Funding to accomplish multi-thousand-acre projects. • Need collaborative planning for prescriptions to avoid unintended consequences.
Gila River water utilization in accordance with the AWSA (New Mexico Unit)					
Use up to 14,000 acre-feet per year, on average, of Gila River water for industrial, municipal, agricultural, and environmental use.	New Mexico Central Arizona Project (CAP) Entity	USBR, NMISC	AWSA	TBD	• NEPA considerations. • Opposition by some Steering Committee members. • Decisions regarding moving forward will be made through AWSA process, not regional water planning process.

Table 8-2. Key Programs, Projects, and Policies
2017 Southwest New Mexico Regional Water Plan
Page 3 of 6

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Hydrogeological investigation of the San Agustin and connected groundwater aquifers					
Determine how much the San Agustin aquifer supports adjacent watersheds.	• Catron County Commission • Dennis Inman	New Mexico Tech	• Water Trust Board • New Mexico Legislature	$300,000 to $500,000	• Lack of funding. • Opposition from proposed drilling project personnel.
Water conservation, source water protection, drought mitigation and rainwater harvesting					
Establish a regional working group to leverage resources and expertise across the Southwest New Mexico water planning region to implement projects on water conservation, source water protection, drought mitigation, and rainwater harvesting. Collaborate in grant funding and coordinate activities in these areas across all sectors (Agriculture and Municipal and Industrial).	• Natural Resources Conservation Service (NRCS) • SWCDs	• Municipalities • Conservation organizations • NMED • New Mexico Office of the State Engineer (NMOSE) Water Conservation Bureau • Farm Bureau	• Water Trust Board • WaterSmart (USBR program)	Project-dependent	Funding.

Table 8-2. Key Programs, Projects, and Policies
2017 Southwest New Mexico Regional Water Plan
Page 4 of 6

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Maintenance and optimization of regional existing diversion structures (Gila, San Francisco, Mimbres, Tularosa)					
Maintain and optimize existing diversions from perennial streams to facilitate fish passage and water efficiency. Improve ditch infrastructure to minimize water loss and maximize use.	• Ditch company and land owner • New Mexico Acequia Association	• Conservation and wildlife nonprofits • USFS • USBR • NMISC • NMED • Water Trust Board • NRCS • USFWS	• Conservation and wildlife nonprofits • Forest Service • USBR • NMISC • NMED • Water Trust Board • NRCS • USFWS	$100,000 for design to multimillions for construction	• Funding: projects are very expensive and often not a priority without widespread interest. • NEPA process is required in some cases.
Twin Sisters effluent reuse					
Implement effluent reuse, to preserve more potable water for other needs, in connection with sub-regional infrastructure for greater system capacity in the southern Grant County/Santa Clara area. Water would be reused for the Bayard Cemetery, baseball fields, and schools, allowing the Twin Sisters wells to pump less.	Village of Santa Clara	• Hurley • Bayard • Grant County • Gila National Forest	• AWSA • Water Trust Board	Approximately $3 million	• Funding. • Permitting required with testing and monitoring.

Table 8-2. Key Programs, Projects, and Policies
2017 Southwest New Mexico Regional Water Plan
Page 5 of 6

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Purchase of unused mining water rights to support local agriculture					
Develop regional water harvesting and agricultural small growers' use of water for conservation and economic development potential.	• NRCS • SWCDs	• GCFPC (Grant County Food-Policy Council) • SWNMFPC (Southwest New Mexico Food Policy Council) • Town of Silver City Office of Sustainability (Denise Smith)	• USDA • Foundations	$1,000 to $10,000 per acre foot	• Cost of acquisition of water rights. • Beneficial use issues. • Willing farmers.
Education for four-county area on issues such as septic system impacts, conservation, capacity building, resources and energy efficiency					
Education on programs to improve awareness in protecting groundwater, enhancing water conservation measures, capacity building, resources and energy efficiency.	• NMED • Rural Community Assistance Corporation(RCAC) • Lead varies depending on training	• U.S. EPA • New Mexico Finance Authority (NMFA) • NMED • NM Rural Water Association • NM Water and Wastewater Association • USDA • NMOSE • Southwest New Mexico Council of Governments (SWNM COG)	• CDBG Planning • NMFA Planning	$25,000-$50,000 for planning	Funding.

Table 8-2. Key Programs, Projects, and Policies
2017 Southwest New Mexico Regional Water Plan

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Repair of flood, sediment control, and recreational dams					
Maintain, repair, or decommission flood, sediment control, and recreational dams on public land (excluding dirt stock tanks).	• Mill Levy group / Upper Gila Valley Watershed Association / Ty Bays • USFS for dams on Gila River • NMG&F for Bear Canyon Dam • NMOSE • Army Corps of Engineers	• Mill Levy group / Upper Gila Watershed Association / Ty Bays • USFS for dams on Gila River • NMG&F for Bear Canyon Dam • NMOSE • Army Corps of Engineers	• Mill levy taxes • Gila National Forest funds • State funds (for lakes)	See Table 5-7	• Costs exceed available funding. • Many dams were built long ago and need significant repair (some are filled with sediment).

References

AMEC Earth & Environmental, Inc. (AMEC). 2010. Regional water demand study for southwest New Mexico, Catron, Grant, Hidalgo and Luna counties. Prepared for New Mexico Interstate Stream Commission, Office of the State Engineer Santa Fe, New Mexico. October 10, 2010.

Angelou Economics, Inc. 2012. *Grant County economic development master plan: Strategic recommendations & action plan.* April 5, 2012. Available at <http://www.angelou economics.com/grantcounty/documents/Grant%20County%20FINAL%20 Recommendations.pdf>.

Arrowhead Center. 2013. *Economic base studies* [Catron, Grant, Hidalgo, and Luna counties]. New Mexico State University. September 2013. Available at <http://arrowheadcenter.nmsu.edu/economic-base-studies>.

Basabilvazo, G. 1997. *Ground-water resources of Catron County, New Mexico*. Water-Resources Investigations Report 96-4258, U.S. Geological Survey. Prepared in cooperation with New Mexico State Engineer Office and New Mexico Bureau of Mines and Mineral Resources.

Bawazir, A.S., Z. Samani, M. Bleiweiss, R Skaggs, and T Schmugge. 2009. Using ASTER satellite data to calculate riparian evapotranspiration in the Middle Rio Grande, New Mexico. *International Journal of Remote Sensing* 30(21):5593-5603. November 2009. Available at <http://www.researchgate.net/publication/228895780_Using_ASTER_satellite_data_to_calc ulate_riparian_evapotranspiration_in_the_Middle_Rio_Grande_New_Mexico>.

Brinegar, H.R., and F.A. Ward. 2009. Basin impacts of irrigation water conservation policy. *Ecological Economics* 69(2009):414–426.

Bureau of Business & Economic Research (BBER). 2008. *A report on historical and future population dynamics in New Mexico water planning regions.* Population Estimates and Projections Program, BBER, University of New Mexico. Prepared for the New Mexico Interstate Stream Commission. August 2008. Available at <http://www.ose.state.nm.us/PDF/Publications/TechnicalReports/BBER-WPR-Estimates-Projections-Aug2008.pdf>.

Bureau of Business & Economic Research (BBER). 2012. Projected population, New Mexico counties, July 1, 2010 to July 1, 2040. University of New Mexico. <http://bber.unm.edu/demo/PopProjTable1.htm>. November 2012.

Bureau of Land Management (BLM). 2016. New Mexico statewide spatial data: Surface ownership. <http://www.blm.gov/nm/st/en/prog/more/geographic_sciences/-spatial_data_metadata.html> Accessed February 2016.

Cather, S.M. 1980. *Petrology, diagenesis, and genetic stratigraphy of the Eocene Baca Formation, Alamo Navajo Reservation, Socorro County, New Mexico*. Unpublished M.S. thesis, University of Texas, Austin, Texas. 243p.

Catron County. 1992 (updated 2012). *Catron County comprehensive land plan: Multiple use.* National Federal Lands Conference. Available at <http://yourfirstdue.com/manager/data/1316726401/File/catron_county_land_plan_final_updated_2012.pdf>.

Charney, A.H., A.V. Popp, V. Rice, J. Peach, M.J. Vest, and L. Delgado. 2012. *SunZia southwest transmission project economic impact assessment.* Prepared for SunZia Southwest Transmission Project. Revised January 2012. Available at <http://www.sunzia.net/documents_pdfs/sunzia_eia_revised_final_jan_2012.pdf>.

Christensen, N.S. A.W. Wood, N. Voisin, D.P. Lettenmaier, and R.N. Palmer. 2004. The effects of climate change on the hydrology and water resources of the Colorado River Basin. *Climatic Change* 62:337–363. Available at <https://portal.azoah.com/oedf/documents/08A-AWS001-DWR/Supplemental_Beverly_et_al/20040000%20Christensen%20et%20al%20Effects%20of%20Climate%20Change%20on%20Hydrology%20and%20Water%20Resources_Colorado%20River%20B.pdf>.

CommunityByDesign, Southwest Planning and Marketing, and Wilson and Company. 2011a. *Hidalgo County comprehensive plan update 2011*, 10/2011 Draft. Available at <www.hidalgocounty.org/index.php/download_file/view/703/176/>.

CommunityByDesign, Southwest Planning and Marketing, and Wilson and Company. 2011b. *City of Lordsburg 2011 Comprehensive Plan Update*. December 2001. Available at <http://swnmcog.org/images/City_of_Lordsburg_Comp_Plan_Update_2011lr.pdf >.

Consensus Planning, Inc. 2007. *Catron County CIP/Comprehensive plan.* Adopted March 21, 2007. Available at <http://yourfirstdue.com/manager/data/1316726401/File/catron_county_comprehensive_plan_3-07_complete_final.pdf>.

Coonrod, J., and D. McDonnell. Undated. *Using remote sensing and GIS to compute evapotranspiration in the Rio Grande Bosque.* <http://proceedings.esri.com/library/userconf/proc01/professional/papers/pap487/p487.htm#_INTRODUCTION>. Accessed May 2014.

Cuddy, A.S., and E. Keyes. 2011. *Groundwater model of the Mimbres Basin, Luna, Grant, Sierra and Doña Ana counties, New Mexico.* Hydrology Bureau Technical Report 11-1, New Mexico Office of the State Engineer. January 2011.

Darton, N.H. 1916. *Geology and underground water of Luna County, New Mexico.* U.S. Geological Survey Bulletin 618.

Daniel B. Stephens & Associates, Inc.(DBS&A). 2005. *Southwest New Mexico regional water plan.* Prepared for Southwest New Mexico Regional Water Plan Steering Committee, City of Deming, New Mexico, Fiscal Agent. May 2005.

Deming Luna County Economic Development (DLED). 2015. The power of Deming/Luna County. <http://dlced.org/> Accessed March 2015.

Doty, G.C. 1960. *Reconnaissance of ground water in Playas Valley, Hidalgo County, New Mexico*. Technical Report 15, New Mexico State Engineer, Santa Fe, New Mexico. Prepared in cooperation with USGS.

Finch, Steven T. Jr, Annie McCoy, and Erwin Mellis. 2008. Geologic controls on ground-water flow in the Mimbres Basin, southwestern New Mexico. pp. 189-198 *in* Mack, G., J. Witcher, and V.W. Lueth (eds), *Geology of the Gila Wilderness-Silver City area,* , New Mexico Geologic Society 59th Annual Field Conference Guidebook. 210 p.

Forest Guild. 2008. Managing forests in the face of climate change: A summary of New Mexico Forestry and Climate Change Workshop on November 20, 2008 in Albuquerque, New Mexico. December 2008.

Foster, R.W. 1964. *Stratigraphy and petroleum possibilities of Catron County, New Mexico*. New Mexico Bureau of Mines and Mineral Resources Bulletin 85.

Garfin, G., A. Jardine, R. Merideth, M. Black, and S. LeRoy (eds.). 2013. *Assessment of climate change in the southwest United States: A report prepared for the National Climate Assessment.* A report by the Southwest Climate Alliance. Island Press, Washington, DC.

Gori, D., M.S. Cooper, E.S. Soles, M. Stone, R. Morrison, T.F. Turner, D.L. Propst, G. Garfin, M. Switanek, H. Chang, S. Bassett, J. Haney, D. Lyons, M. Horner, C.N. Dahm, J.K. Frey, K. Kindscher, H.A. Walker, and M.T. Bogan. 2014. *Gila River flow needs assessment.* A report by the Nature Conservancy. <http://nmconservation.org/Gila/GilaFlowNeeds Assessment.pdf> Accessed December 2016.

Grant County. 2004. *Grant County comprehensive plan.* March 2004.

Gutzler, D. 2003. Drought in New Mexico: History, causes, and future prospects. pp. 101-105 *in* Johnson, P., L.A. Land, L.G. Price, and F. Titus. (eds.), *Water resources of the lower Pecos region, New Mexico: Science, policy, and a look to the future.* Decision-Makers Field Conference 2003, New Mexico Bureau of Geology and Mineral Resources, Socorro, New Mexico. Available at <http://geoinfo.nmt.edu/publications/decisionmakers/2003/DM-2003-Chapter3.pdf> Accessed June 2005.

Gutzler, D. 2013. Climate change and vegetation in southwestern New Mexico. Presentation to New Mexico Vegetation Management Association. November 13, 2013. Available at <http://www.nmvma.com/images/13Nov_NMVegMgmtAssn_Gutzler_reduced.pdf>.

Hagevoort, R. 2013. New Mexico dairy industry key indicators. NMSU Dairy Extension. March 2013.

Hanson, R.T., J.S. McLean, and R.S. Miller. 1994. *Hydrogeologic framework and preliminary simulation of ground-water flow in the Mimbres Basin, Southwestern New Mexico*. U.S. Geological Survey Water-Resources Investigations Report 94-4011. Prepared in cooperation with New Mexico SEO.

Hawley, J.W. 1986. Physiographic provinces [and] landforms of New Mexico. p. 23-31 *in* Williams, J.L., ed., *New Mexico in Maps* (2nd edition). The University of New Mexico Press, Albuquerque, New Mexico.

Hawley, J.W., B.J. Hibbs, J.F. Kennedy, B.J. Creel, M.D. Remmenga, M. Johnson, M.M. Lee, and P. Dinterman. 2000. *Trans-international boundary aquifers in southwestern New Mexico*. New Mexico Water Resources Research Institute Technical Completion Report, Interagency contract no. X-996350-01-3. Prepared for U.S. Environmental Protection Agency, Region 6 and International Boundary and Water Commission, U.S. Section. March 2000.

Hurd, Brian and Julie Coonrod. 2008. *Climate change and its implications for New Mexico's water resources and economic opportunities.* Technical Report 45, New Mexico State University.

Intera. 2013. *Remote-sensing-based comparison of water consumption by drip-irrigated versus flood-irrigated fields*. Prepared for the New Mexico Interstate Stream Commission.

Intergovernmental Panel on Climate Change (IPCC). 2013. *Climate change 2013, The physical science basis.* Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY. 1535p. Available at <http://www.ipcc.ch/report/ar5/wg1/>.

Johnson, B.D. 1978. *Genetic stratigraphy and provenance of the Baca Formation, New Mexico, and the Eagar Formation, Arizona*. Unpublished M.S. thesis, University of Texas, Austin, Texas. 150p.

Johnson, M.S., and D.H. Rappuhn. 2002. *Hydrogeology and preliminary simulation of ground-water flow in the Lower Animas and Lordsburg basins, Grant and Hidalgo counties, New Mexico.* New Mexico Office of the State Engineer, Technical Division Hydrology Report 02-06. July 2002.

Johnson, M.S., L.M. Logan, and D.H. Rappuhn. 2002. *Analysis of effects of ground-water development to meet project demands in Regional Planning District 4, Southwest New Mexico*. Draft Hydrology Report 02-X, New Mexico Office of the State Engineer, Hydrology Bureau. March 2002.

Kernodle, J.M. 1992. *Summary of U.S. Geological Survey ground-water-flow models of basin-fill aquifers in the Southwestern Alluvial Basins region, Colorado, New Mexico, and Texas*. U.S. Geological Survey Open-File Report 90-361.

Keyes, E. 2015a. E-mail from Eric Keyes, New Mexico Office of the State Engineer Hydrology Bureau, to Tom Morrison, New Mexico Office of the State Engineer. April 30, 2015, 10:50 a.m.

Keyes, E. 2015b. E-mail from Eric Keyes, New Mexico Office of the State Engineer Hydrology Bureau, to Tom Morrison, New Mexico Office of the State Engineer. April 30, 2015, 1:12 p.m.

Keyes, E. 2015c. E-mail from Eric Keyes, New Mexico Office of the State Engineer Hydrology Bureau, to Tom Morrison regarding Animas model. May 13, 2015.

Lee, W.T. 1907. *Water resources of the Rio Grande Valley in New Mexico.* Water-Supply Paper 188, U.S. Geological Survey, 59p.

Longworth, J.W., J.M. Valdez, M.L. Magnuson, and K. Richard. 2013. *New Mexico water use by categories 2010.* Technical Report 54, New Mexico Office of the State Engineer, October 2013. Available at <http://www.ose.state.nm.us/Conservation/PDF/NM%20Water%20Use%20by%20Categories%20Tech.%20Report%2054.pdf>.

McCabe, G.J., M.A. Palecki, and J.L. Betancourt. 2004. Pacific and Atlantic Ocean influences on multidecadal drought frequency in the United States. *PNAS* 101(12): 4136-4141.

McLean, J.S. 1977. *Hydrologic maps and data in the Mimbres Basin, New Mexico*. Open-File Report 77-314, U.S. Geological Survey. Prepared in cooperation with Office of the New Mexico State Engineer. April 1977.

McLellan, M.W., L.R. Biewick, and E.R. Landis. 1984. *Stratigraphic framework, structure, and general geology of the Salt Lake Coal Field, Cibola and Catron counties, New Mexico*. U.S. Geological Survey Miscellaneous Field Studies Map MF-1689, scale 1:100,000.

Meinzer, O.E. 1911. *Geology and water resources of Estancia Valley, New Mexico.* U.S. Geological Survey Water-Supply Paper 320. 231p.

Meinzer, O.E. 1916. *Ground water in Big Smoky Valley, Nevada.* U.S. Geological Survey Water-Supply Paper 375. 321p.

Meridian Institute, New Mexico Environment Department, and Grant Soil and Water Conservation District. 2006. Draft Mimbres watershed restoration action strategy (WRAS). Prepared Pursuant to the Clean Water Action Plan and Unified Assessment of New Mexico Watersheds. July 2006. Available at <https://www.env.nm.gov/swqb/wps/WRAS/MimbresWRAS.pdf>.

Meyers, R.G., J.T. Everheart and C.A. Wilson. 1994. *Geohydrology of the San Agustin Basin, Alamosa Creek Basin upstream of Monticello Box, and Upper Gila Basin in parts of Catron, Socorro, and Sierra counties, New Mexico.* U.S Geological Survey Water Resources Investigation Report 94-4125. Prepared in cooperation with New Mexico State Engineer Office.

National Climatic Data Center (NCDC). 2014. Divisional data select. <http://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp#> Accessed March 13, 2014.

National Weather Service Climate Prediction Center (NWS). 2005. State maps with counties & climate divisions. <http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/CLIM_DIVS/states_counties_climate-divisions.shtml> Last modified January 6, 2005.

National Weather Service (NWS). 2015. An introduction to the North American Monsoon System. <http://www.srh.noaa.gov/abq/?n=prepawaremonsoonintro> Accessed December 2015.

Natural Resources Conservation Service (NRCS). 2014a. Monthly snow data. <http://www.wcc.nrcs.usda.gov/nwcc/snow-course-sites.jsp?state=NM> Accessed May 2014.

Natural Resources Conservation Service (NRCS). 2014b. What is snow water equivalent? <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/snow/?cid=nrcs142p2_046155> Accessed September 2014.

New Mexico Bureau of Geology & Mineral Resources (NMBGMR). 2003. Geologic Map of New Mexico, 1:500,000. 2 sheets. Available at <http://geoinfo.nmt.edu/publications/maps/geologic/state>.

New Mexico Department of Workforce Solutions. 2014. Highlights: April 2014 Labor Market Data. *Labor Market Review* 43(4). <http://www.dws.state.nm.us/Portals/0/DM/LMI/lmrApr14.pdf>. Economic Research and Analysis Bureau, Albuquerque, New Mexico. May 23, 2014.

New Mexico Environment Department (NMED). 2009. Gila River watershed improvement plan and strategies. June 2009. Available at <https://www.env.nm.gov/swqb/Gila/index.html>.

New Mexico Environment Department (NMED). 2013. *Procedures for assessing water quality standards attainment for the State of New Mexico CWA §303(d) /§305(b) integrated report: Assessment protocol.* Surface Water Quality Bureau. June 24, 2013. Available at <http://www.nmenv.state.nm.us/swqb/protocols/2014/AssessmentProtocol-w-Appendices-2014.pdf>.

New Mexico Environment Department (NMED). 2014a. 2014 – 2016 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated Report, Appendix A: Final: List of assessed surface waters. Surface Water Quality Bureau. November 18, 2014. Available at <https://www.env.nm.gov/swqb/303d-305b/2014-2016/2014-2016NMList.pdf>.

New Mexico Environment Department. 2014b. GIS dataset provided to Daniel B. Stephens & Associates, Inc. by Office of Information Technology, Enterprise GIS Section. March 25, 2014.

New Mexico Environment Department (NMED). 2015a. New Mexico solid waste landfills-Operating or closure status 2015. August 3, 2015. Available at <https://www.env.nm.gov/swb/documents/FinalUpdatedStateMapLFClosurestatus8-3-15.pdf>.

New Mexico Environment Department (NMED). 2015b. Open permitted landfill list. December 2015. Available at <https://www.env.nm.gov/swb/documents/OpenLFlist.pdf>.

New Mexico Environment Department (NMED). 2016a. Facilities with active tanks by county. <https://www.env.nm.gov/ust/lists.html> Updated January 4, 2016.

New Mexico Environment Department (NMED). 2016b. Current list of domestic and industrial discharge permits. <https://www.env.nm.gov/gwb/NMED-GWQB-PollutionPrevention.htm#PPSlist>. Updated March 30, 2016.

New Mexico Environment Department (NMED). 2016c. NPDES Permits in New Mexico. Surface Water Quality Bureau, Point Source Regulation Section. <http://www.nmenv.state.nm.us/swqb/Permits/>. Accessed May 18, 2016.

New Mexico Environment Department (NMED), New Mexico Bureau of Geology & Mineral Resources (NMBGMR), and New Mexico Department of Health (NMDH). 2016. New Mexico source water protection atlas [GIS dataset]. February 10, 2016.

New Mexico Interstate Stream Commission (NMISC). 2013. Updated regional water planning handbook: Guidelines to preparing updates to New Mexico regional water plans. December 2013.

New Mexico Interstate Stream Commission (NMISC). 2015. *Report for 2015 of irrigated acreage, diversion and consumptive use of water for all purposes in New Mexico from the Gila River, San Francisco River and San Simon Creek (Gila River Basin in New Mexico),*

Arizona v. California, 547 U.S. 150 (2006). New Mexico Interstate Stream Commission, New Mexico Office of the State Engineer, District III. November 2016.

New Mexico Interstate Stream Commission (NMISC). 2016. Welcome to the ISC's AWSA website. <http://nmawsa.org/> Accessed April 2016.

New Mexico Office of the State Engineer (NMOSE). 2013. *New Mexico water conservation planning guide for public water suppliers.* Technical Report 53. September 2013. Available at <http://www.ose.state.nm.us/WUC/wuc_pws.php>.

New Mexico Office of the State Engineer (NMOSE). 2014a. GIS - Geospatial data and maps. <http://www.ose.state.nm.us/GIS/index.php> Accessed March 2014.

New Mexico Office of the State Engineer (NMOSE). 2014b. Dam Safety in New Mexico. Unpublished report provided to Daniel B. Stephens & Associates, Inc. by the NMOSE Dam Safety Bureau, April 2014.

New Mexico Office of the State Engineer (NMOSE). 2014c. Geographical information system data provided to Daniel B. Stephens & Associates, Inc. May 13, 2014.

New Mexico Office of the State Engineer (NMOSE). 2014d. New Mexico water rights reporting system: Point of diversion report selection. <http://nmwrrs.ose.state.nm.us/nmwrrs/wellSurfaceDiversion.html> Accessed May 2014.

New Mexico Office of the State Engineer (NMOSE). 2015. Memorandum from Julie Valdez to File regarding Luna County. Water Use and Conservation Bureau. November 3, 2015.

New Mexico Office of the State Engineer (NMOSE) / New Mexico Interstate Stream Commission (NMISC). 2006. *The impact of climate change on New Mexico's water supply and ability to manage water resources.* July 2006. Available at <http://www.nmdrought.state.nm.us/ClimateChangeImpact/completeREPORTfinal.pdf> Accessed May 9, 2014.

New Mexico Water Quality Control Commission (NMWQCC). 2002. Water quality and water pollution control in New Mexico, 2002: NMED/SWQ-02/1. Available at <http://www.nmenv. state.nm.us/swqb/305b/2002>. Accessed April 15, 2004.

O'Brien, K.M., and W.J. Stone. 1981. *Water-level data compiled for hydrogeologic study of Animas Valley, Hidalgo County, New Mexico*. New Mexico Bureau of Mines and Mineral Resources Open-File Report 130. June 1981.

Paige, S. 1916. *Descriptions of the Silver City quadrangle, New Mexico.* Atlas Folio 199, U.S. Geological Survey, 10p.

Palmer, W.C. 1965. *Meteorological drought.* U.S. Department of Commerce Weather Bureau, Washington, D.C. Research Paper No. 45.

The PRISM Climate Group at Oregon State University (PRISM). 2012. United States average monthly or annual precipitation, 1981-2010. July 10, 2012. <http://www.prism.oregonstate.edu/normals/>.

Reeder, H.O. 1957. *Ground water in Animas Valley, Hidalgo County, New Mexico*. Prepared in cooperation with U.S. Geological Survey. State of New Mexico State Engineer Office Technical Report No. 11.

Resource Technology, Inc. (RTI). 1991. *Southwest New Mexico regional water plan, Southwest New Mexico Planning District V: Catron, Grant, Hidalgo, and Luna counties*. Prepared for Southwest New Mexico Council of Governments and Black Range RC&D. April 1991.

Reynolds, S.E. 1969. *Colorado River Basin Project as it affects New Mexico.* Presentation given at the 14th Annual New Mexico Water Conference, Las Cruces, New Mexico. March 27, 1967.

Schwennesen, A.T. 1918. *Ground water in the Animas, Playas, Hachita, and San Luis basins, New Mexico.* U.S. Geological Survey Water-Supply Paper 422. 35p.

Silver City Daily Press. 2014. *Geothermal plant providing electricity.* January 17, 2014. <http://www.scdailypress.com/site/2014/01/17/geothermal-plant-providing-electricity/>

Sites Southwest. 2010. *City of Deming Comprehensive Plan Update.* July 2010. Available at <http://swnmcog.org/images/demingcomplan-7-10final.pdf>.

Sites Southwest. 2012. *Luna County comprehensive plan update.* December 2012. Available at <http://www.lunacountynm.us/media/documents/LunaCo-CompPlan_finaldraft12-12.pdf>.

Smith Engineering. 2014. *Deming municipal water supply optimization review.* April 2014

Southern Power and Turner Enterprises, Inc. 2015. Macho Springs Solar Facility. <http://www.southerncompany.com/about-us/our-business/southern-power/pdfs/SP_Macho_Springs_Solar_fact_sheet.pdf> Accessed October 2015.

Stewart, R. 2009. The ocean's influence on North American drought. *In Oceanography in the 21st century - An online textbook.* <http://oceanworld.tamu.edu/resources/oceanography-book/oceananddrought.html>.

Thibault, J., and C. Dahm. 2011. Groundwater well data from the Middle Rio Grande riparian zone (1999-). Dataset available at <http://sev.lternet.edu/node/4256>. Sevilleta Long-Term Ecological Research.

Town of Silver City. 2004. *Silver City comprehensive plan.* March 2004. Available at <http://www.townofsilvercity.org/r/town_of_silver_city_NM.php?r=67,yju2r>.

Trauger, F.D. 1972. *Water resources and general geology of Grant County, New Mexico*. Hydrologic Report 2, New Mexico State Bureau of Mines and Mineral Resources. Prepared in cooperation with U.S. Geological Survey, New Mexico State Engineer Office, and Grant County Commission.

Trauger, F.D., and E.H. Herrick. 1962. *Ground water in central Hachita Valley, northeast of the Big Hatchet Mountains, Hidalgo County, New Mexico*. Technical Report 26, New Mexico State Engineer, Santa Fe, New Mexico. Prepared in cooperation with U.S. Geological Survey and U.S. Army Corps of Engineers.

Trauger, F.D., and G.C. Doty. 1965. Ground water—Its occurrence and relation to the economy and geology of southwestern New Mexico. *In* Fitzsimmons, J.P., and C. Lochman-Balk (eds.), *Guidebook of southwestern New Mexico II*. Proceedings of New Mexico Geological Society, Sixteenth Field Conference, 15-17 October 1965.

U.S. Army Corps of Engineers. 1999. National Inventory of Dams (NID) database. <http://nid.usace.army.mil/cm_apex/f?p=838:4:0::NO>

U.S. Bureau of Land Management (BLM). 1990. *Draft environmental impact statement, Fence Lake project*. U.S. Department of the Interior, Bureau of Land Management, Las Cruces District Office, Socorro Resource Area. May 1990.

U.S. Bureau of Reclamation (USBR). 2011. SECURE Water Act Section 9503(c) – Reclamation climate change and water 2011. Prepared for United States Congress. April 2011.

U.S. Bureau of Reclamation (USBR). 2013. *USBOR west-wide climate risk assessment: Upper Rio Grande impact assessment.* Upper Colorado Region, Albuquerque Area Office. December 2013. Available at <http://www.usbr.gov/WaterSMART/wcra/docs/urgia/-URGIAMainReport.pdf>

U.S. Census Bureau. 2010. TIGER/Line Shapefile, 2010, 2010 state, New Mexico, 2010 Census Block State-based. <http://www.census.gov/geo/www/tiger>.

U.S. Census Bureau. 2014a. Annual estimates of the resident population: April 1, 2010 to July 1, 2013. American Fact Finder <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t> Accessed May 2014.

U.S. Census Bureau. 2014b. Profile of general population and housing characteristics: 2010. American Fact Finder. <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_DP_DPDP1> Accessed May 2014.

U.S. Census Bureau. 2014c. State & county quickfacts: New Mexico. Data derived from population estimates, American community survey, census of population and housing, state and county housing unit estimates, county business patterns, nonemployer statistics, economic census, survey of business owners, building permits. <http://quickfacts.census.gov/qfd/states/35000.html> Last revised July 8, 2014.

U.S. Census Bureau. 2015. TIGER/Line Shapefiles 2015. <https://www.census.gov/geo/maps-data/data/tiger-line.html>. Released August 19, 2015.

U.S. Congress. 2004. *Arizona Water Settlements Act.* Public Law 108–451, 108th Congress, 118 STAT. 3478. December 10, 2004. Available at <https://www.congress.gov/108/plaws/publ451/PLAW-108publ451.pdf>.

U.S. Department of Agriculture National Agricultural Statistics Service (USDA NASS). 2014. *2012 Census of agriculture: New Mexico state and county data.* Volume 1, Geographic Area Series, Part 31, AC-12-A-31. May 2014. Available at <http://www.agcensus.usda.gov/-Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/New_Mexico/nmv1.pdf>.

U.S. Environmental Protection Agency (EPA). 2013. Superfund National Priorities List (NPL) sites, EPA Region 6. Vector digital data available at <https://edg.epa.gov/data/public/R6/NPL/>. June 2013.

U.S. Environmental Protection Agency (EPA). 2014. About Superfund: New Mexico site status summaries. <http://www.epa.gov/region6/6sf/6sf-nm.htm>. Accessed June 2014.

U.S. Environmental Protection Agency (EPA). 2015. Final 2015 MSGP documents. <https://www.epa.gov/npdes/final-2015-msgp-documents> Accessed April 2016.

U.S. Environmental Protection Agency (EPA). 2016a. Deleted National Priorities List (NPL) sites - by state. <https://www.epa.gov/superfund/deleted-national-priorities-list-npl-sites-state#NM> Accessed May 20, 2016.

U.S. Environmental Protection Agency (EPA). 2016b. National Priorities List (NPL) sites - by state. <https://www.epa.gov/superfund/national-priorities-list-npl-sites-state#NM> Accessed May 20, 2016.

U.S. Geological Survey (USGS). 2014a. Annual water data reports. <http://wdr.water.usgs.gov>.

U.S. Geological Survey (USGS). 2014b. Groundwater levels for New Mexico. <http://nwis.waterdata.usgs.gov/nm/nwis/gwlevels> Accessed April 2014.

U.S. Geological Survey (USGS). 2014c. USGS surface-water data for the nation. <http://waterdata.usgs.gov/nwis/sw>.

U.S. Geological Survey (USGS). 2014d. National hydrography dataset: Get NHD data [NHD extracts by state]. <http://nhd.usgs.gov/data.html> Accessed August 2014.

U.S. Global Change Research Program (USGCRP). 2009. *Global Climate Change Impacts in the United States: 2009 Report.* <http://nca2009.globalchange.gov/southwest>.

Ward, F.A., and M. Pulido-Velazquez. 2008. Water conservation in irrigation can increase water use. *Proceedings of the National Academy of Sciences* 105(47):18215–18220.

Western Regional Climate Center (WRCC). 2014. Cooperative climatological data summaries: NOAA cooperative stations - Temperature and precipitation. <http://www.wrcc.dri.edu/summary/Climsmnm.html>. Data for New Mexico downloaded May-June 2014.

Wilkins, D.W. 1986. *Geohydrology of the southwest alluvial basins, Regional aquifer-systems analysis in parts of Colorado, New Mexico, and Texas*. Water-Resources Investigations Report 84-4224, U.S. Geological Survey.

Willard, M.E. and R.H. Weber. 1958. *Reconnaissance geologic map of Cañon Largo 30-minute quadrangle*. New Mexico Bureau of Mines and Mineral Resources Geological Map 6, scale 1:26,720.

Williams, A.P., C.D. Allen, C. Millar, T. Swetnam, J. Michaelsen, C.J. Still, and S.W. Leavitt. 2010. Forest responses to increasing aridity and warmth in southwestern North America. *Proceedings of the National Academy of Sciences, USA* 107(50):21289-21294.

Appendix 2-A

Master Stakeholder List

Southwest New Mexico Region 4 RWP Master Stakeholder List

Updated December 9, 2016

Last	First	Affiliation / Category
		San Francisco SWCD
Alcorn	Marilyn	Grant County
Allred	Bucky	Catron County Commissioner
Ashby	Wayne	Rancho Grade Water Association
Barr	Ken	Grant County Food Policy Council
Bates	Tom	Deming Soil and Water Conservation District
Bauch	Richard	Village of Santa Clara
Bays	Ty	AWSA Freeport & McMorun Cooper
Berg	Gary	Engineers Inc.
Bernal	Mark	BLM
Bettison	Cynthia Ann	Councilor, Town of Silver City
Boyett	Sara	SWNM Audubon Society
Boykin	Doug	NM State Forestry
Brown	Alex	Town Manager & Finance Director, Silver City
Burr	Elizabeth	Luna Health Promotion Team
Cano	Guadalupe “Lupe”	Councilor, Town of Silver City
Carlos	Erica	City of Deming
Castaneda	Valerie	Grant County Health Council
Chaires	Richard	Hidalgo County Commissioner
Childress	William T.	GS340 - District Manager
Clark	Kim	AWSA SCR Associate Realtors
Cloudt	Nancy	Rodeo MDWCA
Conway	John	The Volunteer Center
Cook	Kevin	Freeport McMoran
Cooper	Martha Schuman	The Nature Conservancy
Cordell	Connie	Mayor, Village of Reserve
Dabb	J.J.	Gila Cooperative and Farmers’ Market
Darrow	Michael	Fort Sill Apache
De La Garza	Alex	City of Lordsburg
De La Garza	Melissa	Hidalgo County Clerk
Deubel	Mick	Alternative Forestry
Diaz	Javier	Luna County Commissioner
Dodds	Eileen	WD & SAWC

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.

Southwest New Mexico Region 4 RWP Master Stakeholder List

Updated December 9, 2016

Last	First	Affiliation / Category
Dombrowski	Roger	Grant County Citizen
Dunivan	Donna	Pinos Altos Water Association
Edwards	Alicia	Director, of The Volunteer Center of Grant County
Encinias	Edward	Mayor, Town of Hurley Mayor
Escobar	Elizabeth	Rodeo Water Users
Esqueda	Robert	Town of Silver City
Estrada	Vicky	NM Forest Watershed Restoration Institute
Etcheverry	Jessica	Director, Luna County Community Projects
Evers	Edward	Town of Hurley
Fisher	Ben	Silver City Daily Press
Fleming	Tom	Rosedale Mutual Domestic Water Association
French	Debra	Luna County Community Member
Fuller	Brigitte	Wilson & Company for Village of Columbus
Gaume	Norm	
Giese	Michele	Health Promotion Specialist, Southwest Region Health Promotion Team, Grant County Public Health Office
Gil	Esther	Hurley
Giron	Andre	Manager, Village of Reserve
Gojkonich	Emily	Southwest NM Council of Governments
Goodman	Melanie	Senator Tom Udall Field Office
Green	Tisha H.	Administrator, Hidalgo County
Griffin	Glenn	Gila Tree Trimmers
Grijalva	Alma	Food Service Director, Cobre Consolidated School District
Gutierrez	Anthony	NM Cap Entity
Hall	Ron	Commissioner, Grant County
Hand	Anita	Commissioner, Catron County
Haozous	Jeff	Chairman, Ft. Sill Apache
Harriet	Ruth Ann	Quemado SWCD Salado SWCD
Harris	Buford	ISC Commissioner
Head	Tom	Freeport Copper
Hull	Cynthia	Senator Martin Heinrich Field Office
Hunt	Patricia E.	Farm Bill Program Specialist, Silver City NRCS Field Office
Hutchinson	Howard	San Francisco SWCD
Inman	Dennis	WD Board member
Jameson	Ryan	Surface /Ground Water User
Jasso	Benny	City of Deming

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.

Southwest New Mexico Region 4 RWP Master Stakeholder List

Updated December 9, 2016

Last	First	Affiliation / Category
Jasso	Lila	Administrative Secretary, City of Deming
Jensen	Rulene	Mayor, Village of Virden
Jichlinski	Michel	Principal, Ascendant Program Services, LLC, Augustin Plains Ranch
Juarez	Glory	Interim County Manager, Luna County
Kaminski	Nancy	
Kasten	Brett	Commissioner, Grant County
Kellar	Hilda	Mayor of Reserve
Kelly	Charles	Bayard City Hall
Koury	Carolyn	Gila National Forest
Larsen	Karla	Trout Valley MDWCA
Levine	Lacy	NM Department of Agriculture
Lucero	Denisha	Executive Assistant for the Grant County Commission
Lucero	Priscilla	SWNMCOG
Lucero	Willie	State Land Office
Mackie	Ann L.	Town Clerk, Silver City
Madrid	Frank	City of Lordsburg
Marshall	James	Asst. Town Manager, Silver City
Martinez	Fernando	Mayor, Town of Hurley
Massengill	Jim	Deming Public Works Director
McClintic	Stewart	Silver City Daily Press
McSpadden	Katie	Hidalgo SWCD
Mendez-Lopez	Sylvia	Nutritionist and part-time faculty at Western New Mexico University
Miera	Gilbert	Arenas Valley Water Association
Moeny	John	NMED/SWQB
Morales	Howie	NM State Legislator
Morgan	Genevieve	Farm Manager, San Vicente Farms LLC
Morones	Michael S.	Mayor, Silver City
Murphy	Mary Alice	Reporter, Grant County Beat
Ortiz	Kristina	City of Bayard
Ossim	Susan	NMED/SWQB
Peru	Bertha	North Hurley MDWCA
Pittman	Carol	
Portillo	Crystal	Grant County
Prince	Kathy	Lake Roberts Water Association
Ramos	Gabriel	Commissioner, Grant County
Rasmussen	Ben	Grant County Food Policy Council

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.

Southwest New Mexico Region 4 RWP Master Stakeholder List

Updated December 9, 2016

Last	First	Affiliation / Category
Ray, Jr.	Jose A.	Councilor, Town of Silver City
Reece	Mary	Bureau of Reclamation, Program Development Division Manager in the Phoenix Area
Reese	Justin	Public Works Director, Grant County
Rivera	Jose	UNM, Professor
Rivera	Julia Faith	Gila Ranger District, CFRP Coordinator
Robinson	Abby	
Robinson	Matt	Luna County Health Council
Rodriguez	Freddie	Town of Hurley
Rooks	Stewart	Grant County Farm and Livestock Bureau
Salas	Esequiel Bruce	Columbus Trustee
Salas	Martha	Town of Hurley, Town Clerk
Salmon	Dutch	GCC
Schadel	Arlene	Gila Economic Development Alliance
Schulke	Todd	Center for Biodiversity
Schultz	Gerald	NM RC&D
Sera	Aaron	Deming Asst. City Administrator
Shannon	Darr	Hidalgo County SWCD
Shelby	Joanne	Deming-Luna Economic Development Inc.
Sherman	Nancy	Luna County Healthy Kids
Siwik	Allyson	GRIP and GCC
Skinner	Philip	Mayor, Village of Columbus
Smith	Carolyn Honey	Grant County Food Policy Council
Smith	Clark	Mayor, Village of Lordsburg
Smith	Denise	Office of Sustainability, Silver City
Song	John	Grant County Food Policy Council
Stevens	Donna	UGWA Director
Stockton	Kenneth	NM Acequia Commissioner
Strong	Matthew	Preferred Produce Inc.
Telles	Art	Gila N.F.
Terry	Scott C.	President - CEO, Silver City Grant County Chamber of Commerce
Timme	Terry	Audubon
Valdez	Erica	Hidalgo SWCD Admin. Asst.
Vowles	Tonya	NM State Forestry
Ybarra	Tony	U.S. Forest Service, Gila NF
Ward	Ryan	Water Policy Analyst, New Mexico Department of Agriculture

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.

Southwest New Mexico Region 4 RWP Master Stakeholder List

Updated December 9, 2016

Last	First	Affiliation / Category
Warhank	Brandi	Women, Infant and Children (WIC) Nutritionist, New Mexico State Dept. of Health
Webb	Charlene	Grant County Manager
Wiseman	Matthew	Natural Resources Conservation Black Range Resource Conservation and Development Inc.
Ylarraz	Paula	Hidalgo County Food Coalition Rodeo Farmers Market

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 2-B

Single Comment Document: Summary of Comments on Technical and Legal Sections

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
1	Eileen Dodds and Dennis Inman	Section 5.3	No where in existing Regional Water Planning literature is the correlation between the San Agustin Plains and the Tularosa-San Francisco Rivers, or the Gila River mentioned. Hydrological studies from the 1970s indicate an underground water connection to these rivers, and the possibility of Alamosa Creek as well. This hydrological connection needs to be part of the RWP before the Basin is allowed to be pumped for commercial sale to Albuquerque or Rio Rancho.
2	Gila Conservation Coalition	General	As noted in the attached comments, the December version of the draft differs from what is posted on the ISC's website. I was not able to go back and compare the two documents to determine the extent of the differences apart from formatting and Section 2 on Public Participation. Given that Steering Committee members were not notified of the differences between versions, I would like to reserve the right on behalf of all steering committee members to review the Regional Water Plan document again before it is finalized.
3	Gila Conservation Coalition	General	Misleading, false and unsupported statements occur throughout the plan.
4	Gila Conservation Coalition	General	The updated plan, ostensibly intended to provide the basis for prioritization of the projects list, fails totally to address the big picture water management problems that the region must solve, alternatives for addressing these problems, thoughtful consideration of choices, and selection of a preferred approach. Neither does it provide the factual basis necessary for a legitimate planning effort.
5	Gila Conservation Coalition	General	The plan omits a number of key studies and data, such as the State Engineer approved 40 year municipal water plans; discussion of Columbus and Mining District communities of Bayard, Hurley, Santa Clara; OSE and other groundwater modeling studies; Bureau of Reclamation supply/demand study and other reports conducted for the Arizona Water Settlements Act Planning Process; data from the annual Arizona v. California decree reports; and data regarding reduction in Mimbres Basin depletions from conversion of flood irrigation to drip irrigation.
6	Gila Conservation Coalition	General	Even more so than the 2005 SWNM Regional Water Plan, the updated plan draft and the process appear to be geared toward support for the Gila River diversion. The narrative misrepresents the purpose of the Arizona Water Settlements Act. At every opportunity the narrative emphasizes misleading statements about the availability of water and the ability of the AWSA to satisfy needs that are improperly characterized.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
7	Gila Conservation Coalition	General	The common technical platform is biased and does not reflect reality, as it does not take into consideration groundwater in storage and the permitted supply of municipalities and the mining sector, or large amounts of unused Gila and San Francisco Rivers consumptive use allocations set forth in the U.S. Supreme Court decree in Arizona v. California. It does not coordinate in any way with State Engineer approved 40 year water plans. The projected decline in groundwater levels appear to be due to selection of an unreasonable worst case scenario (with no responsive actions such as deepening or replacing marginal wells), although the results and the narrative fail to disclose this.
8	Gila Conservation Coalition	General	Unused Arizona v. California decree consumptive use allotments to New Mexico are strategically omitted while the decree is falsely described as a limiting factor historically and currently. Discussion misrepresents the history, impacts, and limits imposed by the decree and the purpose of the AWSA.
9	Gila Conservation Coalition	General	The response of the Mimbres Basin aquifer is very different spatially. It is disinformation to characterize it as if it had a single dimension. It is necessary to use modern tools, such as groundwater flow models, rather than the single dimension approach used in the draft plan that is so oversimplified as to be devoid of any practical meaning.
10	Gila Conservation Coalition	General	The regional water plan ignores the regional water budget for the Mimbres Basin aquifer, as clearly and thoughtfully presented in the Office of the State Engineer's Hydrology Bureau 2011 report and model (Cuddy and Keyes, 2011). Huge recent changes in the aquifer budget resulting from changes in agricultural uses are either absent from or misrepresented in the draft regional water plan.
11	Gila Conservation Coalition	General	Aggregate numbers for supply, demand, and the gap between supply and demand are meaningless from a water planning perspective. Communities can't conduct effective water planning at the sub basin or sub watershed level with aggregated regional numbers.
12	Gila Conservation Coalition	General	The estimated gap in the regional water plan is not coordinated with the 40 year water plans of municipalities in the SWNM water planning region. It's also difficult to do the cross walk with aggregate numbers.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
13	Gila Conservation Coalition	General	The steering committee facilitator emailed out the files of the RWP draft on December 14, 2015. At the January 2016 meeting steering committee members were told they had until March 10 to submit comments. However, it was only on March 2 (eight days before review comments were due), that the steering committee was provided with the link to revised/updated versions of the documents on the ISC website. The steering committee was not told that these documents are in fact different from what was provided to us in December. For example, Public Participation Section 2 is in the more recent version of the document on the ISC website, but was not included in the version circulated via email to the steering committee in December. It is unknown if there are any other discrepancies, therefore, **more time should be given for steering committee members to provide comments on the newer versions of the draft documents**.
14	Gila Conservation Coalition	Legal	Section 4.1.5 discussion of local water laws and policies has some omissions. **See comments in track changes for specifics.**
15	Gila Conservation Coalition	Legal	"The following section on page 37 is wrong; “The region suffers from a deficit of water. The AWSA was enacted by Congress with the intent to soften the local impacts of the U.S. Supreme Court decision in Arizona v. California, 376 U.S. 340 (1964). However, implementation of a project is still years away. Lack of additional water resources is one reason the region, one of the poorest in the country, is experiencing little to no growth.” It is true that the desert’s water resources are limited. The degree of suffering and regional poverty attributable to “lack of additional water supplies” is an opinion without factual support or logic disclosed. It is also true that an AWSA water development project is years away. However, it is wrong by omission that the AWSA is presented in the draft plan, particularly in the Water Demand section (see comments below), as being even remotely capable of either “softening regional impacts” or being sufficient to change “little or no growth.” It is incorrect that the intent of Congress in passing the AWSA was to soften the local impacts of Arizona v California. The relevant facts, including citations, are contained in Ira G. Clark’s Water in New Mexico: A History of its Management and Use, UNM Press, 1987, pages 520 through 531. The updated regional water plan would be vastly improved if it replaced its AWSA advocacy propaganda with scholarly researched history.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
16	Gila Conservation Coalition	Legal	"The following paragraph is a mixture of false logic. The discussion includes true facts and inferences associated with those facts that are just plain wrong: "The U.S. Supreme Court, in its 1964 Arizona v California Decree, limited New Mexico's consumptive use from the Gila and San Francisco Rivers to about 30,000 acre-feet per year, with no consideration for future growth. The 1964 Decree also limits the amount of water use in each of New Mexico's three sub-basins in the Gila Basin. Any unused amount in one sub-basin cannot be added to the limit imposed on another sub-basin." The following spreadsheet [see comments for tables - difficult to incorporate into this comment format] shows actual consumptive use reported by the ISC pursuant to the annual reporting requirements for 1969, the first year of complete reporting pursuant to the decree, and for 2014, the most recent year for which reporting is complete. All of the ISC's annual decree reports are highly pertinent and should be cited and analyzed in the regional water plan water supply and demand sections. [Continued on next line]
16 Continued			[Continued from above] The 1969 annual report, which it describes itself as the first to fully incorporate the system of measurements required by the decree, shows aggregate consumptive use of 51% of the decreed annual limit, with an ample margin between decreed use and actual use in each sub-basin. The key consumptive use reporting table from the 1969 annual report is depicted below. The top half of the spreadsheet above totals and provides percentages for the two rightmost columns of this table. The difference between actual annual consumptive use and the allotted amounts of consumptive use pursuant to the decree is even greater in 2014. Only 45% of the combined allotted limit of 30,000 acre-feet was actually consumptively used in 2014, leaving more than 15,000 acre feet of allocated senior consumptive use rights unused and flowing across the state line to Arizona. This materially relevant omission appears to be deliberate and strategically intended to mislead those who would rely on the regional water plan. Although the State Engineer considers the Gila River Basin in New Mexico fully appropriated, the ISC has continuously reported, every year since annual decree reporting began in 1968, much less actual consumptive use than New Mexico's legal consumptive use entitlements in each and every sub-area defined in the decree.
17	Gila Conservation Coalition	Legal	The Plains of San Augustin water export scheme is mentioned in the Middle Rio Grande regional water plan draft update in the context of the regulatory powers of the Office of the State Engineer. It should be cited in this plan also. The SW New Mexico update regional water plan should cite and address references that indicate that the aquifer that the project would develop is within the Southwest New Mexico Planning Region and discharges to the Gila River Basin.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
17a	Jeff Haozous, Chairman, Fort Sill Apache Tribe	Legal	We would like to replace the existing text under Tribal Law on page 22 with the following text: Water use on the Fort Sill Apache tribal trust land in New Mexico is governed by tribal law. (Inserted as comment number 146 at the end of this document).
18	Gila Conservation Coalition	Water Supply	Key water supply issues on pages 38 and 39 are false and misleading and need to be corrected: "Declining groundwater levels in the Animas, Mimbres, and Nutt Hockett Basins (central and southern part of the region) due to heavy pumping for municipal and agricultural use present an issue for long-term sustainability of groundwater resources in the region." For the reasons outlined below, this blanket statement needs to be rewritten. Heavy pumping for agriculture, not municipal and industrial demand, dominates and is the exclusive source of the groundwater overdraft in the Animas and Nutt Hockett Basins. In the Mimbres Basin, we see localized declines due to agricultural pumping. Fallowing of fields combined with conversion to drip irrigation have reduced groundwater pumping by 13,300 af/y and brought about a recovery of groundwater wells in the Deming area. Cuddy and Keyes (2011) demonstrate that Mimbres Basin annual depletion of stored groundwater has declined to 15,000 af from a high of 60,000 af in the 1970's. The Plan needs to acknowledge the positive progress toward reducing net depletions of stored groundwater. "Recent increases in irrigation efficiency have not reduced pumping; instead, they have increased the amount of water consumption (Intera, 2013)." [Continued on next line]
19 continued			[Continued from above] This statement cites the Intera report. However, this issue was not addressed within a meaningful mass balance context by the Intera report. A professional report by consulting hydrologist John Ward that the Gila Conservation Coalition provided to the RWP contractor was not used nor cited. It's analysis and conclusions show why the statement above is in error: Using ISC's consultant's (Intera) comparative results, the total amount of water applied to a drip irrigated field was 25% less (half an acre foot/acre in their study) than to a flood irrigated field. There is a greater proportion of beneficial consumptive use 7 by the crop and less return flow with drip irrigation, reducing withdrawals because one does not need to pump that extra amount in the first place (as one would with flood). The increased irrigation efficiency of drip irrigation and resulting increased crop yield are equivalent to growing the same crop yield on 25% fewer acres. That is, growing on 3 acres with drip what flood irrigators are growing on 4 acres. A conversion of 75% to 85% of agricultural lands to drip irrigation has conserved more than 10,000 acre-feet annually. Total irrigation water withdrawals have declined from approximately 90,000 acre-feet per year to 30,000 acre-feet per year in the past 20 years.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
19 continued			[Continued from above] This statement on page 39 needs to be put in context: "The U.S. Supreme Court, in its 1964 Arizona v California Decree, limited New Mexico's consumptive use from the Gila and San Francisco Rivers to about 30,000 acre-feet per year, with no consideration for future growth." While it is true the Arizona v. California decree did not provide for future growth in the consumptive use allocation to New Mexico, neither did the Pecos River Compact, nor the Rio Grande Compact, nor the Costilla Creek Compact, nor the La Plata River Compact. But that is an immaterial point when compared to the fact that half of the decreed consumptive use allotment was not initially used nor is it in use today. See specific data in the water supply section above. This statement on page 39 is partially false: "The 1964 Decree also limits the amount of water use in each of New Mexico's three sub-- basins in the Gila Basin. Any unused amount in one sub-- basin cannot be added to the limit imposed on another sub-- basin." The decree limits consumptive use transfers for irrigation uses between any of the individually named irrigation areas of the Gila River, the San Francisco River, and San Simon Creek. The decree does not prohibit transfers for other purposes of use and allows export of water subject to the decree out of the Gila River basin.
20	Gila Conservation Coalition	Water Supply	Regional Hydrogeology section is missing an important, more recent paper regarding the Mimbres Basin Aquifer: New Mexico Geological Society Guidebook, 59 GEOLOGIC CONTROLS ON GROUND-WATER FLOW IN THE MIMBRES BASIN; Finch et al. 189th Field Conference, Geology of the Gila Wilderness - Silver City 8 Area, 2008, p. 189-198. This paper is important as it estimates the amount of water in storage as 246.5 million acre-feet.
21	Gila Conservation Coalition	Water Supply	"Aquifer Conditions discussion in Section 5.3.2 has omissions and is misleading: The discussion neglects consideration of usable water in aquifer storage. "Steady water level declines have been observed in the Lordsburg and Deming areas where pumping withdrawals are high." This statement is misleading as it tells only half the story. The data in Figure 5-11 do not support this statement, as they show more wells have recovered rather than declined (see discussion below).
22	Gila Conservation Coalition	Water Supply	Water Quality Assessment in Section 5.4 has a number of omissions. **See specific comments in track changes.**

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
23	Gila Conservation Coalition	Administrative Water Supply	The OSE Hydrology Bureau's 2011 groundwater model (Cuddy and Keyes, 2011) was not applied in any meaningful way to project area-specific aquifer responses to future pumping projections. This would have been far easier and more meaningful than the grossly oversimplified, one dimensional administrative water supply concept with lumped future projection of well water columns. Cuddy and Keyes Mimbres Basin model water budget conclusions ignored include: (1) The 15,000 AF annual reduction of aquifer storage currently is only 25% of the 60,000 per year depletion of aquifer storage in the 1970s; (2) That overall depletion of storage means little, since drawdowns from predevelopment and exploitable aquifer thickness are unevenly distributed; and (3) Northern areas are stable or able to sustain pumping for a long time to come, while localized depletions in the pumping centers adjacent to Deming may present water supply limits.
24	Gila Conservation Coalition	Administrative Water Supply	Methodologies used to estimate projected groundwater declines are biased. Models and model-derived water budgets were ignored, while selective, likely biased hydrographs of water level decline are emphasized. For example: The maximum well decline in the Mimbres Basin occurred in Luna County based on Figure 5 11 but was applied to Grant County in the modeled projected well decline. However, this is inappropriate because this Luna County maximum well decline does not reflect what is happening in Grant County based on Figure 5 11. Therefore, the RWP's modeled projected groundwater declines for Grant County are not supportable. The discussion does not give sufficient detail on the methodology to make it clear that the estimates for Grant County are likely biased toward higher estimated decline. The Plan's conclusion regarding comparison of modeled declines in 2060 vs. 2060 declines using actual rates of decline are incorrect. The model predicted greater decline overall (3.5% higher). However, the breakout for Underground Water Basin also needs to be examined. The modeled decline for the Mimbres Basin assigns more of the decline to Grant County relative to Luna County than what we see using actual rates of decline. The modeled decline for Grant County is 5 times more in 2060 than when using actual rates of decline. (This is because the maximum decline for the Mimbres Basin which occurred in Luna County was applied for Grant County.) For Luna County, the 2060 decline using actual rates of decline is 1.5X more than the modeled decline. Therefore the model underestimates declines for Luna County and significantly overestimates them for Grant County.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
25	Gila Conservation Coalition	Administrative Water Supply	Well data do not support Plan's conclusion that the Mimbres Aquifer is in overall significant decline. Examination of Figure 5 11, shows that more wells have recovered than declined in Luna County, while Grant County wells show minimal change or well recovery. Some of the modeled decline in the northern extent of the Mimbres Basin Aquifer is a modeling artifact due to a no flow model boundary in an area of the aquifer that is hydrologically continuous along the length of the Mangas Trench which spans the Continental Divide and the current groundwater flow divide between the Mimbres Basin and the Gila River Basin. Figure 5-11 refutes the plan's narrative that the Mimbres Aquifer overall is in critical decline. Recent OSE well data is biased. The most recent water level measurements (2012) relied on by ISC were collected late into the irrigation season; preceding measurements (1997, 2002, 2007) were collected generally earlier in the irrigation season or prior to the season. Measurements collected later in the season are influenced by pumping from nearby irrigation wells. Of the 5 wells with the greatest declines since 2007 (25-80 feet), all are near active areas of irrigation. All 5 measurements should be considered an artifact of poor data collection practices. The magnitude of groundwater level changes for the Basin indicates overall rising water levels between 2007 and 2012.
26	Gila Conservation Coalition	Drought Supply in Section 5.5.2	The future drought water supply projections (no recharge whatsoever for 20 years) are irrational as they assume there would be no rational response to drought, such as deepening or relocating wells, or decreased irrigation due to costs of pumping. The projections are also irrational because they assume the impacts on the worst wells would represent the impacts on the best wells.
27	Gila Conservation Coalition	Drought Supply in Section 5.5.2	The region's ground water supply will not be reduced to only 37% by 2060 in a worst-case 20 year drought. Saying so as a basis for planning is unfounded and will result in a meaningless exercise.
28	Gila Conservation Coalition	Drought Supply in Section 5.5.2	Strategically omitted from this section is the fact that in such a drought, the water supply legally available for diversion pursuant to the AWSA will be equal to zero.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
29	Gila Conservation Coalition	Water Demand	Unsupported and incorrect statement on p. 65: "The Arizona Water Settlement Act will likely lead to greater water availability within the entire region, which could support economic development in Grant County, as well as the other counties in the region." This argument is totally unsupported. A full-blown billion dollar AWSA project with a 64,000 acre foot lined reservoir, according to the table in ISC's Value Engineering report by RJH consultants, October 2014, shows the firm yield of an AWSA project is only 6,000 acre-feet, and that optimistic yield is unsupported by any publicly available derivation and is disputed. Even if that were the case, once water for mitigation of environmental impact of the AWSA diversion (that is, to fulfill the ISC's stated purpose of keeping water in the river for fish below existing Cliff-Gila Valley diversions), and supplemental water for irrigation along the Gila River in New Mexico is removed from the Gila, half or less of that theoretical 6,000 acre-feet will be available for export and that is spoken for by Deming. Worse, the annual firm yield of a Phase I diversion as proposed in the Bureau of Reclamation's October 2015 Value Study, and as modeled by the ISC and posted at nmawsa.org, is only 2000 acre-feet. None of that water is proposed for export. [Continued Below]
29 Continued			[Continued from above] From another perspective, this statement relies on a "if you build it, they will come" argument and is not based in fact. On average, as noted above, more than 4,000 acre-feet of water per year authorized by Arizona v. California goes unused by irrigators on the Gila River. Freeport-McMoRan has been trying to get out from under a lease of water from the Starks Wellfield. No one wants to buy the 3,000 acre-feet of available water. The AWSA can't provide water for 20 years or more. Furthermore, it's unclear how much water it could provide, and at what cost. FMI has 63,000 acre-feet of water rights in SWNM and the company is using only 11 – 14% of them in any given year. The facts just don't support this statement.
RE: 29 - Response from Ty Bays with Freeport-McMoRan			At the 5-11-16 meeting, Ty Bays of Freeport McMoran said that he didn't agree with the statement that Freeport McMoran is only using 11-14% of it's water rights; he said he would need to research exact numbers but thought it was more like 70 percent of their rights are being used. He also said it is not correct that Freeport McMoran is trying to get out of a lease at the Starks wellfied. GCC responded that the 63,000 acre-feet of water rights that they were referring to was from the 2010 Amec Report done for ISC.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
30	Gila Conservation Coalition	Water Demand	Need to fix incorrect statement on P. 65 "While subject to fluctuation, copper prices have increased in recent years, leading to more jobs in the mining industry". Copper prices have significantly declined over the past 5 years. Copper prices are about $2/pound and have declined from an all time high of $4.50/pound in 2011. Freeport-McMoRan is in serious debt and trying to cut costs and relieve its debt burden. Therefore, Tyrone is no longer actively mining and FMI New Mexico Operations has laid off more than 200 people. Cobre Mine still has not reopened after 20 years on standby. Given weak demand and too much supply, analysts have predicted depressed copper prices for the next decade and decreased production in response (see http://www.businessfinancenews.com/27164-will supermines-rule-the-fate-of- mining-giants/) There are not more jobs in the mining industry now in Grant County relative to 1999. Based on NMEMNRD annual reporting data, copper mining employment in 1997 was 2,707; in 2008 it was 1,970; and in 2015 it was 1,842. Given the current outlook - there are substantial global supplies of copper, and the fact that NM's copper mines are playing out - there is no justification for saying that mining sector employment is on the rise.
RE: 30 - Response from Ty Bays with Freeport-McMoRan			At the 5-11-16 meeting, Ty Bays said that they laid off 43 people and others took early retirement (so the statement that they laid off more that 200 people is not correct). Also, Tyrone is actively mining - they have not shut down. And the Cobre mine is in the process of being permitted - it does have a future.
31	Gila Conservation Coalition	Water Demand	Discussion on p. 73 omits full, objective discussion of benefits of agricultural irrigation efficiency and the progress that Luna County farmers have made in reducing net aquifer depletions from conversion from flood irrigation to drip irrigation. See more detailed comments above in water supply section.
32	Gila Conservation Coalition	Water Demand	Ag to M&I ratio raw data is presented but not discussed. Recognition of the uses of water and their relative economic values is neglected.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
33	Gila Conservation Coalition	Water Demand Projections	The draft update plan under the heading 'Projections of Future Demand…' says, "In regions that use surface water for agriculture withdrawals, the 2010 administrative 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 demand for both the high and low scenarios." Table 6.1 indicates Catron, Grant, Hidalgo, and Luna County surface water diversions in 2010 totaling 82,820 acre feet. The demand projection methodology presumes that these demands will continue in the future and the gap analysis presumes that these need to be satisfied. No tabulation of actual acreage irrigated with surface water or unit diversions expressed as acre feet of diversions per acre of irrigated land is provided. However, the Arizona v. California decree report for 2010 contains the following data for the irrigated areas within the Gila River Basin in New Mexico [see comments for tabulated data]: ... Virtually all of these diversions reported pursuant to the decree are from surface water. It is irrational for the draft update regional water plan to project 17 and 18 acre-feet per acre as the future irrigation demand for water as a basis for the gap analysis. This example illustrates the flaws of the ISC's administrative water supply approach. It is a material omission that the update plan fails to address these high diversions and the associated low irrigation efficiencies, even though the decree reports show the historical unit diversions are consistently in the high teens or 20s of acre feet of water diverted per irrigated acre per year.
34	Gila Conservation Coalition	Water Demand Projections	The ISC dictated methodology that limits future surface water withdrawals to the 2010 withdrawal amount unless there is a new source of available supply (i.e., water project or settlement) is not justified since there is a large amount of available consumptive use decreed to NM under Arizona v. California that is not being used and has never been used. New Mexico is using roughly half of its depletion right. See the spreadsheet included in the water supply section of these comments.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
35	Gila Conservation Coalition	Water Demand Projections	Reasoning used to justify the administrative water supply methodology on page 75 cuts both ways. The Plan assumes that public water supply use stays steady given that "water rights used for public water supply have value and are not likely to be lost through forfeiture or abandonment proceedings; therefore, constant use is assumed even as population declines slightly, as public water suppliers may serve additional customers through annexation or regionalization, or because communities outside the municipal boundaries will request service from the municipal system." If this true, why doesn't the Plan factor in existing permitted water supply that municipalities hold in reserve as part of their 40-year water plans or the thousands of acre-feet of water rights that Freeport McMoRan owns and doesn't use? This approach is inconsistent.
36	Gila Conservation Coalition	Water Demand Projections	Projected water use for the mining sector is overestimated in Table 6 5. According to AMEC (2010), the EMNRD Mining and Minerals Division states that 13 mining is projected to decline statewide over decade 2010 – 2020. This has certainly been born out over the past year or so with Freeport-McMoRan shutting down mines in Arizona and the Tyrone mine in Grant County. It is unrealistic and not based on any reasonable indicators to double the amount of water use from the mining sector given the poor global outlook for copper mining over the next decade.
37	Gila Conservation Coalition	Gap between supply and demand	The gaps with and without the 20-year drought are meaningless due to the flawed methodology to estimate both the supply and the demand.
38	Gila Conservation Coalition	Gap between supply and demand	The majority of the region's water users are supplied by groundwater. There is no way that groundwater supply availability in 2060 will be only 37% of the 2010 supply. The stored water will last for centuries at current rates of demand. Rationally, irrigated uses, which are dominant, can be expected to continue to decrease as they have historically.
39	Gila Conservation Coalition	Gap between supply and demand	The problem is not a gap. Rather what is needed is a groundwater management plan to extend the life of the aquifer in the face of realistic declines in groundwater recharge by managing demand.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
40	Gila Conservation Coalition	Gap between supply and demand	The AWSA cannot contribute sufficient new supplies to make any material change in the Mimbres Basin aquifer budget. The total proposed allocation to Deming under the Phase 3 diversion proposal, 2,500 acre-feet annually, would amount to about half (or more) of Deming's projected demand to 2060 but is only one sixth of the current net annual depletion of stored aquifer water. With an estimated volume of 30 million acre feet of high quality groundwater in the Basin (this is a conservative estimate of storage in the Mimbres Basin (Hawley 2000) vs. the 246 million estimated by Finch et al.), the asserted Phase 3 yearly diversion of 2,500 acre-feet amounts to only 0.08% of the water in storage beneath Deming. At current rates of pumping in the Mimbres Basin, there is an 850-year supply of high quality groundwater, assuming no replenishment in the meantime. (Note that is is based on the conservative 30 million acre-feet estimate from above.) Adding 2,500 acre feet annually to Deming's supply would only amount to an additional 73-year supply of water in the Basin.
41	Gila Conservation Coalition	Gap between supply and demand	The plan should analyze the best and worst cases for AWSA new water and compare them to the gap, in the context of the facts that the AWSA water legally available for diversion will vanish in a drought, and will be materially reduced by projected climate change impacts.
42	Gila Conservation Coalition	Gap between supply and demand	The plan should consider the hydrological and legal means to bring New Mexico's unused allocation of consumptive use pursuant to the Arizona v. California decree into beneficial use rather than pretending that this senior water - the best right on the Gila River anywhere - is fully used.
43	Gila Conservation Coalition	Section 4.1.3.3	"The 1944 Treaty between the United States and Mexico regarding distribution of the waters of the Colorado may have some applicability since the Gila is a tributary to the Colorado River." **<How is this applicable?>**
44	Gila Conservation Coalition	Section 4.1.3.4	"The New Mexico CAP Entity will enter into **<Completed Nov. 23, 2015>** the New Mexico Unit Agreement with the Secretary of the Interior."
45	Gila Conservation Coalition	Section 4.1.5	This section covers more than just local laws. It also includes policies, goals, objectives. Why are the 40 year water plans not included in this section?
46	Gila Conservation Coalition	Section 4.1.5.3	Omission - discussion of a regional water distribution system for Silver City and Mining District
47	Gila Conservation Coalition	Section 4.1.5.3	"Grant County has no water code." **<Grant Co. must enforce state subdivision code that covers water availability.>**
48	Gila Conservation Coalition	Section 4.1.5.3	"However, the County's Comprehensive Plan, revised in 2003 **<2004>**, provides the County's general policies regarding water."

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
49	Gila Conservation Coalition	Section 4.1.5.3	The Comp Plan came out before the AWSA was passed so it states that it supports CAP water.
50	Gila Conservation Coalition	Section 4.1.5.3	"The County should prepare a Strategic Water Action Plan outlining actions..." **<Not sure what this is. This is not mentioned in the Grant County Comprehensive plan. There is a Gila and Mimbres Protection & Enhancement Strategy and the Water & Wastewater Servicing Strategy.>**
51	Gila Conservation Coalition	Page 26, 2nd bullet	"Restoring stream and river bi~~i~~**o**sques"
52	Gila Conservation Coalition	Section 4.1.5.4	Missing discussion of the Utilities section of the Town's Municipal Code covering new subdivisions and policies re: fees for water and sewer extensions. The developer is required to pay all water connection fees up front for all of the lots platted in the new development. Also The new (2006) language allows a developer to provide new water rights in lieu of paying the acquisition portion of the water connection fees. A single development can't encumber more than 20% of the water rights that are currently unused by the Town. And a buffer of 20% of the Town's entire allotment of water rights must be preserved as precautionary measure against exceeding use of authorized water rights during extended dry periods.
53	Gila Conservation Coalition	Section 4.1.5.5, 1st bullet	"Encouraging water ~~conversation~~**conservation** in a manner that is fair and equitable to all users."
54	Gila Conservation Coalition	Section 4.1.5.7, 2nd paragraph	The comprehensive plan does not say this. Here is the statement from page 26 and 27: "The County is already mining the aquifer (using more water than is replenished by recharge) and is predicted to run short of needed water supplies between 2040 and 2060, depending on location." This is a misleading statement. Based on current configuration of wells, there could be problems. Deming and Columbus both have sufficient water rights to meet high growth projections according to their 40-year water plans.
55	Gila Conservation Coalition	Page 30	Water issues for Mining district communities of Bayard, Hurley and Santa Clara are missing. Also Columbus water issues are missing.
56	Gila Conservation Coalition	Page 31, 1st and 2nd bullets	"Spikedace (endangered**; recovery team preparing plan**): Catron, Grant, and Hidalgo counties." "Loach minnow (endangered**; recovery team preparing plan**): Catron, Grant, and Hidalgo counties."
57	Gila Conservation Coalition	Section 4.3, 1st sentence	This is a blanket statement that is not supported by the data. This might be true for some areas within SWNM, but to apply this statement to the entire region is misleading and false.
58	Gila Conservation Coalition	Section 4.3, 2nd sentence	This is revisionist history and not the reason why the AWSA was enacted.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
59	Gila Conservation Coalition	Section 4.3, 4th sentence	This statement is false and is not supported by the data. There are thousands of acre-feet of water rights that are unused in SWNM. Freeport McMoRan has been trying to sell 3000 afy of water from the Starks well field for many years. There are no takers.
RE: 59, Response from Ty Bays with Freeport-McMoRan			Ty Base said they don't own those water rights and are not trying to sell other peoples water rights.
60	Gila Conservation Coalition	Section 5	This discussion is missing progress made in converting flood irrigation to drip in Luna and Hidalgo counties and the amount of water saved. Luna County Comprehensive Plan encourages conversion to drip from flood irrigation. According to the data, agricultural water use has declined by a factor of 3 since 1995 due to farm fallowing and conversion to drip irrigation. Water savings from conversion to drip from flood irrigation saves 13,300 afy.
61	Gila Conservation Coalition	Section 5, Page 39, 2nd bullet	These blanket statements are not supported by the data. There are localized declines due to agricultural pumping. as well as recovery of wells in the Mimbres Basin. Statement re: irrigation efficiency is not supported by the data. The Intera report is faulty. See detailed comments.
62	Gila Conservation Coalition	Section 5, Page 39, 3rd bullet, 2nd sub-bullet	True, but NM only using half of its depletion right since 1969 so it doesn't matter. The decree limits consumptive use transfers for irrigation uses between any of the individually named irrigation areas of the Gila River (3 areas), the San Francisco River (2 areas), and San Simon Creek. The decree does not prohibit transfers for other purposes of use, and allows export of water under the decreed water rights out of the Gila River basin.
63	Gila Conservation Coalition	Section 5, Page 39, 3rd bullet, 3rd sub-bullet	Capitalize "The" at the beginning of the bullet.
64	Gila Conservation Coalition	Section 5, Page 40, 1st main bullet, last sub-bullet	The correct title of this project is Grant County Regional Water Supply Project
65	Gila Conservation Coalition	Page 41, 3rd bullet	"Silver City and Deming have completed updated water conservation plans in the last few years and are actively implementing water conservation projects. The AWSA is providing up to 3 million dollars in funding for these **and other conservation** projects **in the region**."
66	Gila Conservation Coalition	Page 41, last bullet	What's the citation and what are the implications of these new criteria?

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
67	Gila Conservation Coalition	Section 5.1.2, Page 44, 4th paragraph	Gila River will cease to be a snowpack fed river by mid-century according to Dr. Gutzler.
68	Gila Conservation Coalition	Section 5.1.2, Page 45, 2nd bullet	Need to add that streamflows on the Gila River are likely to decrease according to Gutzler.
69	Gila Conservation Coalition	Section 5.3.1	Missing an important, more recent paper re: Mimbres Basin groundwater. New Mexico Geological Society Guidebook, 59 GEOLOGIC CONTROLS ON GROUND-WATER FLOW IN THE MIMBRES BASIN 189 th Field Conference, Geology of the Gila Wilderness - Silver City Area, 2008, p. 189-198.
70	Gila Conservation Coalition	Section 5.3.2	This discussion is missing discussion of the amount of water in storage.
71	Gila Conservation Coalition	Section 5.3.2	There is also the other Mimbres model developed by Shomaker & Associates that estimates that there is 246.5 million acre-feet of water in storage: GEOLOGIC CONTROLS ON GROUND-WATER FLOW IN THE MIMBRES BASIN, SOUTHWESTERN NEW MEXICO STEVEN T. FINCH, JR., ANNIE MCCOY, AND ERWIN MELIS John Shomaker & Associates, Inc., 2611 Broadbent Parkway NE, Albuquerque, NM 87107, sfinch@shomaker.com ; New Mexico Geological Society Guidebook, 59 GEOLOGIC CONTROLS ON GROUNDWATER FLOW IN THE MIMBRES BASIN 189 th Field Conference, Geology of the Gila Wilderness - Silver City Area, 2008, p. 189-198 https://nmgs.nmt.edu/publications/guidebooks/downloads/59/59_p0189_p0198.pdf
72	Gila Conservation Coalition	Section 5.3.2, Page 51, 1st complete paragraph	This tells only half the story since Figure 5-11 shows more wells that have recovered rather than declined.
73	Gila Conservation Coalition	Section 5.3.2, Page 51, 2nd complete paragraph	What is this in acre-feet? Finch et al estimate total recharge in the mimbres basin of 29,000 acre-feet/year. This is important for people to be able to put the volume of water from recharge in perspective.
74	Gila Conservation Coalition	Table 5-9	The table is missing NPDES permits for Freeport-McMoRan Chino and Tyrone mines.
75	Gila Conservation Coalition	Table 5-10	Table is missing Little Rock DP-1286
76	Gila Conservation Coalition	Page 53, last paragraph	"These mines present a potential threat to **surface and** groundwater quality because of some of the toxic compounds used in mineral extraction, including mercury and cyanide."
77	Gila Conservation Coalition	Page 53, last paragraph	"The Cleveland Mill site north of Silver City was previously listed as a Superfund site, but it is no longer included on the National Priorities List **because it was reclaimed** (Table 5-11)."

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
78	Gila Conservation Coalition	Page 53, last paragraph	This summary is incomplete. Need to add other sites on CERCLA list and other sites cleaned up since 2005 RWP e.g., San Vicente Creek tailings
79	Gila Conservation Coalition	Section 5.4.2, last paragraph	Discussion of where this is a problem. In Grant Co., Arenas Valley and Mimbres Valley, Deming Ranchettes, others?
80	Gila Conservation Coalition	Section 5.5	This methodology omits permitted water supply of municipalities and the mining sector and the amount of water in storage. 40-year water plans are not included at all in this discussion. Amount of unused water rights is also not discussed. See detailed comments on this section.
81	Gila Conservation Coalition	Section 5.5.1.1	This method seems to reflect current well configuration. Also the maximum well decline in mimbres basin which was in Luna county based on Figure 5-11, was applied to Grant Co. This does not reflect what is happening in Grant co and therefore biases the results.
82	Gila Conservation Coalition	Section 5.5.1.1, 1st bullet	Delete "s" in "Grants"
83	Gila Conservation Coalition	Section 5.5.1.1, 1st bullet	How was 2060 modeled pumping apportioned between two counties? What does this reflect? The maximum level of drawdown? Mining is playing out so diversions in 2060 are predicted to be lower with closeout of mines. The methodology needs to be put in context i.e, this is an extremely conservative approach.
84	Gila Conservation Coalition	Page 57, 3rd bullet	Delete "s" in "Grants"
85	Gila Conservation Coalition	Section 5.5.1.2	This methodology reflects current pumping rates and well configuration and does not reflect permitted supply or the amount of water in storage.
86	Gila Conservation Coalition	Table 5-14b	Need to QA the table – Playas Valley Row 6 and 7 are wrong – off by 2 decimal places. Should be 1.227%
87	Gila Conservation Coalition	Section 5.5.1.2, Page 58, 3rd bullet	It's median water column, so 50% of the wells are more than 16 feet. Your calculation is in error. See next comment.
88	Gila Conservation Coalition	Section 5.5.1.2, Page 58, 3rd bullet	Following how the calculations are done in the table, there is an error in calculation. Off by 2 decimal points. Row 6 should be 1.227 percent and Row 7 should be 20,342.3 af.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
89	Gila Conservation Coalition	Section 5.5.1.2, Page 58, 2nd paragraph	Comparison of modeled declines in 2060 for SWNM vs. 2060 declines using actual rates of decline: The models predicted greater decline overall (3.5% higher). However, you need to look at the breakout for UWB. The modeled decline for the Mimbres assigns more of the decline to Grant co. relative to Luna county than what we see using actual rates of decline. The modeled decline for Grant County is 5X more in 2060 than when using actual rates of decline. For Luna county, the 2060 decline using actual rates of decline is 1.5X more than the modeled decline.
90	Gila Conservation Coalition	Section 5.5.1.3, last bullet	Unless you change the place of withdrawal.
91	Gila Conservation Coalition	Section 5.5.2	This discussion omits the amount of water in storage.
92	Gila Conservation Coalition	Section 6.1, 3rd paragraph	"The predominant water use in 2010 in the Southwest New Mexico region was for irrigated agriculture, with 87 percent of ~~the~~**total** water use ~~in~~**from** that sector."
93	Gila Conservation Coalition	Section 6.2.2, Page 65, 1st complete paragraph, 1st sentence	This comment seems like a non sequitur. See detailed comments.
94	Gila Conservation Coalition	Section 6.2.2, Page 65, 1st complete paragraph, 2nd sentence	This is incorrect. See detailed comments.
95	Gila Conservation Coalition	Section 6.2.4, Page 68, 5th paragraph	Sapphire energy plant is an algae farm that is producing omega oils and protein for nutrition. When fully operational, the commercial site will beneficially reuse CO2 to produce Omega oils and protein from algae. The algae will consume approximately 56 metric tons of CO2 per day and produce, on average, 130 tonnes of Omega oils per year. http://www.sapphireenergy.com/locations/green-crude-farm
96	Gila Conservation Coalition	Page 72, 3rd paragraph	"As the largest water use in the region, conservation in this sector may be **the most** beneficial."
97	Gila Conservation Coalition	Page 73, 1st paragraph	While it may be true that irrigation efficiency may increase consumptive use within a stream system, for irrigation systems using pumped groundwater this may not be true. This discussion only tells half the story and leaves out the progress made in Luna County to reduce net depletions from conversion of flood irrigation to drip. See detailed comments.
98	Gila Conservation Coalition	Page 73, 2nd paragraph	This is a major omission and misrepresents the potential water savings from agricultural water conservation.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
99	Gila Conservation Coalition	Page 75, 1st paragraph	This method artificially limits supply and is not grounded in reality.
100	Gila Conservation Coalition	Page 75, 2nd paragraph	This may be true, so why doesn't the plan factor in existing permitted water supply or the thousands of acre-feet of water rights that Freeport-McMoRan owns. This approach is inconsistent.
101	Gila Conservation Coalition	Paragraph that spans pages 75-76, last sentence	This is hyperbole. What aquifers are going dry in the SW region? Well levels are dropping in some areas, wells are recovering in others. This statement is not supported by fact.
102	Gila Conservation Coalition	Page 76, 2nd complete paragraph	This is not supported by the data in Luna County. Farm fallowing has resulted in decreased withdrawals and the water has not necessarily been used elsewhere. Some water rights have been purchased by Deming for municipal use.
103	Gila Conservation Coalition	Page 77, last complete paragraph	This is the biggest category of water use in Grant Co. This discussion is unacceptable as it seems like boilerplate and doesn't reflect the specifics of mining in Grant County. Freeport mines are playing out and could be closed out within the 2060 time frame. This will reduce mining water use. This discussion needs to be beefed up. See AMEC report (2010).
104	Gila Conservation Coalition	Paragraph that spans pages 77-78	There are no coal mines in in the SWNM region.
105	Gila Conservation Coalition	Page 79, 3rd complete paragraph	Hyphenate "Freeport McMoRan" Mining water use projections are inflated. This statement is contrary to the prevailing thought that copper prices will remain depressed over the next decade. Tyrone has shut down and Cobre still hasn't reopened. See detailed comments.
106	Gila Conservation Coalition	Page 80, 1st bullet	"compact requirements" This doesn't apply to our region.
107	Gila Conservation Coalition	Page 80, 2nd bullet	Agreed. That's why you should be looking at these issues on a basin level by county.
108	Gila Conservation Coalition	Page 80, 3rd bullet	This discussion needs to be balanced. Groundwater is recovering in some locations. See Figure 5 11. This is because of farm field fallowing and conversion to drip irrigation.
109	Martha Cooper	Section 4.1.1.10	Might it be worth, in this section or the one above, describing conservation plans as a mechanism to avoid forfeiture of water rights on ditches?
110	Martha Cooper	Section 4.3, 1st sentence	The state of NM is located in the arid Southwest. Arguable, SW NM is better off, in terms of access to water, than regions in the state w/ large cities (ABQ, Santa Fe, Las Cruces) or industrial-scale agriculture (Rio Grande Valley).
111	Martha Cooper	Section 4.3, 1st paragraph, last sentence	Not true. Has been there an analysis of lack of economic growth? Like proximity to large population centers? An uneducated work force?

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
112	Martha Cooper	Section 4.3, 2nd paragraph	"**While the AWSA was enacted to help water supply in the region,** ~~T~~**t**he possible construction of a New Mexico Unit of the Central Arizona Project pursuant to the AWSA is a controversial topic **given the undemonstrated need, the extraordinary high cost, and potential for ecological degradation**."
113	Martha Cooper	Section 5, 1st bullet	Is 'drought' code for climate change?
114	Martha Cooper	Section 5, 1st bullet	The majority of very low flow days (<20 cfs) for the Gila River (at the Gila @Gila gage) have occurred from 2002 to the present in an 86-year gage record.
115	Martha Cooper	Section 5, 2nd bullet	Perhaps impt to note that these burned areas could benefit from restoration.
116	Martha Cooper	Section 5, 2nd bullet	"Continued and expanded efforts to reduce **high-severity** ~~catastrophic~~ fire risk through forest management, as well as additional information on the quantitative benefits of various management techniques, are needed."
117	Martha Cooper	Page 39, 3rd bullet, 1st sub-bullet	Seems anecdotal.
118	Martha Cooper	Page 39, 3rd bullet, 2nd sub-bullet	And what has consumptive use been historically?
119	Martha Cooper	Page 40, 1st main bullet	"In 2014 and 2015, the NMISC also voted to **partially** fund additional water-use projects in the region:"
120	Martha Cooper	Page 41, 1st bullet	Relates to lack of run-off, inefficient water management, and inadequate economic returns on agricultural activities.
121	Martha Cooper	Page 44, 4th bullet	"In the Gila River Basin in the Southwest New Mexico region, snowpack is expected to be lower and snowmelt is expected to be earlier (Gutzler, 2013**; Gori et al. 2014**)."
122	Martha Cooper	Section 5.3.1	Where does the aquifer connection w/ the Plains of St. Augustine come in?
123	Martha Cooper	Page 59, last complete paragraph	"Also, due the large area of the Southwest New Mexico Region, ~~the~~ surface water irrigators are in many instances far removed from developed groundwater sources, so drought may result in a much larger reduction from normal year supplies in those areas."
124	Martha Cooper	Section 6.1, 3rd paragraph	Seems like innovative water management related to the ag sector is a major opportunity to meet water supply demand.
125	Martha Cooper	Page 62, 1st complete bullet	"It is recognized that there is also value in preserving instream water for ecosystem**,** ~~and~~ habitat and tourism purposes."
126	Martha Cooper	Page 64, 1st paragraph	wow
127	Martha Cooper	Paragraph spanning pages 64-65, 1st sentence	Absurd. No evidence is provided that water limits economic development.

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
128	Martha Cooper	Page 79, 4th complete paragraph	Curious, given the current economic status of FMI
129	Martha Cooper	Page 80, 1st complete bullet	"reservoirs will fill" We don't have any yet.
130	Priscilla Lucero	Notes in top margin of TOC	Where are ICIPs or water projects? Need to mention Regional Water Project.
131	Priscilla Lucero	Notes in top margin of TOC	Missing Virden, Santa Clara, Bayard, Hurley, Columbus
132	Priscilla Lucero	Page 64	"**Employment** ~~W~~**w**age and salary ~~employment~~ has generally increased since 2010 and stood at 10,996 in 2013. During this time, the unemployment rate dropped from 10.2 percent in 2010 to 7.3 **<new stats>** percent in 2013."
133	Priscilla Lucero	Page 64-65	from "An assisted living facility..." is circled and asterisked. "an RV park in Hurley" is crossed out
134	Priscilla Lucero	Page 65, 1st complete paragraph	capitalize "main street" "Growth" circled with question mark
135	Priscilla Lucero	Page 65, 2nd complete paragraph	"County planners see potential development occurring outside of Silver City~~, where~~ **with** five subdivisions with large lots have been platted."
136	Priscilla Lucero	Page 65, 2nd complete paragraph	"SunZia transmission line" explanation of why important
137	Priscilla Lucero	Page 66, 1st complete paragraph	"Other ranchers are tr**ansporting**~~ucking~~ in water and feed to maintain operations."
138	Priscilla Lucero	Bulleted list, Pages 66-67	Third bullet: replace "winery" with vineyard Add Tilapia Fish Farm Add "Border Commercial Traffic Zone is 6 mile radius @ POE for overweight trucks to be able to come across & unload w/in zone, rather than in Mexico." 5th bullet: comment - All ports of entry in NM
139	Priscilla Lucero	Page 67 - Luna County	"The largest incorporated community is Deming~~,~~ with a population of nearly 15,000~~ comprising over half of the residents within the county~~." **<? Census skewed>**
140	Priscilla Lucero	Page 67 - Luna County	"**Employment** ~~W~~**w**age and salary ~~employment~~ has increased by 3 percent since 2010. The largest employment sectors are education and health services, retail trade, tourism-related services, ~~and~~ agriculture**,** and mining."
141	Priscilla Lucero	Page 68, 2nd paragraph	Paragraph circled with question mark
142	Priscilla Lucero	Page 68, 3rd paragraph	"Deming Luna Economic Development recently hired a new executive director, ~~which could help~~ **to** spur further growth."
143	Priscilla Lucero	Page 68-69	Need to speak about chile production; largest chile growing county in state

Southwest Regional Water Plan 2016
Compilation of Comments on Draft Plan

NO.	Comment Souce	Location (Section/ Page/ Paragraph)	COMMENTS
144	Priscilla Lucero	Page 69, 1st complete paragraph	"three dairies" **<?>** "Preferred Produce~~, which~~ grows organic vegetables and pecans south of Deming, could add 20 to 30 jobs per year over each of the next five years and could also add another 100 to 200 employees if plans for tilapia and shrimp farming ~~are realized~~**become a reality**."
145	Priscilla Lucero	Page 71, notes in top margin	enhancing water meters drought mitigation plans water source mitigation plans
146	Jeff Haozous, Chariman, Fort Sill Apache Tribe	Legal	We would like to replace the existing text under Tribal Law on page 22 with the following text: Water use on the Fort Sill Apache tribal trust land in New Mexico is governed by tribal law.

Appendix 5-A

NMOSE Corrected Luna County Withdrawals

MEMORANDUM
New Mexico Office of the State Engineer
Water Use and Conservation Bureau

DATE: November 3, 2015
TO: File
FROM: Julie Valdez, Senior Water Resource Specialist
SUBJECT: Luna County

Background

A review of our files found that the consumptive irrigation requirement (CIR) for acreage irrigated with surface water in Luna County for the *Mimbres Wild Flooding* published in Table 8 *Irrigated Agriculture,* in the *New Mexico Water Use by Categories 2010 Report* (TR 54) Luna County is incorrect. On page 104 of TR 54 in Luna County (No. 29) the CIRSW for the Mimbres Wild Flooding was computed to be 2.65 acre-feet; however the CIRSW should have been 0.75 acre-feet. As a result the total farm withdrawal surface water (TFWSW) should have been 17,500 acre-feet instead of the 61,833 acre-feet published. The 17,500 acre-feet number is obtained using the following equation:

$$TFWSW = (CIRSW * acreage)/EF$$

Where EF is the on farm efficiency (0.45) and acreage is 10,500 acres (obtained from NMSU Luna County Extension Agent in 2012); hence

$$TFWSW = [(0.75)\ (10{,}5000)]/0.45 = 17{,}500$$

For comparison purposes Table 1 below illustrates the incorrect CIRSW and TFWSW published in Table 8 of TR 54. Table 2 illustrates the corrected CIRSW and TFWSW.

Table 1. Incorrect Mimbres Wild Flooding CIRSW and TFWSW

Table 8. Irrigated Agriculture. Withdrawals in acre-feet, in New Mexico counties, 2010. Data compiled by Julie Valdez, Molly Magnuson and Kenneth Richard, New Mexico Office of the State Engineer.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	TFWSW	CLSW	TPWSW	TPWGW
27	P	Rio Hondo & Tributaries	D	0.00	1.28	0	5	0	0	5	0.85	0.00	0.00	0	0	0	8
27	P	Scattered	F	0.00	1.28	0	2	0	0	2	0.45	0.70	0.00	0	0	0	6
27	P	Rio Hondo & Tributaries	F	2.03	2.03	1,465	380	1,189	509	3,543	0.50	0.70	0.35	10,775	4,618	15,393	3,609
27	P	Rio Hondo & Tributaries	S	0.00	2.09	0	330	0	0	330	0.65	0.00	0.00	0	0	0	1,061
		River Basin Subtotals				1,465	717	1,189	509	3,880				10,775	4,618	15,393	4,683
27	RG	Carrizozo & Vicinity	F	0.00	1.39	0	9	0	0	9	0.55	0.00	0.00	0	0	0	23
		River Basin Subtotals				0	9	0	0	9				0	0	0	23
		County Totals				1,465	726	1,189	509	3,889				10,775	4,618	15,393	4,706
29	RG	Mimbres Basin	D	0.00	1.74	0	10,650	0	0	10,650	0.85	0.00	0.00	0	0	0	21,801
29	RG	Nutt-Hockett	D	0.00	2.18	0	4,800	0	0	4,800	0.85	0.00	0.00	0	0	0	12,311
29	RG	Nutt-Hockett	F	0.00	1.43	0	850	0	0	850	0.60	0.00	0.00	0	0	0	2,026
29	RG	Mimbres River	F	2.16	2.16	200	1,950	600	600	3,350	0.55	0.65	0.36	3,142	1,658	4,800	10,015
29	RG	Mimbres--Wild Flooding	F	2.65	0.00	10,500	0	0	0	10,500	0.45	1.00	0.45	61,833	0	61,833	0
29	RG	Mimbres River	S	0.00	2.80	0	300	0	0	300	0.65	0.00	0.00	0	0	0	1,292
29	RG	Nutt-Hockett	S	0.00	2.15	0	510	0	0	510	0.65	0.00	0.00	0	0	0	1,687
		River Basin Subtotals				10,700	19,060	600	600	30,960				64,975	1,658	66,633	49,132
		County Totals				10,700	19,060	600	600	30,960				64,975	1,658	66,633	49,132
31	LC	Zuni & Ramah	F	0.40	0.00	760	0	0	0	760	0.55	0.70	0.39	553	237	790	0
		River Basin Subtotals				760	0	0	0	760				553	237	790	0

Key: CN=county number; RVB=river basin; T=type of irrigation system, i.e., drip (D), flood (F), or sprinkler (S); CIRSW=consumptive irrigation requirement for acreage irrigated with surface water; CIRGW=consumptive irrigation requirment for acreage irrigated with ground water; ASWO=acreage irrigated with surface water only; AGWO=acreage irrigated with ground water only; ASWC=surface water component of acreage irrigated with combined water, i.e., both surface and ground water; AGWC=ground water component of acreage irrigated with combined water; TAI=total acreage irrigated; EF=on-farm irrigation efficiency; EC=off-farm conveyance efficiency; EJ=project efficiency; TFSW=total farm withdrawal, surface water; CLSW=surface water conveyance losses from stream or reservoir to farm headgate; TPWSW=total project withdrawals, surface water; TPWGW=total project withdrawals, ground water; 1=Adjusted CIR in the area please see Chapter 3 for a description; 2=Due to report format and water shortages this Ef is not a true measure of efficiency, 3=metered and diversion data reported,4=NIIP numbers are as reported by NMISC.

Table 2. Corrected Mimbres Wild flooding CIRSW and TFWSW

Table 8. Irrigated Agriculture. Withdrawals in acre-feet, in New Mexico counties, 2010. Data compiled by Julie Valdez, Molly Magnuson and Kenneth Richard, New Mexico Office of the State Engineer.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	TFWSW	CLSW	TPWSW	TPWGW
27	P	Rio Hondo & Tributaries	D	0.00	1.28	0	5	0	0	5	0.85	0.00	0.00	0	0	0	8
27	P	Scattered	F	0.00	1.28	0	2	0	0	2	0.45	0.70	0.00	0	0	0	6
27	P	Rio Hondo & Tributaries	F	2.03	2.03	1,465	380	1,189	509	3,543	0.50	0.70	0.35	10,775	4,618	15,393	3,609
27	P	Rio Hondo & Tributaries	S	0.00	2.09	0	330	0	0	330	0.65	0.00	0.00	0	0	0	1,061
		River Basin Subtotals				1,465	717	1,189	509	3,880				10,775	4,618	15,393	4,683
27	RG	Carrizozo & Vicinity	F	0.00	1.39	0	9	0	0	9	0.55	0.00	0.00	0	0	0	23
		River Basin Subtotals				0	9	0	0	9				0	0	0	23
		County Totals				1,465	726	1,189	509	3,889				10,775	4,618	15,393	4,706
29	RG	Mimbres Basin	D	0.00	1.74	0	10,650	0	0	10,650	0.85	0.00	0.00	0	0	0	21,801
29	RG	Nutt-Hockett	D	0.00	2.18	0	4,800	0	0	4,800	0.85	0.00	0.00	0	0	0	12,311
29	RG	Nutt-Hockett	F	0.00	1.43	0	850	0	0	850	0.60	0.00	0.00	0	0	0	2,026
29	RG	Mimbres River	F	2.16	2.16	200	1,950	600	600	3,350	0.55	0.65	0.36	3,142	1,658	4,800	10,015
29	RG	Mimbres--Wild Flooding	F	0.75	0.00	10,500	0	0	0	10,500	0.45	1.00	0.45	17,500	0	17,500	0
29	RG	Mimbres River	S	0.00	2.80	0	300	0	0	300	0.65	0.00	0.00	0	0	0	1,292
29	RG	Nutt-Hockett	S	0.00	2.15	0	510	0	0	510	0.65	0.00	0.00	0	0	0	1,687
		River Basin Subtotals				10,700	19,060	600	600	30,960				20,642	1,658	22,300	49,132
		County Totals				10,700	19,060	600	600	30,960				20,642	1,658	22,300	49,132
31	LC	Zuni & Ramah	F	0.40	0.00	760	0	0	0	760	0.55	0.70	0.39	553	237	790	0
		River Basin Subtotals				760	0	0	0	760				553	237	790	0

Key: CN=county number; RVB=river basin; T=type of irrigation system, i.e., drip (D), flood (F), or sprinkler (S); CIRSW=consumptive irrigation requirement for acreage irrigated with surface water; CIRGW=consumptive irrigation requirment for acreage irrigated with ground water; ASWO=acreage irrigated with surface water only; AGWO=acreage irrigated with ground water only; ASWC=surface water component of acreage irrigated with combined water, i.e., both surface and ground water; AGWC=ground water component of acreage irrigated with combined water; TAI=total acreage irrigated; EF=on-farm irrigation efficiency; EC=off-farm conveyance efficiency; EJ=project efficiency; TFSW=total farm withdrawal, surface water; CLSW=surface water conveyance losses from stream or reservoir to farm headgate; TPWSW=total project withdrawals, surface water; TPWGW=total project withdrawals, ground water; 1=Adjusted CIR in the area please see Chapter 3 for a description; 2=Due to report format and water shortages this Ef is not a true measure of efficiency, 3=metered and diversion data reported,4=NIIP numbers are as reported by NMISC.

Hence, Table 3 below illustrates the published incorrect withdrawal surface water (WSW) and the corrected WSW for Table 5 of TR 54 in Luna County:

Published Table 5. Summary of water use in acre-feet in New Mexico, 2010.

CN	COUNTY	CAT	WSW	WGW	TW
29	Luna	Commercial (self-supplied)	0	314	314
29	Luna	Domestic (self-supplied)	0	868	868
29	Luna	Industrial (self-supplied)	1	12	13
29	Luna	[1]Irrigated Agriculture	66633	49132	115765
29	Luna	Livestock (self-supplied)	47	523	570
29	Luna	Mining (self-supplied)	12	154	166
29	Luna	Power (self-supplied)	0	1219	1219
29	Luna	Public Water Supply	0	4055	4055
29	Luna	Reservoir Evaporation	0	0	0
			66693	56276	122970

Corrected

CN	COUNTY	CAT	WSW	WGW	TW
29	Luna	Commercial (self-supplied)	0	314	314
29	Luna	Domestic (self-supplied)	0	868	868
29	Luna	Industrial (self-supplied)	1	12	13
29	Luna	[2]Irrigated Agriculture	22300	49132	71432
29	Luna	Livestock (self-supplied)	47	523	570
29	Luna	Mining (self-supplied)	12	154	166
29	Luna	Power (self-supplied)	0	1219	1219
29	Luna	Public Water Supply	0	4055	4055
29	Luna	Reservoir Evaporation	0	0	0
			22360	56276	78636

[1]WSW values is inaccurate due to an error in Table 8 Luna County CIRSW

[2]WSW and TW values were updated; an error was found in Table 8 Luna County CIRSW which affected TFWSW

Utilizing the number from the corrected Table 3 above approximately 28% of the withdrawal in Luna County is from surface water and the remaining 72% is from groundwater.

Appendix 6-A

List of Individuals Interviewed

Appendix 6-A. List of Individuals Interviewed Southwest New Mexico Water Planning Region

Name	Title	Organization	City
Priscilla Lucero	Executive Director	SW NM COG	Silver City
Jim Creek	Consultant	NM Border Authority	Santa Teresa
John Allen	District Conservationist	USDA NRCS	Lordsburg
Patricia Hunt	District Conservationist	USDA NRCS	Silver City
Matt Wiseman	District Conservationist	USDA NRCS	Deming
Tracy Drummond	County Extension Agent	USDA	Reserve
Tim Eastep	Representative	Freeport-McMoRan Inc.	Phoenix
Matthew Strong	CEO	Preferred Produce	Deming
Aaron Sera	Assistant City Administrator	City of Deming	Deming
Joanne Shelby	President	Deming-Luna Economic Development Inc.	
Jim Massengill	Public Works Director	City of Deming	Deming
Jessica Etcheverry	Community Projects Director	Luna County	Deming
Gary Meyers	General Manager	Apache Homelands Entertainment Center	Akela Flats
Alex Brown	City Manager	Town of Silver City	Silver City
David Manzano	Director of Govt. Affairs	NM Tech (Playas)	Socorro
Elizabeth Jeffries	Property Manager	NM Facilities Management Division	Santa Fe
Mike Greene	Project Manager, Generation Asset Management	PNM	Albuquerque
Miles Morgan	Water Resource Engineer	Tri-State Generation & Transmission Association	Denver
Damon Seawright	Owner	Americulture Inc.	Animas
Damon Shirk	Owner	Faywood Hot Springs	Faywood
Robert Hagevoort	Extension Dairy Specialist and Associate Professor	NMSU Agricultural Science Center	Clovis
Tyson Bays	Representative	Freeport-McMoRan Inc.	Silver City

Appendix 6-B

Projected Population Growth Rates, 2010 to 2040

Appendix 6-B. BBER Projected Five-Year Population Growth Rates, 2010 to 2040 Southwest New Mexico Water Planning Region

County	Five-Year Growth Rate (%)					
	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040
Catron	2.68	2.20	1.71	0.60	0.13	0.17
Grant	0.16	0.14	-0.08	-0.42	-0.49	-0.22
Hidalgo	-0.76	-0.80	-1.12	-1.95	-2.68	-3.15
Luna	5.51	5.84	5.96	5.96	6.15	6.58

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

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
aa Grant	R	Project	Water System Infrastructure	Grant County regional water supply project	Steering Committee, see Table 8-2	Improve and increase access to public water supplies that currently serve approximately 26,000 people in central Grant County, including developing a new well field and pipeline to Hurley.	A key project from the Steering Committee. The project lead is Grant County Water Commission	• Hurley • Santa Clara • Bayard • North Hurley MDWCA • Hanover MDWCA • Arenas Valley Water Association • Tyrone • Rosedale MDWCA			• Phase I –$6.6 Million Hurley Phase • Phase II – $3.9 Million Bayard Phase • Phase III $1.9 Million Bayard to Santa Clara • Phase IV $2.8 Million Santa Clara to Hanover		Implementation issues: FMI contract expires December 31, 2018 for providing water to Hurley.
ab Catron Grant Hildalgo Luna	R	Project	Watershed Restoration	Watershed restoration / Erosion control / Water quality protection / Riparian restoration / Post–fire restoration	Steering Committee, see Table 8-2	Implement forest thinning, prescribed fire, stream restoration, riparian restoration, erosion control structures, grassland restoration, meadow restoration, wetland improvement / creation, post-fire rehabilitation, road decommissioning, road best management practices for drainage, rangeland recovery, trail improvement, noxious weed eradication, invasive species treatment, aquatic habitat improvement, and stream stabilization.	A key project from the Steering Committee. The project leads are • Forest Service • NMDG&F • New Mexico State Forestry • Bureau of Land Management • State Land Office • Private landowners	• Nature Conservancy • Forest Industry Association • Conservation nonprofits • Bureau of Reclamation • Fish and Wildlife Service • NMED • Local counties • SWCDs			$20,000 to multimillions		Implementation issues: Time to get through NEPA process, including USFWS consultation (wildlife) and State Historical Preservation Office (SHPO) process (archaeology). Funding to accomplish multi-thousand-acre projects. Need collaborative planning for prescriptions to avoid unintended consequences.
ac Catron Grant Hildalgo Luna	R	Project	New Diversion	Gila River water utilization in accordance with the AWSA (New Mexico Unit)	Steering Committee, see Table 8-2	Use up to 14,000 acre-feet per year, on average, of Gila River water for industrial, municipal, agricultural, and environmental use.	A key project from the Steering Committee. The project lead is NM CAP Entity~~, NMISC~~	US Bureau of Reclamation, NMISC			TBD		Implementation issues: NEPA considerations. Opposition by some Steering Committee members. Decisions regarding moving forward will be made through AWSA process, not regional water planning process.
ad Catron	R	Project	Groundwater Investigation	Hydrogeological investigation of the San Agustin and connected groundwater aquifers	Steering Committee, see Table 8-2	Determine how much the San Agustin aquifer supports adjacent watersheds.	A key project from the Steering Committee. The project lead is Catron County Commission, Dennis Inman	New Mexico Tech			$300,000-$500,000		Implementation issues: Lack of funding, opposition from proposed drilling project personnel
ae Catron Grant Hildalgo Luna	R	Project	Water Conservation/ Drought Contingency	Water conservation, source water protection, drought mitigation and rainwater harvesting	Steering Committee, see Table 8-2	Establish a regional working group to leverage resources and expertise across the Southwest New Mexico water planning region to implement projects on water conservation, source water protection, drought mitigation, and rainwater harvesting. Collaborate in grant funding and coordinate activities in these areas across all sectors (Agriculture and Municipal and Industrial).	A key project from the Steering Committee. The project leads are NRCS, SWCDs	Municipalities, Conservation organizations, NMED, NMOSE Water Conservation Bureau, Farm Bureau			Project dependent		Implementation issues: funding

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
af Catron Grant Hildalgo Luna	R	Project	Acequia/ ditch infrastructure	Maintenance and optimization of regional existing diversion structures (Gila San Francisco, Mimbres, Tularosa)	Steering Committee, see Table 8-2	Maintain and optimize existing diversions from perennial streams to facilitate fish passage and water efficiency. Improve ditch infrastructure to minimize water loss and maximize use.	A key project from the Steering Committee. The project lead is the NM Acequia Association, ditch company & land owners	• Conservation and wildlife nonprofits • Forest Service • USBR • NMISC • NMED • Water Trust Board • NRCS • U.S. Fish & Wildlife Service (USFWS)			$100,000 for design, to multimillions for construction		Implementation issues: Funding, NEPA process is required in some cases
ag Grant	R	Project	Water Reuse	Twin Sisters effluent reuse	Steering Committee, see Table 8-2	Implement effluent reuse, to preserve more potable water for other needs, in connection with sub-regional infrastructure for greater system capacity in the southern Grant County/Santa Clara area. Water would be reused for the Bayard Cemetery, baseball fields, and schools, allowing the Twin Sisters wells to pump less.	A key project from the Steering Committee. The project lead is the Village of Santa Clara	• Hurley • Bayard • Grant County • Gila National Forest			Approximatley $3 million		Implementation issues: funding, permitting required with testing and monitoring
ah Catron Grant Hildalgo Luna	R	Project	Water Conservation	Purchase of unused mining water rights to support local agriculture	Steering Committee, see Table 8-2	Develop regional water harvesting and agricultural small growers' use of water for conservation and economic development potential.	A key project from the Steering Committee. The project leads are NRCS and the Soil and Water Conservation Districts (SWCDs)	GCFPC (Grant County Food-Policy Council), SWNMFPC (Southwest New Mexico Food Policy Council), Town of Silver City Office of Sustainability (Denise Smith)			$1,000-$10,000 per acre-foot for water rights purchase		Implementation issues: Cost of acquisition of water rights; Beneficial use issues; Willing farmers
ai Catron Grant Hildalgo Luna	R	Project	Water Conservation	Education for four-county area on such issues as septic system impacts, consevation, etc.	Steering Committee, see Table 8-2	Education on programs to improve awareness in protecting groundwater, enhancing water conservation measures, capacity building, resources, and energy efficiency.	A key project from the Steering Committee. The project lead is NMED and/or Rural Community Assistance Corp. (RCAC). The lead varies depending on the training.	U.S. EPA, New Mexico Finance Authority (NMFA), NMED, NM Rural Water Association, NM Water and Wastewater Association, USDA OSE, SWNM COG			$25,000-$50,000 for planning		Implementation issues: funding
aj Catron Grant Hildalgo Luna	R	Project	Dam Safety	Repair of flood,sediment control, and recreational dams	Steering Committee, see Table 8-2	Maintain, repair, or decommission flood, sediment control, and recreational dams on public land (excluding dirt stock tanks).	A key project from the Steering Committee. The project lead(s) are Mill Levy group / Upper Gila Valley Watershed Association / Ty Bays, U.S. Forest Service for dams on Gila River, NMDG&F for Bear Canyon Dam, NMOSE, Army Corps of Engineers. Project lead varies with individual dam being repaired.	Mill Levy group / Upper Gila Valley Watershed Association / Ty Bays, U.S. Forest Service for dams on Gila River, NMDG&F for Bear Canyon Dam, NMOSE, Army Corps of Engineers			See Table 5-7		Implementation issues: costs exceed available funding, many dams were built long ago and need significant repair (some are filled with sediment)
Catron	SS	Project	Acequia Infrastructure	1892 Luna Irrigation Ditch Association Improvements	ICIP 2017	To plan, design, and construct improvements including divesion dam and pipeline	1892 Luna Irrigation Ditch Association			ICIP 2017, Design Needed	$1,490,484	Install new concrete diversion structure, pipe entier dirch, No design, Cost Est: $1,490,484.	
Catron	SS	Project	Acequia Infrastructure	1892 Luna Irrigation Ditch Association Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements Association 1892 Luna Irrigation Ditch Association	1892 Luna Irrigation Ditch Association			Pre-Planning			

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Catron	SS	Project	Acequia Infrastructure	Aragon Acequia Association Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Aragon Acequia Association	Aragon Acequia Association			Pre-Planning			
Catron	SS	Project	Water Systems Infrastructure	Whitewater Creek Levies	ICIP 2016-2020	Whitewater Creek Levies	Catron County		2016		$2,850,400		
Catron	SS	Project	Acequias Systems Infrastructure	Construct New Irrigation System	ICIP 2016-2020	Construct New Irrigation System	Catron County		2016-2020		$1,360,484		
Catron	R	Project	Data Collection	San Augustin Basin faults Watershed management and Mapping (Catron Co.)	Catron County Commission, Catron County, Bill Allred, PO Box 507, Reserve, NM 87830, 575-533-6423	Watershed management and basin mapping project to provide comprehensive mapping of the faults in the San Augustin Basin, showing water outflows and estimated amounts of water discharged through those faults into other adjacent basins or watersheds. Annual recharge capabilities should also be included in these findings. This study should be tied to a recent study by NM Tech done for the City of Truth or Consequences, which showed a chemical correlation between the waters in their hot springs to the water in the San Augustin Plains and also that in the Monticello Box.	Catron County Commission designate	NM Tech	Funding request: 2016 to the Water Trust Board. Estimated study completion by 2017, and publication thereafter.	Under development	$80,000 - $100,000 (estimate)		
Catron	SS	Project	Watershed Restoration	Tularosa River Riparian Improvement	Dennis Inman, Geologist, P.O. Box 148 Quemado, NM, 87829, dennisinman43@gmail.com, 575-773-4975	The project consists of building sediment check dams across the Tularosa River to trap sediment and impound water in an amount that would be equivalent to 4,000 acre-feet of water. This would improve water quality as well as create additional riparian habitat along the stream. The check dam construction would be standard Best Management Practice structures.	Dennis Inman	Fish & Wildlife (to be determined)	Funding Request: to be determined, Timeframe and anticipation: within the year	Just starting community outreach	$5,000 - $10,000	River maintenance and habitat reparation	
Catron	SS	Project	Acequia Infrastructure	Eastside Pleasanton Ditch Improvements	NMAA	Eastside Pleasanton Ditch Improvements	Eastside Pleasanton Ditch				$200,000	Piping of section of ditch, no design needed, Cost est $200,000.	
Catron	SS	Project	Acequia System Infrastructure	Catron County Ditch Diversions	Catron County	Catron County Ditch Diversions	Catron County	Catron County Ditch Companies	FY2016		$500,000; $100,000 FY2016		
Catron	SS	Project	Ditch Efficiency and Conservation	Kiehle-Middle Frisco Ditch Efficiency	Kiehne-Middle Frisco Ditch, Sammy Bustamante, President (Mayordomo)	Ditch Association proposed to increase water efficiency and conservation on main ditches through infrastructure improvements: (1) construct permanent point of diversion (collector), (2) construct pipeline from diversion along main ditch for entire length of ditches..2.89 miles with cleanouts and gates as deemed necessary by engineering, (3) construct irrigation ponds and fill in off season, providing more efficient use of water rights.	Kiehle-Middle Frisco Ditch		Funding request 2015-2016; hoping for a 3 year time frame from funding date and start of project. Darrel Allred will implement the strategy as project designer with Kiehle-Middle Frisco Ditch Assoc. assisting.	Initial planning and preliminary engineering report completed and included;	Alternative 1 $,435,000, $1,650,000 w/contingency. Alternative 2 $1,149,000, $1,322,000 w/contingency		
Catron	SS	Project	Water System Infrastructure	1892 Luna Irrigation Ditch Improve	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct improvements to the 1892 Luna irrigation ditch association system	Luna Irrigation Ditch						
Catron	SS	Project	Acequia Infrastructure	Parson Ditch Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements ch Parson Ditch	Parson Ditch			Pre-Planning			
Catron	SS	Project	Acequia Infrastructure	Pleasanton Eastside Ditch Association Improvements	ICIP 2017	To plan, design, and construct piping for section of ditch	Pleasanton Eastside Ditch Association			ICIP 2017, No Design	$200,000		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Catron	SS	Project	Water System Infrastructure	Datil School Fire suppression	Datil School, Quemedo School District, Datil, NM	Fire suppression water system at Datil School. Project to include 30,000 gallon water tank (supplied by existing well), underground piping infrastructure, and fire hydrant in proximity to the school which will provide protection to the school buildings. Currently relies on 5 fire extinguishers and the local volunteer fire dept. protection. Local fire department must shuttle water approximately 1/2 mile across U.S. 60.	Quemedo School Board	TBA	Funding Request to be submitted to the NM Water Trust Board upon completion of project planning. Timeframe TBA	Preliminary development stage	$140,000 - $160,000	Fire safety	
Catron	SS	Project	Water System Infrastructure	Rancho Grande: Preliminary Engineering Report	ICIP FY 2017-2021	Plan and develop a preliminary engineering report for water system improvements that would assess and provide recommendations for improvements to the Rancho Grande MDWCA	Rancho Grande MDWCA -- Contact: Wayne Ashby, wayner1217@gilanet.com -- 575.533.6603		5-year, 2017-2021		$60,000		
Catron	SS	Project	Water System Infrastructure	Rancho Grande: Drilling a Well	ICIP FY 2017-2021	Drilling a new well along NM 15 (Reserve, NM 87830) to supplement the existing well that is going dry. The Rancho Grande Water Association plans on purchasing property to drill the well. The preliminary engineering report needs to be completed in order to provide more detail information on the scope of work.	Rancho Grande MDWCA -- Contact: Wayne Ashby, wayner1217@gilanet.com -- 575.533.6604		5-year, 2017-2021		313,000		
Catron	SS	Project	Water System Infrastructure	Rancho Grande: Storage Tank Purchase & Water System	ICIP FY 2017-2021	Purchase a water storage tank and construct water improvements for the Rancho Grande.	Rancho Grande MDWCA -- Contact: Wayne Ashby, wayner1217@gilanet.com -- 575.533.6605		5-year, 2017-2021		120,000		
Catron	SS	Project	Water System Infrastructure	Rancho Grande: Asset Management Plan	ICIP FY 2017-2021	Plan and develop an asset management plan for the water system, allowing an inventory of system assets and expected replacement timelines for equipment, etc. RG will be seeking funding to complete this inventory.	Rancho Grande MDWCA -- Contact: Wayne Ashby, wayner1217@gilanet.com -- 575.533.6606		5-year, 2017-2021		20,000		
Catron	SS	Project	Water System Infrastructure	Wastewater Treatment Plant Improvements	ICIP 2017-2021	Wastewater Treatment Plant Improvements	Village of Reserve		2017		$1,393,400		
Catron	SS	Project	Water System Infrastructure	Purchase Electronic Read Meters	ICIP 2017-2021	Purchase Electronic Read Meters	Village of Reserve		2017		$120,000		
Catron	SS	Project	Acequia Infrastructure	W S Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to W.S. Ditch	W.S. Ditch			Pre-Planning			
Catron Grant Hildalgo Luna	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
Catron/ Socorro	SS	Project	Hydrogeologic Investigation	San Augustin Basin outflow (Dennis Inman)	Dennis Inman, Geologist, P.O. Box 148 Quemado, NM, 87829, dennisinman43@gmail.com, 575-773-4975	San Augustin basin study - To determine just how much water is in the basin and how much it is leaking water into adjacent basins. It has been conjectured by many previous researchers that the basin is losing water to adjacent basin. In a recent study on the Alamosa River basin by Socorro Tech., the finding can conclude that the water from the San Augustin basin is leaking water into the Alamosa Basin. This is occurring along faults that cross the watershed divide. This more than likely occurs on other mapped faults that also cross the watershed divide into Tularosa/San Francisco and Gila River basins. Before this water, which is being sought by developers, is shipped out of the San Augustin basin, it would be nice to know how this would affect all of the surrounding basins. In fact the water that makes the Tularosa River an annual stream is coming from the San Augustin basin and it was not accounted for in the Arizona Water Settlement Act. The study needs to address this issue before regional planning allocates water to development that may not be actually available.	Dennis Inman	NM Tech	Funding Request: 2016, sourced potentially from Water Trust Board. Timeframe: estimated completion by 2017and publication thereafter.	Under development	$200,000 - $300,000		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	SS	Project	Acequia Infrastructure	Ancheta Galaz community Ditch Improvements	ICIP 2017	To plan, design, and construct improvements to Anchete Galaz Ditch including a diversion dam	Ancheta Galaz Community Ditch			ICIP 2017, Needs Design	$108,750	Replace diversion Dam, No design, Cost Est. $108,750.	
Grant	SS	Project	Water Supply	Arenas Valley: Waterline Improvements	ICIP FY 2017-2021	Construct waterline improvements to include replacement of 3" water main with a 6" water main on Mathers Road to Escobedo Lane, from Escobedo Lane to the intersection of Kirkland Road, from Kirkland Road to Goathead Path, and from the beginning of Goathead Path to the end of Goathead Path. Planning of this project is complete, but the design of the project is in progress.	Arenas Valley MDWCA -- contact Julie Dubiskas, 575.538.3782 -- avwawater@gmail.com				$704,000		
Grant	SS	Project	Water System Infrastructure	Casas Adobes:	ICIP FY2018-2022	North Tank and Well Improvements	Casas Adobe MDWCA -- contact Brian O'Flynn, 575.494.1426 -- brian@oflynn.name				$895,987		
Grant	SS	Project	Water System Infrastructure	Casas Adobes:	ICIP FY2018-2022	Replace Water Mains on Vida and Oro Streets	Casas Adobe MDWCA -- contact Brian O'Flynn, 575.494.1426 -- brian@oflynn.name				$579,099		
Grant	SS	Project	Water System Infrastructure	Casas Adobes:	ICIP FY2018-2022	Replacement of water mains on Uvas and Manzano Rojo Street.	Casas Adobe MDWCA -- contact Brian O'Flynn, 575.494.1426 -- brian@oflynn.name				$629,497		
Grant	SS	Project	Water System Infrastructure	Casas Adobes:	ICIP FY2018-2022	Replacement of Mains on Placitas, Rio Vista & Caballo Blanco	Casas Adobe MDWCA -- contact Brian O'Flynn, 575.494.1426 -- brian@oflynn.name				$12,823		
Grant	SS	Project	Water System Infrastructure	Water and Sewer Distribution Line Improvements	City of Bayard, Kristina Ortiz, Clerk Treasurer	Plan, design, and construct water and sewer distribution line improvements throughout the City of Bayard.	City of Bayard		Not available at this time.	No documents prepared at this time.	$2,000,000		
Grant	SS	Project	Water System Infrastructure	Well Field Improvements	City of Bayard, Kristina Ortiz, Clerk Treasurer	Well field improvements to include plan, design, construct, drill and equip water wells and water pumping equipment at the Bayard well field.	City of Bayard		Not available at this time.	City of Bayard is completing a well field capacity assessment.	$2,000,000		
Grant	SS	Project	Water System Infrastructure	Water Effluent Distribution Improvements from Wastewater Facility to Cobre High School for Discharge to Ball Fields.	City of Bayard, Kristina Ortiz, Clerk Treasurer	Plan, design, and construct water effluent distribution improvements from wastewater facility to Cobre High School for discharge to ball fields.	City of Bayard		Upon secure funding. Funding request: has been submitted to ISC - Water Conservation Funding.	City of Bayard has preliminary information on the project.	$1,100,000		
Grant	SS	Project	Water Systems Infrastructure	Drainage Improvements	ICIP 2016-2020	Drainage Improvements	City of Bayard		2017-2019		$502,684		
Grant	SS	Project	Water Systems Infrastructure	Regional Wastewater Project	ICIP 2016-2020	Regional Wastewater Project	City of Bayard		2017-2018		$900,000		
Grant	SS	Project	Water Systems Infrastructure	Sewer System Improvements	ICIP 2016-2020	Sewer System Improvements	City of Bayard		2018		$500,000		
Grant	SS	Project	Water System Infrastructure	Upgrade Water Distribution System	ICIP 2017-2021	Upgrade Water Distribution System	City of Bayard		2017		$500,000		
Grant	SS	Project	Acequia Infrastructure	Eby and Baca Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Eby and Baca Ditch	Eby and Baca Ditch			Pre-Planning			
Grant	SS	Project	Acequia Infrastructure	Gila Hot Springs Irrigation Association Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Gila Hot Springs Irrigation Association	Gila Hot Springs Irrigation Association			Pre-Planning			

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	SS	Project	Water Systems Infrastructure	Fort Bayard Medical Facility Water Project	ICIP 2016-2020	Fort Payard Medical Facility Water Project	Grant County		2016-2017		$643,000		
Grant	SS	Project	Irrigation System Improvement	Cliff, NM, riverside ditch restoration	Grant Co. Farm Bureau, Stewart Rooks	Work is beginning to develop a plan to restore water in the riverside ditch south of Cliff, NM. We are engaging the NRCS to help with the engineering of the project. A reasonable estimate of the cost of the project cannot be determined until the design and engineering is complete. There are cost share possibilities through the NRCS. This project would allow water rights owners to use their water.	Grant County Farm Bureau	Riverside Ditch association, NRCS					
Grant	SS	Project	Water System Infrastructure	Gila Bear Creek Siphon	Grant Co. Farm Bureau, Stewart Rooks	The Gila Farm Ditch utilizes a siphon to get irrigation water under Bear Creek in Gila, NM. We have engaged the NRCS to help with the design and engineering to replace the siphon which is over 50 years old experiencing a loss of efficiency. A cost estimate will not be available until engineering is complete. Cost sharing may be possible through the NRCS.	Grant County Farm Bureau	Gila farm ditch association, NRCS					
Grant	R	Policy	Water Conservation	Water Harvesting	Grant Food Policy Council, John R. Song, Co-chair and Denise Smith, Director of Sustainability, Silver City	Water harvesting is a water conservation practice that will ultimately reduce the overall withdrawal and use of water in Grant County. Water harvesting practices will enable our communities to become more self-sustaining in the face of disasters that may result in water and food shortages. Harvesting rainwater, stormwater, and gray water for irrigation or other outdoor uses is defined and recommended in the Town of Silver City's 'Water Conservation Plan' that was adopted in 2013. Policy development to encourage water harvesting practices to include incentives to businesses, property owners, backyard gardeners, and small farmers is needed to encourage these practices. The project will (1) research water harvesting policies in nearby states, (2) develop water savings estimates and economic benefits of local municipalities and area citizens, (3) collaborate with local partners such as the Town's Office of Sustainability, and (4) present policy to local government.	Grant County Food Policy Council	Town of Silver City Office of Sustainability			Grant County Food Policy membership time as well as local partner's time and materials to coordinate the effort estimated at $5,000		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	R	Policy	Water Conservation	Water Rates	Grant Food Policy Council, John R. Song, Co-chair and Denise Smith, Director of Sustainability, Silver City	Urban gardening in our local communities and small farming in our counties diversifies the economy and creates jobs while improving food security by offsetting potential shortages in the food supply due to environmental or economic changes. Supporting individuals participating in backyard gardening (food) especially makes sense for communities that are poor and rural. Importing food that can be grown locally is expensive, uses greater amounts of fossil fuels, and sends money out of the county rather than circulates it within the communities. Municipalities should explore local policy development that will stimulate backyard gardening by instituting the following practices: (1) Change policy to allow backyard gardeners to sell food grown with city water or domestic wells up to a certain threshold (e.g., a cottage industry rule/ordinance for Silver City residents), (2) Incentivize water conservation/reclamation practices (e.g., an annual rebate for verified installation and/or implementation of water conservation/reclamation techniques [drip irrigation, mulching and composting, rainwater harvesting, capturing water runoff and on-site gray water systems] for outside water use in gardening and landscaping), (3) Offer a reduced rate on water billing for backyard growers that use timers and water at off-peak times, (4) In accordance with the Town of Silver City's Water Conservation Plan, encourage turf removal, xeriscaping, and permaculture principles that promote healthy water and soil management so that food crop growing can be integrated into xeriscape designs. These practices may be promoted through public education, the institution of rate structures that provide an incentive for voluntary conservation practices, and through the development of xeriscape demonstration projects in Grant County.	Grant County Food Policy Council	Town of Silver City Office of Sustainability			Grant County Food Policy membership time as well as local partner's time and materials to coordinate the effort estimated at $7,500	The project will include the following process: gather information on water use for backyard residential and small farm agriculture and cost of subsidizing water use; gather information regarding the cost savings to the town and county regarding turf removal, permaculture practices including soil improvement and xeriscaping; list benefits of supporting local agriculture and costs of not doing so: multiplier effects of local agriculture versus importation of food, shortages in the food supply due to environmental or economic changes, health costs due to poor nutrition and food insecurity ,etc.; collaborative planning efforts with local partners such as the Town's Office of Sustainability; meet with elected officials and staff to educate them regarding the importance of these projects; present draft policy to local governments	
Grant	R	Policy	Water Rights	Water Rights right of first refusal	Grant Food Policy Council, John R. Song, Co-chair and Denise Smith, Director of Sustainability, Silver City	Water rights are property rights. Their ownership by small agricultural users are slowly disappearing in our region. These small user water rights are vital to maintaining the existing and revitalizing a small scale farming economic sector in our region. If these water rights are lost forever we may never be able, as a community, to recover the ability to sustain our population through the production of locally grown food. Unlike other agricultural areas where small growers' water rights are purchased and consolidated into larger farms, the mining companies and their subsidiaries have been the primary entities purchasing and consolidating the small grower water rights in Grant County. Should the mines decide to divest themselves of any of their water rights as a business decision or even shut down at a future date it would be prudent for our municipalities and county governments to have policy in place regarding 'the right of first refusal' to be able to purchase and reserve these water rights for use by ouates water to development that may not be actually ava	Grant County Food Policy Council	Town of Silver City Office of Sustainability			Legal fees to draft the proposed 'Right of first Refusal' estimated at $5,000; Legal fees to present 'Right of First Refusal' to Freeport McMoRan, Inc. estimated at $3,000; Grant County Food Policy membership time as well as local partner's time and materials to coordinate the effort estimated at $5,000	The project will include the following tasks: List benefits of supporting local agriculture and costs of not doing so: multiplier effects of local agriculture versus importation of food, shortages in the food supply due to environmental or economic changes, health costs due to poor nutrition and food insecurity, etc.; Collaborative planning efforts with local partners such as the Town's Office of Sustainability; Meet with elected officials and staff to educate them regarding the importance of the project; Hire legal representation to draft a proposal to Freeport McMoRan, Inc.; Present draft statute to local governments; Local governments present proposal to Freeport McMoRan, Inc	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	R	Policy	Water Rights	Water Rights for Agriculture	Grant Food Policy Council, John R. Song, Co-chair and Denise Smith, Director of Sustainablity, Silver City	Water rights are vital to maintaining and revitalizing small farming in our region. The development of a regional water policy that designates a percentage of water rights to sustain local small agriculture is imperative. Without local agriculture our communities lose jobs and the diversity that provides economic security. Additionally, the loss of local small grower water rights increases local food insecurity through a loss of the ability to produce food to sustain our communities during economic downturns when demand for increased government support to maintain basic nutrition needs is strained.	Grant County Food Policy Council	Town of Silver City Office of Sustainablility			Legal fees to draft the proposed water rights distribution policy estimated at $5,000. Legal fees to present the proposed 'Water Rights Distribution Policy' to county and state elected officials - $3,000. Grant County Food Policy membership time as well as local partner's time and materials to coordinate the effort estimated at $5,000	The project will include the following tasks: List benefits of supporting local agriculture and costs of not doing so: multiplier effects of local agriculture versus importation of food, shortages in the food supply due to environmental or economic changes, health costs due to poor nutrition and food insecurity, etc.; Collaborative planning efforts with local partners such as the Town's Office of Sustainability; Meet with the Grant County Water Board and elected officials and staff to educate them regarding the importance of the project; Work with the Grant County Water Board to draft up a proposed water rights distribution policy	
Grant	R	Project	Water System Infrastructure	Silver City Airport Wellfield	Town of Silver City, Robert M. Esqueda, Utilities Director	Design and construct the Airport Wellfield to provide water to Hurley, and construct a regional water transmission line to provide water from Hurley to Bayard, Santa Clara, Arenas Valley, and Silver City. Construction of the project would provide for additional water for the communities in the Mining District, and provide for commercial & residential development in the area.	Grant County Water Commission	Town of Silver City, Hurley, Bayard, Santa Clara, Grant County	Funding request: 2016. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability	The project is currently under development and the Grant County Water Commission is currently seeking funding for the project. A preliminary Engineering Report was completed by Engineers Inc. on November 6, 2014.		Meeting local water demands	
Grant	R	Project	Watershed Restoration	Mangas Watershed Restoration	Grant Soil & Water Conservation District, Rebecca Benavidez, Project Coordinator	This is an ongoing project that has used 319 funding along with Gila National Forest funds for watershed restoration of the Mangas Watershed. Grant SWCD desires to get funding for restoration of the upper Mangas Springs area, that has been lost due to past uses, flooding, because of poor watershed health. GSWCD has done major work on the watershed; now we desire to repair the Mangas drainage/springs. This will help protect water supply flow to the Gila, and help with water quality.	Grant SWCD	FCX agriculture		Some planning has been done			
Grant	SS	Project	Watershed Restoration	Mangas Watershed Restoration	ICIP FY 2017-2021	Restoration of the upper Mangas Springs area for the purpose of building stabilization structures (using soil cement) that will lift the bed of the Mangas Creek and create a permanent source of water below these structures for wildlife. The project will consist of analysis of watershed, building the first structures, planting of willow trees and other shrubs above the dams, and finally building a second series of dams upstream of the first ones.	Grant SWCD -- contact Rebecca Benavidez, 575.388.1569 -- grantswcd@zianet.com				1,385,000		
Grant	SS	Project	Acequia Infrastructure	Greenwald Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Greenwald Ditch	Greenwald Ditch			Pre-Planning			
Grant	SS	Project	Acequia Infrastructure	Grijalva Ditch Association Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Grijalva Ditch Association	Grijalva Ditch Association			Pre-Planning			
Grant	SS	Project	Drill New Well	Construct supply well	Water Trust Board Database	Construct supply well	Hanover MDWCA		FY2015		$70,000		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	SS	Project	Acequia Infrastructure	Heredia Community Ditch Improvements	ICIP 2017	To plan, design, and construct improvements to Heredia Community Ditch including a diversion dam and pipeline	Heredia Community Ditch			ICIP 2017, Design Complete	$250,000		
Grant	SS	Project	Acequia Infrastructure	Heredia Community Ditch: Diversion Dam	ICIP FY 2017-2021	Plan, design and equip a diversion dam for the Heredia Ditch Association located in Grant County, NM. This proposed project would include storm water, sediment, and construction management. Construction dewatering, site preparation, site reclamation, excavation and backfill, concrete and materials	Heredia Community Ditch Association -- Contact Art Merino, 575.574.7643		2 years		$193,028.00		
Grant	SS	Project	Acequia Infrastructure	Heredia Community Ditch: Pipeline Construction	ICIP FY 2017-2021	Plan, design and equip a pipeline for the Heredia Community Ditch Association. Project Consists of installation, of pipeline, trenching, pipe bedding materials, low head gate valves, and a concrete access vault with cover.	Heredia Community Ditch Association -- Contact Art Merino, 575.574.7643				$137,306.00		
Grant	SS	Project	Acequia Infrastructure	Heredia Community Ditch: Pipeline construction, phase 2	ICIP FY 2017-2021	Plan, design and equip a pipeline for the Heredia Community Ditch Association. Phase 2 will be expansion of phase one t include 24 inch pipe installation.	Heredia Community Ditch Association -- Contact Art Merino, 575.574.7643				$53,396.00		
Grant	SS	Project	Water System Infrastructure	LRWA: Water System Improvements	ICIP FY 2017-2021	Purchase, plan, design, construct, equip and furnish water system improvements for the Lake Roberts Water Association in Grant County. Project entails replacing distribution lines, upgrading water tanks, drilling a new well, chlorination system improvement, and meters. These improvements will be done in the entire subdivision.	Lake Roberts Water Association -- contact Kathy Prince, 520.722.4682, kathyprince@hotmail.com				$1,089,555.00		
Grant	SS	Project	Water System Infrastructure	LRWA: purchase Electronic Meters	ICIP FY 2017-2021	Purchasing and furnishing software and electronic meters for Lake Roberts Water Association's water system. The system currently has an old and obsolete metering system. Approx. 35 meters will be replaced.	Lake Roberts Water Association -- contact Kathy Prince, 520.722.4682, kathyprince@hotmail.com				$20,000.00		
Grant	SS	Project	Acequia Infrastructure	Llano Community Acequia Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Llano Community Acequia	Llano Community Acequia			Pre-Planning			
Grant	SS	Project	Acequia Infrastructure	Macedonio Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Macedonio Ditch	Macedonio Ditch			Pre-Planning			
Grant	SS	Program	Watershed Plan	Lower Animas Watershed Based Plan (State Funded)	NMED	Lower Animas Watershed Based Plan (State Funded)	Mountain Studies Institute						
Grant	SS	Project	Acequia Infrastructure	Riverside Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Riverside Ditch	Riverside Ditch			Pre-Planning			
Grant	SS	Project	Acequia Infrastructure	San Lorenzo Community Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to San Lorenzo Community Ditch	San Lorenzo Community Ditch			Pre-Planning			
Grant	SS	Project	Watershed Restoration	San Vicente Creek Urban Watershed Restoration Project (RSP)	NMED	San Vicente Creek Urban Watershed Restoration Project (RSP)	Stream Dynamics, Inc.						
Grant	SS	Project	Acequia Infrastructure	Tajo Ditch Improvements	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Tajo Ditch	Tajo Ditch			Pre-Planning			
Grant	SS	Project	Acequia Infrastructure	Tigner Community Ditch Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Tigner #1 Community Ditch	Tigner #1 Community Ditch			Pre-Planning			
Grant	SS	Project	Water System Infrastructure	New Water System	ICIP 2017-2021	New Water System	Town of Hurley		2017		$13,247,770		
Grant	SS	Project	Water System Infrastructure	Purchase Lift Station	ICIP 2017-2021	Purchase Lift Station	Town of Hurley		2017		$400,000		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	SS	Project	Water System Infrastructure	Purchase Electronic Read Meters	ICIP 2017-2021	Purchase Electronic Read Meters	Town of Hurley		2017		$120,000		
Grant	SS	Project	Water System Infrastructure	Hurley Water System Improve	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, construct and equip water system improvements in Hurley	Town of Hurley						
Grant	SS	Project	Water System Infrastructure	Silver City streets and drainage improve	Capitol Outlay Database	Silver City street and drainage improvements	Town of Silver City				$100,000		Fund: STB
Grant	SS	Project	Water Systems Infrastructure	Gough Park Irrigation Upgrade and Repair	ICIP 2016-2020	Gough Park Irrigation Upgrade and Repair	Town of Silver City		2016		$20,000		
Grant	SS	Project	Water Systems Infrastructure	WWTP Belt Filter Press	ICIP 2016-2020	WWTP Belt Filter Press	Town of Silver City		2016		$400,000		
Grant	SS	Project	Water Systems Infrastructure	Sewer System Master Plan Update	ICIP 2016-2020	Sewer System Master Plan Update	Town of Silver City		2017		$50,000		
Grant	SS	Project	Water Systems Infrastructure	32nd Street Waterline Replacement	ICIP 2016-2020	32nd Street Waterline Replacement	Town of Silver City		2018		$300,000		
Grant	SS	Project	Water Systems Infrastructure	Wastewater Effluent Re-use Improvements	ICIP 2016-2020	Wastewater Effluent Reuse Improvements	Town of Silver City		2018		$250,000		
Grant	SS	Project	Water Systems Infrastructure	Anderson Well Replacement	ICIP 2016-2020	Anderson Well Replacement	Town of Silver City		2018		$750,000		
Grant	SS	Project	Water Systems Infrastructure	Water System Master Plan Update	ICIP 2016-2020	Water System Master Plan Update	Town of Silver City		2018		$75,000		
Grant	SS	Project	Water Systems Infrastructure	Franks Wellfield Transmission Line Replacement	ICIP 2016-2020	Franks Wellfield Transmission Line Replacement	Town of Silver City		2018		$15,000,000		
Grant	SS	Project	Water Systems Infrastructure	Replace Ridge Road Waterline Hwy 90 to Pheasant	ICIP 2016-2020	Replace Ridge Road Waterline Hwy 90 to Pheasant	Town of Silver City		2018		$150,000		
Grant	SS	Project	Water Systems Infrastructure	Little Walnut Water Storage Tank	ICIP 2016-2020	Little Walnut Water Storage Tank	Town of Silver City		2019		$750,000		
Grant	SS	Project	Water Systems Infrastructure	Mountain View Road Sewer Extension	ICIP 2016-2020	Mountain View Road Sewer Extension	Town of Silver City		2019		$5,600,000		
Grant	SS	Project	Water Systems Infrastructure	New Well Construction - Woodward	ICIP 2016-2020	New Well Construction - Woodward	Town of Silver City		2019		$500,000		
Grant	SS	Project	Water Systems Infrastructure	Ridge Road Waterline Replacement-Pheasant to Lance	ICIP 2016-2020	Ridge Road Waterline Replacement-Pheasant to Lance	Town of Silver City		2019		$250,000		
Grant	SS	Project	Water Systems Infrastructure	Virginia St Sewer Improvements	ICIP 2016-2020	Virginia St Sewer Improvements	Town of Silver City		2019		$550,000		
Grant	SS	Project	Water System Infrastructure	Chihuahua Hill Water System Improvements	ICIP 2017-2021	Chihuahua Hill Water System Improvements	Town of Silver City		2017		$550,000		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	SS	Project	Drill New Well	Silver City Woodward Wellfield	Town of Silver City, Robert M. Esqueda, Utilities Director	Design and construct a new supplemental well at the Woodward Wellfield to increase water production capabilities and meet future water demands of the Town of Silver City.	Town of Silver City		Funding request: 2019. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability		The estimated cost is $600,000	Meeting town water demands	
Grant	SS	Project	Water System Infrastructure	Silver City Upper W Storage Tank	Town of Silver City, Robert M. Esqueda, Utilities Director	Design and construct a new 1,000,000 gallon fresh water storage tank within the Upper W Mountain Pressure Zone to increase storage and delivery of water within the Town of Silver City's water system. The storage tank would minimize water outages to residents during waterline breaks as there is only one feed into the zone.	Town of Silver City		Funding request: 2019. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability		The estimated cost is $850,000.00	Preventing water outages	
Grant	SS	Project	Drill New Well	Silver City Franks Wellfield Supplemental Well	Town of Silver City, Robert M. Esqueda, Utilities Director	Design and construct a new supplemental well at the Franks Wellfield to increase water production capabilities and meet future water demands of the Town of Silver City.	Town of Silver City		Funding request: 2019. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability		The estimated cost is $750,000		
Grant	SS	Project	Water System Infrastructure	Silver City Franks Wellfield storage tank	Town of Silver City, Robert M. Esqueda, Utilities Director	Design and construct a new 500,000 gallon raw water storage tank and the Franks Wellfield to increase storage and delivery of water to the town of Silver City.	Town of Silver City		Funding request: 2018. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability		The estimated cost is $600,000		
Grant	SS	Project	Water System Infrastructure	Silver City Franks Wellfield transmission line	Town of Silver City, Robert M. Esqueda, Utilities Director	Increase transmission line capacity from the Franks Wellfield to the Wye in connection from both wellfields. The project will replace an existing 12-inch line with a new 20-inch line to increase water delivery capabilities from the Franks Wellfield to the Town of Silver City to meet future water demands.	Town of Silver City		Funding request: 2019. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability		The estimated cost is $2,000,000	Meeting local water demands	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	SS	Project	Water System Infrastructure	Silver City Gabby Hayes well improvements	Town of Silver City, Robert M. Esqueda, Utilities Director	Design and construct Gabby Hayes Well improvements which will include the construction of a new storage tank, booster station, solar facility, and transmission line. Project will allow Gabby Hayes well to pump directly into the Town's water system and offset daytime water demands during peak hours while offsetting the peak hour electrical usage from the solar production.	Town of Silver City		Funding request: 2017. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability		The estimated cost is $1,750,000.00	Offset daytime water demands while offsetting peak hour electrical usage.	
Grant	SS	Project	Water System Infrastructure	Silver City alternative power sources	Town of Silver City, Robert M. Esqueda, Utilities Director	Construct alternative power sources to offset water production costs associated with electrical usage. The town will seek funding to construct alternative sources of electricity, such as solar, to offset increasing electrical costs associated with the production and delivery of water throughout the Town of Silver City's water system.	Town of Silver City		Funding request: 2017. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability		The estimated cost is unknown, as specific alternatives have not been determined.	Production of alternative energy	
Grant	SS	Project	Water System Infrastructure	Silver City Water system upgrade	Town of Silver City, Robert M. Esqueda, Utilities Director	Continued replacement and upgrade of existing water system. Replacement and upgrade will allow for increased water delivery capabilities to meet future water demands, reduce operating & maintenance costs, and conserve water by eliminating water loss due to leaks and breaks in older water lines within the water system.	Town of Silver City		Funding request: 2016. potential funding sources: CDBG, Colonias Infrastructure, DWSRLF, Legislative Grant. Implementation dictated by funding availability		The estimated cost is $350,000 annually	Meeting local water demands	
Grant	R	Project	Groundwater Modeling	Silver City Underground Water Model Expansion	Town of Silver City, Robert M. Esqueda, Utilities Director	Expansion of Silver City Underground Water Model to include the communities of Hurley, Bayard, and Santa Clara. Expansion of the Model will allow the area to have a better knowledge of water availability to meet future demands, and allow for better planning strategy by the region.	Town of Silver City	Hurley, Bayard, Santa Clara, County of Grant	Funding request: 2016. potential funding sources: Colonias Infrastructure, DWSRLF, Legislative Grant, Water Trust Board. Implementation dictated by funding availability		The estimated cost is $400,000.00 annually	Meeting local water demands	
Grant	SS	Project	Water Supply	Preliminary Engineering Report for Water	ICIP FY 2017-2021	Plan and develop a preliminary engineering report with recommendations for improvement to system with phasing for the Tyrone MCWA.	Tyrone MDWCA -- contact Priscilla C. Lucero, 575.388.1509, priscillalucero@swnmcog.org				$60,000		
Grant	SS	Project	Water Supply	Water System Improvements Tolteca	ICIP FY 2017-2021	Design and construct water system improvements for Camino Tolteca. This is phase II of the project, and will consist of replacing distribution lines, pressure reducing valves, etc. at Tyrone MCWA. The length and size of improvements will have to be evaluated by an engineer.	Tyrone MDWCA -- contact Priscilla C. Lucero, 575.388.1509, priscillalucero@swnmcog.org				$527,000		
Grant	SS	Project	Water Supply	Camino Azteca Water System Improvements	ICIP FY 2017-2021	Design and construct the replacement of water distribution lines, pressure reducing valves on Camino Azteca. The length and size of distribution lines will be determined by an engineer.	Tyrone MDWCA -- contact Priscilla C. Lucero, 575.388.1509, priscillalucero@swnmcog.org				$87,253		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Grant	SS	Project	Water Supply	Preliminary Engineering Report Wastewater System	ICIP FY 2017-2021	The project consists of planning recommendations for a wastewater system in the Tyrone subdivision.	Tyrone MDWCA -- contact Priscilla C. Lucero, 575.388.1509, priscillalucero@swnmcog.org				$60,000		
Grant	SS	Project	Acequia Infrastructure	US Government Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to US Government Ditch	US Government Ditch			Pre-Planning			
Grant	SS	Project	Water Systems Infrastructure	Water Systems Improvements	ICIP 2016-2020	Water Systems Improvements	Village of Santa Clara		2016		$550,000		
Grant	SS	Project	Water Systems Infrastructure	Develop a 40 Year Water Plan	ICIP 2016-2020	Develop a 40 Year Water Plan	Village of Santa Clara		2016		$60,000		
Grant	SS	Project	Water Systems Infrastructure	Phase II Reg Wastewater Facility Effluent Reuse	ICIP 2016-2020	Phase II Reg Wastewater Facility Effluent Reuse	Village of Santa Clara		2016		$500,000		
Grant	SS	Project	Water System Infrastructure	Sewer System Improvements	ICIP 2017-2021	Sewer System Improvements	Village of Santa Clara		2017		$350,000		
Grant	SS	Project	Acequia Infrastructure	Wardwell Heron Ditch Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Wardwell Heron Ditch	Wardwell Heron Ditch			Pre-Planning			
Grant	SS	Project	Watershed Restoration	Forest Restoration, Prescribed Fire and Fire for Resource Benefit	Watershed Subcommittee	Landscape-scale forest restoration treatments are needed to mitigate the risk that wildfire poses to watershed function (specifically the ability to capture, store, filter, and transport water). Small-scale treatments are appropriate in areas identified as high-priority through a planning process or when they have some other strategic purpose, like building capacity. Priority areas for treatment include watersheds around Silver City and Pinos Altos, the Upper Mimbres Watershed, and the Burro Mountains -- including the Mangas watershed. The Gila NF has 5-year restoration plan outlining their restoration goals.	Watershed Subcommittee					Healthy watersheds are critical to ensure an adequate supply of clean water in the future. Healthy watersheds can improve water quality, water quantity, and the consistency of water delivery for human use and can sustain the watershed and its inhabitants. A well-functioning watershed can help to reduce the severity of floods, drought and fire, and it can rebound more quickly after those natural disturbances. Degraded watersheds have less capacity to provide ecosystem services and can diminish water quality and water quantity. Watershed functions: capture, store, filter, and transport water; regulate water flow under the surface and on the surface over space and time; reduce the severity of natural disturbances such as floods, drought, and fire; provide natural resources (water, timber, forage, space) to people. Watershed structures: soil structure and composition enables water to infiltrate; connect drainages to their floodplains; intact and abundant wetlands; intact upland vegetative	Note: The Grant County Eco-Watershed Planning Group hosted a meeting and discussion focused on contributing to the Regional Water Plan Update. This group does not represent all 4 counties in SW NM.
Grant	R	Project	Regional Water System	Grant County Water Commission Wellfield and Pipeline	Grant County Water Commission	Grant County Water Commission Wellfield and Pipeline	Town of Hurley	Grant County Water Commission	FY2016		$2,100,000; $100,000 FY2016		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Hidalgo	SS	Project	Water System Infrastructure	Lordsburg Well Replacement	City of Lordsburg, Arthur Clark Smith, Mayor	SP Well is over 70 years old, Well #1 and Well #2 are over 40 years old, and the Smith Well is almost 20 years old. The well casings are deteriorating, a well house is collapsing, discharge pipe cannot sustain the necessary water pressures. The City proposes to replace the SP Well and relocate to a different location further from the railroad tracks, rehab Wells #1 and #2, and the Smith Well. Construct new tie-ins from the well improvements to the existing water system. The improvements can be phased over years as funding is obtained. Each phase can be a stand-alone project; the priorities are as follow: (1) SP Well, (2) Smith Well, (3) Well #1, and (4) Well #2.	City of Lordsburg	Glen Acres Water Association	Duration of project - It is projected that the design phases will take approximately 5 months from execution of a Notice to Proceed, the Bidding phase would take approximately 2 months, the pre-construction phase would take approximately 1 month, and then actual construction of the proposed improvements would take approximately 4 months. Total project timeframe would be approximately 1 year.	The project is currently in the initial planning stages by the City. A PER for water system improvements was completed in 1995. A 40-year Water Plan was completed in 1994. Both of these documents included information on the City's existing wells at that time. Both documents were completed by Engineers Inc. The PER would need to be updated to incorporate improvements to the water system since then.	Total project cost is approximately $1,500,000 for the entire project. Below is a breakdown of each phase: Priority #1: SP Well - $525,000; Priority #2: Smith Well - $365,000; Priority #3: Well #1 - $300,000; Priority #4: Well #2 - $310,000. An itemized breakdown of each phase is attached, which includes both construction and engineering.		
Hidalgo	SS	Project	Water System Infrastructure	Rehab Wells and Drill New Well	ICIP 2017-2021	Rehab Wells and Drill New Well	City of Lordsburg		2017		$1,500,000		
Hidalgo	SS	Project	Water System Infrastructure	Water and Wastewater Line Improvements	ICIP 2017-2021	Water and Wastewater Line Improvements	City of Lordsburg		2017, 2019		$1,000,000		
Hidalgo	SS	Project	Water System Infrastructure	Lordsburg Water System Improve	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design, construct and equip water system improvements, including rehabilitation of wells and drilling of a new well, in Lordsburg	City of Lordsburg						
Hidalgo	SS	Project	Acequia Infrastructure	New Model Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to New Model	New Model			Pre-Planning			
Hidalgo	SS	Project	Acequia Infrastructure	Sunset Canal Improvements	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Sunset Canal	Sunset Canal			Pre-Planning			
Hidalgo	SS	Project	Water System Infrastructure	Water System Improvements	ICIP 2017-2021	Water System Improvements	Village of Virden		2017		$399,000		
Hidalgo	SS	Project	Acequia Infrastructure	Acequia-Irrigation System Improvements	ICIP 2017-2021	Acequia-Irrigation System Improvements	Village of Virden		2017		$570,000		
Luna	SS	Project	Water System Infrastructure	Deming Golf Course	City of Deming, Jim Massengill, Public Works Director	The sprinkler system at the golf course is in need of upgrades. The condition of the waterlines will allow them to continue to be used, but several valves and sprinkler heads need to be replaced. Other miscellaneous items also need to be replaced including swivel joints, wire and small sections of pipe. The repairs will take place on fairways 4, 10, 11, 17, and 18 and at the driving range.	City of Deming		Funding request: 2020. Implementation by City of Deming. Implementation will begin when funding is allocated.	Effluent Reuse Expansion Project as per the City of Deming Preliminary Engineering Report for Proposed Effluent Reuse Expansion (SMA - Nov. 2013)	Construction est. $66,500, non-construction est. $109,400, additional annual O&M: $3,300	Potable Water Conservation	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Luna	SS	Project	Water Reuse	Deming County Courthouse	City of Deming, Jim Massengill, Public Works Director	This option includes the installation of approximately 50 LF of 6-inch reuse line. The line will tie into 10-inch trunk line where the line crosses in front of the park area at the county courthouse. The area to be irrigated is approximately 2.0 acres, reflecting an estimated demand of 323,140 gallons per month during peak usage.	City of Deming		Funding request: 2018. Implementation by City of Deming. Implementation will begin when funding is allocated.	Effluent Reuse Expansion Project as per the City of Deming Preliminary Engineering Report for Proposed Effluent Reuse Expansion (SMA - Nov. 2013)	Construction est. $13,900, non-construction est. $92,000, additional annual O&M: $500 Comparative Metric: $321.10 per 1,000 gallons of reuse water applied monthly	Potable Water Conservation	
Luna	SS	Project	Water Reuse	Deming Pearl Park	City of Deming, Jim Massengill, Public Works Director	This option includes the installation of approximately 1,530 LF of 6-inch reuse line branching off of the 10-inch trunk line north on San Carlos Street until reaching Pearl Park, at the intersection of East Elm street. This line would be used to irrigate Pearl Park and will reduce the need to use potable water by an estimated 323,140 gallons per month during peak months.	City of Deming		Funding request: 2018. Implementation by City of Deming. Implementation will begin when funding is allocated.	Effluent Reuse Expansion Project as per the City of Deming Preliminary Engineering Report for Proposed Effluent Reuse Expansion (SMA - Nov. 2013)	Construction est. $97,300, non-construction est. $120,900, additional annual O&M: $500 Comparative Metric: $711.15 per 1,000 gallons of reuse water applied monthly	Potable Water Conservation	
Luna	SS	Project	Water Reuse	Deming Park, T-Ball, BMX	City of Deming, Jim Massengill, Public Works Director	This option includes the construction and installation of approximately 1,000 LF of 6-inch reuse line along South Grand Avenue running north. This line will tap into the trunk line and will be used to irrigate the park area at the Lloyd Pratz T-ball Complex and the BMX park (approx. 7.2 acres). Using reuse water would reduce the use of potable by approximately 1,610,800 gallons per month during peak usage months.	City of Deming		Funding request: 2017. Implementation by City of Deming, Implementation will begin when funding is allocated.	Effluent Reuse Expansion Project as per the City of Deming Preliminary Engineering Report for Proposed Effluent Reuse Expansion (SMA - Nov. 2013)	Construction est. $106,900, non-construction est. $121,300, additional annual O&M: $500 Comparative Metric: $176.38 per 1,000 gallons of reuse water applied monthly	Potable Water Conservation	
Luna	SS	Project	Water Reuse	Deming Florida Park	City of Deming, Jim Massengill, Public Works Director	This option includes the installation of approximately 2,670 LF of 6-inch reuse line along South Platinum Avenue. This line would be used to irrigate Florida Park (approximately 3.3 acres) and will reduce the amount of potable water used by an estimated 557,840 gallons per month during peak demand months.	City of Deming		Funding request: 2019. Implementation by City of Deming, Implementation will begin when funding is allocated.	Effluent Reuse Expansion Project as per the City of Deming Preliminary Engineering Report for Proposed Effluent Reuse Expansion (SMA - Nov. 2013)	Construction est. $239,800, non-construction est. $146,900, additional annual O&M: $500	Potable Water Conservation	
Luna	SS	Project	Water System Infrastructure	Deming SCADA System	City of Deming, Jim Massengill, Public Works Director	Water system infrastructure - Upgrade the city's SCADA system to include computer assigned monitoring for five wells.	City of Deming		Funding request: 2017. Implementation by City of Deming, Implementation will begin when funding is allocated.	City of Deming Municipal Water Supply System Optimization Report (BOR)	$510,000	Potable Water Conservation	
Luna	SS	Project	Water System Infrastructure	Deming Pond	City of Deming, Jim Massengill, Public Works Director	This alternative includes the construction of an additional nominal 2 million gallon pond in the vicinity of the existing ponds at the golf course. The City has discussed two possible locations for the new pond. The first location is near Hole 15 and the other location between holes 13 and 15. This pond will be used for additional storage if the effluent water is not being used for irrigation purposes due to poor weather or in the event that the distribution or supply system becomes temporarily unavailable	City of Deming		Funding request: 2016. Implementation by City of Deming, Implementation will begin when funding is allocated.	Effluent Reuse Expansion Project as per the City of Deming Preliminary Engineering Report for Proposed Effluent Reuse Expansion (SMA - Nov. 2013)	Construction est. $264,100, non-construction est. $158,500, additional annual O&M: $2,500.	Potable Water Conservation	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Luna	SS	Project	Water Reuse	Deming Soccer, football fields	City of Deming, Jim Massengill, Public Works Director	This option includes construction and installation of approximately 5,000 LF of 10-inch reuse line to irrigate the soccer fields, the dog park and the Pop Warner Football Fields. Using reuse water for irrigation will reduce the amount of potable water usage by approximately 7,531,415 gallons per month during the peak demand months. The area to be irrigated is approx. 13 acres.	City of Deming		Funding request: 2017. Implementation by City of Deming, Implementation will begin when funding is allocated.	Effluent Reuse Expansion Project as per the City of Deming Preliminary Engineering Report for Proposed Effluent Reuse Expansion (SMA - Nov. 2013)	Construction est. $295,200, non-construction est. $150,200, additional annual O&M: $1,000.	Potable Water Conservation	
Luna	SS	Project	Water Systems Infrastructure	Water System Line Replacement/ Repair	ICIP 2016-2020	Water System Line Replacement/Repair	City of Deming		2016		$1,222,886		
Luna	SS	Project	Water Systems Infrastructure	Effluent Reuse and Irrigation Improvements	ICIP 2016-2020	Effluent Reuse and Irrigation Improvements	City of Deming		2016, 2018-2019		$5,600,000		
Luna	SS	Project	Water Systems Infrastructure	Regional Water Conservation	ICIP 2016-2020	Regional Water Conservation	City of Deming		2016-2020		$1,500,000		
Luna	SS	Project	Water Systems Infrastructure	Well Upgrades/ Optimization/ Conversion/ SCADA	ICIP 2016-2020	Well Upgrades/Optimization/Conversion/SCADA	City of Deming		2016-2020		$2,150,000		
Luna	SS	Project	Water Systems Infrastructure	Water Rights-Purchase of	ICIP 2016-2020	Water Rights-Purchase of	City of Deming		2016-2020		$1,250,000		
Luna	SS	Project	Water Systems Infrastructure	Deep Well Study/Planning and Development	ICIP 2016-2020	Deep Well Study/Planning and Development	City of Deming		2017-2020		$90,000		
Luna	SS	Project	Water Systems Infrastructure	Wastewater Treatment Plant Equip Replacement	ICIP 2016-2020	Wastewater Treatment Plant Equip Replacement	City of Deming		2017-2020		$850,000		
Luna	SS	Project	Water Systems Infrastructure	Sewer-Utility Equipment Vactor Truck	ICIP 2016-2020	Sewer-Utility Equipment Vactor Truck	City of Deming		2017		$385,000		
Luna	SS	Project	Water System Infrastructure	Sewerlines Replacement	ICIP 2017-2021	Sewerlines Replacement	City of Deming		2017-2021		$3,000,000		
Luna	SS	Program	Water System Infrastructure	Municipal Water System PER	Water Trust Board 2016 Recommendations	Planning	City of Deming						
Luna	SS	Project	Drill New Well	Water Distribution Improvements-Pear Street Revitalization Improvements Phase III	Water Trust Board Database	Water Distribution Improvements-Pear Street Revitalization Improvements Phase III	City of Deming		FY2014		$1,017,705		
Luna	SS	Project	Drill New Well	Effluent Reuse Expansion Project	Water Trust Board Database	Effluent Reuse Expansion Project	City of Deming		FY2014		$800,356		
Luna	SS	Project	Acequia System Infrastructure	1892 Luna Irrigation Ditch Diversion	Luna Ditch	1892 Luna Irrigation Ditch Diversion	Luna Ditch	Irrigators	FY2016		$100,000		
Luna	SS	Project	Effluent Reuses	Deming Effluent Reuse Project	City of Deming	Deming Effluent Reuse Project	City of Deming		FY2016		$1,750,000; $1,000,000 FY2016		
Luna	SS	Project	PER	Deming Planning (PER)	City of Deming, Jim Massengill, Public Works Director	Southwest regional Water Supply system -- planning (preliminary engineering report)	New Mexico CAP Entity		Funding Request: 2016. Timeframe implementation: New Mexico CAP entity/ Interstate Stream Commission	Ten percent engineering by Bureau of Reclamation	To Be Determined		

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
Luna	SS	Project	Water System Infrastructure	Columbus border area flood control	Capitol Outlay Database	Columbus border area flood control	Village of Columbus				$1,800,000		Fund: CIPF
Luna	SS	Project	Water System Infrastructure	Columbus border area flood control	Capitol Outlay Database	Columbus border area flood control	Village of Columbus				$187,500		Fund: STB
Luna	SS	Project	Water System Infrastructure	Columbus port of entry street & drain improve	Capitol Outlay Database	Columbus port of entry street & drain improvements	Village of Columbus				$218,000		Fund: CIPF
Luna	SS	Project	Water Systems Infrastructure	Water System Improvements	ICIP 2016-2020	Water System Improvements	Village of Columbus		2016-2020		$2,794,250		
Luna	SS	Project	Water System Infrastructure	Port of Entry Flood and Drainage Control	ICIP 2017-2021	Port of Entry Flood and Drainage Control	Village of Columbus		2017		$2,900,000		
Luna	SS	Project	Water System Infrastructure	Columbus Land Port Of Entry Water & WWater Improve	Legislative Council Service, 52nd Legislature, 2nd Session, 2016	To plan, design and construct water and wastewater improvements for the land port of entry in Columbus	Village of Columbus						
Luna	SS	Project	Infrastructure Improvements	Water Storage Capacity & Sewage Lagoon Cell Capacity Improvement	Village of Columbus	The project consists of construction of additional water storage capacity and increased sewage lagoon cell capacity for the Village of Columbus. The current water storage capacity is 443,000-gallons, which does not allow enough storage capacity for average day demand needs or for fire suppression storage. The construction of the new port of entry facility will require 200,000 gallons of fire storage. Construction would consist of an additional welded steel tand of approximately 400,000 gallons built in the location of the village's current two water storage reservoirs in the northwest part of the village. The village sewage facultative pond that serves the port of entry area is presently at capacity. Given the construction of the new port of entry facilities, construction of additional sewage lagoon cell area will be required.	Village of Columbus -- (575) 531-2663		Latter part of 2017	Under preliminary design, and is included in a preliminary engineering report to be completed by July 2016			
	SS	Project	Watershed Restoration	Negrito EMA Black Six Shooter-Reserve Ranger District	Carolyn Koury, Gila National Forest	Shooter Timber Sale slash treatment. Prescribed burn. 661 acres.	Gila National Forest		FY2016	5 Year Plan 2015-2	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Negrito EMA Burro Sale SRx & Sale Prep-Reserve Ranger District	Carolyn Koury, Gila National Forest	Timber Sale Burro Sale slash treatment. Mechanical treatment - forest. 6,000 acres.	Gila National Forest	NM State Forestry	FY2016	5 Year Plan 2015-2019	$800,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Negrito EMA-Reserve Ranger District	Carolyn Koury, Gila National Forest	Rx Fire Sheep Basin North 141 - Partnership. Prescribed burn. 800 acres.	Gila National Forest	State Of NM, Rocky Mountain Elk Foundation	FY2016	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Moraga Wildlife Habitat Improv. -Reserve Ranger District	Carolyn Koury, Gila National Forest	Thin for WL habitat improv. Wildlife habitat improvement. 500 acres.	Gila National Forest	NM Game and Fish, Rocky Mountain Elk Foundation	FY2016	5 Year Plan 2015-2019	$55,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landacape-Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx burn bar 6 Block 1. Prescribed burn. 2,000 acres.	Gila National Forest	NM Game and Fish,	FY2016	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landacape-Silver City Ranger District	Carolyn Koury, Gila National Forest	Mechanical Thinning Bar #3. Mechanical treatment - woodland/brush. 600 acres.	Gila National Forest	NM Game and Fish,	FY2016	5 Year Plan 2015-2019	$80,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Ft. Bayard Silver City-Ranger District	Carolyn Koury, Gila National Forest	Cameron Creek Rx Burn. Prescribed burn. 3,000 acres.	Gila National Forest	NM Game and Fish,	FY2016	5 Year Plan 2015-2019	$100,000	Integrated Resource Restoraation	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak George Town-Silver City Ranger District	Carolyn Koury, Gila National Forest	Mech. Thin Georgetown #2. Mechanical treatment - woodland/brush. 1,500 acres.	Gila National Forest	NM Game and Fish,	FY2016	5 Year Plan 2015-2019	$150,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landacape-Silver City Ranger District	Carolyn Koury, Gila National Forest	Mech. thin watershed #2. Mechanical treatment - woodland/brush. 70 acres.	Gila National Forest	NM Game and Fish,	FY2016	5 Year Plan 2015-2019	$14,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landacape-Silver City Ranger District	Carolyn Koury, Gila National Forest	Erosion control watershed #6. Soil and water improvement. 32 acres.	Gila National Forest	Office Natural Resource Trustee	FY2016	5 Year Plan 2015-2019	25000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Vigil Canyon Watershed Restoration Action Plan	Carolyn Koury, Gila National Forest	riparian restoration, spring restoration, road reroute - improved watershed condition class	Gila National Forest		FY2016	5 Year Plan 2015-2019	$125,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Snow Canyon Watershed Restoration Action Plan	Carolyn Koury, Gila National Forest	riparian restoration, grade control, aquatic habitat improvement, wetland restoration - improved watershed condition class	Gila National Forest	Resource Advisory Council	FY2016	5 Year Plan 2015-2019	$165,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Forest Road 150 Bridge Replacement	Carolyn Koury, Gila National Forest	Replacement of 4 bridges on Indian Creek, Black Canyon, Terry Canyon, and tributaries	Gila National Forest		FY2016	5 Year Plan 2015-2019	$700,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Catwalk National Recreation Trail Restoration	Carolyn Koury, Gila National Forest	Restoration of the historic Catwalk Trail, including bank stabilization and trail drainage improvements	Gila National Forest	Federal Highway Administration	FY2016	5 Year Plan 2015-2019	$4,500,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Indian Peaks Area 74-Black Ranger Ranger District	Carolyn Koury, Gila National Forest	Landscape broadcast burn forest pri? Prescribed burn. 9,500 acres.	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$50,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Indian Peaks Area 74-Black Ranger Ranger District	Carolyn Koury, Gila National Forest	Grassland Restoration Rng/WL. Grassland restoration. 500 acres.	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$50,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Indian Peaks Little Red-Black Range Ranger District	Carolyn Koury, Gila National Forest	Watershed range WL restoration. Mechanical treatment - woodland/brush	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$20,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Slaughter Mesa Restoration-Quemado Ranger District	Carolyn Koury, Gila National Forest	Unit 12 Rx Burn Ph. 1. Prescribed burn. 400 acres.	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Slaughter Mesa Restoration-Quemado Ranger District	Carolyn Koury, Gila National Forest	Unit 6 Burn (partner) Ph. 4. Prescribed burn. 400 acres.	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Slaughter Mesa Restoration-Quemado Ranger District	Carolyn Koury, Gila National Forest	Unit 2 Rx burn. Prescribed burn. 207 acres.	Gila National Forest		FY2017	5 Year Plan 2015-2019	$20,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	East Centerfire WUI-Quemado Ranger District	Carolyn Koury, Gila National Forest	Freeman Unit Rx burn. Prescribed burn. 3,453 acres.	Gila National Forest		FY2017	5 Year Plan 2015-2019	$60,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Snare Mesa - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Rx burn. Prescribed burn. 200 acres.	Gila National Forest	NM State Forestry	FY2017	5 Year Plan 2015-2019	$15,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Deep Creek Slash Treatment - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Rx of activity fuels. Prescribed burn.	Gila National Forest	NM State Forestry, Resource Advisory Council	FY2017	5 Year Plan 2015-2019	$15,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Cedar Breaks - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Rx of activity fuels. Prescribed burn.	Gila National Forest	Resource Advisory Council, NM State Forestry	FY2017	5 Year Plan 2015-2019	$15,000	Integrated Resource Restoraation	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
	SS	Project	Watershed Restoration	Fire Restoration Whitewater Baldy - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Trail maint and reconstruction. Trail rehab. 30 miles.	Gila National Forest	Federal Highway Administration	FY2017	5 Year Plan 2015-2019	$1,500,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Fire Restoration Whitewater Baldy - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Heritage Site Stabilization. Mechanical treatment - woodland/brush. 2 acres.	Gila National Forest		FY2017	5 Year Plan 2015-2019	$10,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	fire Restoration Whitewater Baldy - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Catwalk. Trail rehab. 1 mile.	Gila National Forest	Federal Highway Administration	FY2017	5 Year Plan 2015-2019	$400,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak-Silver City Ranger District	Carolyn Koury, Gila National Forest	Initial entry & maint: L_T West, alt. unit cottonwood revisited. Prescribed burn. 5,500 acres.	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$65,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Wilderness Ranger District	Carolyn Koury, Gila National Forest	Initial entry-Small Pine Block- T-Bird 1. Pile burning. 125 acres.	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$10,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Wilderness Ranger District	Carolyn Koury, Gila National Forest	L_T West, alt. unit Cottonwood Revisited D5. Prescribed burn. 5,500 acres.	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$65,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Negrito EMA Activity Treatment - Reserve Ranger District	Carolyn Koury, Gila National Forest	Treat activity fuels broadcast burn. Prescribed burn. 500 acres.	Gila National Forest		FY2017	5 Year Plan 2015-2019	$25,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx Jaybird. Prescribed burn. 2,359 acres.	Gila National Forest	NM Game ad Fih	FY2017	5 Year Plan 2015-2019	$65,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landacape -Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx burn bar 6 block 2. Prescribed burn. 1,800 acres.	Gila National Forest		FY2017	5 Year Plan 2015-2019	$50,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landacape -Silver City Ranger District	Carolyn Koury, Gila National Forest	Mechanical thinning willow. Mechanical treatment - woodland/brush. 2,000 acres.	Gila National Forest		FY2017	5 Year Plan 2015-2019	$85,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres /Signal Peak George Town - Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx burn Georgetown block 1. Prescribed burn. 1450 acres.	Gila National Forest	NM Game and Fish	FY2017	5 Year Plan 2015-2019	$30,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landscape Cienega -Silver City Ranger District	Carolyn Koury, Gila National Forest	Erosion control watershed #6. Steam improvement. 32 miles or structures.	Gila National Forest	Office Natural Resource Trustee	FY2017	5 Year Plan 2015-2019	$250,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Indian Peaks Little Red -Black Range Ranger District	Carolyn Koury, Gila National Forest	Watershed range WL restoration. Mechanical treatment - woodland/brush. 500 acres.	Gila National Forest	Wildlife non profits	FY2018	5 Year Plan 2015-2019	$50,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Gap 2 WUI - Quemado Ranger District	Carolyn Koury, Gila National Forest	Rx broadcast burn. Prescribed burn. 100 acres.	Gila National Forest	Wildlife non profits	FY2018	5 Year Plan 2015-2019	$10,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Slaughter Mesa Restoration - Quemado Ranger District	Carolyn Koury, Gila National Forest	Unit 12 Thinning (partner) Ph. 2. Mechanical treatment - woodland/brush. 400 acres.	Gila National Forest	Wildlife non profits	FY2018	5 Year Plan 2015-2019	$40,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Slaughter Mesa Restoration - Quemado Ranger District	Carolyn Koury, Gila National Forest	Unit 3 maintenance burn. Mechanical treatment - woodland/brush. 1,056 acres.	Gila National Forest	Wildlife non profits	FY2018	5 Year Plan 2015-2019	$65,000	Integrated Resource Restoraation	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
	SS	Project	Watershed Restoration	East Centerfire WUI -Quemado Ranger District	Carolyn Koury, Gila National Forest	Toirette/Dillon unit maintenance burn.Prescribed burn. 6,000 acres.	Gila National Forest		FY2018	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	snare Mesa - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Rx burn. Prescribed burn. 30 miles.	Gila National Forest	NM State Forestry, Resource Advisory Council	FY2018	5 Year Plan 2015-2019	$10,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Fire Restoration Whitewater Baldy - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Trail maint and reconstruction. Trail rehab. 50 acres.	Gila National Forest		FY2018	5 Year Plan 2015-2019	$18,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Fire Restoration Whitewater Baldy - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Noxious/invasive plant treatment. Invasive species treatments - plants. 2.	Gila National Forest		FY2018	5 Year Plan 2015-2019	$1,500	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	fire Restoration Whitewater Baldy - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Heritage site stabilization. 1 mile.	Gila National Forest		FY2018	5 Year Plan 2015-2019	$1,500	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	fire Restoration Whitewater Baldy - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Catwalk. Trail rehab. 50 acres.	Gila National Forest		FY2018	5 Year Plan 2015-2019	$80,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	San Francisco - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Noxious weed/INV plant trtmnt. Invasive species treatments - plants. 250 acres.	Gila National Forest		FY2018	5 Year Plan 2015-2019	$1,500	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Tucson Electric Powerline - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Fuel Treatment. Mechanical treatment - woodland/brush. 5,500 acres.	Gila National Forest	Tucson Electric Powerline	FY2018	5 Year Plan 2015-2019	$500,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Wilderness Ranger District	Carolyn Koury, Gila National Forest	Initial entry & maint: L_T West, alt. unit cottonwood revisited. Prescribed burn. 75 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2018	5 Year Plan 2015-2019	$15,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Wilderness Ranger District	Carolyn Koury, Gila National Forest	Initial entry-Small Pine Block- Hwy 4. Prescribed burn. 500 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2018	5 Year Plan 2015-2019	$25,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Negrito EMA Activity Treatment - Reserve Ranger District	Carolyn Koury, Gila National Forest	Treat activity fuels broadcast burn. Prescribed burn. 2,000 acres.	Gila National Forest	NM State Forestry	FY2018	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Negrito EMA Burro Sale -Reserve Ranger District	Carolyn Koury, Gila National Forest	Timber Sale prep, Burro Sale. Mechanical treatment - forest. 200 acres.	Gila National Forest	NM State Forestry	FY2018	5 Year Plan 2015-2019	$40,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	District-wide TSI Forest Veg Improvement - Reserve Ranger District	Carolyn Koury, Gila National Forest	Non-commercial thinning. Mechanical treatment - woodland/brush. 3,000 acres.	Gila National Forest		FY2018	5 Year Plan 2015-2019	$85,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Reserve WUI Prescribed Burn - Reserve Ranger District	Carolyn Koury, Gila National Forest	Treat activity fuels broadcast burn. Prescribed burn. 500 acres.	Gila National Forest		FY2018	5 Year Plan 2015-2019	$20,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Moraga Wildlife Habitat Improv. -Reserve Ranger District	Carolyn Koury, Gila National Forest	Thin for WL habitat improv. Mechanical treatment - woodland/brush. 2,036 acres.	Gila National Forest	Wildlife non profits	FY2018	5 Year Plan 2015-2019	$10,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Signal Peak/Upper Mimbres -Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx Mill Scott. TSI. 1,200 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2018	5 Year Plan 2015-2019	$50,000	Integrated Resource Restoraation	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
	SS	Project	Watershed Restoration	Burro Mountain Landscape -Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx burn bar block 3. Prescribed burn. 1,200 acres.	Gila National Forest	Office Natural Resource Trustee	FY2018	5 Year Plan 2015-2019	$20,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landscape -Silver City Ranger District	Carolyn Koury, Gila National Forest	Mechanical thinning mulberry. Mechanical treatment - woodland/brush. 1,200 acres.	Gila National Forest	Office Natural Resource Trustee	FY2018	5 Year Plan 2015-2019	$50,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx Burn Georgetown Block 2. Prescribed burn. 2,150 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2018	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Silver City Ranger District	Carolyn Koury, Gila National Forest	Mech Thin Georgetown #3. Mechanical treatment - woodland/brush. 600 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2018	5 Year Plan 2015-2019	$100,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landscape Cienega -Silver City Ranger District	Carolyn Koury, Gila National Forest	Mech. Thin Watershed #5. Mechanical treatment - woodland/brush. 70 acres.	Gila National Forest	Office Natural Resource Trustee	FY2018	5 Year Plan 2015-2019	$14,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landscape Cienega -Silver City Ranger District	Carolyn Koury, Gila National Forest	Erosion control watershed #6. Soil and water improvement. 32 acres.	Gila National Forest	Office Natural Resource Trustee	FY2018	5 Year Plan 2015-2019	$100,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Mangas WUI, -Quemado Ranger District	Carolyn Koury, Gila National Forest	Thinning. Mechanical treatment - forest. 300 acres.	Gila National Forest		FY2019	5 Year Plan 2015-2019	$60,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Escudilla East Vegetation Treatment Cut, -Quemado Ranger District	Carolyn Koury, Gila National Forest	Luna TS Rx burn slash disposal. Prescribed burn. 700 acres.	Gila National Forest		FY2019	5 Year Plan 2015-2019	$25,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Slaughter Mesa, -Quemado Ranger District	Carolyn Koury, Gila National Forest	Vegetation Treatment. Prescribed burn. 500 acres.	Gila National Forest	Wildlife non profits	FY2019	5 Year Plan 2015-2019	$20,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Snare Mesa -Glenwood Ranger District	Carolyn Koury, Gila National Forest	Mechanical Thin Force Account. Mechanical treatment - woodland/brush. 50 acres.	Gila National Forest	NM State Forestry, Resource Advisory Council	FY2019	5 Year Plan 2015-2019	$10,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Snare Mesa -Glenwood Ranger District	Carolyn Koury, Gila National Forest	Mechanical Thin Contract. Mechanical treatment - woodland/brush. 200 acres.	Gila National Forest	NM State Forestry, Resource Advisory Council	FY2019	5 Year Plan 2015-2019	$40,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Snare Mesa -Glenwood Ranger District	Carolyn Koury, Gila National Forest	Rx burn. Prescribed burn. 200 acres.	Gila National Forest	NM State Forestry, Resource Advisory Council	FY2019	5 Year Plan 2015-2019	$10,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Fire Restoration Whitewater Baldy -Glenwood Ranger District	Carolyn Koury, Gila National Forest	Trail maint and reconstruction. Trail rehab. 30 miles.	Gila National Forest		FY2019	5 Year Plan 2015-2019	$500,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Fire Restoration Whitewater Baldy -Glenwood Ranger District	Carolyn Koury, Gila National Forest	Noxious/invasive plant treatment. Invasive species treatments - plants. 50 acres.	Gila National Forest		FY2019	5 Year Plan 2015-2019	$1,500	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Fire Restoration Whitewater Baldy -Glenwood Ranger District	Carolyn Koury, Gila National Forest	Heritage site stabilization. 2.	Gila National Forest		FY2019	5 Year Plan 2015-2019	$1,500	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Fire Restoration Whitewater Baldy -Glenwood Ranger District	Carolyn Koury, Gila National Forest	Catwalk. Trail rehab. 1 mile.	Gila National Forest		FY2019	5 Year Plan 2015-2019	$40,000	Integrated Resource Restoraation	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
	SS	Project	Watershed Restoration	San Francisco - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Noxious weed/INV plant trtmnt. Invasive species treatments - plants. 50 acres.	Gila National Forest	Wildlife non profits	FY2019	5 Year Plan 2015-2019	$1,500	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Tucson Electric Powerline - Glenwood Ranger District	Carolyn Koury, Gila National Forest	Fuel Treatment. Mechanical treatment - woodland/brush. 250 acres.	Gila National Forest	Tucson Electric Powerline	FY2019	5 Year Plan 2015-2019	$30,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Wilderness Ranger District	Carolyn Koury, Gila National Forest	Initial entry & maintenance: L_T West, alt. unit cottonwood revisited. Prescribed burn. 5,500 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2019	5 Year Plan 2015-2019	$65,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak -Wilderness Ranger District	Carolyn Koury, Gila National Forest	Broadcast burn. Prescribed burn. 450 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2019	5 Year Plan 2015-2019	$20,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Negrito EMA Activity Treatment - Reserve Ranger District	Carolyn Koury, Gila National Forest	Treat activity fuels broadcast burn. Prescribed burn. 500 acres.	Gila National Forest	NM State Forestry	FY2019	5 Year Plan 2015-2019	$20,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Negrito EMA Burro Sale -Reserve Ranger District	Carolyn Koury, Gila National Forest	Timber Sale Prep, Burro Sale. Mechanical treatment - forest. 2,000 acres.	Gila National Forest	NM State Forestry	FY2019	5 Year Plan 2015-2019	$300,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	District-wide TSI Forest Veg Improvement - Reserve Ranger District	Carolyn Koury, Gila National Forest	Non-commercial thinning. Mechanical treatment - woodland/brush. 200 acres.	Gila National Forest		FY2019	5 Year Plan 2015-2019	$40,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Reserve WUI Prescribed Burn - Reserve Ranger District	Carolyn Koury, Gila National Forest	Treat actuvuty fuels broadcast burn. Prescribed burn. 3,000 acres.	Gila National Forest		FY2019	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Moraga Wildlife Habitat Improv. -Reserve Ranger District	Carolyn Koury, Gila National Forest	Thin for WL habitat improv. Mechanical treatment - woodland/brush. 500 acres.	Gila National Forest	Wildlife non profits	FY2019	5 Year Plan 2015-2019	$50,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Negrito EMA Burro Rx burn -Reserve Ranger District	Carolyn Koury, Gila National Forest	Rx Burn in Burro Planning Area. Prescribed burn. 3,000 acres.	Gila National Forest	NM State Forestry	FY2019	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Signal Peak/Upper Mimbres -Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx Farm Flat. Prescribed burn. 2,036 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2019	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landscape - Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx burn bar block 3. Prescribed burn. 1,200 acres.	Gila National Forest	Office Natural Resource Trustee	FY2019	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak - Silver City Ranger District	Carolyn Koury, Gila National Forest	Rx burn Georgetown block. Prescribed burn. 2,150 acres.	Gila National Forest	Wildlife non profits	FY2019	5 Year Plan 2015-2019	$35,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Upper Mimbres/Signal Peak-Silver City Ranger District	Carolyn Koury, Gila National Forest	Mech thin Georgetown. Mechanical treatment - woodland/brush. 600 acres.	Gila National Forest	Nature Conservancy, NM State Forestry	FY2019	5 Year Plan 2015-2019	$50,000	Integrated Resource Restoraation	
	SS	Project	Watershed Restoration	Burro Mountain Landscape Cienega-Silver City Ranger District	Carolyn Koury, Gila National Forest	Mech. thin watershed. Mechanical treatment - woodland/brush. 70 acres.	Gila National Forest	Office Natural Resource Trustee	FY2019	5 Year Plan 2015-2019	$20,000	Integrated Resource Restoraation	

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
	SS	Project	Watershed Restoration	Burro Mountain Landscape Cienega-Silver City Ranger District	Carolyn Koury, Gila National Forest	Erosion control watershed. Soil and water improvement. 32 acres.	Gila National Forest	Office Natural Resource Trustee	FY2019	5 Year Plan 2015-2019	$100,000	Integrated Resource Restoraation	
	SS	Project	Riparian Habitat	Tularosa River - Reserve Ranger District	Carolyn Koury, Gila National Forest	Aquatic Organism Passage/Wetland Restoration	Gila National Forest	Central Federal Lands	FY2018-FY2019		$380,000	Integrated Resource Restoration	
	SS	Project	Watershed Restoration	Royal John Mine CERCLA - Silver City Ranger District	Carolyn Koury, Gila National Forest	Abandoned mine cleanup/lead tailings	Gila National Forest	Grant County Soil and Water Conservation District; NMED	FY2017-FY2019		$3,000,000	Abandoned mine cleanup	Comprehensive Environmental Response, Compensation & Liability Act (CERCLA)
	R	Program	Municipal Conservation	Municipal Conservation	Municipalities within the region	Municipal Conservation	Municipalities within the region		FY2016		$3,000,000		
	SS	Project	Acequia System Infrastructure	Gila Basin Irrigation Commission Diversion Structure	Gila Basin Irrigation Commission	Gila Basin Irrigation Commission Diversion Structure	Gila Basin Irrigation Commission	Grant Soil and Water Conservation District	FY2016		$1,250,000; $100,000 FY2016		
	SS	Project	Acequia System Infrastructure	Pleasanton East Side Ditch Project	Pleasanton East Side Ditch	Pleasanton East Side Ditch Project	Pleasanton East Side Ditch	Irrigators	FY2016		$200,000		
	SS	Project	Acequia System Infrastructure	Sunset Canal/ New Model Canal Ditch Rehabilitation	New Model Ditch	Sunset Canal/ New Model Canal Ditch Rehabilitation	New Model Ditch	Irrigators	FY2016		$200,000		
	SS	Project	Watershed Restoration	Instream, Floodplain, Riparian and Wetland Restoration	Watershed Subcommittee: Grant County Eco-Watershed Group, Grant County SWCD - Ty Bays, NM State Forestry Tonya Vowles, Carolyn Koury, NMED - John Money, NM Forest and Watershed Restoration Institute - Vicky Estrada, USDA NRCS - Cody Robertson, USFS Gila NF, Carolyn Koury and Diane Taliaferro, BLM Las Cruces - Mark Bernal, The Nature Conservancy - Martha Cooper, Upper Gila Watershed Association - Donna Stevens	Examples: Removal of invasive, non-native riparian vegetation (salt cedar, Russian olive, and mesquite) and streams and rivers F; Fencing of riparian, spring, and wetland areas to manage grazing impacts from cattle.	Watershed Subcommittee					see above	see above
	SS		Watershed Restoration	Water Banking/Voluntary Leases of Water Rights	Watershed Subcommittee		Watershed Subcommittee					see above	see above

Regional Water Planning Update

Projects, Programs, and Policies

Water Planning Region: Southwest

County	Regional (R) or System Specific (SS)	Strategy Type (Project, Program, or Policy)	Category	Project Name	Source of Project Information	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
	SS	Project	Watershed Restoration	Rangeland Management and Conservation	Watershed Subcommittee	NRCS works with private landowners to improve range conditions. BLM and USFS staff oversee range condition on public lands. Example: Upper Burro Cienega project is supporting water development for ranchers and wildlife, funding provided by ONRT and FWS.	Watershed Subcommittee					see above	see above
	SS	Project	Watershed Restoration	Road Improvements	Watershed Subcommittee	Example: Fix road drainage problems that contribute to erosion; Implementation of the Gila National Forests Travel Management Plan will begin in Jan. 2016, preceded by an assessment in August.	Watershed Subcommittee					see above	see above
	SS	Project	Watershed Restoration	Stream Restoration Structures/Water Harvesting	Watershed Subcommittee	Example: Stream Dynamics San Vicente project funded by NMED's River Steward's Program. This project focuses on curb cuts in Silver City.	Watershed Subcommittee					see above	see above
	SS	Program	Watershed Restoration	Monitoring Programs	Watershed Subcommittee	In uplands and along streams and rivers, collect data to understand effect of restoration treatments, prescribed fire, and wildfires. Grant County SWCD assisted with a paired-watershed study in the Burros, looking at soil moisture in response to thinning. Monitor groundwater levels in response to flows and climate. NMDGF funded long-term data collection in the Cliff-Gila Valley.	Watershed Subcommittee					see above	see above
	SS	Project	Watershed Restoration	Wetland mapping and monitoring along major rivers (Gila, San Francisco, and Mimbres)	Watershed Subcommittee	Use the methodology (NM RAM) developed by NMED to assess wetlands.	Watershed Subcommittee					see above	see above
	SS	Project	Watershed Restoration	Road Assessment and Planning	Watershed Subcommittee		Watershed Subcommittee					see above	see above
	SS	Project	Watershed Restoration	Education Programs	Watershed Subcommittee	Include Aldo Leopold School projects, Water Festival for elementary students, WNMU programs.	Watershed Subcommittee					see above	see above
	SS	Project	Watershed Restoration	Grazing management Plans	Watershed Subcommittee		Watershed Subcommittee					see above	see above
	SS	Project	Watershed Restoration	Collaborative efforts coordinated among all stakeholders to increase pace and scale of restoration in our watersheds	Watershed Subcommittee	Use the Rio Grande Water Fund as an example to engage partners.	Watershed Subcommittee					see above	see above
	SS	Policy	Watershed Restoration	"possible designations"	Watershed Subcommittee	As part of Forest Plan Revision, the Gila NF is exploring possible designations, such as Outstanding Natural Resource Waters.	Watershed Subcommittee					see above	see above