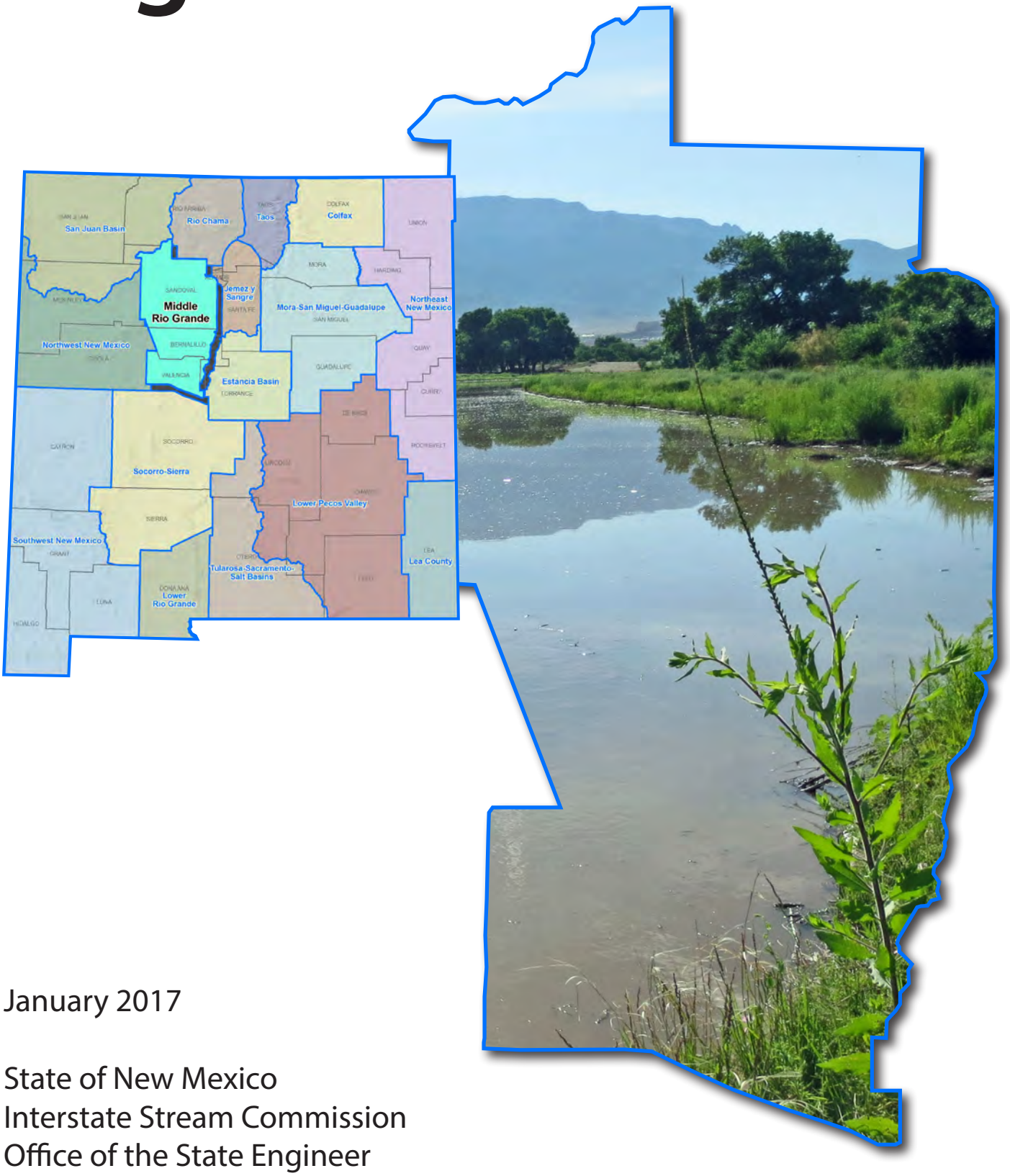
Middle Rio Grande Regional Water Plan



January 2017

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

Cover photograph: Rio Grande upstream of embayment

Table of Contents

List of Figures

List of Tables

List of Appendices

Note: Appendix designations indicate corresponding section in plan

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List of Acronyms

°F	degrees Fahrenheit
ABCWUA	Albuquerque Bernalillo County Water Utility Authority
ac-ft/yr	acre-feet per year
AMAFCA	Albuquerque Metropolitan Arroyo Flood Control Authority
AMO	Atlantic multidecadal oscillation
AWRM	Active Water Resource Management
BBER	Bureau of Business and Economic Research
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CID	Carlsbad Irrigation District
COA	City of Albuquerque
CSWCD	Ciudad Soil and Water Conservation District
CWA	Clean Water Act
DBS&A	Daniel B. Stephens & Associates, Inc.
DWP	Drinking Water Project
DWS	Domestic Well Statute
EBID	Elephant Butte Irrigation District
EPA	U.S. Environmental Protection Agency
EPCWID #1	El Paso County Water Improvement District Number One
ESA	Endangered Species Act
FY	fiscal year
GIS	geographic information system
gpcd	gallons per capita per day
GWQB	Ground Water Quality Bureau [New Mexico Environment Department]
ICIP	Infrastructure Capital Improvement Plan
IPCC	Intergovernmental Panel on Climate Change
JRWG	Jemez River Watershed Group
JSAI	John Shomaker & Associates, Inc.
KAFB	Kirtland Air Force Base
LQ	location quotient

MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MDWCA	mutual domestic water consumers association
MRCOG	Mid-Region Council of Governments
MRGAA	Middle Rio Grande Administrative Area
MRGCD	Middle Rio Grande Conservancy District
MRGWA	Middle Rio Grande Water Assembly
MSA	metropolitan statistical area
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
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMISC	New Mexico Interstate Stream Commission
NMOSE	New Mexico Office of the State Engineer
NMSA	New Mexico Statutes Annotated
NMSU	New Mexico State University
NMWQCC	New Mexico Water Quality Control Commission
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
PCB	polychlorinated biphenyl
PDO	Pacific decadal oscillation
PDSI	Palmer Drought Severity Index
PPP	project, program, and policy
PSTB	Petroleum Storage Tank Bureau (NMED)
PVACD	Pecos Valley Artesian Conservancy District
RCRA	Resource Conservation and Recovery Act
RWP	regional water plan
SDWA	Safe Drinking Water Act
SNOTEL	snowpack telemetry
SSPA	S.S. Papadopulos & Associates, Inc.

SWCD	soil and water conservation district
TDS	total dissolved solids
TMDL	total maximum daily load
U.S. EPA	U.S. Environmental Protection Agency
UNM	University of New Mexico
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
USR	underground storage and recovery
UST	underground storage tank
UWB	underground water basin
WEG	WildEarth Guardians
WQA	Water Quality Act (New Mexico)
WRAS	Water Restoration Action Strategy
WRCC	Western Regional Climate Center
WUA	water users association

Executive Summary

The Middle Rio Grande Water Planning Region, which includes most of Sandoval and Bernalillo counties, all of Valencia County, and a very small portion of Torrance County (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 Middle Rio Grande Regional Water Plan was completed and accepted by the NMISC in 2004.

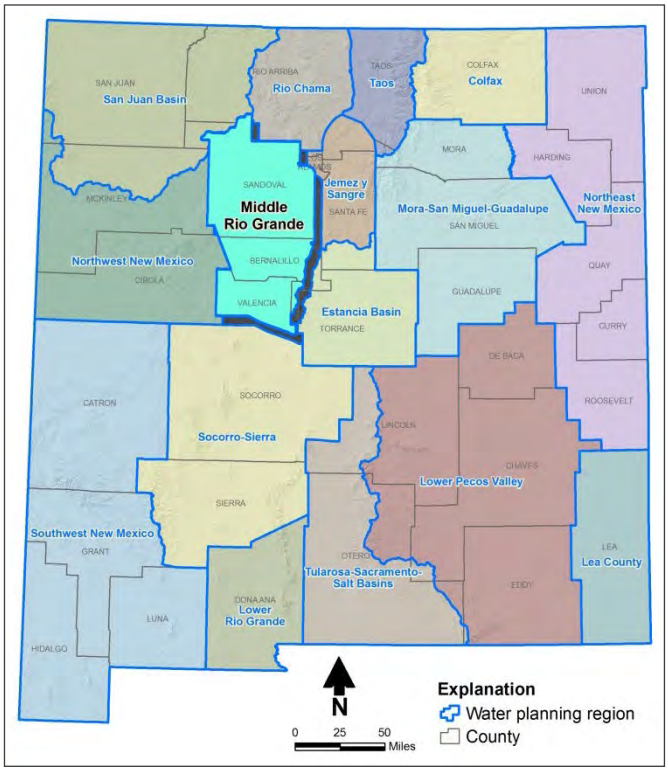


Figure ES-1. Middle Rio Grande Water Planning Region

The purpose of this document is to provide new and changed information related to water planning in the Middle Rio Grande 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 2004 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. Because of its reliance on surface water, the region has a high degree of vulnerability to drought, especially for irrigated agriculture, and the estimated annual shortage in drought years is expected to range from 207,357 to 282,108 acre-feet. Consequently, the region has recommended several high-priority strategies to meet future demand, including stormwater management, treated effluent reuse, and watershed management, better management of existing supply through adjudication of water rights, measuring all water uses and losses, and water resource databases, and supporting the economy through consistent funding for water projects and building local markets.

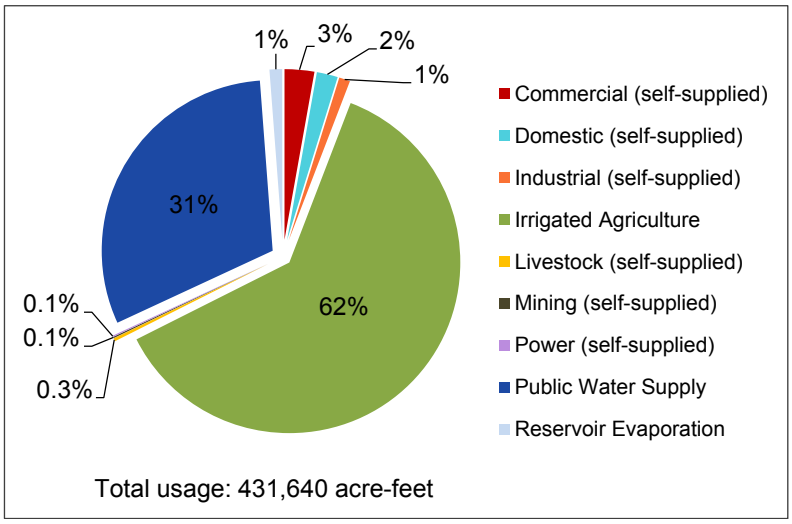


Figure ES-2. Total Regional Water Use, 2010

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.

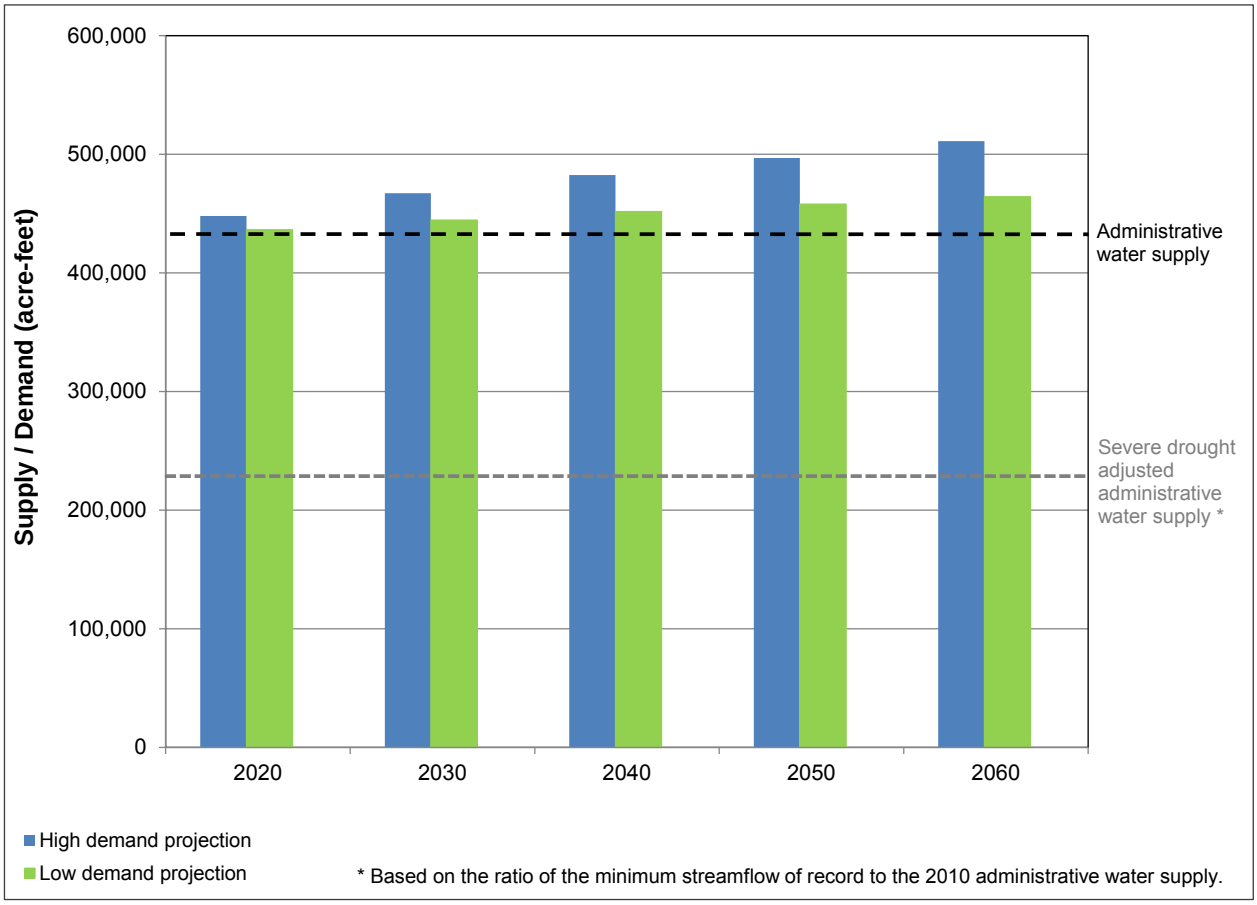


Figure ES-3. Available Supply and Projected Demand

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.

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:

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

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.

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, 18 meetings were held in the Middle Rio Grande region, including 17 NMISC-facilitated meetings and an additional public forum. 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 Middle Rio Grande region include the following:

- The climate divisions within the planning region have all experienced drought in recent years. This is a particular concern for agricultural users that are dependent on surface water, but drought preparedness is important for each community in the region.

- The Rio Grande Compact requires delivery of specified amounts of water to Elephant Butte Reservoir based on the annual natural flow of the Rio Grande at the Otowi gage. New Mexico's delivery to Elephant Butte Reservoir under the Compact is dependent, in part, upon natural and man-caused depletions within parts of the Jemez y Sangre, Middle Rio Grande, and Socorro-Sierra planning regions. This requirement limits combined depletions in these three regions. When the stored water in Elephant Butte and Caballo reservoirs legally available for release to the lower Rio Grande drops below a specified level, certain provisions of the Compact restrict storage and/or release of stored water in reservoirs upstream of Elephant Butte constructed after 1929, thus impacting water operations in the region, perhaps significantly.

- The Rio Grande is the main river in the planning region, and most of the groundwater in the region is within the Rio Grande Underground Water Basin and is considered to be stream-connected. The Rio Grande in the region is considered by the State Engineer to be fully appropriated, and any new diversion of surface water or stream-connected groundwater requires the transfer of a valid senior surface water right. The availability of senior water rights may thus be a limiting factor in meeting the future water needs of the region.

- Water users seeking to obtain water rights to meet growing demands, such as municipal users, are challenged because they must transfer an existing senior water right. No new

appropriations are available in the region. After the groundwater basin was closed to new appropriations in 1956, a number of entities applied for and were issued groundwater pumping permits with the condition that the effects of the pumping on the river would be offset when they occur. Municipal return flow, San Juan-Chama Project water, and the transfer of senior water rights are used as offsets as required by the specific permit requirements, with return flows comprising the greatest volume of offset. The amount of senior water rights needed to offset the pumping under these permits when the effects are fully realized on the river is roughly equal to all of the transferrable senior water rights from the irrigated land along the Rio Grande from north of Albuquerque to Elephant Butte. The total amount of groundwater pumping currently occurring in the planning region is much less than the total amount permitted.

- Several Middle Rio Grande entities have contract allotments of water from the San Juan-Chama Project, which brings water from the Colorado River Basin to the Rio Grande basin. San Juan-Chama Project contractors in the Middle Rio Grande region include the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) (48,200 acre--feet per year [ac-ft/yr]), Middle Rio Grande Conservancy District (MRGCD) (20,900 ac-ft/yr), Town of Belen (500 ac-ft/yr), Town of Bernalillo (400 ac-ft/yr), and Village of Los Lunas (400 ac-ft/yr).

- Since the 2004 plan was completed, the ABCWUA has begun to use surface water from the San Juan-Chama Project to supplement its water supply. This surface water use allows groundwater withdrawals to be reduced and is intended to save groundwater for use as a drought supply when surface water is not available. As a result, ABCWUA, which holds upward of 70 percent of the permitted post-1956 groundwater pumping rights in the region, does not need to pursue acquisition of pre-1907 water rights for offset purposes for several decades. ABCWUA has a goal to manage its existing water resources over the next hundred years to meet river offset requirements without further transfer of pre-1907 water rights. Prior to developing its surface diversion infrastructure, the ABCWUA leased, loaned, or gave portions of its San Juan-Chama Project water to other parties in the Middle Rio Grande for various uses. The smaller municipalities have not developed this renewable water supply and instead will likely continue to use their San Juan-Chama Project water for offset purposes as necessary.

- The NMOSE adopted the Middle Rio Grande Administrative Guidelines in September 2000 for the administration of the Middle Rio Grande Administrative Area (MRGAA). These guidelines are designed to protect water rights, Rio Grande Compact compliance, and the aquifer, and to minimize land subsidence. Under the guidelines new groundwater appropriations will be approved in the MRGAA only if surface water rights are obtained and transferred to offset the diversion amount less any flow returned directly to the Rio Grande. Surface water supplies are fully appropriated, and MRGAA Critical

Management Areas, which are now limited to parts of Albuquerque, are closed to additional pumping.

- The MRGCD has four major river diversion points and a large network of irrigation canals and drains in the area between Cochiti and the Bosque del Apache National Wildlife Refuge. Additionally, passive diversion by MRGCD occurs from the river to the adjacent riverside drains in some reaches. MRGCD coordinates with the Bureau of Reclamation (USBR), and the NMISC in specific instances, on El Vado Reservoir operations so that it can provide stored water to its farmers when native flow is insufficient to meet MRGCD irrigation demand.

- The MRGCD has not yet submitted documentation regarding the water that it has put to beneficial use since its permit (SP-1690) was issued in 1930. Without such documentation and critical evaluation of the documentation by the State Engineer, it will remain unclear what the rights under the permit are. Storage and release from El Vado Reservoir under the permit is coordinated between MRGCD and USBR.

- The Federal Emergency Management Administration recently released new floodplain maps of Sandoval, Bernalillo, and Valencia counties. The new maps 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, thereby helping the region prepare for extreme precipitation. Communities can work to make their watersheds more resilient under climate change by assessing the adequacy of bridges and culverts to sustain peak flow events.

- The existing flood control infrastructure along the Rio Grande is many decades old and nearing the end of its design life. In a number of instances the levees were not engineered and consist simply of excavated materials placed alongside the river when the riverside drains were constructed. Further, because the bottom of the river is higher than the floodplain in some areas, failure of a levee in these areas will cause the river to leave its channel and flood the developed floodplain, including farms, communities, and irrigation and drainage infrastructure. The cost to replace or reinforce this infrastructure throughout the Middle Rio Grande valley is estimated at more than $750 million. A task force of local stakeholder entities has been evaluating the situation, developing reports to the legislature, and seeking funding for higher-priority projects.

- Middle Rio Grande geomorphology has changed significantly from its unmanaged state (Mussetter, 2002). Cochiti Reservoir and other flood control features have trapped sediment, leading to significant and continued channel incising in the upper reaches of the Middle Rio Grande. Conversely, excessive sedimentation from ephemeral tributaries south of Albuquerque, combined with surface water withdrawals, results in significant

channel aggradation. These changes in the river system impact how water is managed as the region reacts to endangered species and water delivery mandates.

- In addition, the river channel has narrowed during the drought and islands have formed that are now vegetated. These conditions will make it difficult to move water through some areas when the next big snowmelt runoff occurs. The potential for extreme precipitation events highlights the need for flood preparation and maintenance of flood control structures.

- The ABCWUA has investigated aquifer storage and recovery (ASR) projects through a demonstration project at Bear Canyon and obtained the first full-scale underground storage and recovery permit in the state in August 2014. Between November 2014 and March 2015, the project recharged 520.6 acre-feet into the aquifer. ABCWUA is implementing a second ASR demonstration project to store up to 5,000 acre-feet of treated San Juan-Chama water through injection wells located at the Drinking Water Treatment Plant in the Rio Grande Valley, at an anticipated cost of $5.7 to $5.9 million, and is currently evaluating other potential projects that would allow them to store more surface water, building up a drought reserve.

- The City of Rio Rancho has demonstrated that surface infiltration and direct injection methods can be used to safely replenish the underlying aquifer with a purified, reclaimed water source. Projects include a 2-acre surface infiltration system and a direct injection facility, each of which has the capacity to recharge the underlying aquifer at a rate of approximately 2 and 3 acre-feet per day, respectively. Full-scale permits for operation of the direct injection facility have been recently issued by the New Mexico Environment Department (NMED) and NMOSE.

- The Middle Rio Grande region is home to six federally listed endangered and threatened species—the Rio Grande silvery minnow, southwestern willow flycatcher, Jemez Mountains salamander, New Mexico meadow jumping mouse, western yellow-billed cuckoo, and Mexican spotted owl—and water demand for these species has resulted in changes in some water operations in the region in recent years. Litigation is occurring on a federally mandated Biological Opinion from 2003 for all Middle Rio Grande water operations that specifies instream flow targets to assist in the recovery of the silvery minnow. The 2003 Biological Opinion was replaced in December 2016, when a new Biological Opinion was issued for Water Operations and River Maintenance actions of USBR, the Bureau of Indian Affairs, MRGCD, and the State. The litigation on the 2003 Biological Opinion is currently stayed to allow the parties to evaluate the changed situation relative to the litigation complaints.

- The congressionally authorized Middle Rio Grande Endangered Species Collaborative Program has provided funding at a 75 percent federal and 25 percent non-federal cost

share to address endangered species and water user conflicts and maintain Endangered Species Act compliance for New Mexico water users above Elephant Butte Reservoir. The Collaborative Program has coordinated efforts by federal, state, and local government and Native American and private entities and expended more than $150 million since 2001. The NMISC has provided approximately 90 percent of the required non-federal cost share. Although litigation is underway, Endangered Species Act compliance has been maintained since 2003 and many projects benefiting the endangered species have been completed.

- Pueblo water rights have not been fully characterized or quantified, yet they constitute the most senior water claims in the basin.

- Sandia and Isleta pueblos have EPA-approved water quality standards, which means that upstream discharges, including treated wastewater return flows from Bernalillo, Rio Rancho, and Albuquerque, must meet Pueblo standards.

- The Middle Rio Grande Water Assembly, a non-profit organization dedicated to educating residents of the Middle Rio Grande about relevant water issues, developed a water budget for the Middle Rio Grande as part of the original water planning effort. Though this document uses a different approach from the common technical approach for all planning regions, the original water budget is still a useful tool that helps describe the water balance in the Middle Rio Grande. The budget has recently been updated by the Middle Rio Grande Water Assembly Water Budget Task Force.

- Due to the large amount of forested land within and upstream of the region, coupled with the recent drought conditions, the threat of wildfire and subsequent sedimentation impacts on streams and reservoirs remains a key planning issue. Continued and expanded efforts to reduce catastrophic fire risk through forest management, as well as additional information on the quantitative benefits of various management techniques, are needed.

- The Nature Conservancy is working to develop the Rio Grande Water Fund, which if funded, will generate sustainable income for a 10- to 30-year forest restoration program through a multi-party effort. Models of debris flow risk after high-severity fire indicate that key water sources are at risk, and the goal of the program is to reduce the risk of catastrophic wildfire and subsequent sedimentation and localized water quality impacts to protect the region's water supply.

- The U.S. Air Force, under direction from the NMED, is cleaning up a jet fuel spill at Kirtland Air Force Base. Plume assessment and interim remediation measures are in place, and a final remediation strategy will be developed under the Resource Conservation and Recovery Act.

- In 2014, the U.S. Environmental Protection Agency issued a National Pollutant Discharge Elimination System Watershed Based MS4 Permit NMR04A000, which covers the Middle Rio Grande watershed. The watershed based MS4 Permit replaces an earlier MS4 Permit NMS000101 for four co-permittees that have been participating under a 2003 cooperative agreement to jointly conduct stormwater quality monitoring. The NMISC is concerned that compliance with the permit will reduce the amount of water reaching the river because, unless a flood control purpose is present, the permit requires retention of water on newly developed and redeveloped sites as opposed to detention, treatment, and release.

- While the largest urban populations are served by municipal suppliers, there are many small and rural drinking water systems in the region, outside of these urban areas. These small systems face challenges in financing infrastructure maintenance and upgrades and complying with water quality monitoring and training standards. Many smaller communities in the region do not have adequate wastewater treatment facilities.

- The East Mountain area (east of the Sandia Mountains in the central part of the planning region) is supplied largely by domestic wells and small water systems. Yields are low in some areas, shallow wells are vulnerable to drought, and septic systems can impact water quality. Bernalillo County groundwater level monitoring has shown significant water level declines in some areas.

- Between 2006 and 2008, 35 entities filed notices of intent to drill more than 420 deep wells in the Middle Rio Grande for the withdrawal of more than 1.14 million acre-feet per year of nonpotable groundwater. Two test wells were drilled and tested for this purpose in Sandoval County. No other wells have been drilled associated with these notices, and no water has been put to beneficial use under any of these notices. These proposed groundwater withdrawals from deep aquifers have the potential to affect shallow freshwater aquifers and the surface water of the Rio Grande stream system.

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 2004 Middle Rio Grande Regional Water Plan recommended the following strategies for meeting future water demand:

- Urban and rural conservation
    - Establish a domestic well policy
    - Outdoor conservation programs

- Rainwater harvesting
- Conversion to low flow appliances
- Urban water pricing
- Greywater reuse
- Controlled growth of parks and golf courses

- Water resources planning and management
  - Adjudication of water rights
  - Conjunctive use management
  - Funding source for water activities
  - Elephant Butte loss accounting
  - Active administration
  - Water resource database
  - Watershed management plans
  - Comprehensive, integrated and continued water planning
  - Stormwater management plans
  - Cooperative regional water management
  - Water banking
  - Land use management and planning

- Water monitoring and measurement
  - Measure all water uses

- Agriculture
  - Upgrade agricultural conveyance systems
  - Level irrigated fields
  - Establish a local marketing infrastructure
  - Acequia program

- Water quality
  - Mitigate septic tank impacts
  - Improved water quality and sampling
  - Protect water from contamination

- Bosque and other riparian habitats
  - Riparian habitat restoration
  - Constructed wetlands
  - River restoration
- Water storage to reduce evaporation
  - Implement upstream surface water storage
  - Implement upstream aquifer water storage
  - Implement aquifer storage and recovery for drought
  - Water modeling
- Desalination and transfer of water
  - Develop new water supplies through desalination
  - Investigate the potential for importing water
  - Undeclared water
- Public education
  - Develop a water education curriculum for schools
  - Implement adult public education programs

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

During the two-year update process the Middle Rio Grande Steering Committee and stakeholders identified projects, programs, and policies (PPPs) to address their water issues. Some water projects were already identified through the State of New Mexico Infrastructure Capital Improvement Plan, Water Trust Board, Capital Outlay, and NMED funding processes; these projects are also included in a comprehensive table of PPP needs. The information was not ranked or prioritized; it is an inclusive table of all of the PPPs that regional stakeholders are interested in pursuing. In the Middle Rio Grande region, projects identified on the PPP table are primarily drinking water, wastewater, and stormwater infrastructure, rural community and acequia support, and watershed or riparian restoration projects.

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

- Watershed management
- Treated effluent reuse
- Water resources database
- Stormwater management
- Regional collaboration for drinking water systems

The 2016 RWP 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.

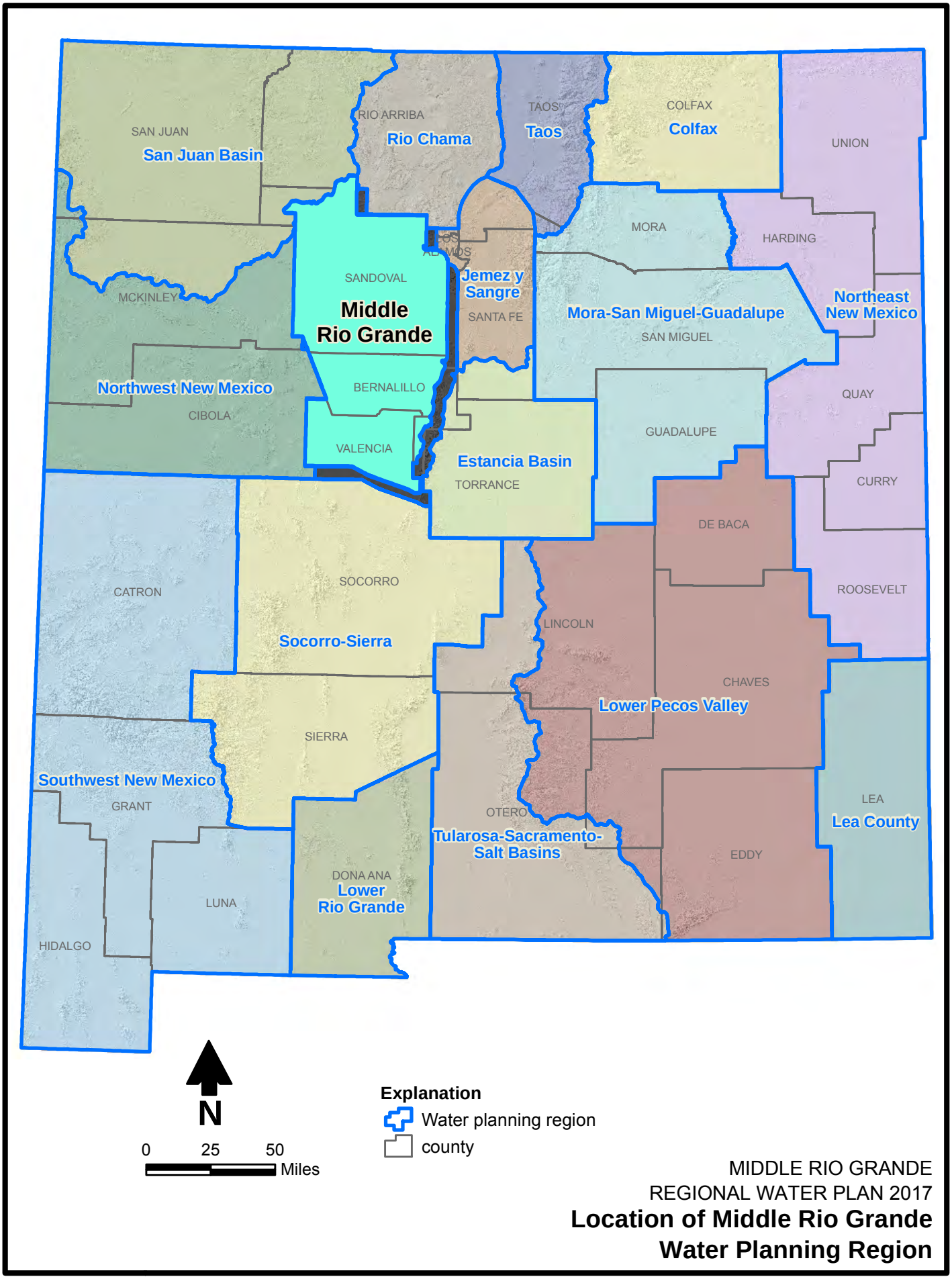
1. Introduction

The Middle Rio Grande Water Planning Region is one of 16 water planning regions in the State of New Mexico. The region includes most of Sandoval and Bernalillo counties, all of Valencia County, and a very small portion of Torrance County (Figure 1-1). Because there was no significant use in the part of the region located in Torrance County, the original plan focused just on the other three counties. 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 *Middle Rio Grande Regional Water Plan, 2000-2050* was completed and accepted by NMISC in 2004 (MRCOG and MRGWA, 2004).

The purpose of this document is to provide new and changed information related to water planning in the Middle Rio Grande 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 2004 regional water plan (2004 RWP) 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 Middle Rio Grande 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 Middle Rio Grande 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.



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Location of Middle Rio Grande Water Planning Region

Figure 1-1

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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.
- Section 3 provides background information regarding the characteristics of the Middle Rio Grande 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.
- A water budget that included surface and groundwater terms, along with general information on water quality issues, was included in the 2004 RWP; key information from that plan is summarized in Section 5, with new information that has become available since 2004 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

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.*

detail in the 2004 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.

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

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

- *Water use* is water withdrawn from a surface or groundwater source for a specific use. In New Mexico water is accounted for as one of the nine categories of use in the *New Mexico Water Use by Categories 2010* report prepared by the New Mexico Office of the State Engineer (NMOSE).
- *Water withdrawal* is water diverted or removed from a surface or groundwater source for use.
- *Administrative water supply* is based on the amount of water withdrawals in 2010 as outlined in the *New Mexico Water Use by Categories 2010* report.
- *Water demand* is the amount of water needed at a specified time.

2. Public Involvement in the Planning Process

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

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

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

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

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

In accordance with the updated Handbook (NMISC, 2013), the NMISC re-established the regional planning effort in 2014 by working with existing local and regional stakeholders and organizations, such as regional councils of government, water providers, water user organizations, and elected officials. The NMISC initiated the process by hosting and facilitating meetings in all 16 regions between February and August of 2014. During these first months, and through its team of consultants 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 Middle Rio Grande 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 *Middle Rio Grande Regional Water Plan 2017*, 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, and7] and comments received from the public on Section 8.)

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 Middle Rio Grande 2017 regional water plan.

2.2 Public Involvement in the Middle Rio Grande 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

The Mid-Region Council Governments (MRCOG), representing the Middle Rio Grande region and including the municipalities within the region, has been working to preserve and protect water resources through a concerted effort in conservation and efficient use of water by all communities. The MRCOG Board of Directors created the Water Resources Board as an advisory body on planning and management of regional water resources. The Water Resources Board meets quarterly and transmits reports and recommendations regarding water policies, planning, and management to the MRCOG Board of Directors. The Water Resources Board took the lead on supporting the regional water planning effort by naming individuals to the Middle Rio Grande Steering Committee following the NMISC RWP Handbook template. With the exception of U.S. Fish and Wildlife Service, the steering committee did not identify any additional resource agencies to be part of the steering committee. In addition, the steering committee did utilize the knowledge and plan development of the previous effort led by the Rio Grande Water Assembly in the current effort to update the Middle Rio Grande RWP. The Assembly organized a well-attended public meeting to gather additional information for the strategies.

Other steering committee members were identified and asked to participate through recommendations and outreach to specific interests such as tribal entities. Tribal governments were invited to attend in whatever capacity was appropriate to them. Through this outreach, the Middle Rio Grande region established a representative steering committee, the members of which are listed in Table 2-1.

The steering committee includes several individuals who 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. The steering committee identified a chair and co-chair as follows: Ron Brown, of AMAFCA, and Steven Perich, of the Association of Commerce & Industry of New Mexico. These leaders were chosen because of their knowledge about the region, and have helped to maintain an active steering committee with regular meetings. The steering committee was supported by MRCOG planning staff, who sent out information and letters of invitation to tribes, pueblos and other stakeholders.

2.2.2 Regional Water Plan Update Meetings

The steering committee met every other week from February 17, 2015 through June 9, 2015 at the offices of Dekker/Perich/Sabatini office located in Albuquerque, New Mexico. Meetings were not publicly advertised due to budget limitations but were open to the public, and representatives of interested groups frequently attended the meetings. Each steering committee member was encouraged to select an alternate to represent their organization in the event the primary member was unable to attend a meeting. A telephone call-in number was created so that any interested parties or committee members unable to attend in person had the opportunity to teleconference the meeting if they so wished. Generally, steering committee members were asked that they ensure other concerned or interested individuals received the announcements and recommended key contacts to add to the master stakeholder list throughout the planning process.

During the first few meetings, the steering committee discussed and reached consensus on what could and could not be accomplished in the limited time period and with the limited funds available. Given the extensive process and evaluations done for the 2004 RWP, the committee concluded that the 2017 RWP should include a progress report of Chapter 10's Recommendations. The product would be (1) an assessment of what has been implemented in the past ten years and (2) a prioritization of the unfinished recommendations over the next five years plus other strategies to address the current information provided in the technical platform developed by the State.

Over the two-year update process, 17 NMISC-facilitated meetings were held in the Middle Rio Grande region with an additional public meeting sponsored by the Rio Grande Water Assembly that brought together water experts to discuss future strategies. A summary of each of the meetings is provided in Table 2-2.

Table 2-1. Steering Committee Members, Middle Rio Grande Water Planning Region

Water User Group	Name	Organization / Representation
Agricultural – user	Janet Jarrett	Land owner and water rights holder
Agricultural – acequias	Gilbert Sandoval	Jemez Springs
Agricultural – surface water user		
Rural water provider	John Chavez Guy Jackson	Sandia Peak Utility
Watershed Interest		
Federal agency	Paul Tashjian	U.S. Fish & Wildlife Service
	Dagmar Llewellyn	Bureau of Reclamation
Local agency	Lynn Montgomery	Coronado Soil & Water Conservation District
Conservation organization	Sharon Wirth	Audubon
Business Interest		
Local business	Steven Perich	Association of Commerce & Industry of New Mexico
Business	Michelle Henrie	New Mexico Business Task Force
Municipal Governments		
City government	Kevin Daggett	City of Albuquerque
	Marian Wrage	City of Rio Rancho FY 2016
	Larry Webb	City of Rio Rancho FY 2015
County government	Dan McGregor	Bernalillo County
	Jacobo Martinez	Valencia County
		Sandoval County
City/County government	Katherine Yuhas	Albuquerque Bernalillo County Water Utility Authority
Flood control	Ron Brown	Albuquerque Metropolitan Arroyo Flood Control Authority (AMFCA)
Tribal Governments / Observers		
Tribal	Jessica Tracy	Pueblo of Sandia
Tribal	Sharon Hausam	Pueblo of Laguna
Tribal	Myron Armijo	Pueblo of Santa Ana (Invited)
Tribal	Genevieve McGeisey	Pueblo of Zia (Invited)
Tribal	Edwin Jaramillo	Pueblo of Isleta (Invited)
Tribal	Kenneth Lovato	Pueblo of Santo Domingo (Invited)
Other Interests Identified by the Steering Committee		
Rio Jemez Water Users		
Rio Puerco Watershed		

Table 2-2. Middle Rio Grande Region Public Meetings

Date	Location	Purpose	Meeting Summary
FY 2014			
04/02/2014	Mid-Region Council of Governments Albuquerque, NM	NMISC-facilitated kickoff meeting to present the regional water planning update process to the region and continue to conduct outreach to begin building the steering committee.	Representatives from many of the water user groups attended the meeting and were instrumental in identifying other individuals as potential representatives for a particular group. Many of the meeting attendees were not on the master stakeholder list, and those individuals were added to the list.
FY 2015			
01/23/2015	Mid-Region Council of Governments Albuquerque, NM	NMISC-facilitated meeting to 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.
02/17/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting to review the update process and the timeline for completing the regional water plan (RWP) update. Set up meeting times and locations for future meetings.	The steering committee membership and leadership were affirmed, with alternates named as appropriate. The group decided that future meetings would be held every other Tuesday at the Dekker/Perich/Sabatini office in Albuquerque from 1:30 to 3:00 p.m. A conference call number was also set up so that members could join the meeting by phone. A worksheet to help gather ideas and data about updated/new projects, policies, and programs (PPPs) was distributed and strategies for completing it were discussed. The group discussed the public welfare statement from the 2004 RWP and decided there was not enough time to craft a new one that truly reflected regional input.

Table 2-2. Middle Rio Grande Region Public Meetings
Page 2 of 6

Date	Location	Purpose	Meeting Summary
03/03/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting to develop a plan for reviewing the 2004 RWP alternatives.	A Water Assembly representative provided the group a review of the 2004 RWP including recommendations that had been enacted to date. The group discussed concerns with the water budget data, but determined that they didn't have the resources or capability to update the regional water budget at this time. The committee decided that it would rate the 2004 strategies by effectiveness (or how successfully each was implemented) and the priority moving forward. Each alternative was rated from 1 to 5 with 1 being the least effective and lowest priority and 5 being the highest. The group also noted if the alternative was complete.
03/14/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting to learn from committee members about the status of ongoing projects in the area.	Members of the committee presented information on projects completed and in progress, including a progress report from Rio Rancho, and an update from ABCWUA. A recommendation assessment was submitted by another steering committee member.
03/21/2015	University of New Mexico Albuquerque, NM	Public meeting organized by the Middle Rio Grande Water Assembly to gather new strategies for the plan update.	The Middle Rio Grande Water Assembly held a forum on *Climate Disruption & Our Water Future; Mitigate, Adapt, or Suffer – A Call for New Strategies*. This was not a steering committee meeting, but a public meeting focused on discussion about water issues. A summary of key issues and proposed strategies was summarized and presented to the steering committee at the June 9th meeting.

Table 2-2. Middle Rio Grande Region Public Meetings
Page 3 of 6

Date	Location	Purpose	Meeting Summary
03/31/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting to continue to learn about projects in the region. Begin reviewing/rating the 2004 RWP alternatives from Chapter 8.	UNM Professor Bruce Thomson gave a presentation to the committee about how the water supply data for the 2004 RWP was developed. The URGSiM model was created using actual diversion and pumping data when available and then balancing the model to determine the unknowns like evaporation and riparian transpiration. After the presentation, the committee began rating the alternatives in Chapter 8 of the 2004 RWP.
04/14/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting to continue to learn about projects in the region and rate the 2004 RWP alternatives from Chapter 8.	The meeting included a presentation on MRGCD activities, including modernization of the MRGCD water management that has reduced diversions from the river almost in half over the last 25 years. NMISC gave a presentation on the status of the RWP process and the NMISC work plan for the remainder of the planning process.
04/28/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting to discuss alternatives in Chapter 10 of the 2004 RWP and in the sub-region plans.	A table of combined alternatives from Chapters 8 and 10 of the 2004 RWP had been distributed to the group by a Water Assembly representative. There was concern that the sub-regions of Rio Jemez and Rio Puerco, which are discussed in Chapter 12, are not being covered in this review due to a lack of steering committee members from those areas. Ideas for outreach to these sub-regions was discussed.
05/12/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting to complete the review of 2004 alternatives.	The group completed the review and prioritization of the Chapter 8 and Chapter 10 alternatives at this meeting. The group was encouraged to bring new project ideas to discuss at the next meeting.

Table 2-2. Middle Rio Grande Region Public Meetings
Page 4 of 6

Date	Location	Purpose	Meeting Summary
05/26/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated meeting to review the RWP status and deadlines. Begin review of new projects or programs.	The meeting began with a short presentation from Eastern Sandoval County Arroyo Flood Control Authority describing new projects that they are working on. A discussion on the status of the RWP process was led by NMISC, and deadlines for submitting new material were discussed. The plan for reviewing the draft and the public involvement plan for the next 12 months were reviewed. The steering committee began to review the ICIP data for this region.
06/09/2015	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting to complete review of new project information and the draft public involvement plan.	The draft public involvement plan was provided to the group for review. The group strategized on methods that would increase participation in the Rio Puerco and Rio Jemez sub-regions. The alternatives from Chapter 12 were not evaluated as there was not sufficient participation from these sub-regions. There was also concern that the plan can easily become urban-centric, and increased outreach in rural areas is needed. A summary of information compiled by the Water Assembly was forwarded to members for more detailed review. After again reviewing ICIP and Water Trust Board data, the steering committee felt it would be more beneficial to point the readers of the water plan to the appropriate agency websites, as any static table of projects would quickly become outdated.

Table 2-2. Middle Rio Grande Region Public Meetings
Page 5 of 6

Date	Location	Purpose	Meeting Summary
FY 2016			
02/09/2016	New Mexico Office of the State Engineer / Interstate Stream Commission Albuquerque, NM	NMISC-facilitated meeting to review the update process and timeline for completion. Review steering committee makeup.	The draft plan that had been e-mailed to the MRG distribution list in January 2016 was discussed. The consultants affirmed the next steps for the RWP update effort and the timeline for meetings. The group reviewed the steering committee membership and discussed additional members to fill vacancies and decided that steering committee leadership would continue as is for now.
03/15/2016	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated meeting to discuss how comments would be documented.	NMISC and consultants worked with the steering committee to affirm the process for consolidation of comments and to report on how the comments would be addressed.
03/21/2016	Jerry Cline Tennis Center Albuquerque, NM	NMISC-facilitated meeting to refine the key collaborative PPP recommendations specific to Section 8.	Using the rating information from previous meetings, the group identified a number of programs that would potentially have greater interest and benefit multiple stakeholders, and added additional information in a small group format using worksheets.
04/12/2016	Dekker / Perich / Sabatini office Albuquerque, NM	NMISC-facilitated steering committee meeting	The steering committee began reviewing comments on the plan. There was not enough time at this meeting to get through all of the comments. The group will continue their review after the May 18th meeting.

Table 2-2. Middle Rio Grande Region Public Meetings
Page 6 of 6

Date	Location	Purpose	Meeting Summary
5/17/2016	Jerry Cline Tennis Center Albuquerque, NM	NMISC-facilitated meeting to review the Public Involvement section (2) and the Section 8 key strategies and PPP list.	Steering committee and interested stakeholders discussed and made significant changes to all of the documents presented. Consultants reviewed the acceptance criteria for the RWP and affirmed presentation to the NMISC by the chair and co-chair in November. A conference call will be set up to review the presentation. The steering committee leadership suggested that June 14 would be the ideal time to review the suggested changes to specific sections.
06/14/2016	Dekker / Perich / Sabatini office Albuquerque, NM	Finalize NMISC-facilitated steering committee comments on Sections 2 and 8.	Consensus was reached on Section 2 and 8 after much discussion. Some of the background information requested by a member of Water Assembly will be reviewed, and the steering committee will determine if this is to be included in the appendix of the plan.

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

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

- Albuquerque remains the preferred location, but Belen or San Isidro are also options.
- Public meeting advertisement would include radio, and flyers in rural locations like feed stores, post offices, and grocery stores.
- Weekends or evening should be considered to ease participation from those who can't miss work hours.
- Be considerate of conflicts with local events when planning public meetings.
- Consider a website where the public can submit comments on the plan and suggest new alternatives.
- Steering committee members will continue to assist with outreach.

3. Description of the Planning Region

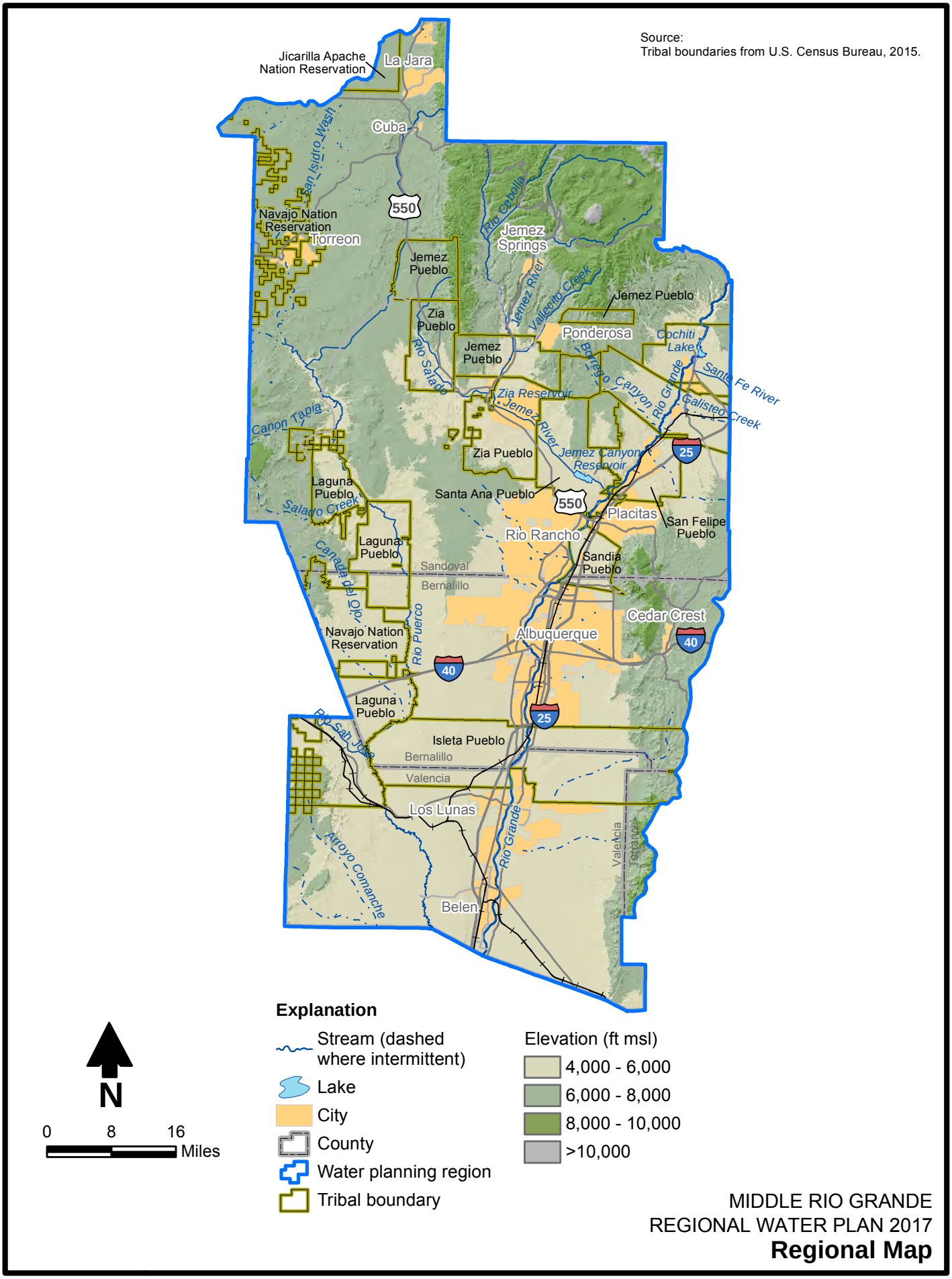
This section provides a general overview of the Middle Rio Grande Water Planning Region. Detailed information, including maps illustrating the land use and general features of the region, was provided in the 2004 RWP; that information is briefly summarized and updated as appropriate here. Additional detail on the climate, water resources, and demographics of the region is provided in Sections 5 and 6.

3.1 General Description of the Planning Region

The Middle Rio Grande Water Planning Region, located in central New Mexico, encompasses Valencia County, most of Bernalillo and Sandoval counties, and a small part of Torrance County. The region is bounded on the north by the San Juan and Rio Chama planning regions (Rio Arriba and the northern part of Sandoval counties), on the west by the San Juan and Northwest planning regions (McKinley and Cibola counties), on the south by the Socorro-Sierra planning region (Socorro County), and on the east by the Jemez y Sangre and Estancia planning regions (Torrance, Santa Fe, and Los Alamos counties) (Figure 3-1).

The total area of the planning region is approximately 5,472 square miles, distributed among the four counties as follows:

- Sandoval County: 3,284 square miles
- Bernalillo County: 1,054 square miles



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Regional Map

Figure 3-1

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- Valencia County: 1,068 square miles
- Torrance County: 66 square miles

The terrain of the planning region ranges from relatively flat terrain along the Rio Grande valley to the mountainous areas of the Sandia and Manzano Mountains to the east and the Jemez Mountains to the west. There are 11 Native American tribes in the region, listed below, and different types of federally owned land. The largest urban area in New Mexico, the Albuquerque metropolitan area, is located in the Middle Rio Grande region.

- Cochiti
- Isleta
- Jemez
- Jicarilla Apache Nation
- Laguna
- Navajo Nation (Tohajiilee)
- San Felipe
- Sandia
- Santa Ana
- Santo Domingo
- Zia

3.2 Climate

The climate of the planning region is semiarid and variable, with higher temperatures and lower precipitation in the valleys than in the mountains. Long-term average annual temperatures in the region are around 50 to 55 degrees Fahrenheit. Average annual precipitation varies from 8 to 12 inches along the Rio Grande Valley to more than 30 inches at the highest elevations.

3.3 Major Surface Water and Groundwater Sources

The Rio Grande is the principal surface water source in the Middle Rio Grande region; other sources include two tributaries to the Rio Grande, the Rio Jemez and Rio Puerco, and water from the San Juan-Chama Project (Figure 3-1). The Rio Grande is shared with five other water planning regions: Taos, Rio Chama, Jemez y Sangre, Socorro-Sierra, and Lower Rio Grande. In addition, the planning region's share of the river is governed by the Rio Grande Compact between Colorado, New Mexico, and Texas, which NMISC administers on behalf of New Mexico.

The Middle Rio Grande water planning region falls almost entirely within the middle portion of the Rio Grande Underground Water Basin (UWB), commonly referred to as the Middle Rio Grande UWB. (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.) Along its eastern boundary, however, a small portion of the Middle Rio Grande water planning region falls instead within the Sandia UWB. The Middle Rio Grande water planning region shares the Middle Rio Grande UWB primarily with the Socorro-

Sierra water planning region. Geographically, the Northwest New Mexico and Estancia Basin regions also overlie the Middle Rio Grande UWB, but these regions rely on groundwater sources that are hydrologically separate from the Middle Rio Grande UWB. 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 Middle Rio Grande region consists primarily of the entirety of Valencia County and most of Bernalillo and Sandoval counties. The 2013 population of Bernalillo County was 674,221, while there were 136,575 people residing in Sandoval County and 76,284 in Valencia (U.S. Census Bureau, 2014a).

As shown in Table 3-1, all three counties experienced a high rate of population growth from 2000 to 2010; however, since 2010, growth has slowed in Bernalillo and Sandoval counties and declined slightly in Valencia County. The boundaries of the Middle Rio Grande roughly coincide with the Albuquerque Metropolitan Statistical Area (MSA), which also includes a small part of Torrance County.

The largest employment categories in the region are education/healthcare, professional services, retail trade, and tourism-related services (arts, entertainment, recreation, hospitality, and food services). Manufacturing and construction are also important. Agriculture is the largest water user in Sandoval and Valencia counties, while public water supply is the largest water user in Bernalillo County.

Land in the Middle Rio Grande Water Planning Region is owned by various federal, tribal, state, and private entities, as illustrated on Figure 3-2 and outlined below:

- Federal agencies: 1,710 square miles
- Tribes: 1,623 square miles
- State agencies: 205 square miles
- Private entities: 1,934 square miles

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

Table 3-1. Summary of Demographic and Economic Statistics for the Middle Rio Grande Water Planning Region

a. Population

County	2000	2010		2013
		Total	Within Region[a]	
Bernalillo	556,678	662,564	656,267	674,221
Sandoval	89,908	131,561	130,529	136,575
Valencia	66,152	76,569	76,569	76,284
Total Region	712,738	870,694	863,365	887,080

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

b. Income and Employment

County	2008-2012 Income [a]		Labor Force Annual Average 2013 [b]		
	Per Capita ($)	Percentage of State Average	Number of Workers	Number Employed	Unemployment Rate (%)
Bernalillo	26,766	113	299,939	279,142	6.9
Sandoval	26,848	113	55,971	51,509	8.0
Valencia	20,416	86	28,887	27,547	7.8

[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*
Bernalillo	Education/Healthcare	78,101	15,810
	Professional, scientific, management	42,805	
	Retail trade	34,184	
	Entertainment, recreation, arts, hospitality, restaurant	33,768	
Sandoval	Education/Healthcare	12,628	1,652
	Retail trade	7,213	
	Professional, scientific, management	6,234	
	Entertainment, recreation, arts, hospitality, restaurant	5,933	
	Manufacturing	5,739	

Table 3-1. Summary of Demographic and Economic Statistics for the Middle Rio Grande Water Planning Region

c. Business Environment (continued)

County	Industry	Number Employed	Number of Businesses
	2008-2012 [a]		*2012*
Valencia	Education/Healthcare	6,828	896
	Retail trade	3,866	
	Construction	3,127	
	Public administration	2,910	
	Entertainment, recreation, arts, hospitality, restaurant	2,574	

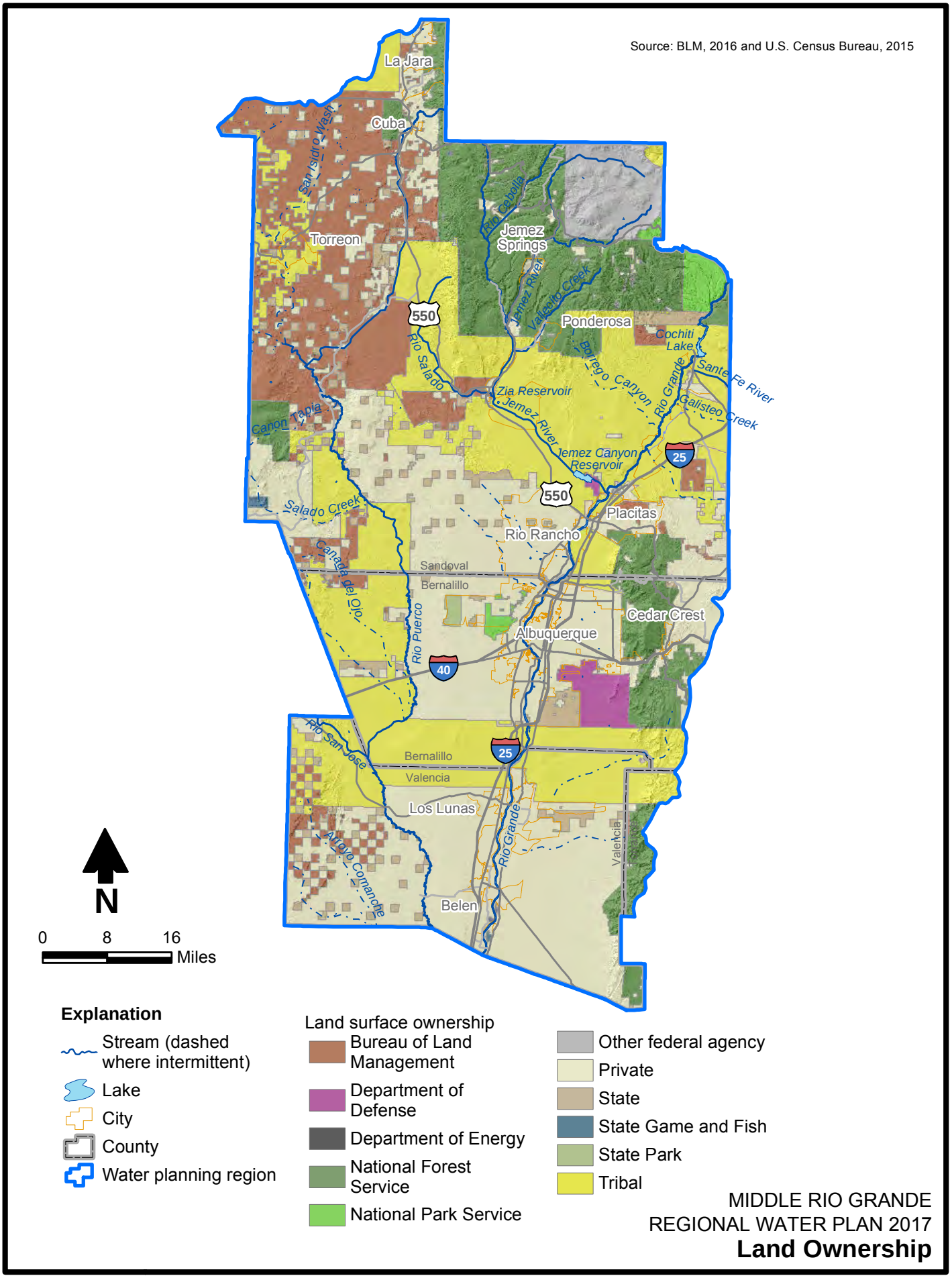
[a] U.S. Census Bureau, 2014b

d. Agriculture

County	Farms / Ranches [a]			Most Valuable Agricultural Commodities [b]
	Number	Acreage		
		Total	Average	
Bernalillo	1,006	350,658	349	Livestock, poultry Nursery, greenhouse Other crops and hay
Sandoval	1,029	950,133	923	Cattle and calves Other crops and hay
Valencia	1,607	669,727	417	Milk from cows Other crops and hay Cattle and calves

[a] USDA NASS, 2014, Table 1

[b] USDA NASS, 2014, Table 2



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Land Ownership

Figure 3-2

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4. Legal Issues

4.1 Relevant Water Law

4.1.1 State of New Mexico Law

The 2004 RWP, and supporting documents H-5 and H-6 to the 2004 RWP, includes a very comprehensive discussion of water law applicable to the region. However, since the accepted regional water plan for the Middle Rio Grande Water Planning Region was published in 2004, 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 Middle Rio Grande 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 Middle Rio Grande 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 U.S. 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 Middle Rio Grande 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. In *Turner* 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, Section 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 new 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. The Middle Rio Grande is a priority basin for the NMISC.

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

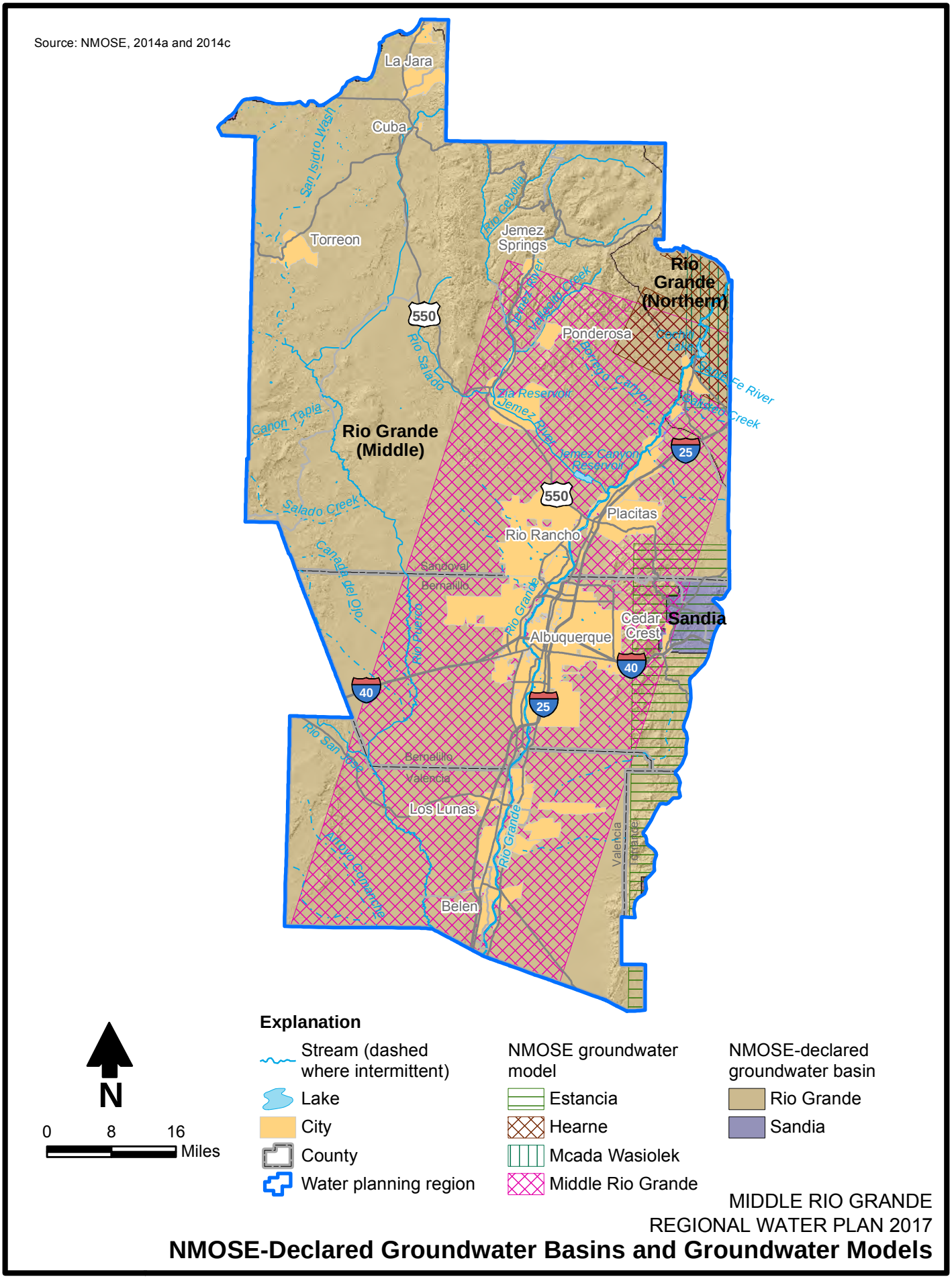
In New Mexico, water is administered generally by the State Engineer, who has the "general supervision of waters of the state and of the measurement, appropriation, distribution thereof and such other duties as required." NMSA 1978, § 72-2-1 (1982). To administer water throughout the state the State 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). In the Middle Rio Grande planning region, water masters have been appointed for the Jemez and Middle Rio Grande basins.

4.1.2.2 Groundwater Basin Guidelines

The NMOSE has declared UWBs and implements guidelines in those basins for the purpose of carrying out the provisions of the statutes governing underground waters. *See* NMAC 19.27.48.6. The groundwater basin guidelines applicable to the Middle Rio Grande region are discussed at length in the 2004 RWP, Section 5.7.1, and the 2003 Overview, Supporting Document H-6, Section II(C). The declared UWBs in the region are the Middle Rio Grande and Sandia (Figure 4-1). In the Rio Grande UWB, groundwater appropriations are administered through the *Middle Rio Grande Administrative Guidelines for Review of Water Right Applications* (NMOSE, 2000). There are no specific guidelines governing groundwater appropriations in the Sandia UWB.



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MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

NMOSE-Declared Groundwater Basins and Groundwater Models

Figure 4-1

4.1.2.3 AWRM Implementation in the Basin

The Middle Rio Grande River Basin has not been designated as a high priority for implementing AWRM regulations.

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. The most important special district in relation to water use in the Middle Rio Grande planning region is the Middle Rio Grande Conservancy District. Additionally, in the planning region there are acequias, mutual domestic water associations, and other forms of special districts. These special districts are discussed in detail in the 2004 RWP, Section 5.8.1, and the 2003 Overview, Supporting Document H-6, Section II(E).

4.1.2.5 State Court Adjudications in the Basin

Section II(F) of the 2003 Overview, Supporting Document H-6 to the 2004 RWP, provides a discussion of adjudications and final decrees.

In September 2002, the Court granted the joint motion of the State and the United States to establish an expedited *inter se* subproceeding (Subproceeding 1) to adjudicate the water rights of Acoma Pueblo and Laguna Pueblo based on past and present uses of water. Discovery began in Subproceeding 1 in 2007 and concluded in November 2013. After the conclusion of discovery and before the filing of dispositive motions on significant legal issues, settlement discussions began in March 2014 involving New Mexico, the United States, Acoma and Laguna Pueblos, and other significant water users in the Rio San Jose stream system. Trial was scheduled to begin in July 2014, but the Special Master ordered a stay in the litigation schedule through calendar year 2014 to allow settlement discussions to continue. Due to the parties failing to reach a settlement, the Special Master in December 2014 denied a further stay of the Subproceeding 1 litigation schedule. New Mexico, the United States, Acoma Pueblo, and several other parties filed dispositive motions in May 2015, which were argued to the Special Master in October 2015. Subsequently, the Special Master has granted multiple stays in the litigation to allow for continued settlement discussions. Concurrently from late 2016 through early 2017 the Special Master will be hearing the trial testimony of four expert witnesses for Tri-State Generation and Transmission Association, Inc. New Mexico, the United States, Acoma and Laguna Pueblos, and several other significant water users continue to participate in regular mediation sessions in the hope of reaching settlement on the matter.

No adjudication is in progress for the Middle Rio Grande (includes the mainstem pueblos).

4.1.3 Federal Water Laws

The law of water appropriation has been developed primarily through decisions made by state courts. Since the accepted plan was published in 2004 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, especially those regions that include the Rio Grande as a surface water source like the Middle Rio Grande, 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 to 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). In New Mexico, courts have faced a different question in the determination of Pueblo Indian water rights. Although one federal district court recognized historically irrigated acreage as the basis for determining the quantity of a pueblo's water right, there is no established law for determining Pueblo Indian water rights. *See New Mexico ex rel. State Engineer v. Aamodt, et al.*, 6:6-CV-6639 (D.N.M.).

Section IV(A) of the 2003 Overview, Supporting Document H-6 to the 2004 RWP, provides a detailed discussion of federal reserved water rights. Lands with federal reserved rights or aboriginal rights within the Middle Rio Grande planning region include the following:

- The nine Pueblos in the region:
  - Isleta
  - Cochiti
  - Sandia
  - Santo Domingo
  - San Felipe
  - Santa Ana
  - Jemez
  - Laguna
  - Zia
- Jicarilla Apache Tribe
- Tohajiilee Navajo Indian Reservation
- Kirtland Air Force Base
- Santa Fe National Forest
- Cibola National Forest
- National Forest Service Wilderness Areas
- Kasha-Katuwe Tent Rocks National Monument
- Bureau of Land Management lands

4.1.3.2 Interstate Stream Compacts

Interstate compacts become federal law once ratified by Congress. Three compacts allocate water in the region—the Rio Grande, Upper Colorado River, and Colorado River compacts—and are discussed in detail in the 2004 RWP, Section 5.4.3, and 2003 Overview, Supporting Document H-6, Section VII(B).

As discussed above, the three party states to the Rio Grande Compact are currently involved in litigation over allegations by Texas that New Mexico has violated the terms of the Compact. The allegations primarily involve actions in the Lower Rio Grande of New Mexico. However, the outcome of the suit may affect the upper reaches of the Rio Grande in New Mexico, especially as related to storage and relinquishment credits, which would directly affect water users in the Middle Rio Grande planning region.

4.1.3.3 Treaties

One treaty indirectly governs water use in the Middle Rio Grande planning region: the Convention with Mexico, May 21, 1906, 34 Stat. 2953, T.S. No. 455, 1 Malloy 1202. This Treaty provides for the distribution between the United States and Mexico of the waters of the Rio Grande in the international reach of the river between the El Paso-Juárez Valley and Fort Quitman, Texas. Although this reach is below the region, any use of water upstream of this reach may impact the downstream distribution of water. The treaty is addressed briefly in the 2004 RWP, Section VII(B)(1).

Also of importance to water rights administration in the region, is the treaty of Guadalupe Hidalgo, entered into on February 2, 1848 between the United States and Mexico. 9 Stat. 922. The treaty provides that "property of every kind" of the Mexicans shall be "inviolably respected," including water rights in the region established prior to 1848. The treaty is mentioned briefly in the 2004 RWP, Section III(B), and more substantially in Section 12.11.

4.1.3.4 Federal Water Projects

The San Juan-Chama Project and the Middle Rio Grande Project are extremely important federal projects in the planning region. The San Juan-Chama Project is discussed in depth in the 2004 RWP, Section 5.5.4, and 2003 Overview, Supporting Document H-6, Section V.

The 2004 RWP and 2003 Overview do not discuss in depth the Middle Rio Grande Project, the other major federal project in the region. In 1947 the U.S. Bureau of Reclamation (USBR) and the U.S. Army Corps of Engineers (Corps) completed a comprehensive plan intended to improve and stabilize the Rio Grande's Middle Valley reaches. The plan included dams for flood and sediment control that were intended to improve operation of the Rio Grande and to ensure deliveries under the Rio Grande Compact. The plan also offered the possibility of a federal loan to rehabilitate the irrigation and drainage systems of the Middle Rio Grande Conservancy District (MRGCD).

Congress authorized the Middle Rio Grande Project in 1948. Flood Control Acts of 1948 and 1950 (Pub. L. No. 80-855; Pub. L. No. 81-516) ("The Act"). Congress also authorized the Corps to construct flood control reservoirs and levees for flood protection. The Act authorized the USBR to undertake the rehabilitation of the MRGCD works and to pay off outstanding MRGCD bond indebtedness.

In exchange for USBR rehabilitating the MRGCD works and paying its debts, the MRGCD entered into a repayment contract with the USBR in 1951. As security for the loan to pay off the MRGCD debt and to ensure payment of the long-term costs of rehabilitation, the MRGCD agreed to transfer assets to the United States as needed to fully protect its security interests. Pursuant to the terms of the 1951 contract, the MRGCD was to assign its water rights to the United States as needed by the Secretary of Interior, but no beneficial use rights by individual irrigators on the land were assigned. Ultimately in 1963, the MRGCD transferred to the USBR only the right to store water in El Vado Reservoir. The MRGCD has repaid the 1951 contract, but there has been litigation between the MRGCD and the USBR over the title to certain parcels and works within the project for a number of years.

Regarding operation of the irrigation works, the USBR operated the MRGCD works for a period of time in order to protect its security interest and to ensure that the contract was repaid. In the 1970s, the USBR transferred these duties associated with the diversion dams back to the MRGCD. As part of the transfer, the USBR and the MRGCD agreed that for purposes of efficiency, and because El Vado Reservoir operations were coordinated with operations of other reservoirs on the Rio Grande, the USBR would operate El Vado Reservoir to provide releases of water for irrigation purposes with the MRGCD. Thus, the Project requires coordination between the MRGCD and USBR.

4.1.3.5 Federal Adjudications in the Basin

Section II(F) of the 2003 Overview, Supporting Document H-6 to the 2004 RWP, provides a discussion of adjudications and final decrees.

The Decrees that have been entered in adjudication courts in the region are:

- Jemez Decree (*United States v. Abousleman,* 83cv01041)
    - Partial Final Judgment and Decree on Non-Pueblo, Non-Federal Proprietary Water Rights (12/01/2000)
    - Partial Final Judgment and Decree of United States' Wild and Scenic River Act Reserved Water Right (10/03/2008)
    - Adjudication resuming to litigate the claims of Pueblos of Jemez, Zia, and Santa Ana for historical, existing, and future uses (see below)
- Jicarilla Decree: Water rights of Jicarilla resolved pursuant to Jicarilla Apache Water Rights Settlement Act of October 23, 1992, 106 Stat. 2237, and the Act of June 13, 1962, 76 Stat. 96)

One adjudication in the region is still pending: the Jemez adjudication (non-Indian claims adjudicated; currently litigating claims of Pueblos of Jemez, Zia, and Santa Ana for historical,

existing, and future uses). No adjudication is in progress for the mainstem Middle Rio Grande (includes the mainstem pueblos).

4.1.4 Tribal Law

There are 11 Indian nations in the Middle Rio Grande region, and several are administered with a tribal water code, however some do not have such codes. Within the region, the Pueblos of Cochiti, Isleta, Sandia, San Felipe, Santa Ana, Santo Domingo (the mainstem pueblos), Jemez, and Zia do not have water codes. Water codes for the other tribes in the region are described below:

- The Pueblo of Laguna restricts the drilling of domestic wells in the areas of Encinal Canyon and the sub-village of Philadelphia. These areas are considered "water control and pollution control areas," and domestic wells can be drilled only with the permission of the Tribal Council. *See* Pueblo of Laguna, New Mexico Tribal Code: Title IX, Chap. 2 (Domestic Water Control).

- Water use on the Jicarilla Apache Nation is governed by its Water Code, Title 21. The Jicarilla Water Code is administered by a Water Commission. *See* Title 21, Chap. 3, § 6. The Code includes provisions for the use and permitting of groundwater and surface water, Chap. 4, §§ 5-6 and Chap. 7, §§ 3-4; the transfer of permitted water uses, Chap. 10; water marketing, Chap. 15; conservation, Chap. 16, § 5; and priority enforcement, Chap. 17.

- The Jicarilla Apache Nation also has a Water and Wastewater Utility Code, which includes provisions for conservation. *See* Title 24, Chap. 3, § 6.

- The Navajo Nation Water Code applies to water use on the Tohajiilee Navajo Indian Reservation. *See* 22 N.N.C. §§ 1101 et seq. (1984). The Code is applicable to "all the waters of the Navajo Nation," which include all surface and groundwater. The Code further declares that ". . . [I]t shall be unlawful for any person . . . to . . . make any use of . . . water within the territorial jurisdiction of the Navajo Nation unless . . . this Code [has] been complied with. No right to use water, from whatever sources, shall be recognized, except use rights obtained under and subject to this Code."

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 Bernalillo County

Water use in Bernalillo County is regulated by ordinances, and guided by a Water Conservation Plan and the Albuquerque/Bernalillo County Comprehensive Plan (City of Albuquerque, as amended through 2013 [further updating is currently in progress]).

The Bernalillo County Code of Ordinances has a number of provisions relating to water use.

- Section 30-153 of the Code establishes a combined city, water authority, and county board called the Water Protection Advisory Board, the purpose of which is to advise the three governmental entities on surface and groundwater protection concerns, including policies necessary to enhance protection of surface and groundwater quality, oversee implementation of the groundwater protection policy and action plan, promote consistency in city, authority, and county actions to protect surface and groundwater quality, and advocate effective protection of surface and groundwater quality.
- Section 30-241 of the Code sets forth water conservation requirements in order to reduce per capita water use, encourage responsible use of water, reduce water waste, require conservation measures for new developments, and preserve water supplies within the County.
- Section 30-247 outlines outdoor water restrictions.
- Section 30-248 prohibits water waste.
- Section 30-249 sets forth design and construction requirements for new developments.

The Subdivision Code, Sections 74-96 and 97 outlines the water availability assessments for subdivisions.

Bernalillo County's Water Conservation Plan (04/21/2006) sets for the following initial goals for the plan and its implementation:

- Evaluate current water usage.
- Evaluate mandatory, voluntary, and other conservation measures for the Water Conservation Plan.
- Determine resource levels for the water conservation program.
- Determine sources of funding for the water conservation program.
- Develop priorities.
- Set measurement goals and criteria.
- Improve baseline information on County water usage and update annually.

- Gather information on domestic well permits and domestic well usage on an ongoing basis.
- Gradually develop appropriate ordinance(s) from the Water Conservation Plan.

The *Albuquerque/Bernalillo County Comprehensive Plan* (COA, 2013) includes policy goals for both water quality and water management. *See* Sections II(C)(2) and II(D)(2). The water quality goal is to maintain a dependable, high-quality supply of water for the urbanized area's needs. The policies for meeting this goal are to minimize the potential for contaminants entering the community water supply, minimize water quality degradation resulting from on-site liquid waste disposal systems, and minimize water quality contamination from solid waste disposal. The water management goal is efficient water management and use. The polices for meeting this goal are to adopt measures to discourage wasteful water use, encourage maximum absorption of precipitation through retention of natural arroyos and other means of runoff conservation, and protect existing water rights and acquire new rights to meet increasing population needs.

4.1.5.2 Albuquerque Bernalillo County Water Utility Authority

The Albuquerque Bernalillo County Water Utility Authority regulates water use through its Water Waste Ordinance. Sections 4-1-3 and 5 of the ordinance define and prohibit water waste, and Section 4-1-4 imposes certain watering restrictions, such as time of day and, under certain conditions set forth in its Drought Management Strategy, day of the week restrictions. The Authority also has a conservation plan and has numerous restrictions on how new development is serviced.

4.1.5.3 City of Albuquerque

The City of Albuquerque Code of Ordinances includes a Water Conservation Landscaping and Water Waste Ordinance. This ordinance prohibits the waste of water, Section 6-1-1-6, imposes time of day water restrictions, Section 6-1-1-5, and imposes water budgets for golf courses and city parks and fields, as well as planting restrictions for new developments, Section 6-1-1-8. The code also includes a Water Conservation Large Users Ordinance, which imposes certain requirements on large users, Section 6-1-4-5. The City's subdivision regulations mandate an adequate water supply for subdivisions, Section 14-14-1-3.

4.1.5.4 Sandoval County

Water use in Sandoval County is governed through subdivision regulations and guided by the *Sandoval County Comprehensive Plan* (Sandoval County, 2013).

The County's subdivision regulations mandate that sufficient water be available for subdivisions and that a subdivision's water requirements be quantified, Sections 4.3, 8.6, and 8.7.

The comprehensive plan sets forth a number of policies relating to water use in Sections I(C)(1) through (5):

- The conservation of water resources is a primary consideration for any new development or changes to land use.
- The augmenting of water resources will be promoted through various strategies to be developed as the need arises.
- Efforts will be made to require community water supply and liquid waste disposal systems in order to ensure safe drinking water for residents.
- Protective zones will be established to ensure that critical areas along the Rio Grande and Jemez River are not negatively impacted by development.
- Critical natural areas will be identified and regulations for their protection adopted where appropriate.

4.1.5.5 Rio Rancho

Water use in Rio Rancho is regulated through the Rio Rancho Municipal Code and the *Rio Rancho Comprehensive Plan* (City of Rio Rancho, 2015).

- The Rio Rancho Code prohibits the waste of water, Section 52.04, and imposes time of day watering restrictions, Section 52.05. It also sets forth emergency water shortage response stages, Section 52.24. The Code further mandates that a city domestic well permit be obtained prior to obtaining a domestic well permit from the State Engineer, Section 53.02. A domestic will permit will be denied by the City if the proposed well is within 300 feet of water distribution system, Section 53.04(E).
- The *Rio Rancho Comprehensive Plan* addresses water quality, water availability, and water conservation and reuse, and sets as goals preserving water resources and identifying and securing a long-term water supply. *See* City of Rio Rancho, 2015, Sections 2.3.2, 4.2.3, 4.2.4, and 8.2.5.2.

4.1.5.6 Town of Bernalillo

The Town of Bernalillo regulates water use through its Ordinance No. 198, Water Conservation, Emergency Response and Drought Management Ordinance.

4.1.5.7 Torrance County

Water use in Torrance County is guided by the *Torrance County Comprehensive Plan* (MRCOG, 2003b) and regulated through its subdivision regulations.

The comprehensive plan recognizes that there is no regional authority to manage the consumptive use of water resources in the County, with many decisions affecting water resources in the County made by individual local governments and by private sector water providers. The

plan recognizes that water is easily the most serious issue affecting the County and sets forth a goal of balancing the needs of a growing population while retaining the rural residential character and culture of the County. The plan also sets as a goal ensuring an adequate and sustainable supply of high-quality water for current and future needs of the County. The plan outlines the following objectives to meet these goals:

- Administer water rights in the Estancia Basin as a Special Groundwater Management Area.
- Educate water users about the necessity of water conservation, while offering conservation techniques.
- Protect groundwater by preventing land uses that pollute the groundwater.
- Support a Basin-wide program of comprehensive monitoring, metering, and ongoing investigation of water resources in the Estancia Basin.
- Promote the efficient use of centralized water and wastewater systems in the urbanizing areas of the county.

Torrance County subdivision regulations require that subdivisions containing 20 or more parcels with at least 1 parcel of 2 acres or less must have a State Engineer permit to appropriate for or transfer water to the subdivision. *See* Section 5.7.

4.1.5.8 Valencia County

The only specific water ordinance for Valencia County is related to subdivision water use. Title XV of the county ordinances (Land Usage), §151.066, requires a State Engineer permit if insufficient water is available to fulfill the maximum water requirement for the subdivision.

Water use in Valencia County is primarily guided by the *Comprehensive Land Use Plan for Valencia County, New Mexico* (Valencia County, 2005). This plan sets forth the following goals:

- Encouraging the preservation of the water resources of the County for future generations by protecting to the extent possible all surface waters for agricultural production, recreational activities, ecosystem management, and aquifer recharge
- Promoting water conservation and drought preparedness programs throughout the County
- Supporting restoration of the Rio Grande Bosque to be maintained as a healthy riparian ecosystem

- Establishing and maintaining a water budget for the County that seeks to balance the relationship between the water inflow, local consumptive use or depletion, and the water outflow
- Protecting and improving the quality of water resources available to the County by
  - Developing and implementing a groundwater protection plan and program
  - Identifying sources and constituents of "non-point source" pollution in the County, and developing a plan and program to mitigate the contamination of water resources
  - Identifying and protecting designated wetlands in the County
  - Evaluating the feasibility of constructed wetlands and vegetation filters for purposes of water treatment

The plan also encourages the establishment of water conservation guidelines for water systems in the unincorporated areas of the County.

4.1.5.9 City of Belen

Water use in the City of Belen is regulated through its code of ordinances and guided by the *City of Belen Comprehensive Land Use Plan* (MRCOG, 2003a).

The Belen Code of Ordinances includes Chapter 13.16 (water waste restrictions) and Chapter 16.24.010 (transfer of water rights by applicant for subdivision approval).

The City of Belen's *Comprehensive Land Use Plan* sets as a policy that an adequate supply of high-quality water for current and future needs of the City be ensured. To meet this goal, the plan sets the following objectives:

- Aggressively acquire and secure water rights to meet projected future demands.
- Adopt and maintain a water conservation program that measures residential and business water consumption, offers conservation incentives, and includes a drought contingency plan.
- Educate water users about the benefits of water conservation and other specific water conservation techniques and practices.
- Develop a groundwater protection plan in cooperation with neighboring communities to reduce the potential for groundwater contamination from on-site liquid waste disposal systems, leaking underground storage tanks, and improper handling or disposal of hazardous materials.

- Protect groundwater by preventing land uses that pollute the groundwater from locating in floodplains, groundwater recharge areas, and wellhead protection zones.

The plan also sets as a goal preparing and implementing a water management program for the City to ensure that the future water supply for the community is secure by adopting and maintaining an active water management program that includes water rights acquisition, conservation strategies, a drought contingency plan, and a groundwater protection plan.

4.1.5.10 Village of Los Lunas

Water use in the Village of Los Lunas is regulated through its Code of Ordinances and guided by the *Village of Los Lunas 2035 Comprehensive Plan* (Village of Los Lunas, 2013).

- The Los Lunas, New Mexico Code of Ordinances includes Chapter 13.20 (emergency water shortage plan) and Chapter 16.40.010 (transfer of water rights by applicant for subdivision approval).

- The comprehensive plan sets forth the goal of maintaining a dependable, high-quality water supply through reducing the potential for groundwater contamination. It also sets forth the goal of managing water resources efficiently and providing incentives for water conservation by pursuing the acquisition of water rights, promoting water conservation, and investigating the potential of using surface water to augment groundwater supplies.

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 animal species in the planning region that are subject to protection under the ESA are:

- Yellow-billed cuckoo (threatened): Bernalillo, Sandoval, Torrance, and Valencia counties
- Mexican spotted owl (threatened; implementation of final recovery plan): Bernalillo, Sandoval, Torrance, and Valencia counties
- Southwestern willow flycatcher (endangered; implementation of final recovery plan): Bernalillo, Sandoval, and Valencia counties
- Sprague's pipit (candidate): Bernalillo County
- Rio Grande silvery minnow (endangered; implementation of final recovery plan): Bernalillo, Sandoval, and Valencia counties
- Jemez Mountains salamander (endangered): Sandoval County
- New Mexico meadow jumping mouse (endangered): Bernalillo, Sandoval, and Valencia counties

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

There has been significant litigation in the Middle Rio Grande planning region regarding the ESA. The Legal Issues memo, Supporting Document H-5 to the 2004 RWP, Section III(C), discusses the original silvery minnow case in depth. In short, in this case environmental groups challenged the validity of a Biological Opinion issued by the USFWS concerning the effects of federal water project activities on the silvery minnow, arguing that the Biological Opinion did

not adequately consider all of the water in the Rio Grande, including water under San Juan-Chama Project contracts. The court vacated all rulings in the case, and issues raised about the federal use of water for endangered species remain unresolved. The protection of the silvery minnow is guided by the Recovery Plan for Rio Grande Silvery Minnow. 75 FR 7625 (February 22, 2010).

Two new cases regarding ESA issues in the Middle Rio Grande region were filed recently. In the first case, the WildEarth Guardians (WEG) filed a Petition for Review of Agency Action, against the U.S. Army Corps of Engineers (Corps) and the USFWS in the San Acacia Reach of the Rio Grande regarding the San Acacia Levee Project (Levee Project). *WildEarth Guardians v. U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service*, Case No. 1:15-cv-00159-SMV-KBM (filed 02/24/2015). The Petition alleges that the Corps' authorization of the Levee Project violates the National Environmental Policy Act (NEPA), 42 U.S.C. §4321 et seq., and the Administrative Procedure Act (APA), 5 U.S.C. 701 et seq. Specifically, the WEG alleges that the Corps violated NEPA by failing to take a hard look at the direct, indirect and the cumulative impacts of the Levee Project to endangered species. WEG alleges further that the USFWS's Biological Opinion for the Levee Project violates the ESA and the APA. The case has been stayed and no further action has been taken.

In a second case, the WEG filed a complaint against the Corps and the Bureau of Reclamation (USBR) alleging, among other things, that

- The USBR's operations and activities in the Middle Rio Grande result in jeopardy to the Rio Grande silvery minnow and the southwestern willow flycatcher, and also result in the adverse modification and/or destruction of the species' designated critical habitat in violation of the substantive requirements of ESA §7(a)(2).

- The USBR's operations and activities in the Middle Rio Grande have caused, and continue to cause, the incidental take of silvery minnows in violation of ESA § 9.

- The Corps' failure to consult with the USFWS to the full extent of its discretionary authorities over operations and activities has resulted in the adverse modification and/or destruction of the species' designated critical habitat in the Middle Rio Grande, in violation of the procedural requirements of ESA § 7(a)(2).

- The USBR failed to consult with the USFWS as to the full extent of its discretionary authorities over operations and activities in the Middle Rio Grande when needed to assure compliance with the ESA in violation of the procedural requirements of ESA §7(a)(2).

The Middle Rio Grande Conservancy District (MRGCD) intervened as a defendant in the case. The Federal defendants and the MRGCD filed a motion to dismiss. The federal district court

filed a Memorandum Opinion and Order on September 23, 2015 granting in part and denying in part the motion to dismiss. The court dismissed WEG's claim that the USBR violated the procedural requirements of ESA § 7(a)(2). However, the court also determined that the WEG's claim that the USBR violated the substantive provisions of ESA § 7(a)(2) was justiciable.

The district court issued a second Memorandum Opinion and Order on September 23, 2015 related to the WEG's claims against the Corps. The district court did not dismiss the WEG's claims against the Corps. In the decision the court found that the Corps does engage in affirmative actions relating to the operation of its Middle Rio Grande dams and reservoirs, and accordingly, the agency has sufficient discretionary authority to modify its actions to benefit endangered species.

The case is currently pending before the federal district court.

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 Middle Rio Grande Water Planning Region, all of the federally listed species discussed above are protected also under the New Mexico Act.

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). The Clean Water Act (CWA), 33 U.S.C. §§ 1251 to 1387—including the National Pollutant Discharge Elimination System (NPDES) permitting program (Section 402) and the dredge and fill permit program (Section 404)—is discussed in detail in Section 5.5.1 of the 2004 RWP and Section VIII(A) of the 2003 Overview, Supporting Document H-6.

4.2.2.1.1 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, the U.S. Environmental Protection Agency (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 New Mexico Environment Department (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). Sections 5.5.1 of the 2004 RWP and VIII(B)(1) of the 2003 Overview provide detailed discussions of the SDWA. The SDWA protects the quality of drinking water in the United States (42 U.S.C. § 300f et seq. (2002)). This law focuses on all waters actually or potentially designed for drinking use, whether from above-ground or underground sources. The Act authorizes EPA to establish safe standards and requires all owners or operators of public water systems to comply with the standards. New Mexico has promulgated drinking water regulations that adopt, in part, federal drinking water standards. *See* NMAC 20.7.10.

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. Section 1377(e).

Several of the tribal nations within the Middle Rio Grande region have adopted water quality standards under the federal Clean Water Act, and they monitor water quality on a regular basis.

- The Pueblo of Isleta adopted surface water quality standards on January 24, 1992, amended March 18, 2002. They were approved by EPA on December 24, 1992.

- The Pueblo of Sandia has also adopted surface water quality standards, which EPA approved on August 10, 1993. Sandia adopted revised standards on January 31, 2008, approved by the tribal council on November 13, 2009. EPA approved the revised standards on March 9, 2010.

- Laguna Pueblo has adopted surface water quality standards, which are set forth in the Pueblo of Laguna Code, Title XI, Chapter 2 (Water Quality Standards) (May 21, 2013). EPA approval of the standards is currently pending.

- The Jicarilla Apache Nation Code, Title 14, Section 5 adopts the State of New Mexico surface and groundwater quality standards.
- The Navajo Nation adopted surface water quality standards on May 13, 2008. See *Navajo Nation Surface Water Quality Standards 2007* (adopted 2008).

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

4.3.1 Ongoing or Threatened Litigation that May Affect Water Management

State of New Mexico v. U.S. Bureau of Reclamation, et al., No. 1:2011-cv-00691-JB-ACT (D.N.M. filed August 8, 2011) involves the 2008 Operating Agreement for the Rio Grande Project. The Operating Agreement was developed during settlement of litigation between the Elephant Butte Irrigation District (EBID), El Paso County Water Improvement District Number One (EPCWID #1), and the U.S. Bureau of Reclamation (USBR). The State of New Mexico asserts that implementation of this agreement appears to have reduced EBID's allocation of Rio Grande Project water in full-supply years by more than 150,000 acre-feet. Furthermore, the State of New Mexico asserts that the USBR illegally took New Mexico credit water as allocated under the Rio Grande Compact and violated NEPA in implementing the agreement. The MRGCD has sought to intervene in the case because of the impacts the Operating Agreement have on upstream storage and relinquishment related to the Rio Grande Compact and, accordingly, on the water users in the middle-valley. The case is currently stayed pending action by the U.S. Supreme Court in *Texas v. New Mexico and Colorado*, No. 220141 Original (U.S. Supreme Court).

In addition, as discussed in Section 4.1.3, the of *Texas v. New Mexico and Colorado,* No. 220141 Original (U.S. Supreme Ct.), may impact water use in the region.

Additionally, on March 21, 2016, WEG filed another lawsuit of importance to the region. *WildEarth Guardians v. Tom Blaine, in his capacity as the New Mexico State Engineer, the MRGCD, and Reclamation*, No D-101-CV-2016-00734, N.M. Dist. Santa Fe, N.M. In this case WEG seeks an Alternative Writ of Mandamus directing the New Mexico State Engineer to perform his nondiscretionary duty to either set a due date for the MRGCD and the USBR to demonstrate proof of beneficial use for Permit Nos. 0620 and 1690 or cancel the permits. The outcome of the case could impact major water users in the region.

Other matters of importance to water users in the region are the outcomes of the Jemez and Rio San Jose adjudications, as well as the Agustin Plains Ranch water rights transfer application.

Other key issues including conflicts in the region identified by the region are summarized in Section 5.

5. Water Supply

This section provides an overview of the water supply in the Middle Rio Grande 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 *Middle Rio Grande Regional Water Plan, 2000-2050* (MRCOG and MRGWA, 2004) 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, including recent projects and studies, and issues impacting the Middle Rio Grande region are:

- The climate divisions within the planning region have all experienced drought in recent years. This is a particular concern for agricultural users that are dependent on surface water, but drought preparedness is important for each community in the region.

- The Rio Grande Compact requires delivery of specified amounts of water to Elephant Butte Reservoir based on the annual natural flow of the Rio Grande at the Otowi gage. New Mexico's delivery to Elephant Butte Reservoir under the Compact is dependent, in part, upon natural and man-caused depletions within parts of the Jemez y Sangre, Middle Rio Grande, and Socorro-Sierra planning regions. This requirement limits combined depletions in these three regions. When the stored water in Elephant Butte and Caballo reservoirs legally available for release to the lower Rio Grande drops below a specified level, certain provisions of the Compact restrict storage and/or release of stored water in reservoirs upstream of Elephant Butte constructed after 1929, thus impacting water operations in the region, perhaps significantly.

- The Rio Grande is the main river in the planning region, and most of the groundwater in the region is within the Rio Grande UWB and is considered to be stream-connected. The Rio Grande in the region is considered by the State Engineer to be fully appropriated, and any new diversion of surface water or stream-connected groundwater requires the transfer of a valid senior surface water right. The availability of senior water rights may thus be a limiting factor in meeting the future water needs of the region.

- Water users seeking to obtain water rights to meet growing demands, such as municipal users, are challenged because they must transfer an existing senior water right. No new appropriations are available in the region. After the groundwater basin was closed to new appropriations in 1956, a number of entities applied for and were issued groundwater pumping permits with the condition that the effects of the pumping on the river would be offset when they occur. Municipal return flow, San Juan-Chama Project water, and the transfer of senior water rights are used as offsets as required by the specific permit requirements, with return flows comprising the greatest volume of offset. The amount of senior water rights needed to offset the pumping under these permits when the effects are fully realized on the river is roughly equal to all of the transferrable senior water rights from the irrigated land along the Rio Grande from north of Albuquerque to Elephant Butte (Schmidt-Petersen, 2011). The total amount of groundwater pumping currently occurring in the planning region is much less than the total amount permitted.

- Several Middle Rio Grande entities have contract allotments of water from the San Juan-Chama Project, which brings water from the Colorado River Basin to the Rio Grande basin. San Juan-Chama Project contractors in the Middle Rio Grande region include the

Rio Grande Compact

Signed in 1938 between Colorado, New Mexico, and Texas, and approved by Congress in 1939, the Rio Grande Compact apportions the surface waters of the Rio Grande Basin above Ft. Quitman, Texas, among the three states. The Rio Grande Compact establishes, among other things, annual water delivery obligations and depletion entitlements for Colorado and New Mexico. The Compact is administered by a commission consisting of one representative from each state and one from the federal government.

The Compact provides for debits and credits to be carried over and accrued from year to year until extinguished under provisions of the Compact. Annual Compact accounting, based on flows at index gaging stations and changes in reservoir storage determines Colorado's and New Mexico's delivery obligations each year.

The Compact affects water planning in New Mexico in several ways:

- The Compact established limitations on the amount of water available for depletion in the northern portion of the Basin in New Mexico. It also requires that a portion of the water that enters the Middle Rio Grande valley be delivered to Elephant Butte Reservoir. These requirements limit depletions in the Rio Chama, Taos, Jemez y Sangre, Middle Rio Grande, and Socorro-Sierra planning regions.
- When the stored water in Elephant Butte drops below specified levels, certain provisions of the Compact restrict storage in reservoirs upstream of Elephant Butte constructed after 1929, thus impacting water operations in the region. Additionally, should New Mexico end the year with an accrued debit balance, it is required to retain in storage an amount of water equivalent to that total debit.

In 1938, in *Hinderlider v La Plata River and Cherry Creek Ditch Co.*, the U.S. Supreme Court ruled that compliance with the terms of an interstate stream compact have the highest priority within a stream system. Thus, from a regional water planning perspective, the waters of the Rio Grande Basin above Elephant Butte Reservoir are a singular supply shared among the Rio Chama, Taos, Jemez y Sangre, Middle Rio Grande, and Socorro-Sierra planning regions, the use of which is constrained by the terms of the Compact.

Albuquerque Bernalillo County Water Utility Authority (ABCWUA) (48,200 ac-ft/yr), Middle Rio Grande Conservancy District (MRGCD) (20,900 ac-ft/yr), Town of Belen (500 ac-ft/yr), Town of Bernalillo (400 ac-ft/yr), and Village of Los Lunas (400 ac-ft/yr).

- Since the 2004 RWP was completed, the ABCWUA has begun to use surface water from the San Juan-Chama Project to supplement its water supply. This surface water use allows groundwater withdrawals to be reduced, and is intended to save groundwater for use as a drought supply when surface water is not available. As a result, ABCWUA, which holds upward of 70 percent of the permitted post-1956 groundwater pumping rights in the region, does not need to pursue acquisition of pre-1907 water rights for offset purposes for several decades. ABCWUA has a goal to manage its existing water resources over the next hundred years to meet river offset requirements without further transfer of pre-1907 water rights. Prior to developing its surface diversion infrastructure, the ABCWUA leased, loaned, or gave portions of its San Juan-Chama Project water to other parties in the Middle Rio Grande for various uses. The smaller municipalities have not developed this renewable water supply and instead will likely continue to use their San Juan-Chama Project water for offset purposes as necessary.

- The NMOSE adopted the Middle Rio Grande Administrative Guidelines in September 2000 for the administration of the Middle Rio Grande Administrative Area (MRGAA). These guidelines are designed to protect water rights, Rio Grande Compact compliance, and the aquifer, and to minimize land subsidence. Under the guidelines new groundwater appropriations will be approved in the MRGAA only if surface water rights are obtained and transferred to offset the diversion amount less any flow returned directly to the Rio Grande (guidelines Section 5.a). Surface water supplies are fully appropriated, and MRGAA Critical Management Areas, which are now limited to parts of Albuquerque, are closed to additional pumping.

- The MRGCD has four major river diversion points and a large network of irrigation canals and drains in the area between Cochiti and the Bosque del Apache National Wildlife Refuge. Additionally, passive diversion by MRGCD occurs from the river to the adjacent riverside drains in some reaches. MRGCD coordinates with the USBR, and the NMISC in specific instances, on El Vado Reservoir operations so that it can provide stored water to its farmers when native flow is insufficient to meet MRGCD irrigation demand.

- The MRGCD has not yet submitted documentation regarding the water that it has put to beneficial use since its permit (SP-1690) was issued in 1930. Without such documentation and critical evaluation of the documentation by the State Engineer, it will remain unclear what the rights under the permit are. Storage and release from El Vado Reservoir under the permit is coordinated between MRGCD and the U.S. Bureau of Reclamation (USBR).

- The Federal Emergency Management Administration recently released new floodplain maps of Sandoval, Bernalillo, and Valencia counties. The new maps 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, thereby helping the region prepare for extreme precipitation. Communities can work to make their watersheds more resilient under climate change by assessing the adequacy of bridges and culverts to sustain peak flow events.

- The existing flood control infrastructure along the Rio Grande is many decades old and nearing the end of its design life. In a number of instances the levees were not engineered and consist simply of excavated materials placed alongside the river when the riverside drains were constructed. Further, because the bottom of the river is higher than the floodplain in some areas, failure of a levee in these areas will cause the river to leave its channel and flood the developed floodplain, including farms, communities, and irrigation and drainage infrastructure. The cost to replace or reinforce this infrastructure throughout the Middle Rio Grande valley is estimated at more than $750 million. A task force of local stakeholder entities has been evaluating the situation, developing reports to the legislature, and seeking funding for higher-priority projects.

- Middle Rio Grande geomorphology has changed significantly from its unmanaged state (MEI, 2002). Cochiti Reservoir and other flood control features have trapped sediment, leading to significant and continued channel incising in the upper reaches of the Middle Rio Grande. Conversely, excessive sedimentation from ephemeral tributaries south of Albuquerque, combined with surface water withdrawals, results in significant channel aggradation. These changes in the river system impact how water is managed as the region reacts to endangered species and water delivery mandates.

- In addition, the river channel has narrowed during the drought and islands have formed that are now vegetated. These conditions will make it difficult to move water through some areas when the next big snowmelt runoff occurs. The potential for extreme precipitation events highlights the need for flood preparation and maintenance of flood control structures.

- The ABCWUA has investigated aquifer storage and recovery (ASR) projects through a demonstration project at Bear Canyon and obtained the first full-scale underground storage and recovery (USR) permit in the state in August 2014. Between November 2014 and March 2015, the project recharged 520.6 acre-feet into the aquifer. ABCWUA is implementing a second ASR demonstration project to store up to 5,000 acre-feet of treated San Juan-Chama water through injection wells located at the Drinking Water Treatment Plant in the Rio Grande Valley, at an anticipated cost of $5.7 to $5.9 million (DBS&A, 2016), and is currently evaluating other potential projects that would allow them to store more surface water, building up a drought reserve.

- The City of Rio Rancho has demonstrated that surface infiltration and direct injection methods can be used to safely replenish the underlying aquifer with a purified, reclaimed water source. Projects include a 2-acre surface infiltration system and a direct injection facility, each of which has the capacity to recharge the underlying aquifer at a rate of approximately 2 and 3 acre-feet per day, respectively. Full-scale permits for operation of the direct injection facility have been recently issued by the NMED and NMOSE.

- The Middle Rio Grande region is home to six federally listed endangered and threatened species—the Rio Grande silvery minnow, southwestern willow flycatcher, Jemez Mountains salamander, New Mexico meadow jumping mouse, western yellow-billed cuckoo, and Mexican spotted owl—and water demand for these species has resulted in changes in some water operations in the region in recent years. Litigation is occurring on a federally mandated Biological Opinion from 2003 for all Middle Rio Grande water operations that specifies instream flow targets to assist in the recovery of the silvery minnow. The 2003 Biological Opinion was replaced in December 2016, when a new Biological Opinion was issued for Water Operations and River Maintenance actions of USBR, the Bureau of Indian Affairs, MRGCD, and the State. The litigation on the 2003 Biological Opinion is currently stayed to allow the parties to evaluate the changed situation relative to the litigation complaints.

- The congressionally authorized Middle Rio Grande Endangered Species Collaborative Program has provided funding at a 75 percent federal and 25 percent non-federal cost share to address endangered species and water user conflicts and maintain Endangered Species Act compliance for New Mexico water users above Elephant Butte Reservoir. The Collaborative Program has coordinated efforts by federal, state, and local government and Native American and private entities and expended more than $150 million since 2001. The NMISC has provided approximately 90 percent of the required non-federal cost share. Although litigation is underway, Endangered Species Act compliance has been maintained since 2003 and many projects benefiting the endangered species have been completed.

- Pueblo water rights have not been fully characterized or quantified, yet they constitute the most senior water claims in the basin.

- Sandia and Isleta pueblos have EPA-approved water quality standards, which means that upstream discharges, including treated wastewater return flows from Bernalillo, Rio Rancho, and Albuquerque, must meet Pueblo standards.

- The Middle Rio Grande Water Assembly, a non-profit organization dedicated to educating residents of the Middle Rio Grande about relevant water issues, developed a water budget for the Middle Rio Grande as part of the original water planning effort. Though this document uses a different approach from the common technical approach for all planning regions, the original water budget is still a useful tool that helps describe the

water balance in the Middle Rio Grande. The budget has recently been updated (Thomson et al., 2014) by the Middle Rio Grande Water Assembly Water Budget Task Force.

- Due to the large amount of forested land within and upstream of the region, coupled with the recent drought conditions, the threat of wildfire and subsequent sedimentation impacts on streams and reservoirs remains a key planning issue. Continued and expanded efforts to reduce catastrophic fire risk through forest management, as well as additional information on the quantitative benefits of various management techniques, are needed.

- The Nature Conservancy is working to develop the Rio Grande Water Fund, which if funded, will generate sustainable income for a 10- to 30-year forest restoration program through a multi-party effort. Models of debris flow risk after high-severity fire indicate that key water sources are at risk, and the goal of the program is to reduce the risk of catastrophic wildfire and subsequent sedimentation and localized water quality impacts to protect the region's water supply. Details of the program plan are included in the *Rio Grande Fund, Comprehensive Plan for Wildfire and Water Source Protection* (Nature Conservancy, 2015).

- The U.S. Air Force, under direction from the NMED, is cleaning up a jet fuel spill at Kirtland Air Force Base. Plume assessment and interim remediation measures are in place, and a final remediation strategy will be developed under the Resource Conservation and Recovery Act (RCRA) (KAFB, 2015).

- In 2014, the U.S. EPA issued a National Pollutant Discharge Elimination System (NPDES) Watershed Based MS4 Permit NMR04A000, which covers the Middle Rio Grande watershed. The watershed based MS4 Permit replaces an earlier MS4 Permit NMS000101 for four co-permittees that have been participating under a 2003 cooperative agreement to jointly conduct stormwater quality monitoring. The NMISC is concerned that compliance with the permit will reduce the amount of water reaching the river because, unless a flood control purpose is present, the permit requires retention of water on newly developed and redeveloped sites as opposed to detention, treatment, and release.

- While the largest urban populations are served by municipal suppliers, there are many small and rural drinking water systems in the region, outside of these urban areas. These small systems face challenges in financing infrastructure maintenance and upgrades and complying with water quality monitoring and training standards. Many smaller communities in the region do not have adequate wastewater treatment facilities.

- The East Mountain area (east of the Sandia Mountains in the central part of the planning region) is supplied largely by domestic wells and small water systems. Yields are low in some areas, shallow wells are vulnerable to drought, and septic systems can impact water

quality. Bernalillo County groundwater level monitoring has shown significant water level declines in some areas (McGregor, 2008).

- Between 2006 and 2008, under Section 72-12-25 NMSA, 35 entities filed notices of intent to drill more than 420 deep wells in the Middle Rio Grande for the withdrawal of more than 1.14 million acre-feet per year of nonpotable groundwater. Two test wells were drilled and tested for this purpose in Sandoval County. No other wells have been drilled associated with these notices, and no water has been put to beneficial use under any of these notices. These proposed groundwater withdrawals from deep aquifers have the potential to affect shallow freshwater aquifers and the surface water of the Rio Grande stream system.

5.1 Summary of Climate Conditions

The 2004 RWP (MRCOG and MRGWA, 2004) included a graph of long-term variations in precipitation in the Southwest based on reconstructed tree-ring records, and precipitation in the region was reflected in the regional water budget through tributary and storm drain inflows. This section provides an updated summary of temperature, precipitation, snowpack conditions, and drought indices pertinent to the region (Section 5.1.1), to be consistent with the common technical approach for regional water planning. Studies relevant to climate change and its potential impacts to water resources in New Mexico and the Middle Rio Grande 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 the Middle Rio Grande region and identifies two stations, Jemez Springs and the Albuquerque airport, that were used for analysis of weather trends. These two stations were selected based on location, how well they represented conditions in their respective counties, and completeness of their historical records (Table 5-1). The locations of the climate stations for which additional data were analyzed are shown in Figure 5-1.

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

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 two representative stations in the planning region. The variability in total annual precipitation for the selected climate stations is shown in Figure 5-4 and is also reflected in the drought indices discussed below. In addition to annual variability, monthly variability in precipitation and resulting streamflow also presents a challenge since snowmelt and/or monsoon flows may not occur at times when water is most needed for agriculture or other uses.

Table 5-1. Middle Rio Grande Climate Stations

Climate Stations [a]	Latitude	Longitude	Elevation	Precipitation		Temperature	
				Data Start	Data End	Data Start	Data End
Sandoval County							
Bernalillo 1 NNE	35.32	–106.55	5,052	5/1/1895	8/31/1982	6/1/1895	8/31/1982
Cabezon 5 SW	35.58	–107.17	6,053	10/1/1939	9/30/1951	—	—
Cochiti Dam	35.64	–106.33	5,560	2/1/1975	Present	2/1/1975	Present
Corrales	35.25	–106.60	5,026	10/31/1982	Present	10/31/1982	Present
Cuba	36.01	–106.97	7,045	9/1/1938	Present	9/1/1938	Present
Jemez Dam	35.39	–106.54	5,388	9/1/1953	Present	9/1/1953	Present
Jemez Springs	35.78	–106.69	6,262	5/1/1910	Present	10/1/1910	Present
Johnson Rch	35.95	–107.09	7,203	7/1/1944	Present	3/1/2013	Present
Lee Rch	35.83	–106.50	8,694	10/1/1923	9/30/1941	10/1/1923	9/30/1941
Pena Blanca	35.58	–106.33	5,233	8/1/1958	1/31/1968	8/1/1958	1/31/1968
Penistaja	35.90	–107.15	6,965	9/1/1943	12/31/1955	6/1/1953	9/30/1955
Placitas 4W	35.30	–106.50	5,515	1/1/1992	Present	1/1/2006	Present
Regina	36.18	–106.95	7,454	7/1/1914	8/31/1969	10/1/1914	8/31/1969
Selsor Rch	35.97	–106.78	8,005	6/1/1912	Present	12/1/1912	Present
Torreon Navajo Mission	35.80	–107.18	6,700	1/1/1961	Present	1/1/1961	Present
Vallecitos	35.65	–106.67	5,900	1/1/1920	6/30/1974	—	—
Wolf Canyon	35.95	–106.75	8,220	6/1/1912	Present	12/1/1912	Present
Bernalillo County							
Albuquerque Fthills NE	35.13	–106.49	6,120	10/1/1991	Present	10/1/1991	Present
Albuquerque Valley	35.02	–106.69	4,955	10/1/1991	Present	10/1/1991	Present
Albuquerque WSFO Airport	35.04	–106.61	5,310	8/1/1946	10/1/2001	1/1/1897	Present
Bernalillo County (cont.)							

Source: WRCC, 2014

— = Information not available

[a] Stations in **bold** type were selected for analysis of weather trends.

WSFO = Weather Service Forecast Office

Table 5-1. Middle Rio Grande Climate Stations

Climate Stations [a]	Latitude	Longitude	Elevation	Precipitation		Temperature	
				Data Start	Data End	Data Start	Data End
Exp Farm	35.02	–106.68	4,934	12/1/1938	7/31/1957	10/1/1938	7/31/1957
Petroglyph Natl Mon	35.14	–106.71	5,121	4/1/1994	Present	4/1/1994	Present
Sandia Crest	35.22	–106.45	10,686	12/1/1953	4/30/1979	12/1/1953	4/30/1979
Sandia Park	35.21	–106.37	7,030	1/1/1939	2/28/2009	1/1/1939	2/28/2009
Tijeras Rs	35.07	–106.38	6,306	4/1/1910	12/31/1974	4/30/1915	12/31/1974
Valencia County							
Belen	34.67	–106.77	4,803	11/1/1941	5/31/1976	11/30/1941	5/31/1976
Los Lunas	34.80	–106.73	4,892	12/1/1892	7/31/1958	12/1/1892	7/31/1958
Los Lunas 3 SSW	34.77	–106.76	4,840	7/1/1957	Present	7/1/1957	Present

Source: WRCC, 2014 — = Information not available

[a] Stations in **bold** type were selected for analysis of weather trends..

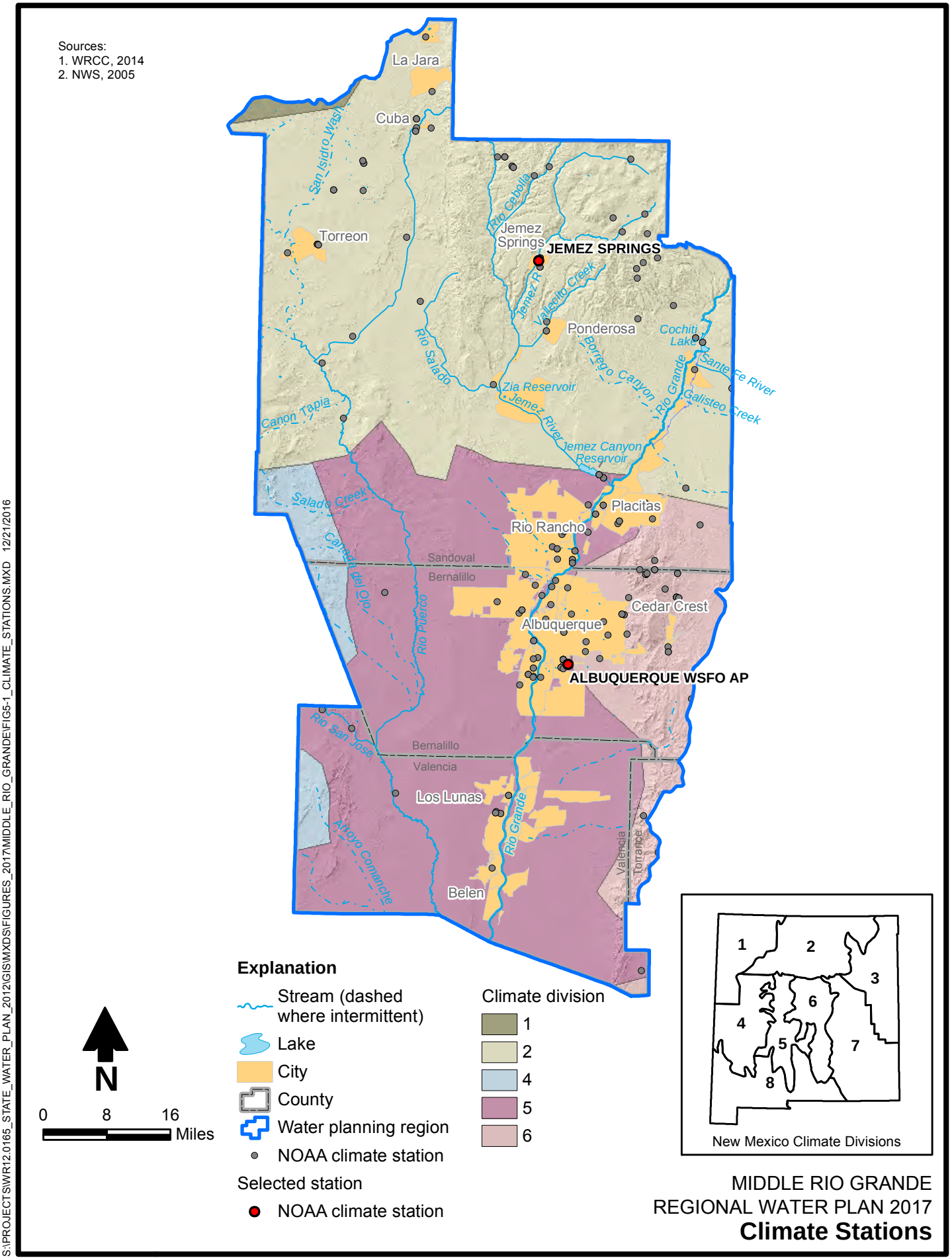
Sources:
1. WRCC, 2014
2. NWS, 2005
La Jara
Cuba
San Isidro Wash
Torreon
Rio Cebolla
Jemez Springs
JEMEZ SPRINGS
Jemez R
Vallecito Creek
Ponderosa
Cochiti Lake
Rio Salado
Borrego Canyon
Rio Grande
Santa Fe River
Zia Reservoir
Galisteo Creek
Canon Tapia
Jemez River
Jemez Canyon Reservoir
Salado Creek
Placitas
Rio Rancho
Sandoval
Bernalillo
Cañada del Ojo
Rio Puerco
Cedar Crest
Albuquerque
ALBUQUERQUE WSFO AP
Rio San Jose
Bernalillo
Valencia
Los Lunas
Arroyo Comanche
Rio Grande
Valencia
Torrance
Belen
N
0
8
16
Miles
Explanation
Stream (dashed where intermittent)
Lake
City
County
Water planning region
NOAA climate station
Selected station
NOAA climate station
Climate division
1
2
4
5
6
1
2
3
4
5
6
7
8
New Mexico Climate Divisions
MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017
Climate Stations
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Figure 5-1

Table 5-2. Temperature and Precipitation for Selected Climate Stations Middle Rio Grande 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]
Jemez Springs	16.96	6.17	28.72	98.1	51.7	37.0	66.4	97.6
Albuquerque WSFO AP	8.65	3.29	15.88	96.6	56.6	43.3	69.9	91.2

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.

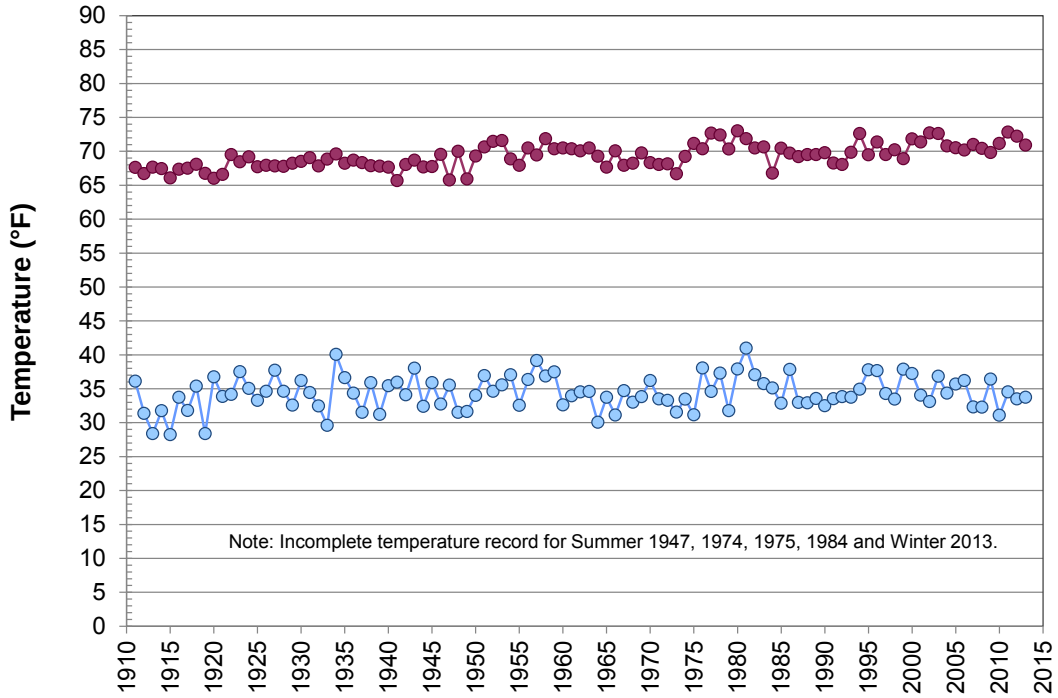
[b] Minimum and maximum recorded annual precipitation amounts for each station.

[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).

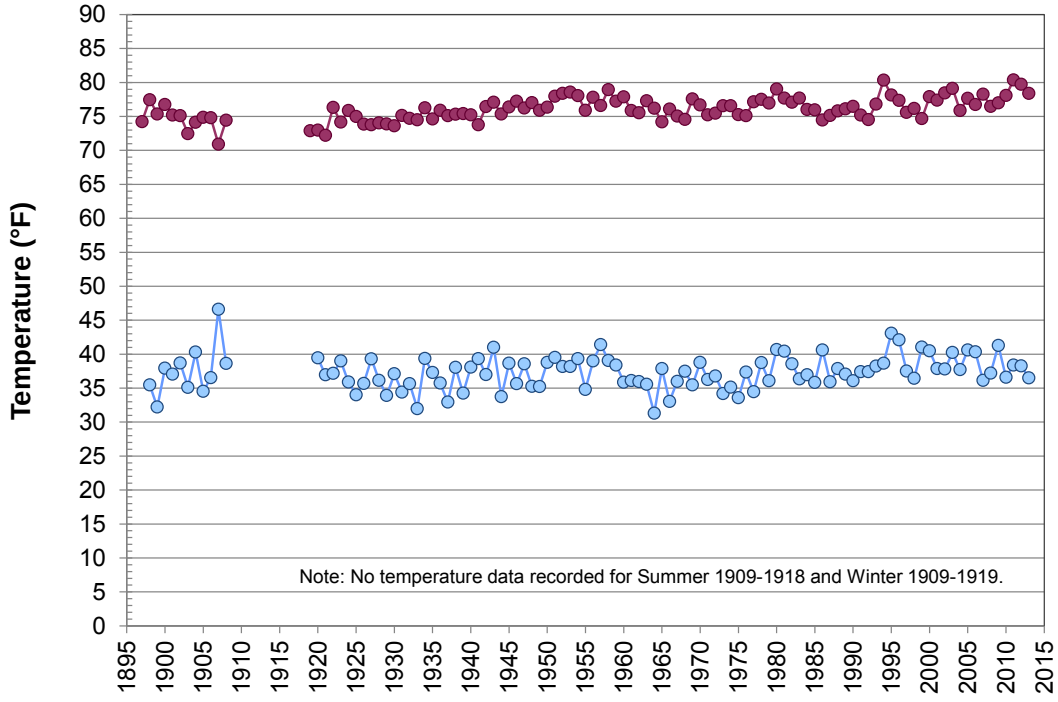
[d] Average of the daily average temperatures calculated for each station.

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

Jemez Springs



Albuquerque WSFO Airport



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Average Temperature, Jemez Springs and Albuquerque WSFO Airport Climate Stations

Figure 5-2

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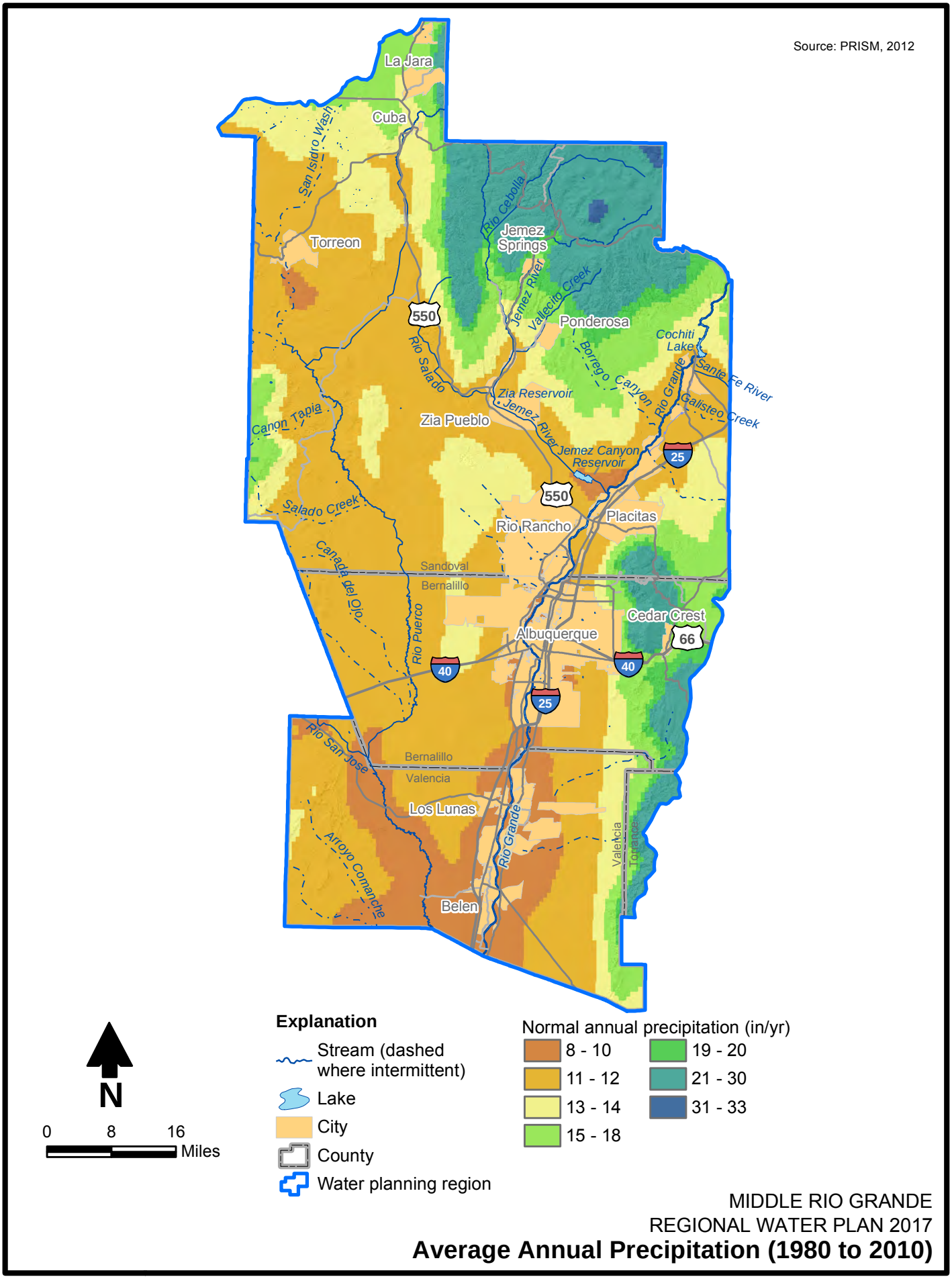

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Average Annual Precipitation (1980 to 2010)

Figure 5-3

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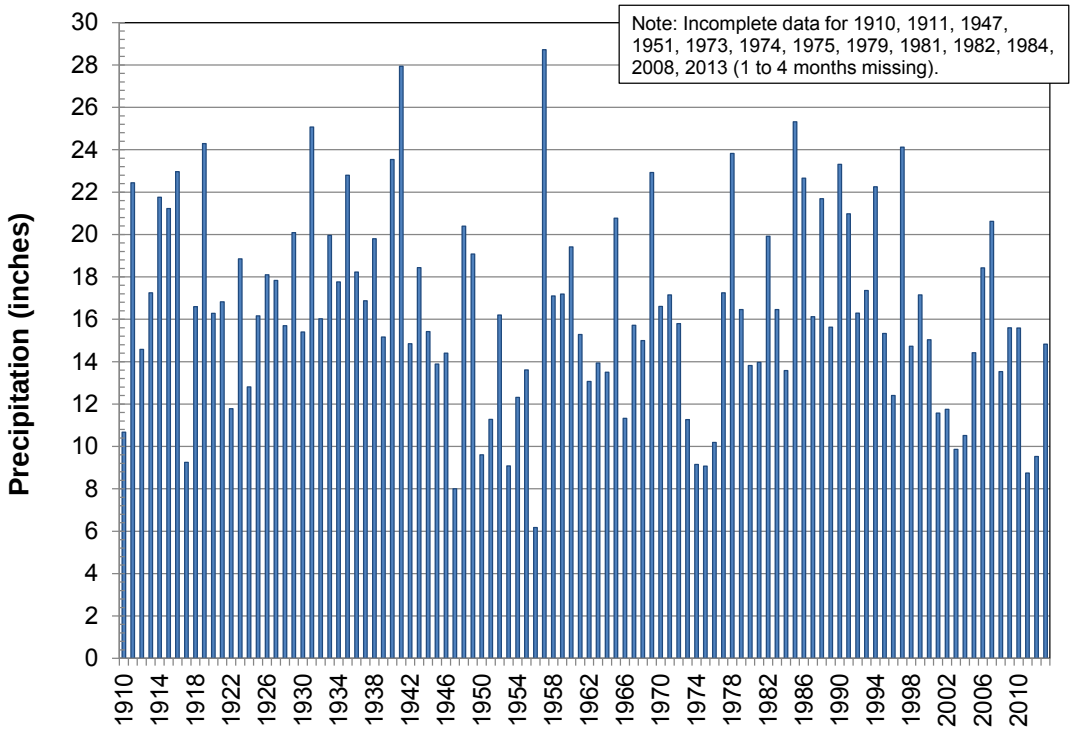
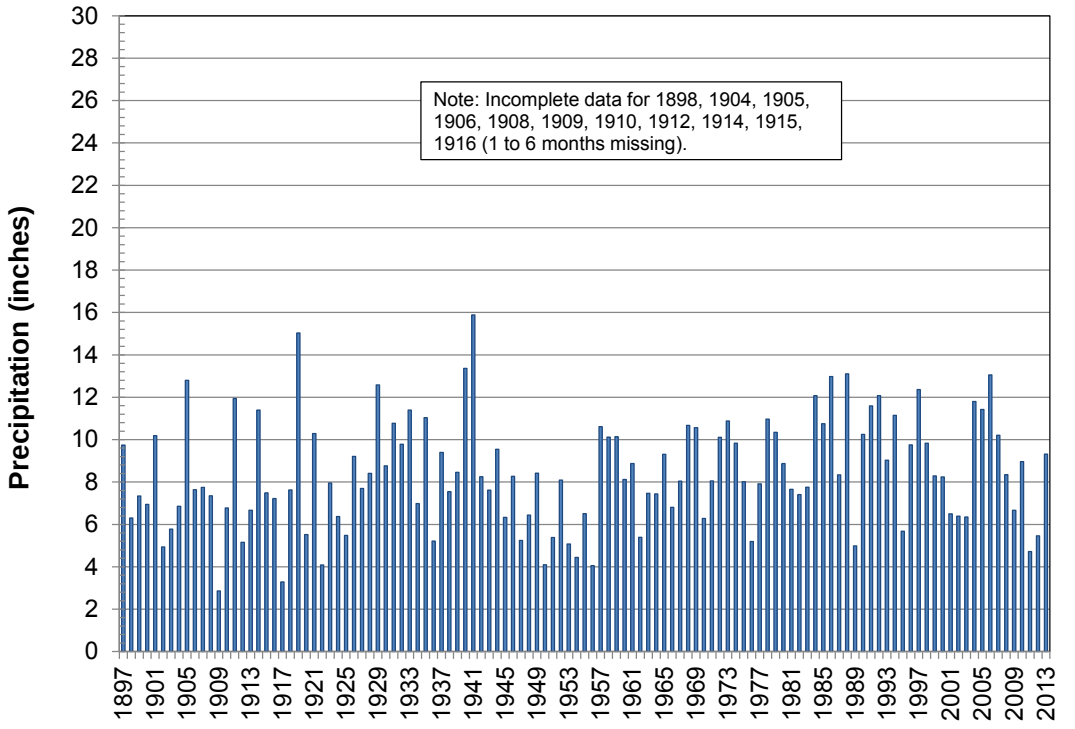
Jemez Springs



Albuquerque WSFO Airport



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Annual Precipitation, Jemez Springs and Albuquerque WSFO Airport Climate Stations

Figure 5-4

P:_NM15-203\RWPs_2016\12_Middle Rio Grande\Figures\Fig5-04_Reg 12_Precip.docx 12/20/16

Snowpack is an indicator of potential streamflow trends, but no Natural Resources Conservation Service (NRCS) SNOTEL or snow course stations are located in the planning region. Snow depth and snow water equivalent data are collected by the NRCS (2014a) at stations north of the region, and these data are used by water managers in the Middle Rio Grande region to anticipate spring snowmelt. 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.

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

Table 5-3. Palmer Drought Severity Index Classifications

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

There are considerable limitations when using the PDSI, as it may not describe rainfall and runoff that varies from location to location within a climate division and may also lag in indicating emerging droughts by several months. Also, the PDSI does not consider groundwater or reservoir storage, which can affect the availability of water supplies during drought conditions. However, even with its limitations, many states incorporate the PDSI into their

drought monitoring systems, and it provides a good indication of long-term relative variations in drought conditions, as PDSI records are available for more than 100 years.

The PDSI is calculated for climate divisions throughout the United States. The Middle Rio Grande region falls within five New Mexico Climate Divisions (1, 2, 4, 5, and 6), though only a very small part of Division 1, located in the northwest corner of the region (Figure 5-1). The chronological history of drought, as illustrated by the PDSI for Climate Divisions 2, 4, 5, and 6, 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 5-6a and 5-6b).

The 2004 RWP referenced a long-term tree ring study (Grissino-Mayer, 1996) which indicates that recent precipitation at the time the plan was prepared was higher than the long-term average and that extrapolation for the future from water budget data may yield an overly optimistic picture.

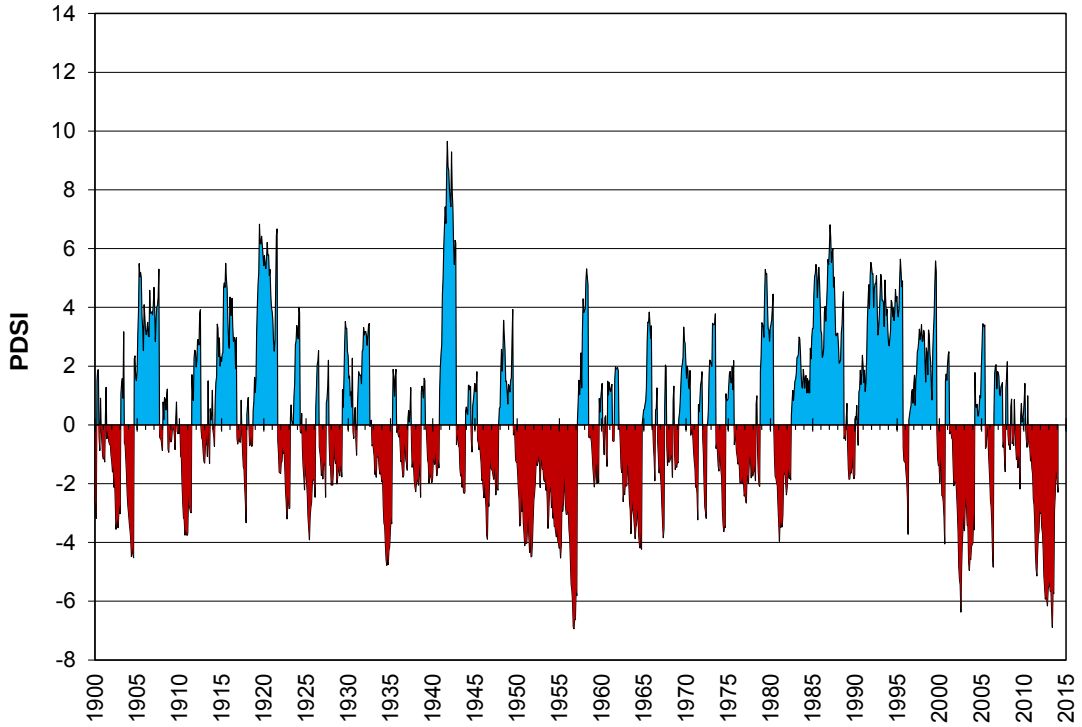
The likelihood of drought conditions developing in New Mexico is influenced by several weather patterns:

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

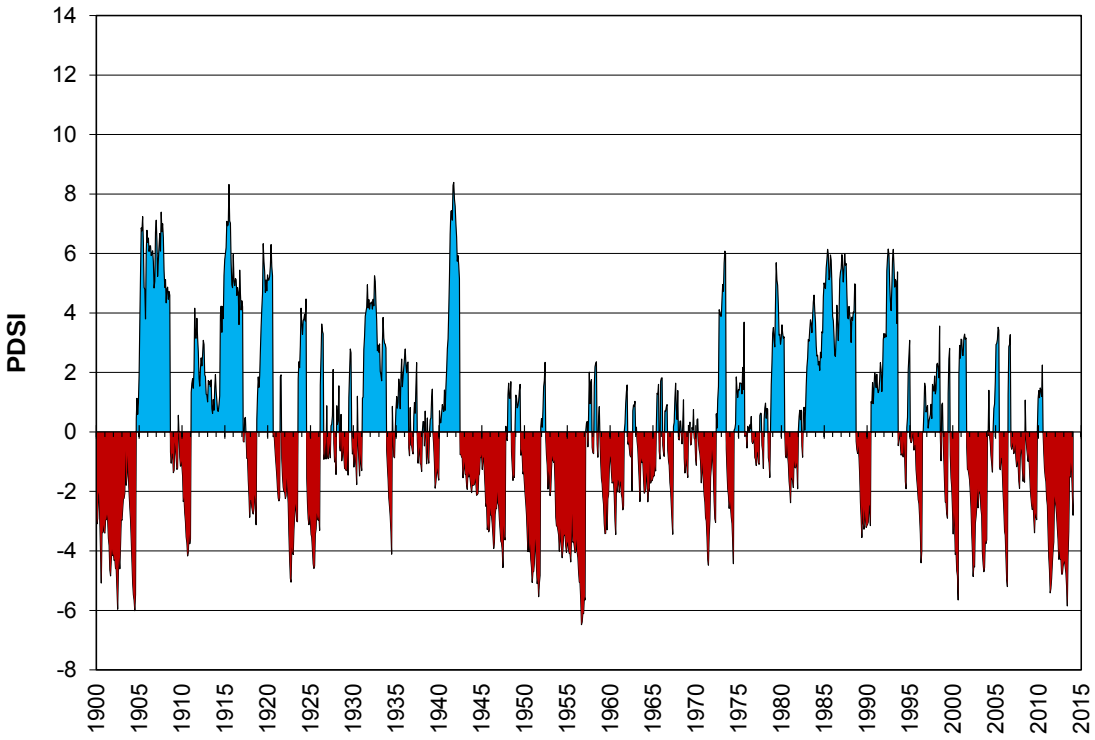
- *The Pacific Decadal Oscillation (PDO):* The PDO is a multi-decadal pattern of climate variability caused by shifting sea surface temperatures between the eastern and western Pacific Ocean that cycle approximately every 20 to 30 years. Warm phases of the PDO (shown as positive numbers on the PDO index)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

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

Climate Division 2



Climate Division 4



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

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Palmer Drought Severity Index
New Mexico Climate Divisions 2 and 4

Figure 5-6a

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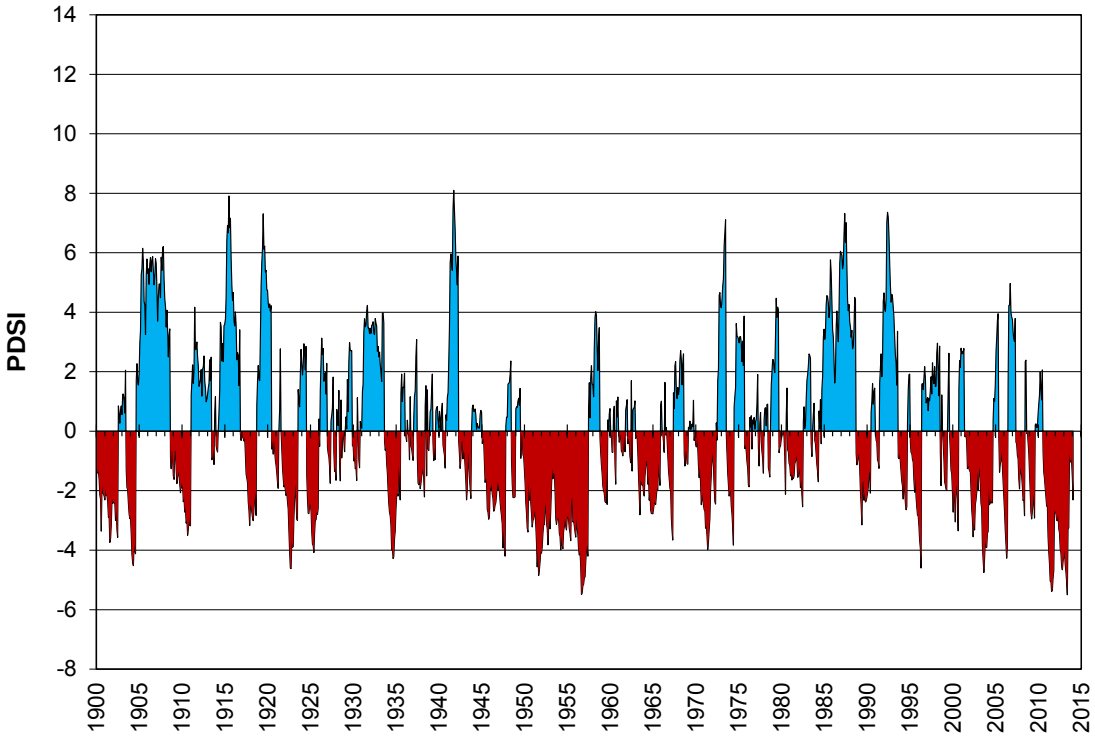
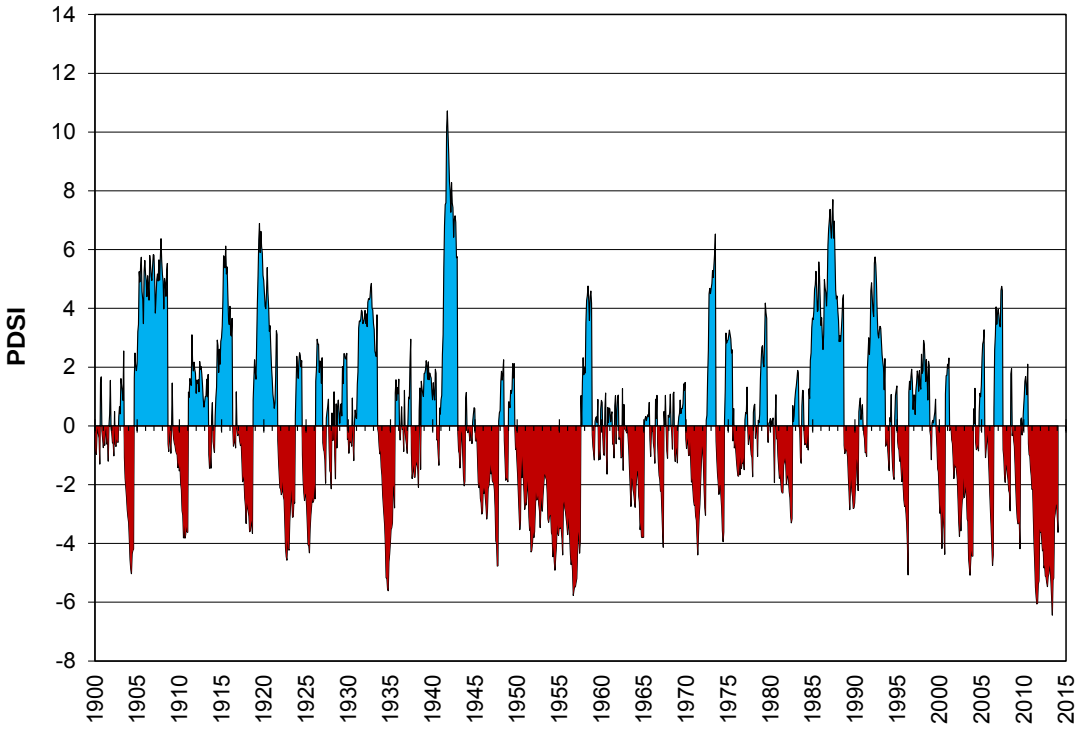
Climate Division 5



Climate Division 6



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

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Palmer Drought Severity Index
New Mexico Climate Divisions 5 and 6

Figure 5-6b

P:_ NM15-203\RWPs_2016\12_MRG\Fig5-06b_Reg 12_PDSI Div 5&6.docx 12/20/16

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

5.1.2 Recent Climate Studies

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

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

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

Although there is consensus among climate scientists that global temperatures are warming, there is considerable uncertainty regarding the specific spatial and temporal impacts that can be

expected. To assess climate trends in New Mexico, the NMOSE and NMISC (2006) conducted a study of observed climate conditions over the past century and found that observed wintertime average temperatures had increased statewide by about 1.5°F since the 1950s. Predictions of annual precipitation are subject to greater uncertainty "given poor representation of the North American monsoon processes in most climate models" (NMOSE/NMISC, 2006).

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

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

To minimize the impact of these changes, it is imperative that New Mexico plan for variable water supplies, including focusing on drought planning and being prepared to maximize storage from extreme precipitation events while minimizing their adverse impacts. MRGCD is leading a consortium of non-federal partners to develop a proposal to the USBR's WaterSMART program for a regional scale Basin Study of the Middle Rio Grande Basin. The study objective is to evaluate the impacts of climate change and help ensure sustainable water supplies by identifying strategies to address imbalances in water supply and demand.

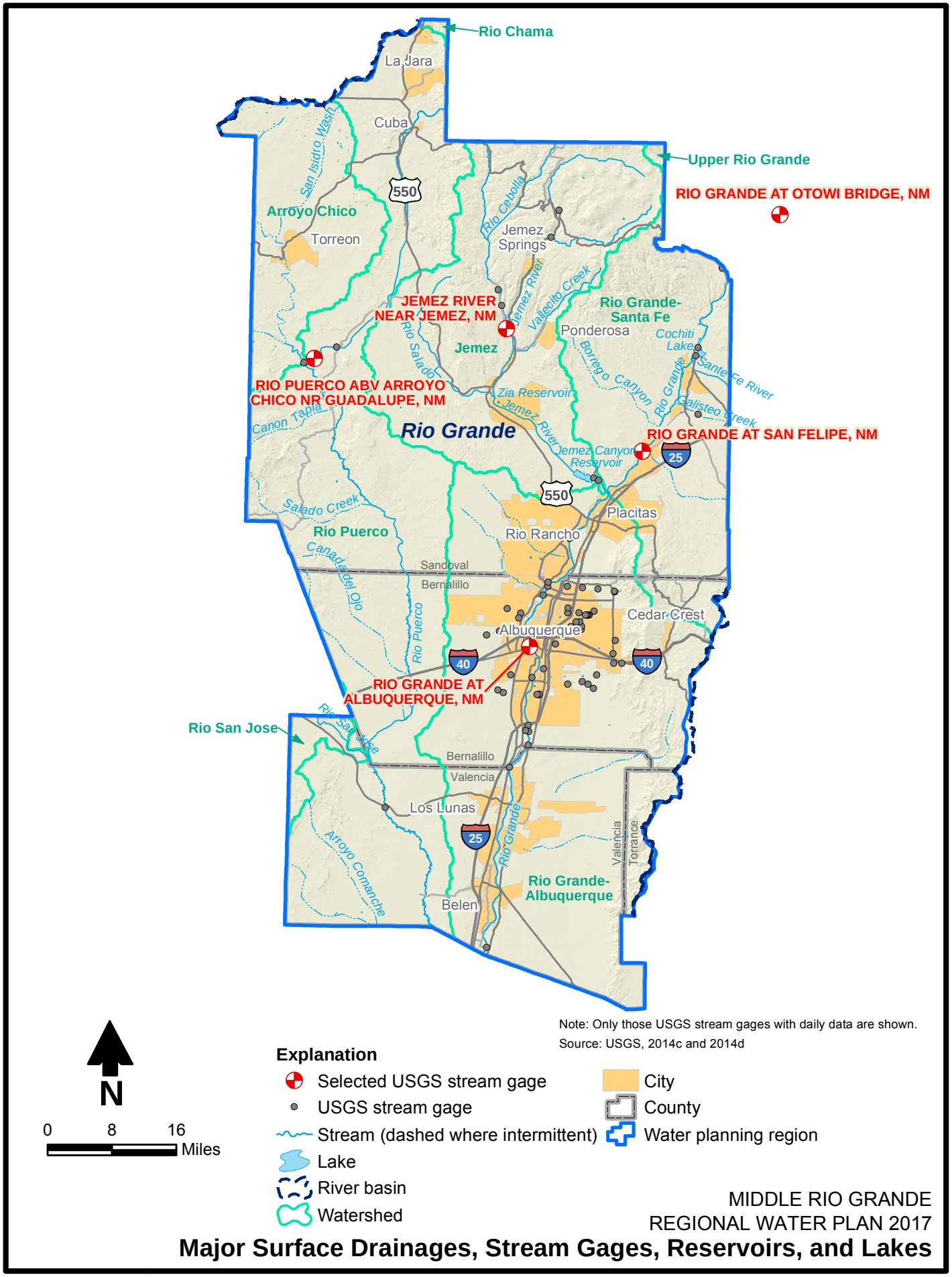
5.2 Surface Water Resources

Surface water supplies approximately 70 percent of the water currently diverted in the Middle Rio Grande Water Planning Region, with its primary uses being for irrigated agriculture followed by public water supply. The dominant waterways flowing in the region are the Rio Grande and its tributaries the Jemez River and the Rio Puerco. 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 interstate compact limitations. The administrative water supply discussed in Section 5.5 is intended to represent supply considering both physical and legal limitations; however, it does not address possible constraints that might be imposed upon this supply due to the need to comply with certain provisions of the Rio Grande Compact. 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. These data indicate that most of the streamflow occurs in the March to June snowmelt period, with secondary peaks occurring at some gages in August and September as a result of monsoon flows.



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Major Surface Drainages, Stream Gages, Reservoirs, and Lakes

Figure 5-7

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Table 5-4a. USGS Stream Gage Stations

USGS Station [a]							Period of Record	
Name [b]	Number	Latitude	Longitude	Elevation (ft amsl)	Drainage Area (sq mi)	Irrigated Upstream Land [c] (acres)	Start Date	End Date
Santa Fe County								
Rio Grande at Otowi Bridge, NM [d]	08313000	35.8745	–106.142444	5,488	14,300	620,000 [e] 75,000 [f]	2/1/1895	Present
Sandoval County								
Rito de los Frijoles in Bandelier Nat Mon, NM	08313350	35.7763889	–106.268333	6,140	18	NA	2/11/1983	Present
Rio Grande at Cochiti, NM	08314500	35.6322528	–106.319471	5,225	14,600	—	6/1/1926	10/30/1970
Rio Grande Below Cochiti Dam, NM	08317400	35.618	–106.323944	5,226	14,900	620,000 [e] 81,000 [f]	10/1/1970	Present
Galisteo C at Domingo, NM	08318000	35.5119789	–106.317524	5,256	640	—	10/1/1941	6/30/1971
Rio Grande at San Felipe, NM	08319000	35.4445833	–106.439833	5,116	16,100	705,000	1/1/1927	Present
Redondo Creek Nr Jemez Springs, NM	08319945	35.8761335	–106.631146	—	—	—	11/10/1981	9/30/1985
Jemez R Bl East Fork Nr Jemez Springs, NM	08321500	35.8275234	–106.648091	6,703	173	—	5/14/1951	12/31/1990
Rio Guadalupe at Box Canyon Near Jemez, NM	08323000	35.7311362	–106.762815	6,016	235	—	5/15/1951	9/30/1996
Rio Guadalupe N Jemez Sps, NM	08323500	35.7028037	–106.754759	—	230	—	12/23/1938	9/30/1950
Jemez River Near Jemez, NM	08324000	35.6619833	–106.743439	5,622	470	300	10/1/1936	Present
Jemez River Outlet Below Jemez Canyon Dam, NM	08328950	35.3947588	–106.545305	5,162	1,034	NA	10/1/2009	Present
Jemez River Below Jemez Canyon Dam, NM	08329000	35.3904167	–106.534611	5,096	1,038	—	4/1/1936	9/30/2009

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: MRCOG and MRGWA, 2004; USGS, 2014a

[d] Located outside region, included to illustrate the water supply entering the region.

[e] In Colorado

[r] In New Mexico

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
Sandoval County (cont.)								
Rio Grande Near Bernalillo, NM	08329500	35.2847625	–106.596415	5,031	17,300	—	10/1/1941	9/30/1969
Corrales Riverside Drain Nr Corrales, NM	08329930	35.2053205	–106.642249	—	—	—	10/1/1996	6/30/1999
Rio Puerco at Cabezon, NM	08333500	35.6222498	–107.117265	—	397	—	10/1/1944	9/30/1951
Rio Puerco Abv Arroyo Chico Nr Guadalupe, NM	08334000	35.6008889	–107.166611	5,950	420	3,700	10/1/1951	Present
Arroyo Chico Nr Guadalupe, NM	08340500	35.59225	–107.189444	5,921	1,390	NA	10/1/1943	Present
Bernalillo County								
Campus Wash at Albuquerque, NM	08329700	35.0938889	–106.623611	5,143	4	NA	4/20/1982	Present
Embudo Arroyo at Albuquerque, NM	08329720	35.1022222	–106.4925	5,925	4	—	10/1/1998	Present
N. Floodway Channel at Albuquerque, NM	08329835	35.1175	–106.611667	5,110	40	—	5/19/1982	Present
Sf Hahn Arroyo in Albuquerque, NM	08329838	35.1211111	–106.567778	5,298	2	—	6/12/1992	7/10/2003
Nf Hahn Arroyo in Albuquerque, NM	08329839	35.1266667	–106.566944	5,290	2	—	10/1/2000	7/10/2003
Hahn Arroyo in Albuquerque, NM	08329840	35.1258778	–106.590303	5,190	4	NA	6/21/1978	Present
Grant Line Arroyo at Villa Del Oso, NM	08329860	35.1344897	–106.571691	5,302	0	—	6/21/1976	9/30/1995
Grant Line Arroyo at Albuquerque, NM	08329865	35.1344897	–106.579191	—	—	—	10/1/1987	9/30/1991
Bear Arroyo at Jefferson St at Albq, NM	08329870	35.1508333	–106.597778	5,130	15	NA	10/1/2003	Present
Pino Arroyo at Ventura at Albq., NM	08329872	35.1544893	–106.540024	5,490	5	—	8/24/1990	9/30/2000
Hoffmantown Church Outlet No. 1 at Albq., NM	08329873	35.1472672	–106.55058	—	0	—	8/10/1990	9/30/1997
Hoffmantown Church Outlet No. 2 at Albq., NM	08329874	35.1472672	–106.553357	—	0	—	8/2/1990	9/30/1997

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: MRCOG and MRGWA, 2004; 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 5-4a. 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
Bernalillo County (cont.)								
Cherry Hills Arroyo No. 1 at Albq., NM	08329875	35.1472672	–106.553357	—	0	—	8/30/1990	9/30/1997
Cherry Hills Arroyo No. 2 at Albq., NM	08329876	35.1472672	–106.556135	—	0	—	8/30/1990	9/30/1997
Pino Arroyo at Wyoming at Albq., NM	08329877	35.1472672	–106.558913	—	6	—	10/1/1990	9/30/1997
Academy Acres Drain In Albuquerque, NM	08329880	35.1511111	–106.573056	5,305	0	—	6/21/1976	9/30/1991
Pino Arroyo at Jefferson St. at Albuquerque, NM	08329882	35.1594444	–106.5975	5,119	8	—	10/1/2000	6/30/2011
La Cueva Arroyo Trib (Upper) at Albq., NM	08329888	35.1894444	–106.495278	6,080	1	—	5/7/1999	6/13/2011
La Cueva Arroyo Tr Nr Albuquerque, NM	08329890	35.1906	–106.496133	6,100	0	—	5/26/1977	10/27/1995
North Floodway Channel Near Alameda, NM	08329900	35.1980556	–106.599722	5,015	88	NA	7/1/1968	Present
North Camino Arroyo at Sunset Hills Nr Albq., NM	08329911	35.1944444	–106.5325	5,645	2	—	10/1/1997	6/13/2011
N Camino Arroyo Tr at Wyo Blvd at Albuquerque, NM	08329914	35.1964333	–106.566414	5,364	0	—	6/14/1979	9/3/1997
Rio Grande at Alameda Bridge at Alameda, NM	08329918	35.1977222	–106.642778	5,050	17,129	—	7/4/2003	Present
Rio Grande Nr Alameda, NM	08329928	35.182	–106.651944	4,990	17,210	714,000	3/1/1989	Present
Arroyo 19a at Albuquerque, NM	08329935	35.1566667	–106.730556	5,341	2	NA	6/17/1977	Present
Taylor Ranch Drain at Albuquerque, NM	08329936	35.1488889	–106.700833	5,102	0	—	8/18/1978	7/6/1998
Ladera Arroyo at Albuquerque, NM	08329938	35.1155556	–106.746667	5,312	0	—	5/28/1981	6/19/2011
Mirehaven Arroyo Nr Albququerque, NM	08329939	35.1083784	–106.774751	—	—	—	9/12/1990	9/30/1990

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: MRCOG and MRGWA, 2004; 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 5-4a. 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
Bernalillo County (cont.)								
Rio Grande at Albuquerque, NM	08330000	35.0891667	–106.680694	4,946	17,440	718,000	3/1/1942	Present
Rio Grande at Rio Bravo Bridge Near Albuquerque,NM	08330150	35.0331035	–106.673637	—	17,440	—	1/19/1991	9/30/1995
San Jose Drain at Woodward Rd at Albq., NM	08330200	35.0488889	–106.648611	4,946	2	NA	10/1/1993	Present
Tijeras Arroyo at Albuquerque, N. Mex.	08330500	35.0611111	–106.477778	5,660	75	NA	4/1/1943	6/30/1949
Tijeras Arroyo Abv Four Hills Brdg at Albq., NM	08330505	35.0608813	–106.495022	—	—	NA	5/11/1989	9/13/1991
Tramway Floodway Channel at Albuquerque, NM	08330540	35.0783333	–106.496944	5,740	2	—	10/1/1989	6/15/2011
Tijeras Arroyo at KAFB at Albuquerque, NM	08330560	35.0397707	–106.531967	—	80	—	6/29/1987	9/30/1988
Arroyo Del Coyote at KAFB Nr Albq., NM	08330565	35.015327	–106.538912	—	27	—	9/2/1989	10/23/1995
Arroyo Del Coyote Abv Tijeras Arroyo at KAFB, NM	08330567	35.0222712	–106.550578	—	28	—	9/2/1989	10/23/1995
Tijeras Arroyo Blw Arroyo Del Coyote at KAFB, NM	08330569	35.0266444	–106.563942	—	117	—	7/25/1989	9/30/1995
Tijeras Arroyo at Montessa Park Nr Albuquerque, NM	08330580	35.0219917	–106.595022	—	122	—	10/1/1987	9/30/1995
Tijeras Arroyo Nr Albuquerque, NM	08330600	35.0019444	–106.6575	4,999	128	—	10/1/1982	Present
South Div Channel Abv Tijeras Arroyo Nr Albq., NM	08330775	35.0027778	–106.657222	4,930	11	NA	6/8/1988	Present
Tijeras Arroyo Bl S Div Inlet Nr Albuquerque, NM	08330800	35.002549	–106.661969	4,933	190	—	7/1/1974	6/8/1988

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: MRCOG and MRGWA, 2004; 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 5-4a. 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
Bernalillo County (cont.)								
Rio Grande at Isleta Lakes Nr Isleta, NM	08330875	34.9466667	−106.680278	4,870	17,666	718,000	10/1/2002	Present
Albuquerque Riverside Drain Nr Isleta, NM	08330915	34.9353288	−106.679192	—	—	—	10/1/1997	6/30/1999
Atrisco Riverside Drain Nr Isleta, NM	08330940	34.9372731	−106.685859	—	—	—	10/1/1997	6/30/1999
Barr Chical Drain Nr Isleta, NM	08331105	34.9111628	−106.680025	—	—	—	10/1/1997	6/30/1999
Amole Del Norte Arroyo at Albuquerque, NM	08331118	35.0372222	−106.720833	4,997	6	—	4/20/2000	6/16/2011
N Pajarito Arroyo at Pl at Albuquerque, NM	08331130	35.0094928	−106.747805	5,148	1	—	5/9/1979	9/30/1986
N Pajarito Arroyo at Gb at Albuquerque, NM	08331140	35.0050486	−106.73586	5,042	1	—	5/9/1979	9/30/1983
Maraposa Div of San Antonio Arr at Albq., NM	083299375	35.14	−106.704722	5,100	31	NA	10/1/1993	Present
Valencia County								
Rio Grande Near Bosque Farms, NM	08331160	34.8705556	−106.72	4,860	17,718	718,000	3/16/2006	Present
Rio Grande at State Hwy 346 Near Bosque, NM	08331510	34.545	−106.763056	—	18,406	718,000	10/1/2005	Present
Rio Puerco at Rio Puerco, NM	08352500	34.793943	−106.989477	5,009	6,590	—	3/1/1934	12/31/1976

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: MRCOG and MRGWA, 2004; 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	
Santa Fe County				
Rio Grande at Otowi Bridge, NM [d]	433,584	983,871	1,993,081	43
Sandoval County				
Rito de Los Frijoles in Bandelier Nat Mon, NM	919	1,274	3,077	11
Rio Grande at Cochiti, NM	303,270	848,489	2,672,162	43
Rio Grande Below Cochiti Dam, NM	323,179	869,484	1,869,283	41
Galisteo C at Domingo, NM	825	5,423	26,352	29
Rio Grande at San Felipe, NM	398,399	946,225	1,968,466	39
Jemez R Bl East Fork Nr Jemez Springs, NM	11,221	24,217	53,574	26
Rio Guadalupe at Box Canyon Near Jemez, NM	18,244	39,601	72,397	14
Jemez River Near Jemez, NM	16,506	46,334	130,748	59
Jemez River Below Jemez Canyon Dam, NM	7,746	39,818	122,930	65
Rio Grande Near Bernalillo, NM	190,910	620,512	2,119,051	27
Rio Puerco Abv Arroyo Chico Nr Guadalupe, NM	464	8,398	32,506	61
Arroyo Chico Nr Guadalupe, NM	1,861	12,597	50,750	49
Bernalillo County				
Campus Wash at Albuquerque, NM	365	582	782	16
N. Floodway Channel at Albuquerque, NM	2,454	5,680	7,674	12
North Floodway Channel Near Alameda, NM	2,823	4,800	10,860	16
Rio Grande Nr Alameda, NM	416,860	813,015	1,455,897	14
Rio Grande at Albuquerque, NM	248,321	857,901	1,841,772	39
San Jose Drain at Woodward Rd at Albq., NM	33	144	466	12
Tijeras Arroyo Nr Albuquerque, NM	41	287	1,991	14
South Div Channel Abv Tijeras Arroyo Nr Albq., NM	115	314	1,238	19
Rio Grande at Isleta Lakes Nr Isleta, NM	292,410	516,044	1,165,587	11
Amole Del Norte Arroyo at Albuquerque, NM	70	236	466	10
Maraposa Div of San Antonio Arr at Albq., NM	17	70	329	12
Valencia County				
Rio Puerco at Rio Puerco, NM	9,267	28,560	175,779	42

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

[d] Located outside region, included to illustrate the water supply entering the region.

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
Santa Fe County													
Rio Grande at Otowi Bridge, NM [d]	43	46,777	47,902	79,199	124,815	206,470	171,277	87,459	59,763	51,517	46,703	52,903	53,785
Sandoval County													
Rito de Los Frijoles in Bandelier Nat Mon, NM	11	75	79	186	325	220	87	121	83	150	79	97	84
Rio Grande at Cochiti, NM	43	39,991	45,942	62,161	115,940	225,447	160,635	65,537	53,079	39,028	35,349	52,116	46,993
Rio Grande Below Cochiti Dam, NM	41	47,639	49,425	71,035	108,625	177,997	155,024	88,937	53,368	40,758	34,875	48,015	52,242
Galisteo C at Domingo, NM	29	17	8	25	174	128	513	1,673	3,099	1,080	548	36	27
Rio Grande at San Felipe, NM	39	50,593	52,045	76,433	117,737	187,581	167,103	97,977	61,686	48,334	42,133	49,972	55,612
Jemez R Bl East Fork Nr Jemez Springs, NM	26	914	1,066	2,797	8,031	4,252	1,285	1,091	1,428	1,164	1,247	1,173	957
Rio Guadalupe at Box Canyon Near Jemez, NM	14	904	1,035	3,637	10,709	12,543	3,709	1,280	1,321	1,106	1,138	1,123	987
Jemez River Near Jemez, NM	59	1,711	1,907	5,436	14,475	13,153	3,500	1,851	2,596	1,930	2,033	2,090	1,747
Jemez River Below Jemez Canyon Dam, NM	65	1,427	1,557	4,079	10,623	11,015	4,091	1,455	2,520	1,374	1,781	1,621	1,269
Rio Grande Near Bernalillo, NM	27	38,716	45,016	48,210	100,147	179,774	135,143	47,249	44,502	20,238	20,448	52,129	47,313
Rio Puerco Abv Arroyo Chico Nr Guadalupe, NM	61	160	613	904	1,067	2,421	772	1,013	1,432	894	473	152	91
Arroyo Chico Nr Guadalupe, NM	49	131	619	637	223	145	252	2,639	5,715	2,425	1,015	159	90

Source: USGS, 2014c

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

USGS = U.S. Geological Survey

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

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

[d] Located outside region, included to illustrate the water supply entering the region.

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
Bernalillo County													
Campus Wash at Albuquerque, NM	16	21	26	40	45	37	49	97	79	72	63	27	27
N. Floodway Channel at Albuquerque, NM	12	221	289	284	352	194	281	895	775	750	691	226	280
North Floodway Channel Near Alameda, NM	16	197	237	365	381	320	400	1,084	1,218	735	744	243	223
Rio Grande Nr Alameda, NM	14	44,641	42,914	70,154	127,365	178,717	144,127	59,331	42,109	32,600	24,754	44,356	53,126
Rio Grande at Albuquerque, NM	39	52,000	52,080	70,844	110,072	176,199	146,553	76,215	44,719	32,753	27,653	50,085	56,724
San Jose Drain at Woodward Rd at Albq., NM	12	5	7	3	13	10	12	35	44	38	24	9	5
Tijeras Arroyo Nr Albuquerque, NM	14	9	19	10	20	6	21	120	127	70	47	8	7
South Div Channel Abv Tijeras Arroyo Nr Albq., NM	19	10	14	18	29	16	24	123	90	67	48	27	12
Rio Grande at Isleta Lakes Nr Isleta, NM	11	36,093	36,267	54,561	89,116	133,899	89,712	36,510	29,586	21,957	19,935	33,506	41,997
Amole del Norte Arroyo at Albuquerque, NM	10	5	5	10	19	16	18	53	39	24	24	8	12
Maraposa Div of San Antonio Arr at Albq., NM	12	2	3	5	9	1	1	11	21	22	14	3	3
Valencia County													
Rio Puerco at Rio Puerco, NM	42	239	1,052	1,487	1,028	3,209	1,160	5,179	15,947	7,551	3,873	345	69

Source: USGS, 2014c

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

USGS = U.S. Geological Survey

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

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

For this water planning update, five stream gages, shown on Figure 5-7, 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. The Otowi gage is upstream of the Middle Rio Grande planning region, but it is representative of the flow coming into the region. Figure 5-8 shows the minimum and median annual water yield for these gages. Figures 5-9a through 5-9c show the annual water yield from the beginning of the period of record through 2013 for the five gages. As shown in these figures, the annual yield is highly variable in all locations, but especially in the Rio Puerco and Jemez River, where flows are not moderated by upstream reservoir releases or supplemented with non-native water. The Rio Grande at Otowi flows shown on Figures 5-8 and 5-9a include non-native flows from the San Juan-Chama Project.

Though there are several reservoirs that store water supply for Middle Rio Grande users, only two large reservoirs (i.e., storage capacity greater than 5,000 acre-feet, as reported in the *New Mexico Water Use by Categories 2010* report [Longworth et al., 2013]) are present in the planning region (Figure 5-7). Cochiti Reservoir's primary purpose is flood control and the Jemez Canyon Dam is for flood and sediment control; neither are authorized for conservation storage. Table 5-6 summarizes the characteristics of these two reservoirs as well as the upstream reservoirs (Heron, El Vado, and Abiquiu) that provide native and San Juan-Chama Project water to the Middle Rio Grande. As indicated on Table 5-6, El Vado provides water supply storage to the MRGCD and others, and Heron provides storage for the San Juan-Chama project. In addition to these large reservoirs, one smaller reservoir (Galisteo Reservoir on Galisteo Creek) is present in the planning region. Galisteo Reservoir is a flood control reservoir owned and operated by the U.S. Army Corps of Engineers and is not authorized for conservation storage.

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. Many of the dams listed on Table 5-7 are flood control dams so don't affect the water supply balance in the region significantly, but they do represent safety hazards.

5.3 Groundwater Resources

Groundwater accounted for about 30 percent of all water diversions in the region in the year 2010 (Longworth et al., 2013). It supplies most of the region's small drinking water systems and provides back up supply to the ABCWUA when surface water cannot be diverted while at other times significantly augmenting supplies even when ABCWUA is diverting surface water. In 2016, about 70 percent of water demand was provided from the San Juan-Chama Drinking Water Project (DWP) and 30 percent from groundwater (ABCWUA 2016).

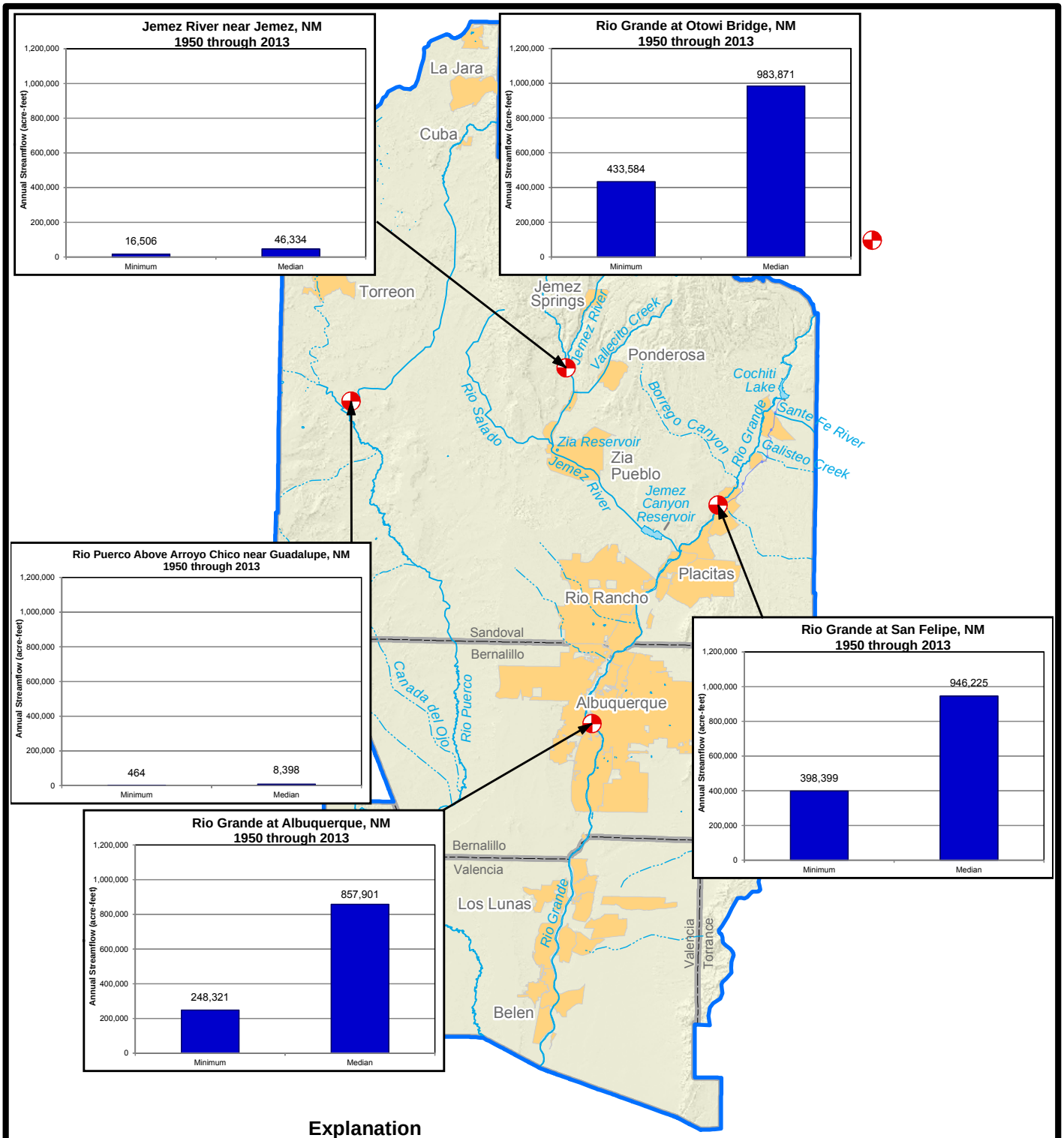

Figure 5-8

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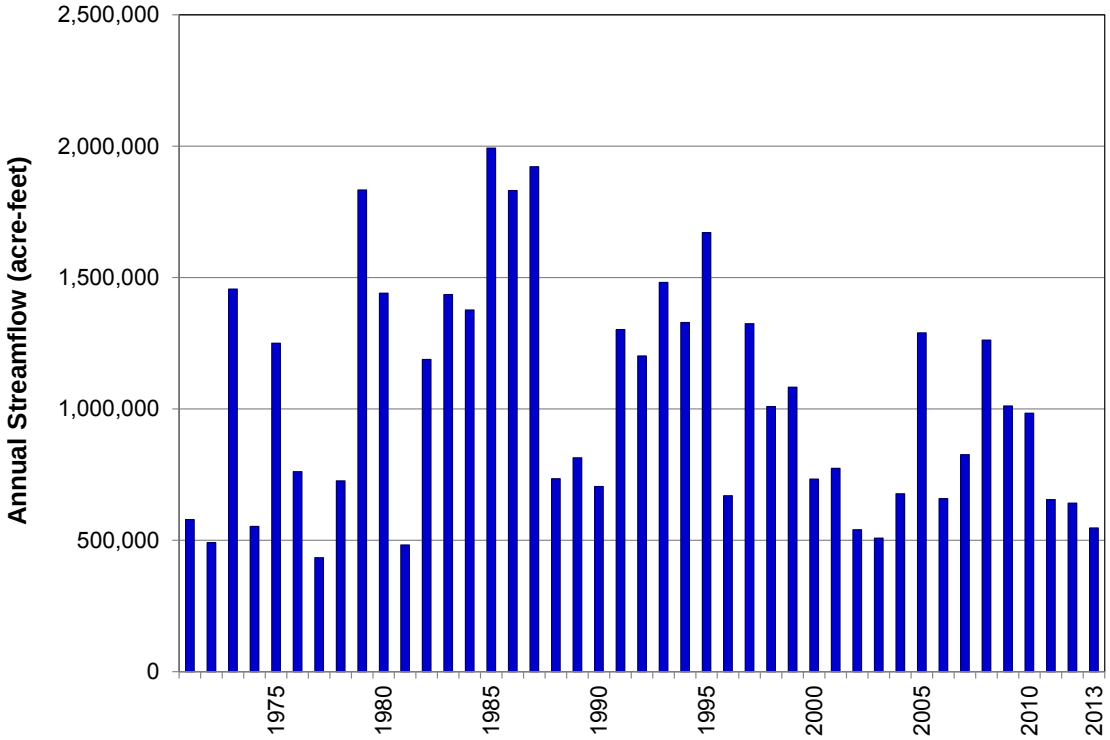
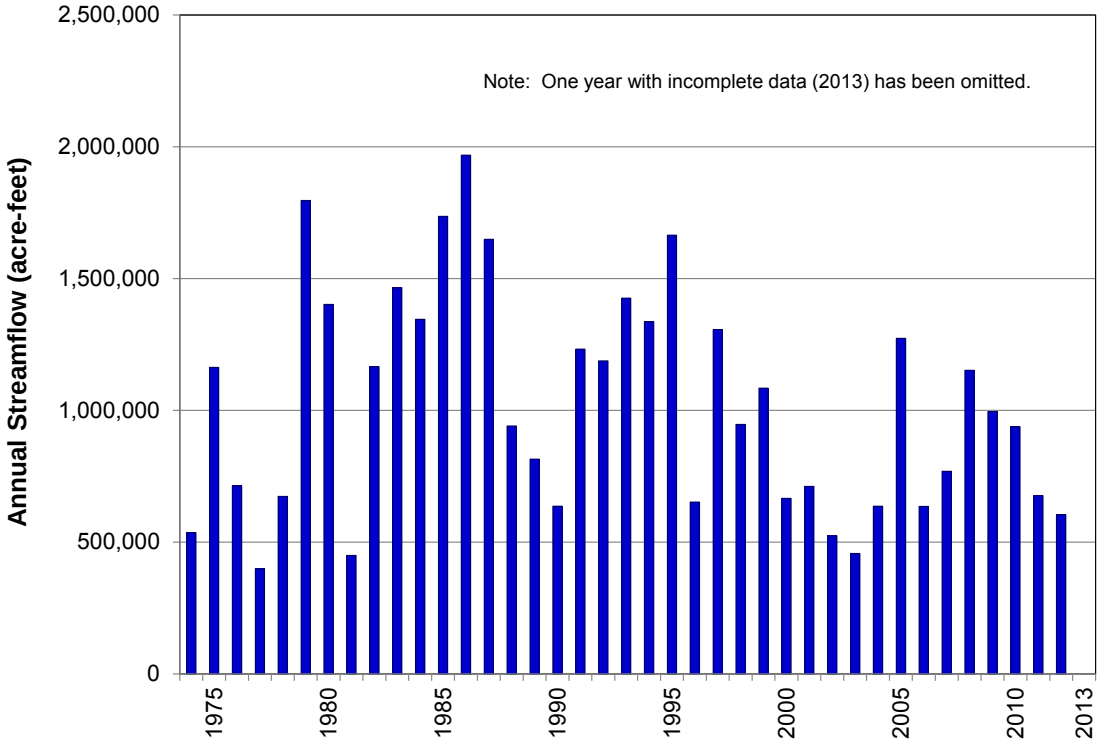
Rio Grande at Otowi Bridge, NM



Rio Grande at San Felipe, NM



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Annual Streamflow for Selected Gaging Stations on the Rio Grande

Figure 5-9a

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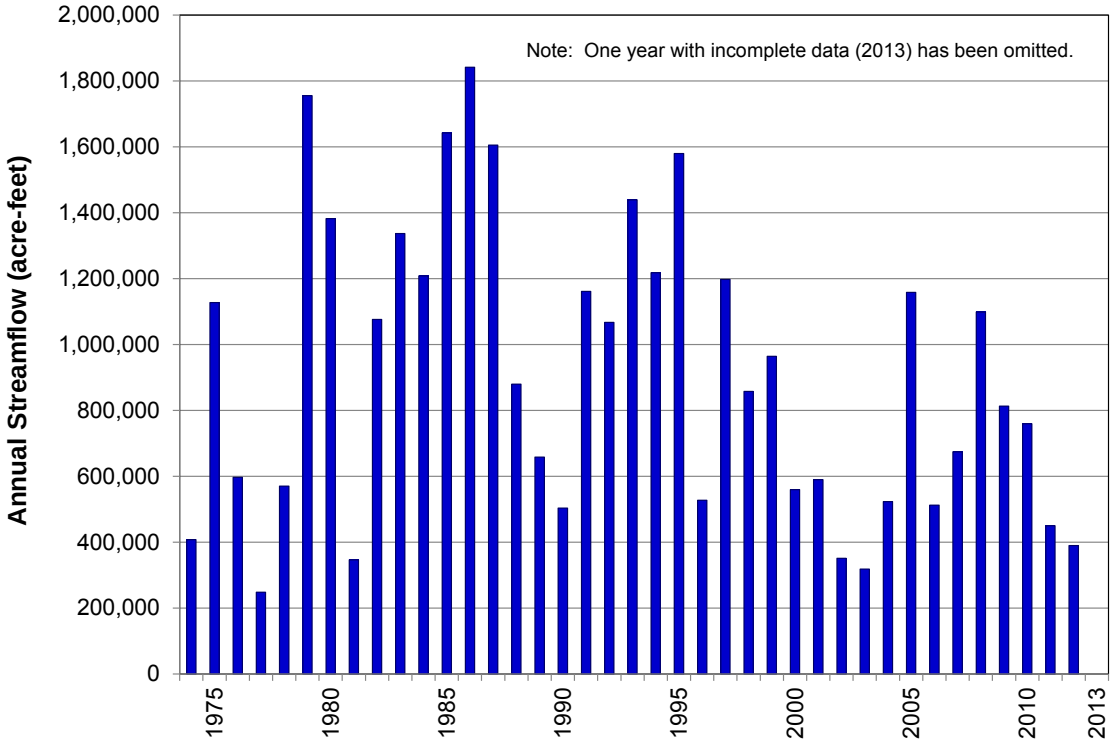
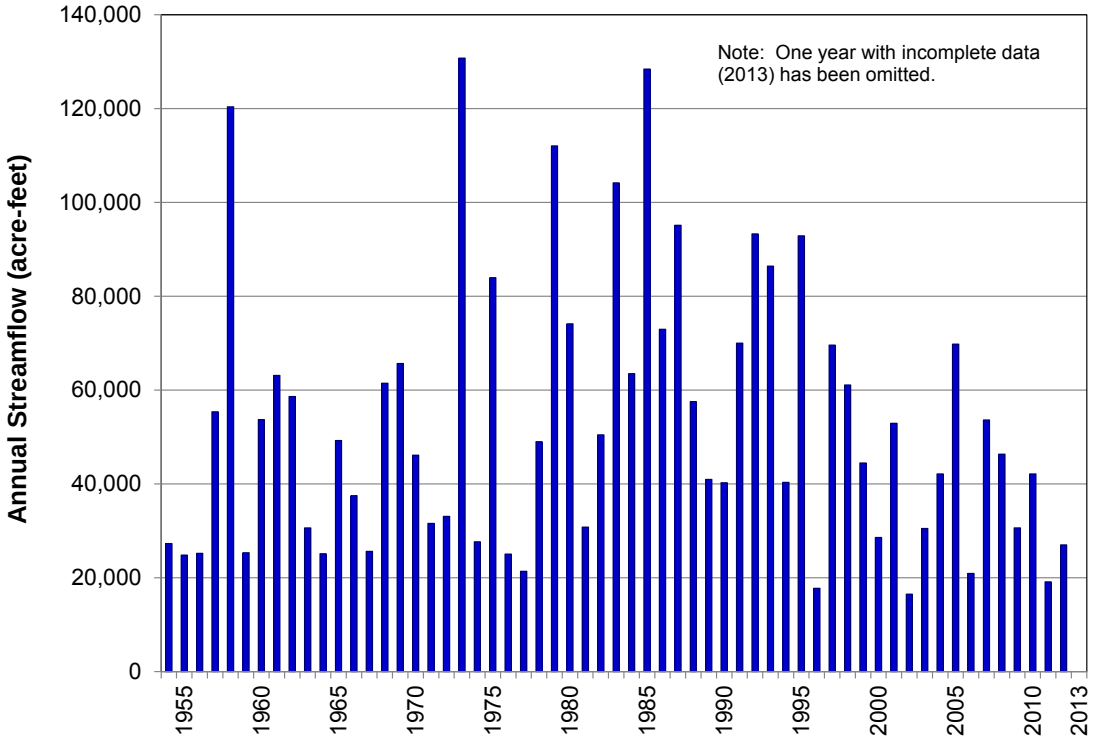
Rio Grande at Albuquerque, NM



Jemez River near Jemez, NM



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Annual Streamflow for Selected Gaging Stations on the Rio Grande and Jemez River

Figure 5-9b

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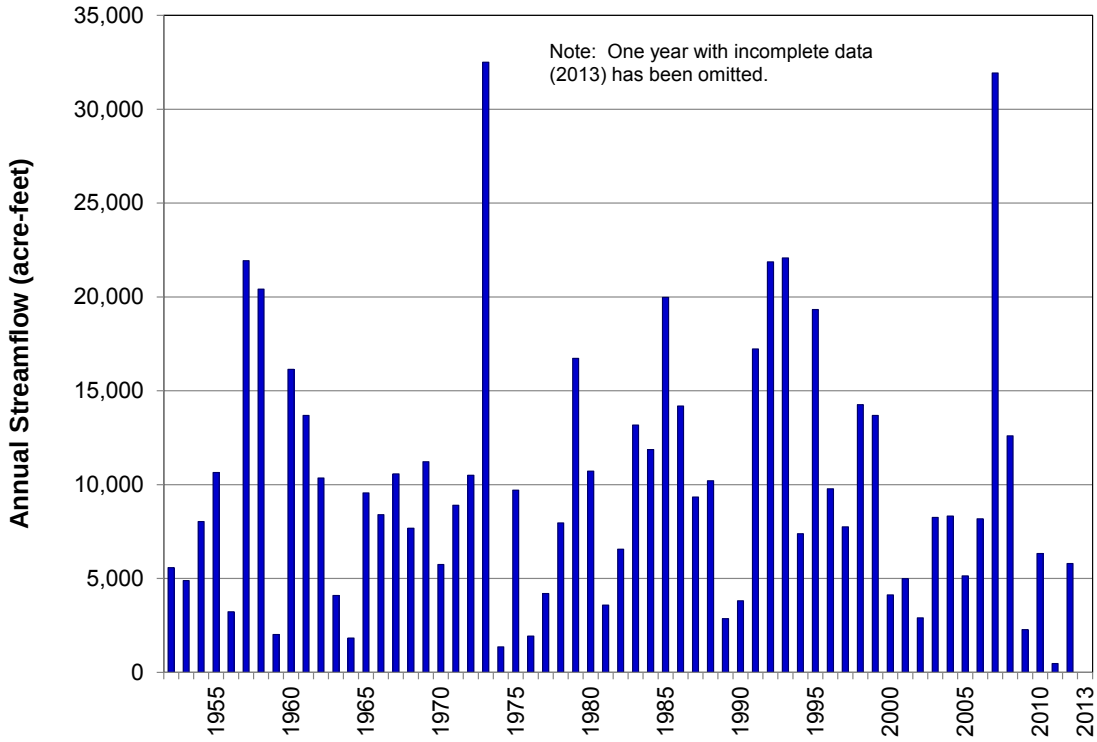
Rio Puerco above Arroyo Chico near Guadalupe, NM



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Annual Streamflow for Selected Gaging Station on the Rio Puerco

Figure 5-9c

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Table 5-6. Reservoirs and Lakes (greater than 5,000 acre-feet) in and Supplying the Middle Rio Grande Water Planning Region

River	Reservoir	Primary Purpose	Operator	Date Completed	Total Authorized Conservation Storage Capacity (acre-feet)	Surface Area [b] (acres)	Dam Height (feet)	Dam Length (feet)
Rio Arriba County [a]								
Willow Creek/ Rio Chama	Heron Dam	Irrigation M&I (storage for SJCP)	Bureau of Reclamation	1970	401,000	5,901	269	1,220
Rio Chama	El Vado Reservoir	Irrigation (for MRGCD)	Bureau of Reclamation	1934	180,000	3,100	230	1,326
	Abiquiu Dam	Flood control	U.S. Army Corps of Engineers	1963	200,000	4,224	354	1,800
Sandoval County								
Rio Grande	Cochiti Lake	Flood control Recreation	U.S. Army Corp of Engineers	1975	50,000 [c]	1,200	251	29,000
Jemez River	Jemez Canyon Reservoir (DRY)	Flood control	U.S. Army Corp of Engineers	1953	0	0	149	870

Sources: USACE, 1999

[a] Reservoirs are upstream of Middle Rio Grande region, but are included because of their relevance to the region.

[b] Surface area at maximum authorized conservation storage.

[c] Authorized Cochiti storage is for a permanent recreation pool of 1,200 surface acres. There is no conservation storage authorized for Cochiti Lake.

M&I = Municipal and industrial
SJCP = San Juan-Chama Project
MRGCD = Middle Rio Grande Conservancy District

Table 5-7. Dams with Dam Safety Deficiency Rankings

Page 1 of 2

Dam	Condition Assessment [a]	Deficiency	Hazard Potential [b]	Estimated Cost to Repair ($)
Sandoval County				
Fenton Lake Dam	Fair	Spillway capacity 38% of required flood	High	5,000,000
		Woody vegetation		
		Erosion		
Hatch Reservoir Dam	Poor	Spillway capacity 1% of required flood	Significant	3,000,000
		Woody vegetation		
		Altered spillway		
Lower Vallecito Dam	Poor	Spillway capacity 1% of required flood	High	4,500,000
		Spillway deteriorated		
		Woody vegetation		
Bernalillo County				
Amole Del Norte Detention Dam	Fair	Spillway capacity 50% of required flood	High	2,000,000
Arroyo Del Oso Detention Dam	Fair	Upstream slope erosion	High	30,000
Black Arroyo Detention Dam	Fair	Spillway capacity 50% of required flood	High	2,000,000
Embudo Dam	Fair	Spillway capacity 68% of required flood	High	50,000
Ladera Dam No. 10	Fair	Spillway obstructed by development	High	400,000
Ladera Dam No. 12	Fair	Ladera 10 impacts Ladera 12	High	400,000
Ladera Dam No. 14	Fair	Ladera 10 impacts Ladera 14	High	400,000
Ladera Dam No. 15	Fair	Ladera 10 impacts Ladera 15	High	400,000
Las Ventanas Detention Dam	Fair	Spillway capacity 50% of required flood	High	2,000,000
Mariposa Dam	Poor	Spillway capacity <10% required, additional documentation needed	High	50,000
Swinburne Dam	Fair	Spillway capacity 50% of required flood	High	250,000
Valencia County				
Houston Arroyo Dam	Poor	Spillway capacity 17% of PMF	High	2,500,000
		Outlet conduit prone to clogging		
		Lack of documentation		

Source: NMOSE, 2014b

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

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

PMP = Probable maximum precipitation

Table 5-7. Dams with Dam Safety Deficiency Rankings
Page 2 of 2

[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.

5.3.1 Regional Hydrogeology

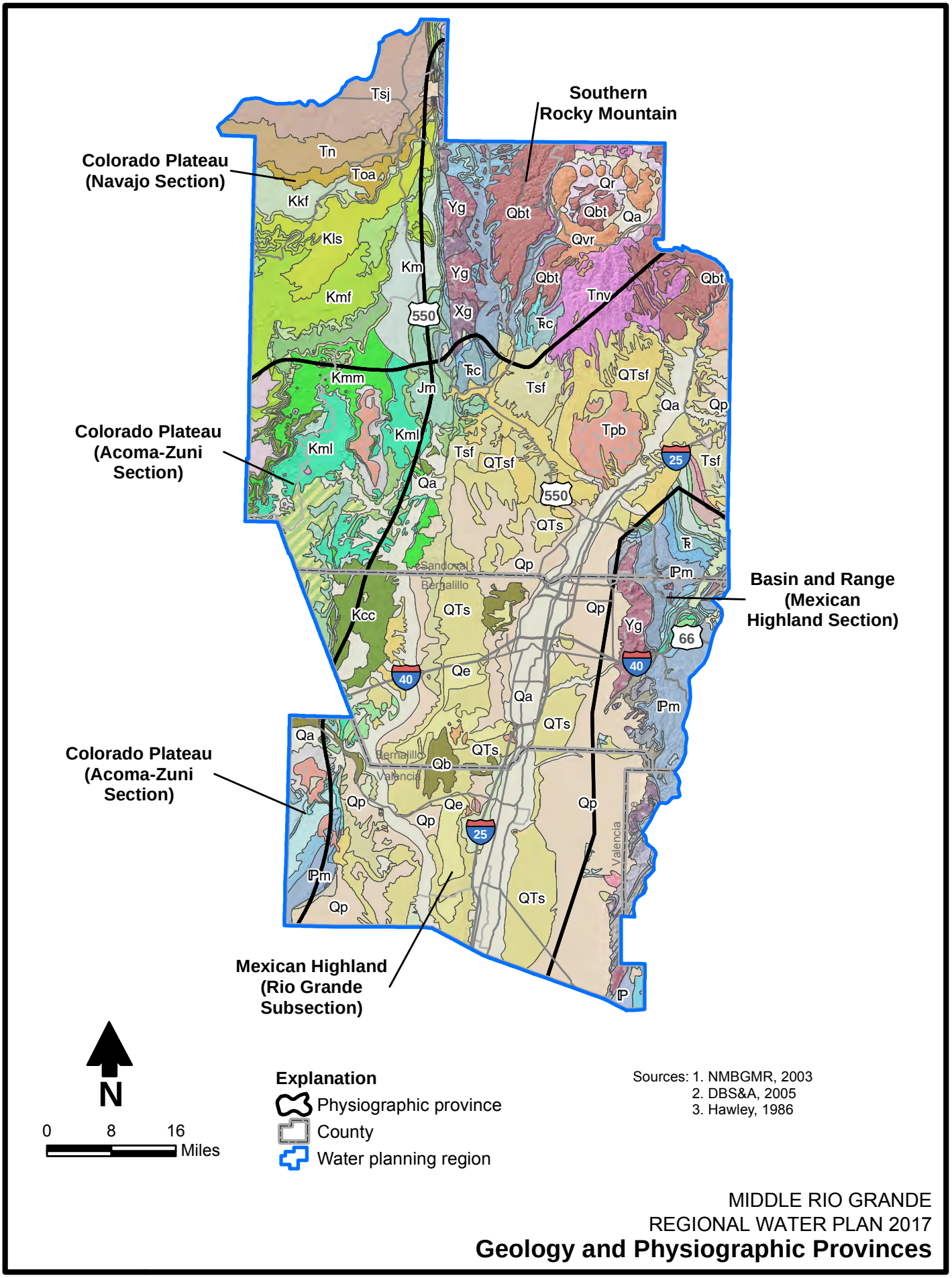
The accepted *Middle Rio Grande Regional Water Plan, 2000-2050* (MRCOG and MRGWA, 2004), did not independently investigate or describe the hydrogeology of the region, but abstracts to relevant publications (Thorn et al., 1993; McAda and Barroll, 2002; Bartolino and Cole, 2002; MRCOG and MRGWA, 2001; MRGWA and MRCOG, 2000; SSP&A, 2000; JSAI and Pioneer West, 2000; NMOSE/NMISC, 2002; Niemi and McGuckin, 1997; Scurlock, 1998) were included as an appendix. 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. As shown on this figure, portions of six physiographic regions exist within the planning region.

The Albuquerque-Belen portion of the Middle Rio Grande Basin, a north-south trending basin in the Rio Grande rift, is the primary groundwater supply in the region. The basin is bound on the north by Cochiti Pueblo, on the south by San Acacia, on the east by the Sandia and Manzano Mountains, and on the west by Llano de Albuquerque or West Mesa. Sediments that have accumulated in this basin are part of the Santa Fe Group (Hansen and Gorbach, 1997). Only the upper part is an important aquifer, and this saturated portion of the upper Santa Fe Group rarely exceeds 1,000 feet (Hansen and Gorbach, 1997). The Santa Fe Group sediments adjacent to the Rio Grande are overlain by 60 to 80 feet of valley-fill sediments, referred to as alluvium or post-Santa Fe fill (Hansen and Gorbach, 1997). Groundwater is transmitted readily through the alluvium and the upper portion of the Santa Fe Group. The most productive lithologies are the fluvial axial channel deposits of the ancestral Rio Grande and, to a lesser extent, the pediment slope and alluvial-fan deposits (Thorn et al., 1993).

Outside of the Albuquerque-Belen basin, groundwater supplies are more limited. Volcanic and alluvial deposits supply small amounts of groundwater in the Jemez Mountains, and sandstone and limestone supply domestic wells and small water systems in the East Mountain area.

5.3.2 Aquifer Conditions

Water enters the Santa Fe Group aquifer system from four main settings: mountain fronts and tributaries to the Rio Grande, the inner valley of the Rio Grande, the Rio Grande, and subsurface basin margins. Water entering the aquifer from the first three settings is usually termed recharge, whereas water entering the basin from the subsurface is typically termed underflow. Groundwater discharges from the Santa Fe Group aquifer system in several ways: pumping from wells, seepage into the Rio Grande and riverside drains, spring flow, evapotranspiration, and subsurface outflow to the Socorro Basin (Bartolino and Cole, 2002).



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MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Geology and Physiographic Provinces

Figure 5-10a

Source: NMBGMR, 2003

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Geology Explanation

Figure 5-10b

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In order to evaluate changes in water levels over time, the USGS monitors groundwater wells throughout New Mexico (Figure 5-11). Hydrographs illustrating groundwater levels versus time, as compiled by the USGS (2014b), were selected for seven monitor wells with longer periods of record and are shown on Figure 5-12. A number of wells in the Albuquerque Basin showed significant declines, but there has been substantial recovery since 2010, when pumping was replaced by diversion of San Juan-Chama Project water from the river (Figure 5-12). Monitoring wells closest to pumping wells that have reduced pumping show recovery, while wells in other parts of the basin are not affected and continue to decline. There are a large number of shallow domestic and agricultural wells located throughout the region.

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

- The ABCWUA, Rio Rancho, and Belen all have well fields that pump from Santa Fe Group sediments in the Albuquerque-Belen portion of the Middle Rio Grande Basin. The ABCWUA well fields are by far the largest producers of the three.

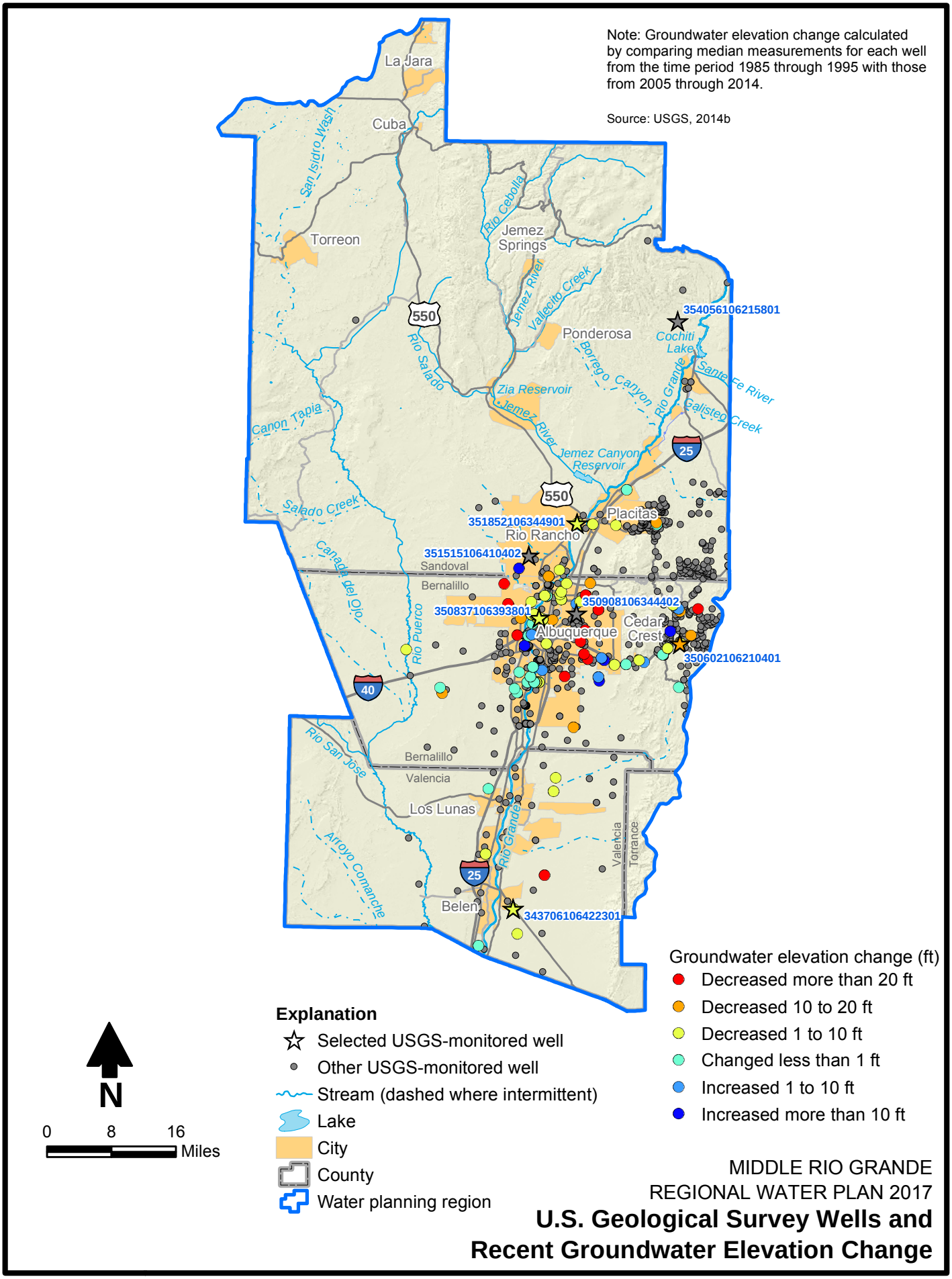
- Smaller communities including Algodones, Bernalillo, San Ysidro, Corrales, Los Lunas, and Bosque Farms also pump from the Albuquerque-Belen portion of the Middle Rio Grande Basin.

- Small systems in the East Mountain area pump from fractured limestone and sandstone units.

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 2004 RWP 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 Middle Rio Grande Water Planning Region is evaluated through periodic monitoring and comparison of sample results to pertinent water quality standards. Several reaches of rivers within the planning 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).



MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

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

Figure 5-11

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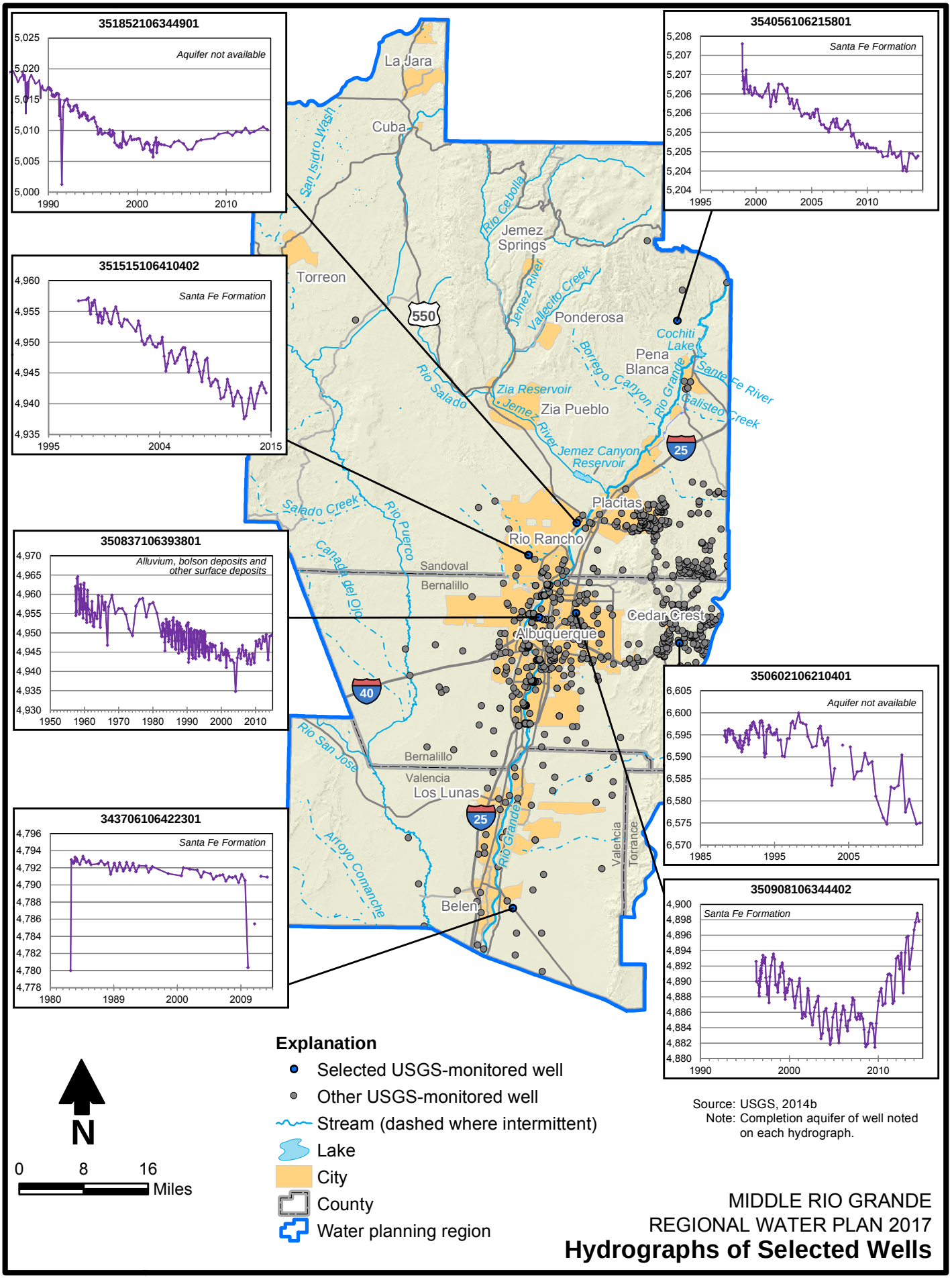
351852106344901
Aquifer not available
5,025
5,020
5,015
5,010
5,005
5,000
1990
2000
2010
354056106215801
Santa Fe Formation
5,208
5,207
5,207
5,206
5,206
5,205
5,205
5,204
5,204
1995
2000
2005
2010
351515106410402
Santa Fe Formation
4,960
4,955
4,950
4,945
4,940
4,935
1995
2004
2015
350837106393801
Alluvium, bolson deposits and other surface deposits
4,970
4,965
4,960
4,955
4,950
4,945
4,940
4,935
4,930
1950
1960
1970
1980
1990
2000
2010
343706106422301
Santa Fe Formation
4,796
4,794
4,792
4,790
4,788
4,786
4,784
4,782
4,780
4,778
1980
1989
2000
2009
350602106210401
Aquifer not available
6,605
6,600
6,595
6,590
6,585
6,580
6,575
6,570
1985
1995
2005
350908106344402
Santa Fe Formation
4,900
4,898
4,896
4,894
4,892
4,890
4,888
4,886
4,884
4,882
4,880
1990
2000
2010
La Jara
Cuba
San Isidro Wash
Rio Cebolla
Jemez Springs
Jemez River
Vallecito Creek
Torreon
550
Ponderosa
Cochiti Lake
Pena Blanca
Borrego Canyon
Rio Grande
Santa Fe River
Calisteo Creek
Rio Salado
Zia Reservoir
Jemez River
Zia Pueblo
Jemez Canyon Reservoir
25
Placitas
Salado Creek
Rio Puerco
Rio Rancho
Canada del Ojo
Sandoval
Bernalillo
Cedar Crest
Albuquerque
40
Rio San Jose
Bernalillo
Valencia
Los Lunas
25
Rio Grande
Valencia
Torrance
Arroyo Comanche
Belen
Explanation
Selected USGS-monitored well
Other USGS-monitored well
Stream (dashed where intermittent)
Lake
City
County
Water planning region
N
0
8
16
Miles
Source: USGS, 2014b
Note: Completion aquifer of well noted on each hydrograph.
MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017
Hydrographs of Selected Wells
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Figure 5-12

Section 303(d) further requires the states to prioritize their listed waters for development of total maximum daily load (TMDL) management plans, which document the amount of a pollutant a waterbody can assimilate without violating a state water quality standard and allocates that load capacity to known point sources and nonpoint sources at a given flow. Figure 5-13 shows the locations of lakes and stream reaches included in the 303(d) list. Table 5-8 provides details of impairment for those reaches. Common causes of impairment in the in the Middle Rio Grande region include aluminum, *E. coli* bacteria, sediment/turbidity, temperature, and biological indicators and nutrients. Some locations also showed elevated arsenic, boron, mercury, polychlorinated biphenyls (PCBs), and gross alpha.

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 good, but there are areas with naturally occurring elevated arsenic and uranium and isolated areas that have been contaminated by manmade sources as well. One particular concern in the Middle Rio Grande region is the Kirtland Air Force Base jet fuel spill that has affected the regional aquifer in the Albuquerque area. The project is part of the Resource Conservation and Recovery Act (RCRA) with oversight from NMED (2015c).

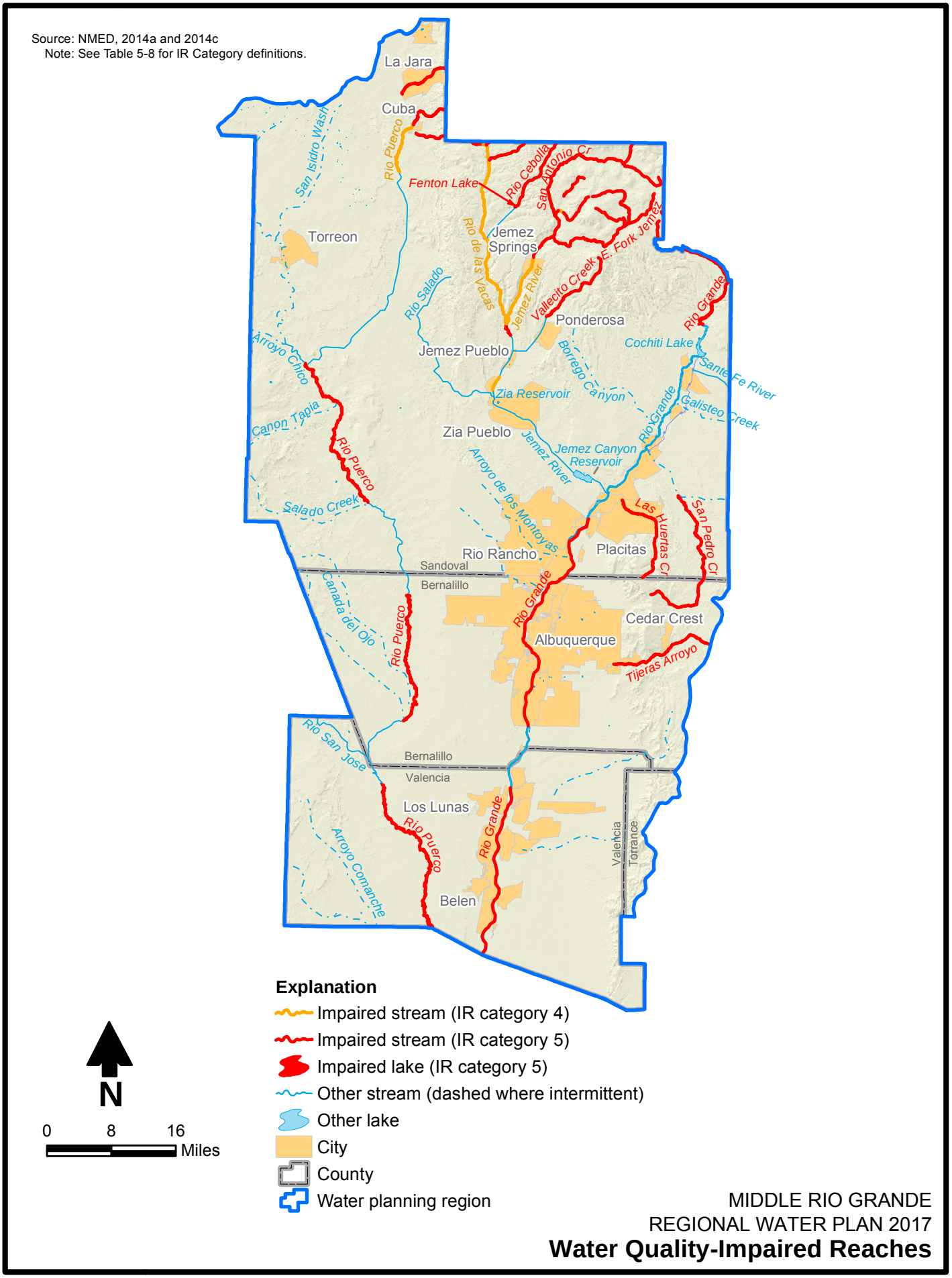
Specific types and sources of contaminants that have the potential to impact either surface or groundwater quality are discussed below. Sources of contamination are considered as one of two types: (1) point sources, if they originate from a single location, or (2) nonpoint sources, if they originate 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.



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MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Water Quality-Impaired Reaches

Figure 5-13

Table 5-8. Total Maximum Daily Load Status of Streams in the Middle Rio Grande 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]
Sandoval County						
Alamo Canyon (Rio Grande to headwaters)	NM-2118.A_71	14.65	Not assessed	—	—	3/3A
American Creek (Rio de las Palomas to headwaters)	NM-2106.A_44	4.8	Not assessed	—	—	3/3A
Arroyo Chico (Rio Puerco to San Isidro Arroyo)	NM-98.A_016	32.46	Not assessed	—	—	3/3A
Arroyo San Jose (Rio Puerco to La Jara Creek)	NM-2107.A_39	6.15	Not assessed	—	—	3/3A
Canon de Valle (upper LANL bnd to headwaters)	NM-9000.A_051	3.56	Source unknown	MWWAL LW	Aluminum Gross alpha PCB in water column	5/5C
Canon del Piojo S Fk (main cny to ranch pond)	NM-97.A_016	1.2	Not assessed	—	—	3/3A
Clear Creek (Rio de las Vacas to San Gregorio Lake)	NM-2106.A_54	5.14	Source unknown	HQColdWAL	Benthic-macroinvertebrate bioassessments	5/5C
East Fork Jemez (San Antonio Creek to VCNP bnd)	NM-2106.A_13	10.39	Source unknown	HQColdWAL	Aluminum Arsenic Temperature, water	5/5B
East Fork Jemez (VCNP to headwaters)	NM-2106.A_10	8.66	Source unknown Recreational pollution sources Silviculture harvesting Wildlife other than waterfowl Rangeland grazing Streambank modifications/destabilization	HQColdWAL	Aluminum Oxygen, dissolved Temperature, water Turbidity pH	5/5C
Fenton Lake	NM-2106.B_00	23.81 [e]	Source unknown	HQColdWAL	Nutrient/eutrophication Biological indicators	5/5C

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] Explanation of uses abbreviations provided at the end of this table

[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 Middle Rio Grande 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]
Sandoval County (cont.)						
Jaramillo Creek (East Fork Jemez to headwaters)	NM-2106.A_12	10.03	Source unknown Wildlife other than waterfowl Road/bridge runoff Natural sources Rangeland grazing Streambank modifications/destabilization	HQColdWAL	Aluminum Temperature, water Turbidity	5/5C
Jemez River (Jemez Pueblo bnd to Rio Guadalupe)	NM-2105_71	1.87	Source unknown	ColdWAL IRR	Aluminum Arsenic Boron Oxygen, dissolved Turbidity	5/5B
Jemez River (Rio Guadalupe to Soda Dam nr Jemez Springs)	NM-2105.5_10	9.62	Site clearance (new development or infill) On-site treatment systems (septic) Recreational pollution sources Loss of riparian habitat Road/bridge runoff Natural sources Rangeland grazing Streambank modifications/destabilization	ColdWAL IRR	Aluminum Arsenic Boron Nutrient/eutrophication Biological indicators Temperature, water Turbidity	4A
Jemez River (Soda Dam nr Jemez Springs to East Fork)	NM-2106.A_00	3.81	Site clearance (new development or infill) Source unknown Recreational pollution sources Loss of riparian habitat Road/bridge runoff Natural sources Rangeland grazing Streambank modifications/destabilization	HQColdWAL DWS	Aluminum Arsenic Arsenic Temperature, water Turbidity pH	5/5B

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] Explanation of uses abbreviations provided at the end of this table

[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 Middle Rio Grande 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]
Sandoval County (cont.)						
Jemez River (Zia Pueblo bnd to Jemez Pueblos bnd)	NM-2105_75	1.86	Source unknown Natural sources	MWWAL IRR	Arsenic Boron	4A
La Jara Creek (East Fork Jemez to headwaters)	NM-2106.A_11	5.33	Source unknown	HQColdWAL	Aluminum	5/5B
La Jara Creek (Perennial reaches abv Arroyo San Jose)	NM-2107.A_46	9.86	Source unknown	ColdWAL	Aluminum, Acute Aluminum, Chronic	5/5A
Las Huertas Ck (Perennial prt Santa Ana Pueblo bnd to hws)	NM-2108.5_00	14.06	Source unknown	HQColdWAL	Nutrient/eutrophication Biological indicators Turbidity	5/5C
Lummis Canyon (Upper Trail to headwaters)	NM-97.A_001	8.28	Not assessed	—	—	3/3B
Nacimiento Ck (Perennial prt HWY 126 to San Gregorio Rsvr)	NM-2107.A_42	6.77	Source unknown	DWS ColdWAL	Aluminum, acute Turbidity Uranium	5/5A
Nacimiento Creek (Rio Puerco to HWY 126)	NM-2107.A_47	2.06	Not assessed	—	—	3/3A
Redondo Creek (Sulphur Creek to VCNP bnd)	NM-2106.A_21	0.73	Loss of riparian habitat Road/bridge runoff Rangeland grazing	HQColdWAL	Turbidity	4A
Redondo Creek (VCNP bnd to headwaters)	NM-2106.A_25	5.28	Source unknown Loss of riparian habitat Road/bridge runoff Rangeland grazing	HQColdWAL	Aluminum Temperature, water Turbidity	5/5C

Source: NMED, 2014a

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[b] Unless otherwise noted.

[c] Explanation of uses abbreviations provided at the end of this table

[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 Middle Rio Grande 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]
Sandoval County (cont.)						
Rio Cebolla (Fenton Lake to headwaters)	NM-2106.A_52	14.63	Source unknown Recreational pollution sources Aquaculture (permitted) Road/bridge runoff Rangeland grazing	HQColdWAL	Aluminum Sedimentation/siltation Turbidity	5/5B
Rio Chiquito (Cochiti Pueblo bnd to headwaters)	NM-9000.A_041	3.29	Not assessed	—	—	3/3A
Rio de las Vacas (Clear Creek to headwaters)	NM-2106.A_46	10.34	Source unknown	HQColdWAL	Aluminum	5/5B
Rio de las Vacas (Rio Cebolla to Clear Creek)	NM-2106.A_40	14.35	Loss of riparian habitat Rangeland grazing Streambank modifications/destabilization	HQColdWAL	Nutrient/eutrophication Biological indicators Temperature, water	4A
Rio Grande (Cochiti Reservoir to San Ildefonso bnd)	NM-2111_00	22.68	Source unknown	WWAL PC LW MCWAL	Escherichia coli Gross alpha PCB in fish tissue PCB in water column Turbidity	5/5C
Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	NM-2105.1_00	11.66	Municipal point source discharges Waterfowl On-site treatment systems (septic) Source unknown Wastes from pets Municipal (high density area) Impervious surface/parking lot runoff	MWWAL LW WH PC	Ambient bioassays -- Acute aquatic toxicity Escherichia coli Gross lpha Oxygen, dissolved PCB in fish tissue PCB in water column	5/5C
Rio Guadalupe (Jemez River to confl with Rio Cebolla)	NM-2106.A_30	12.6	Loss of riparian habitat Natural sources	HQColdWAL	Aluminum Temperature, water	4A

Source: NMED, 2014a

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[b] Unless otherwise noted.

[c] Explanation of uses abbreviations provided at the end of this table

[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 Middle Rio Grande 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]
Sandoval County (cont.)						
Rio Puerco (Arroyo Chijuilla to northern bnd Cuba)	NM-2107.A_40	8.46	Channelization Wildlife other than waterfowl Drought-related impacts Loss of riparian habitat Road/bridge runoff Natural sources Rangeland grazing Streambank modifications/destabilization	WWAL	Aluminum Ammonia (un-ionized) Nutrient/eutrophication Biological indicators Sedimentation/siltation	4A
Rio Puerco (non-pueblo Rio Grande to Arroyo Chico)	NM-2105_20	106.58	Source unknown	PC WH	Escherichia coli Mercury	5/5C
Rio Puerco (Perennial prt northern bnd Cuba to headwaters)	NM-2107.A_44	14.48	Source unknown	ColdWAL	Sedimentation/siltation	5/5A
Rito de las Palomas (Rio de las Vacas to headwaters)	NM-2106.A_43	5.58	Source unknown Loss of riparian habitat Road/bridge runoff Rangeland grazing Streambank modifications/destabilization	HQColdWAL	Sedimentation/siltation Temperature, water Turbidity	5/5A
Rito de los Frijoles (Rio Grande to Upper Crossing)	NM-2118.A_70	7.99	Source unknown	HQColdWAL	Aluminum DDT	5/5A
Rito de los Frijoles (Upper Crossing to headwaters)	NM-2118.A_74	6.01	Source unknown	HQColdWAL	Aluminum	5/5A
Rito de los Indios (San Antonio Creek to headwaters)	NM-2106.A_24	4.47	Source unknown	HQColdWAL	Aluminum	5/5C
Rito de los Pinos (Arroyo San Jose to headwaters)	NM-2107.A_45	8.78	Not assessed	—	—	3/3A

Source: NMED, 2014a

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[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 Middle Rio Grande 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]
Sandoval County (cont.)						
Rito Penas Negras (Rio de las Vacas to headwaters)	NM-2106.A_42	11.8	Source unknown Loss of riparian habitat Road/bridge runoff Rangeland grazing Streambank modifications/destabilization	HQColdWAL	Nutrient/eutrophication Biological indicators Sedimentation/siltation Temperature, water Turbidity	5/5C
San Antonio Creek (East Fork Jemez to VCNP bnd)	NM-2106.A_20	11.19	Site clearance (new development or infill) Forest roads (road construction and use) Source unknown Recreational pollution sources Loss of riparian habitat Natural sources Rangeland grazing Streambank modifications/destabilization	DWS HQColdWAL	Aluminum Arsenic Temperature, water Turbidity	5/5B
San Antonio Creek (VCNP bnd to headwaters)	NM-2106.A_26	15.93	Site clearance (new development or infill) Forest roads (road construction and use) Source unknown Recreational pollution sources Loss of riparian habitat Rangeland grazing Streambank modifications/destabilization	HQColdWAL	Oxygen, dissolved Temperature, water pH	5/5C
San Miguel Arroyo (San Pablo Canyon to headwaters)	NM-2107.A_51	9.61	Not assessed	—	—	3/3A
San Pedro Creek (San Felipe bnd to headwaters)	NM-9000.A_004	24.62	Source unknown	ColdWAL	Benthic-macroinvertebrate bioassessments	5/5C
Sulphur Creek (Redondo Creek to VCNP bnd)	NM-2106.A_22	2.03	Not assessed	—	—	3/3A

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] Explanation of uses abbreviations provided at the end of this table

[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 Middle Rio Grande 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]
Sandoval County (cont.)						
Sulphur Creek (San Antonio Creek to Redondo Creek)	NM-2106.A_27	0.81	Source unknown	HQColdWAL	Aluminum Turbidity	5/5B
Sulphur Creek (VCNP to headwaters)	NM-2106.A_23	4	Source unknown	LAL	Aluminum	5/5B
Unnamed tributary (Canon del Piojo S Fk to mine outfall)	NM-97.A_017	1.2	Not assessed	—	—	3/3A
Vallecito Ck (Jemez Pueblo bnd to Div abv Ponderosa)	NM-2105.5_20	3.03	Not assessed	—	—	3/3A
Vallecito Ck (Perennial Prt Div abv Ponderosa to headwaters)	NM-2105.5_21	11.74	Source unknown	ColdWAL	Aluminum Turbidity	5/5B
Virgin Canyon (Rio Guadalupe to headwaters)	NM-2106.A_31	13.1	Not assessed	—	—	3/3A
Bernalillo County						
Conservancy Park Lake	NM-9000.B_032	15 [e]	Not assessed	—	—	3/3A
Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	NM-2105_50	19.9	Municipal point source discharges Waterfowl On-site treatment systems (septic) Source unknown Wastes from pets Municipal (high density area) Impervious surface/parking lot runoff	MWWAL PC	Escherichia coli Oxygen, dssolved PCB in fish tissue Temperature, water	5/5A

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] Explanation of uses abbreviations provided at the end of this table

[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 Middle Rio Grande 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]
Bernalillo County (cont.)						
Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	NM-2105.1_00	11.66	Municipal point source discharges Waterfowl On-site treatment systems (septic) Source unknown Wastes from pets Municipal (high density area) Impervious surface/parking lot runoff	MWWAL LW WH PC	Ambient bioassays -- Acute aquatic toxicity Escherichia coli Gross alpha Oxygen, dissolved PCB in fish tissue PCB in water column	5/5C
Rio Puerco (non-pueblo Rio Grande to Arroyo Chico)	NM-2105_20	106.58	Source unknown	PC WH	Escherichia coli Mercury	5/5C
San Pedro Creek (San Felipe bnd to headwaters)	NM-9000.A_004	24.62	Source unknown	ColdWAL	Benthic-macroinvertebrate bioassessments	5/5C
Tijeras Arroyo (Four Hills Bridge to headwaters)	NM-9000.A_001	15	Source unknown	WWAL	Benthic-macroinvertebrate bioassessments Nutrient/eutrophication Biological indicators	5/5C
Tijeras Arroyo (Rio Grande to Four Hills Bridge)	NM-9000.A_070	11.49	Not assessed	—	—	3/3A
Unnamed tributary (div channel to Fire Academy outfall)	NM-97.A_014	0.6	Not assessed	—	—	3/3A
Unnamed tributary (San Pedro Cr to PAAKO outfall)	NM-97.A_013	0.8	Not assessed	—	—	3/3A

Source: NMED, 2014a

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

[b] Unless otherwise noted.

[c] Explanation of uses abbreviations provided at the end of this table

[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 Middle Rio Grande 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]
Valencia County						
Rio Grande (Rio Puerco to Isleta Pueblo bnd)	NM-2105_40	35.97	Municipal point source discharges Waterfowl On-site treatment systems (septic) Source unknown Wastes from pets Municipal (high density area) Impervious surface/parking lot runoff	MWWAL PC	Escherichia coli Temperature, water	5/5A
Rio Puerco (non-pueblo Rio Grande to Arroyo Chico)	NM-2105_20	106.58	Source unknown	PC WH	Escherichia coli Mercury	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
DWS = Domestic water supply
HQColdWAL = High quality coldwater aquatic life
IRR = Irrigation
LAL = Limited aquatic life
LW = Livestock watering
MCWAL = Marginal coldwater aquatic life
MWWAL = Marginal warmwater aquatic life
PC = Primary contact
WH = Wildlife habitat
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 Middle Rio Grande 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 3B: Limited data (n = 1) available, exceedence. AUs are listed in this subcategory when there is an exceedence in the limited data set. These are considered high priority for follow up monitoring (NMED, 2013).

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

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

Category 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 Category 5A until TMDLs for all pollutants have been completed and approved by U.S. EPA.

Category 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 uses are inappropriate. After a review of the water quality standard is conducted
a use attainability analysis (UAA) will be developed and submitted to U.S. EPA for consideration
or the AU will be moved to Category 5A and a TMDL will be scheduled.

Category 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 are not enough data to determine the pollutant of concern or there are 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 Category 5A and a TMDL will be scheduled. If it is determined that the current designated uses are inappropriate
it will be moved to 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 Category 4C.

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/). Most of the permits in the Middle Rio Grande region are for municipal wastewater treatment plants. Other permits types include mine, fish hatchery, utility, stormwater, and private domestic permits.

A summary list of current groundwater discharge 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

There are four sites in Bernalillo County listed by the U.S. EPA (2014) as Superfund sites. One additional site in Valencia County is no longer on the Superfund national priorities list (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 Middle Rio Grande region are identified on Figure 5-14. Many of the UST sites listed in the NMED database require no further action and are not likely to pose a water quality threat. Sites that are being investigated or cleaned up by the state or a responsible party, as identified on Table 5-12, should be monitored for their potential impact on water resources. Additional details regarding any groundwater impacts and the status of site investigation and cleanup efforts for individual sites can be obtained from the NMED database, which is accessible on the NMED website (https://www.env.nm.gov/ust/lists.html).

5.4.1.4 Landfills

Landfills used for disposal of municipal and industrial solid waste often contain a variety of potential contaminants that may impact groundwater quality. Landfills operated since 1989 are regulated under the New Mexico Solid Waste Management Regulations. Many small landfills throughout New Mexico, including landfills in the planning region, closed before the1989 regulatory enactment to avoid more stringent final closure requirements. Other landfills have closed as new solid waste regulations became effective in 1991 and 1995. Within the planning region, there are 5 operating landfills and 38 closed landfills (Table 5-13, Figure 5-14).

Table 5-9. Municipal and Industrial NPDES Permittees in the Middle Rio Grande Water Planning Region

Permit No	Municipality/Industry [a]	Permit Type [b]
Sandoval County		
NM0023485	Bernalillo, City of/WWTP	Municipal (POTW)
NM0024848	Cuba, Village of/WWTP	Municipal (POTW)
NM0028011	Jemez Springs, Village of/WWTP	Municipal (POTW)
NM0028479	Jemez Valley Public Schools	Private domestic
NM0030112	NMG&FD/Seven Springs Fish Hatchery	Fish hatchery
NM0028169	Resurrection Mining, LLC -- Rio Puerco Mine [c]	Mine (Non-Coal)
NM0027987	Rio Rancho, City of/No. 2 [c]	Municipal (POTW)
NM0029602	Rio Rancho, City of/No. 3	Municipal (POTW)
NM0031011	San Felipe Pueblo Wastewater Treatment Plant	Municipal (POTW)
Bernalillo County		
NM0022250	Albuquerque, City of/WWTP [c]	Municipal (POTW)
NMS000101	Albuquerque/MS4 [c]	Storm water individual
NM0030376	Delta Person Generating Station	Utility
NM0000116	GCC Rio Grande, Inc.	Other
NM0030724	PAA-KO Communities Sewer Association	Other
NM0030384	Public Service Co. of NM/Person Station	Aquifer remediation
NM0000124	Public Service Co. of NM/Reeves Station	—
NM0030686	Rio Puerco WWTP	—
NM0027863	Sandia Peak Ski Company/Sandia Peak	Private domestic
Valencia County		
NM0020150	Belen, City of/WWTP [c]	Municipal (POTW)
NM0030279	Bosque Farms, Village of/WWTP	Municipal (POTW)
NM0020303	Los Lunas,Village of [c]	Municipal (POTW)
NM0027782	New Mexico Water Serv. Co./Rio Communities	—
NM0030414	NM Water Serv. Co. / Rio Del Oro WWTF	—

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
WWTP = Wastewater treatment plant
POTW = Publicly owned treatment works
NMG&FD = New Mexico Game and Fish
MS4 = Municipal Separate Storm Sewer System
— = Not designated
WWTF = Wastewater treatment facility

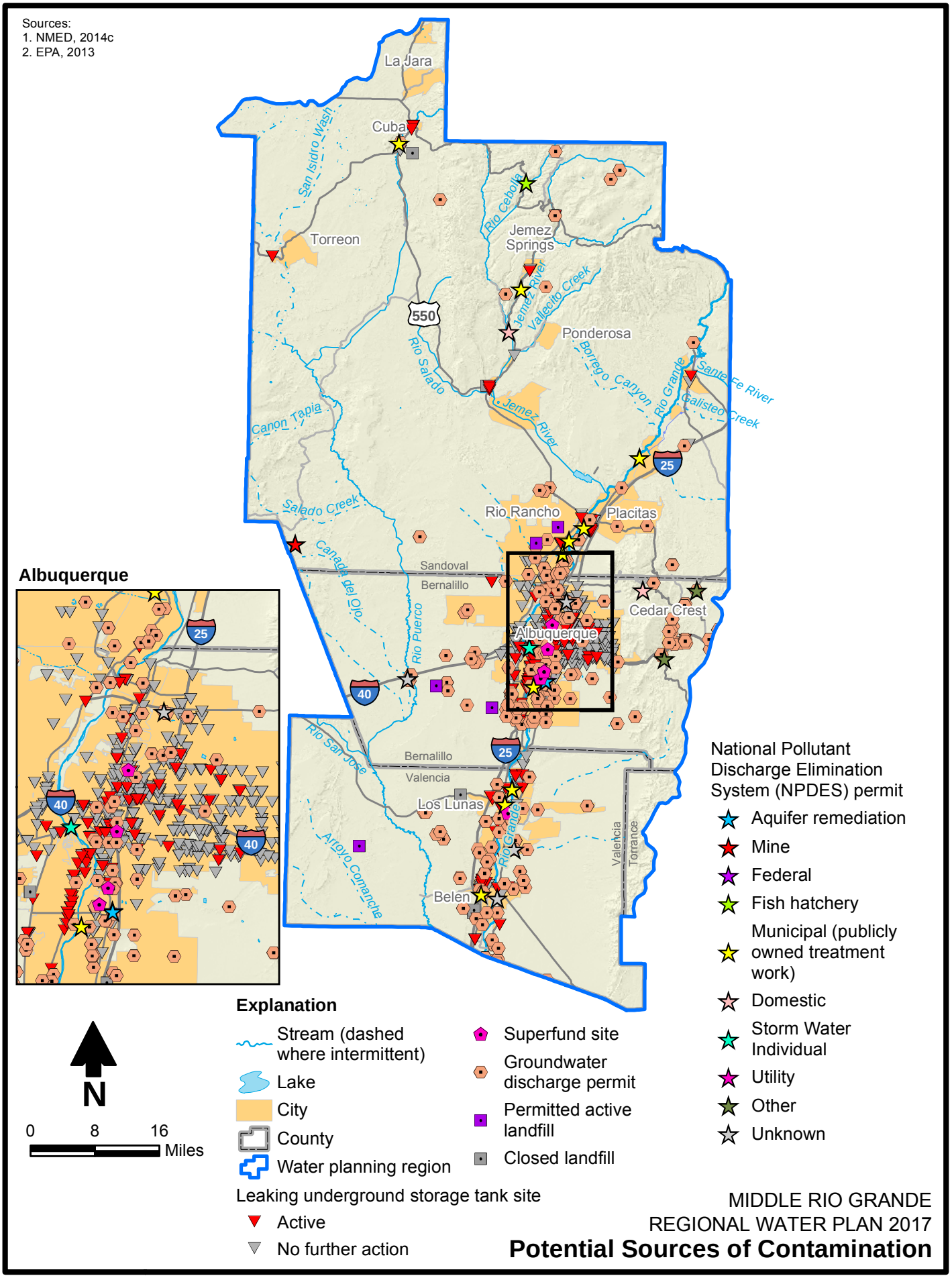
Sources:
1. NMED, 2014c
2. EPA, 2013
La Jara
Cuba
San Isidro Wash
Torreon
Rio Cebolla
Jemez Springs
Jemez River
Vallecito Creek
550
Rio Salado
Ponderosa
Borrego Canyon
Rio Grande
Santa Fe River
Calisteo Creek
Canon Tapia
Jemez River
25
Salado Creek
Rio Rancho
Placitas
Canada del Ojo
Sandoval
Bernalillo
Cedar Crest
Albuquerque
Rio Puerco
40
Rio San Jose
Bernalillo
Valencia
Los Lunas
Arroyo Comanche
Rio Grande
Valencia
Torrance
Belen
Albuquerque
25
40
40
N
0
8
16
Miles
Explanation
Stream (dashed where intermittent)
Lake
City
County
Water planning region
Superfund site
Groundwater discharge permit
Permitted active landfill
Closed landfill
Leaking underground storage tank site
Active
No further action
National Pollutant Discharge Elimination System (NPDES) permit
Aquifer remediation
Mine
Federal
Fish hatchery
Municipal (publicly owned treatment work)
Domestic
Storm Water Individual
Utility
Other
Unknown
MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017
Potential Sources of Contamination
S:\PROJECTS\WR12.0165_STATE_WATER_PLAN_2012\GIS\MXDS\FIGURES_2017\MIDDLE_RIO_GRANDE\FIG5-14_CONTAM_SOURCES.MXD 12/21/2016

Figure 5-14

Table 5-10. Groundwater Discharge Permits in the Middle Rio Grande Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Sandoval	Agronics Mine	DP-1247	Active	—
	Albuquerque Public Schools - Corrales Elementary School	DP-1099	Active	13,300
	Algodones Elementary School	DP-711	Active	6,215
	Campbell Ranch	DP-1738	Pending	—
	Chamisa Hills Country Club	DP-1629	Active	1,740,000
	City of Rio Rancho - Mariposa WWTF (Plant #4) and National Guard (Plant #5)	DP-1467	Active	677,000
	Corrales (Village of) - Recreation Center	DP-1139	Active	2,001
	Corrales Village Hall Complex	DP-1527	Active	2,080
	Cuba (Village of) - Wastewater Treatment Plant	DP-483	Active	10
	Grain Power Tucumcari Ltd	DP-1668	Active	43,200
	Homestead Village	DP-1356	Active	5,720
	La Cueva Center Business Owners Association	DP-1519	Active	6,000
	New Mexico (State of) Army National Guard, Rio Rancho Armory	DP-906	Active	1,000
	Placitas Elementary School	DP-687	Active	5,000
	Pueblo Los Cerros	DP-131	Active	20,000
	Rio Rancho (City of) - Direct Injection Recharge Demonstration Project	DP-1650	Active	1,000,000
	Rio Rancho (City of) - Wastewater Treatment Plants 1, 2, 3 and 6	DP-215	Active	8,640,000
	Rio West Water Development	DP-1682	Active	234,480
	Sandia View Elementary School	DP-1563	Active	3,220
	US Army Corps Eng-Cochiti Lake	DP-271	Active	16,678

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 Middle Rio Grande Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Sandoval	Village Pizza	DP-1159	Active	4,300
(cont.)	Vista Verde Memorial Park	DP-140	Active	55,000
Bernalillo	AAA Pumping Service Inc	DP-1471	Active	74,135
	Albuquerque (City of) -Groundwater Remediation System for former Los Angeles Landfill	DP-1468	Active	460,000
	Albuquerque (City of) - North I-25 Corridor Reclamation and Reuse System	DP-1206	Active	8,130,000
	Albuquerque Metropolitan Detention Center	DP-1329	Active	212,600
	Albuquerque North Products Terminal	DP-216	Active	8
	Albuquerque Public Schools - San Antonito Elementary School	DP-989	Active	6,285
	American Pumping Service	DP-1509	Active	—
	American Waste Removal	DP-658	Active	6,000
	Atlas Pumping Company	DP-1389	Active	2,900
	Bear Canyon Recharge Demonstration Project	DP-1626	Active	5,600,000
	Bella Vista	DP-1450	Active	8,970
	Coors Park South Wetland	DP-1028	Active	30,000
	Delta Person - Generating Station	DP-1260	Active	50,400
	DPC Industries, Inc	DP-406	Active	1,600
	Enchanted Trails RV Park and Trading Post	DP-1709	Active	13,995
	Ever-Ready Oil - Bulk Plant Facility	DP-1122	Active	553
	Former Digital Equipment Corporation	DP-1043	Active	432,000

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

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

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gpd = Gallons per day

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Table 5-10. Groundwater Discharge Permits in the Middle Rio Grande Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Bernalillo (cont.)	Former Gulton Facility	DP-1649	Active	800
	General Electric Aviation	DP-1065	Active	1,800,000
	Giant Albuquerque Fuel Terminal	DP-282	Active	1
	Hidden Valley RV Park	DP-1402	Active	11,580
	High Desert RV Park	DP-1314	Active	9,500
	Indian Hills	DP-1178	Active	7,200
	Kirtland Air Force Base	DP-1770	Pending	—
	Leisure Mountain MH and RV Park	DP-559	Active	8,800
	Lost Horizon	DP-1404	Active	7,575
	McCatharn Dairy	DP-585	Active	0
	Mickey's Dairy	DP-1233	Active	6,000
	Mountain View Nitrate Plume Restoration Project	DP-1818	Pending	808,000
	Mountain View Remediation Site	DP-1179	Active	808,000
	Norbertine Wastewater Treatment Plant	DP-1628	Active	—
	Paa Ko Subdivision	DP-954	Active	260,000
	PNM - Reeves Generating Station	DP-68	Active	9,500
	Public Service Company of New Mexico - Person Generating Station, UNM Golf Course	DP-1006	Active	72,000
	Ritchie Bros Auctioneers America Inc	DP-1337	Active	4,350
	Riviera de Sandia	DP-1555	Active	25,000

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

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[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 5-10. Groundwater Discharge Permits in the Middle Rio Grande Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Bernalillo (cont.)	Sandia Motorsports Park, Inc	DP-1278	Active	1,315
	Sandia National Laboratory	DP-530	Active	2,000
	Sandia Peak Ski Area	DP-996	Active	12,900
	Second Chance Detention Center	DP-1489	Active	35,000
	Southside Water Reclamation Plant Reuse System	DP-1308	Active	7,500,000
	Southvalley Dairy	DP-1195	Active	11,999
	Sparton Technology	DP-1184	Active	972,000
	Tablazon Subdivision Wastewater Treatment Facility	DP-959	Active	9,000
	Thermo Fluids Inc	DP-1801	Active	5,049
	Tijeras Restaurant LLC - Pete's Restaurant	DP-1241	Active	2,922
	Turquoise Trail Center	DP-1169	Active	4,500
	Vanderploeg Dairy	DP-568	Active	2,000
	Villa Santa Maria	DP-1549	Active	4,100
	West Mesa Disposal Site	DP-521	Active	95,000
	Winrock Town Center New Regal Entertainment Group Theater	DP-1814	Active	2,400
Valencia	A & A Pumping Services Inc	DP-1534	Active	8,000
	Ann Parish Elementary School	DP-456	Active	14,500
	Belen National Guard Readiness Center	DP-746	Active	2,000
	Bnsf Belen Yard	DP-1715	Active	216,000
	Bosque Farms (Village of) Surface Disposal Facility (Sludge)	DP-1244	Active	17,500

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

gpd = Gallons per day

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[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 5-10. Groundwater Discharge Permits in the Middle Rio Grande Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Valencia (cont.)	Bosque Farms Pumping Service	DP-605	Active	40,000
	Burlington Northern Santa Fe - Belen	DP-278	Active	8,250
	CEMCO Inc	DP-1142	Active	2,050
	Charlie's Septic Pipe And Drain	DP-978	Active	9,380
	Cordova Duplexes	DP-1556	Pending	—
	Dennis Chavez Elementary School	DP-1242	Active	11,290
	Edeal Dairy	DP-1034	Active	32,400
	Frank's Septic Pumping	DP-452	Active	8,000
	Former S&L Service Station Remediation	DP-1834	Active	—
	Gil Sanchez Elementary School	DP-1243	Active	6,556
	Jarratt Dairy	DP-1176	Active	2,500
	JC Mobile Home Park	DP-1621	Active	3,750
	La Luz Energy Center	DP-1829	Active	45,720
	Los Lunas (Village of) - Surface Disposal Facility (Sludge)	DP-1053	Active	45,000
	Los Lunas Senior Health Care	DP-1336	Active	6,000
	Los Lunas Silvery Minnow Refugium	DP-1748	Active	35,000
	Mathews Meat Processing Inc	DP-1172	Active	300
	Mikes Auto Sales And Service	DP-1535	Active	576,000
	NMWSC Sludge Disposal Site	DP-529	Active	14,000
	Othart Dairy #1	DP-190	Active	15,500

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

gpd = Gallons per day

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[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 5-10. Groundwater Discharge Permits in the Middle Rio Grande Water Planning Region

County	Facility Name [a]	Permit No.	Status [b]	Permitted Discharge Amount (gpd)
Valencia (cont.)	R & R Ranch Dairy	DP-1294	Active	80,000
	Rasband Dairy	DP-1181	Active	2,000
	Ray's Septic Pumping	DP-549	Active	8,000
	Rio Del Oro Wastewater Treatment Facility	DP-356	Active	300,000
	Valley Improvement Association Landscape Irrigation Project	DP-1569	Active	300,000

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

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Table 5-11. Superfund Sites in the Middle Rio Grande Water Planning Region

Site Location	Site Name [a]	Site ID	EPA ID	Status [b]
Bernalillo County				
Albuquerque, NM	AT & SF (Albuquerque)	NMD980622864	600879	NPL
	Fruit Avenue Plume	NMD986668911	604068	NPL
	Rinchem Co. Inc.	NMD085267961	600846	Removed from NPL [c]
	South Valley	NMD980745558	600881	NPL
Valencia County				
Los Lunas, NM	Pagano Salvage	NMD980749980	600907	Deleted from NPL

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

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

[b] NPL = National Priorities List

[c] The site has been removed from the NPL before achieving final status.

Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Sandoval County					
Bernalillo	Franks Conoco	61	26900	656 Camino Del Pueblo	Cleanup, State Lead with CAF
	Larrys Chevron	75	29027	901 Camino Del Pueblo	Aggr Cleanup Completed, Resp Party
	Plateau 168, Giant DBA Plateau 7168	51	31832	118 Hwy 44 W	Cleanup, Responsible Party
	TGAS #220/Thriftway #293	1755	31841	401 Hwy 44 N	Investigation, Responsible Party
	Velarde Property	2444	31473	373 Hwy 113	Cleanup, Responsible Party
Canon	Canon Lumber & Hdwe	2272	27211	10902 Hwy 4	Cleanup, Responsible Party
Corrales	Corrales Chevron	76	1165	3745 Corrales Rd	Cleanup, Responsible Party
Cuba	7-2-11 No36	4619	26267	Hwy 44	Investigation, Responsible Party
	Archies Auto/Old Chevron	2285	28325	6331 Hwy 44	Cleanup, State Lead with CAF
	Bar F 3	416	28316	6385 US Hwy 550 South	Aggr Cleanup Completed, Resp Party
	Circle K 561	2318	1143	6366 Hwy 44	Aggr Cleanup Completed, Resp Party
	D & D Self Serve	1838	27604	6442 US Hwy 550 North	Investigation, Responsible Party
	Gurule Ernest and Robert	3516	28425	6359 US Hwy 550 South	Investigation, Responsible Party
	Red Mesa Express 519	4076	31835	State Hwy 197	Investigation, Responsible Party
	Shell Cuba	178	27585	Hwy 3	Investigation, Responsible Party

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

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

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

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

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

Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Sandoval County (cont.)					
Jemez Springs	High Country Store	1984	28523	13724 Hwy 126	Investigation, State Lead, CAF
	Jemez Springs Garage	733	28735	State Route 4	Investigation, Responsible Party
Rio Rancho	Raindrop Car Wash	4534	53762	Unknown	Pre-Investigation, Confirmed Release
San Ysidro	Abandoned Station	3186	26361	Corner of Hwy 44	Investigation, Responsible Party
	Cordova Feed	1158	27525	24 Hwy 44	Cleanup, Responsible Party
	Thriftway 232	4520	1890	E Side Hwy 44	Cleanup, Responsible Party
Torreon	Red Mesa Express 520	4053	31838	27 Miles W of Cuba	Investigation, Responsible Party
Bernalillo County					
Albuquerque	A and C Auto, Graves Oil Transfer Yd	2185	26314	3400 2nd Northwest	Cleanup, Responsible Party
	A&C Auto	2131	26314	3400 2nd Northwest	Cleanup, Responsible Party
	Abandoned Plateau, Thriftway(Abandoned Plateau)	2531	26353	1720 Central Ave Southwest	Cleanup, Responsible Party
	Allsup 152	2631	26498	2801 Coors Southwest	Cleanup, Responsible Party
	Allsups 197/Atex 376	27	26501	1525 Arenal Southwest	Aggr Cleanup Completed, Resp Party
	Anthem Oil 105, Anthem Oil #5 DBA Texaco	4548	29845	9160 Coors Northwest	Cleanup, Responsible Party

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

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Albuquerque (cont.)	Anthem Oil 106	4568	1832	8614 Central NE	Pre-Investigation, Confirmed Release
	Atex/Allsups #149	1169	26496	1125 Alameda Northwest	Cleanup, Responsible Party
	Atex/T-Gas #156 C	2189	26712	3600 Wyoming NE	Investigation, Responsible Party
	Atex/T-Gas #54	1990	1916	7324 Fourth Northwest	Cleanup, Responsible Party
	Atex/T-Gas 1315	1170	26706	2448 Isleta Blvd	Aggr Cleanup Completed, Resp Party
	Atex/T-Gas 380	677	1919	2990 Gun Club Rd	Cleanup, Responsible Party
	Atrisco 66, Roberts Oil-Central	2792	1741	4617 Central Northwest	Aggr Cleanup Completed, Resp Party
	Bachechi Victor, Sullivan Stable	400	26828	9521 Rio Grand	Aggr Cleanup Completed, St Lead, CAF
	Bass Service Site	79	26861	4257 Isleta Blvd Southwest	Aggr Cleanup Completed, St Lead, CAF
	Bern County Yd	67	970	2400 Broadway SE	Aggr Cleanup Completed, St Lead, CAF
	Bob's Burgers	4677	53737	Unknown	Pre-Investigation, Suspected Release
	Bonded Plumbing/Heating	2636	27006	721 Fourteenth St Southwest	Cleanup, Responsible Party
	Brewer ABQ Bulk Plant	2092	835	3200 Candelaria NE	Cleanup, Responsible Party
	Brewer Gascard	4	1280	1816 Fourth Northwest	Aggr Cleanup Completed, St Lead, CAF
	Brewer Gascard #	2523	1280	1816 Fourth Northwest	Pre-Investigation, Confirmed Release
	Brewer Oil Co	1132	835	3200 Candelaria NE	Cleanup, Responsible Party

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

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Albuquerque (cont.)	Building 1033	3097	28884	Building 1033	Referred to Ground Water Quality Bureau
	Carder Concrete A, Brewer Hydro-Conduit	792	27234	2800 2nd St Southwest	Investigation, Responsible Party
	Carnue/Deadmans	34	27249	Hwy 66 Carnuel Exit	Referred to Ground Water Quality Bureau
	CEI Enterprises	802	27280	6501 Broadway SE	Pre-Investigation, Confirmed Release
	Chevron Isleta (South Valley)	314	30681	3401 Isleta Southwest	Aggr Cleanup Completed, St Lead, CAF
	Chevron Terminal	1054	26453	3200 S Broadway	Referred to Ground Water Quality Bureau
	Cigarette Shop	2175	27363	2401 Isleta Southwest	Investigation, Responsible Party
	Circle K Store #2706334, Formerly Plateau 123	3723	47620	7524 Menaul Blvd NE	Cleanup, Responsible Party
	Climate Roofing	1028	27427	2700 Isleta Southwest	Cleanup, State Lead with CAF
	Conservancy Oil	1662	27501	2220 2nd Southwest	Aggr Cleanup Completed, Resp Party
	Conservancy Oil	4485	27501	2220 2nd Southwest	Aggr Cleanup Completed, Resp Party
	Contract Carriers	411	27513	830 Broadway NE	Aggr Cleanup Completed, Resp Party
	Cook Constr Co	1911	27516	506 Carmony Lane NE	Cleanup, Responsible Party

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

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[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

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Albuquerque (cont.)	D and M , Lee's Conoco #2	4517	27606	3900 Isleta Blvd Southwest	Cleanup, Responsible Party
	Davis Charles, Tito's Garage	688	27641	829 Bridge St	Investigation, Responsible Party
	East Mountain Const	2330	27830	3625 High St NE	Investigation, Responsible Party
	Everready Loma	17	29101	400 Lomas NE	Cleanup, State Lead with CAF
	Fina Oil Lomas	2322	29101	400 Lomas NE	Cleanup, State Lead with CAF
	Fina Truck Stop	1685	28027	1915 Menaul Blvd NE	Cleanup, Responsible Party
	Firestone Store 44202, Firestone Store #44w2	2845	28045	701 Central Northwest	Investigation, Responsible Party
	Ford Utilities Building	3207	28077	300 University Blvd NE	Cleanup, Responsible Party
	Former Circle K 479	614	28102	5601 Bluewater Rd Northwest	Investigation, Responsible Party
	Former Pauls Place	3110	28121	7026 Isleta Blvd Southwest	Aggr Cleanup Completed, Resp Party
	G&S Community	53	28207	6100 Isleta Blvd Southwest	Aggr Cleanup Completed, St Lead, CAF
	Gas and Save	4616	31053	2901 Eubank Blvd NE	Investigation, Responsible Party
	Gas Card 1	3368	1279	3319 Carlisle NE	Cleanup, Responsible Party
	Gas Card 2C	4527	1280	1816 Fourth Northwest	Aggr Cleanup Completed, St Lead, CAF
	Gas Man #447	2505	30372	6502 4th St Northwest	Cleanup, Responsible Party
	Gasamat 552	3304	1283	915 Bridge Southwest	Cleanup, Responsible Party

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

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Albuquerque (cont.)	Giant 844, Texaco I	978	30754	2401 San Mateo NE	Pre-Investigation, Confirmed Release
	Giant DBA Gasman 7442, Atex 213	28	31815	3501 Isleta Blvd Southwest	Aggr Cleanup Completed, St Lead, CAF
	Giant DBA Gasman 7445, Atex 212 (Gasho	1059	31816	1312 Bridge Southwest	Aggr Cleanup Completed, St Lead, CAF
	Giant DBA Gasman 7446, Atex 218 (Gashouse)	347	31817	937 Isleta Blvd Southwest	Aggr Cleanup Completed, Resp Party
	Giant Sales Terminal, Tex Term Ko Tan	1242	28322	3209 Broadway SE	Referred to Ground Water Quality Bureau
	Glover Eva and Jim, Yale Auto Sales	678	1361	523 Yale SE	Cleanup, State Lead with CAF
	Herrera School Buses and Coaches Inc 1, Herrera Bus	370	28514	1140 Sunset Rd Southwest	Aggr Cleanup Completed, St Lead, CAF
	Hydro-Conduit	1494	27234	2800 2nd St SW	Investigation, Responsible Party
	Isleta Chevron, Everready Isleta	78	1421	7630 Isleta Blvd Southwest	Cleanup, Responsible Party
	ITRI #2	1625	28676	Area Y Bldg 9200	Cleanup, Federal Facility
	Jim's Automotive	2048	28759	4411 Lead Ave SE	Cleanup, Responsible Party
	Jim's Automotive/2	2524	28759	4411 Lead Ave SE	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.

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Albuquerque (cont.)	K & M Construction	1645	28815	1914 Menaul NE	Cleanup, Responsible Party
	KAFB -- Manzano Site 58	914	28919	Manzano Area	Cleanup, Federal Facility
	KAFB Lovelace	278	28882	E of Lovelace Rd and	Cleanup, Federal Facility
	Karler Packing	193	28825	9111 Broadway SE	Investigation, Responsible Party
	Kirtland ANG #112	1636	28929	Building 1070	Pre-Investigation, Suspected Release
	Kirtland Food Plaza	3688	28944	1620 Carlisle SE	Investigation, Responsible Party
	Lee and Blakely Feed Store	3380	29071	3031 Isleta Blvd Southwest	Cleanup, Responsible Party
	Lee's Conoco	2618	27606	3900 Isleta Blvd Southwest	Cleanup, Responsible Party
	Loves Budget	715	29166	2201 6th St Northwest	Investigation, Responsible Party
	Loves Budget Fuel 21	3686	29166	2201 6th St Northwest	Cleanup, Responsible Party
	Loves Country Store 210	4554	29166	2201 6th St Northwest	Cleanup, Responsible Party
	Loves Country Store 210	4595	29166	2201 6th St Northwest	Investigation, Responsible Party
	Manzano Western	2535	29258	615 Wyoming SE	Investigation, Responsible Party
	NICO Dale St Bulk Plant	4440	52262	105 Dale St SE	Investigation, Responsible Party
	Old Horn Oil Station Isleta	851	28600	430 Isleta Southwest	Aggr Cleanup Completed, St Lead, CAF
	Old Town Chevron F#1556	4699	1556	1000 Rio Grande NW	Investigation, Responsible Party
	Peligro LLC, Plateau 119a	3130	30001	5565 Fourth St Northwest	Aggr Cleanup Completed, Resp 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

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Aggressive Cleanup Completed (Aggr Cleanup Completed): Effective removal of contamination complete
Responsible Party (Resp Party): Owner/Operator responsible for mitigation of release
State Lead: State has assumed responsibility for mitigation of release
Federal Facility: Responsibility under the Federal Govt
CAF: Corrective action fund

Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Albuquerque (cont.)	Phillips 66 Pump And Save #35	4717	1688	4321 Coors Blvd SW	Pre-Investigation, Confirmed Release
	Pit Stop	3379	29986	305 Isleta Blvd Southwest	Aggr Cleanup Completed, Resp Party
	Plateau #119	12	30001	5565 Fourth St Northwest	Aggr Cleanup Completed, Resp Party
	Plateau #124/2	2467	30002	2124 San Mateo NE	Cleanup, Responsible Party
	Pnm Transfer Station	3219	1960	First and Lomas	Cleanup, Responsible Party
	Pollo Mexicano (Bobs Burger)	189	27164	3627 Isleta Blvd Southwest	Aggr Cleanup Completed, Resp Party
	Pump N Save 50, Barelas Bridge	54	29854	800 Bridge Southwest	Aggr Cleanup Completed, St Lead, CAF
	Quality Pontiac	3534	1696	1300 Lomas Blvd NE	Cleanup, Responsible Party
	Rio Grande Oil Co A	4659	30243	Hwy 66 W 12605 Central Northwest	Pre-Investigation, Confirmed Release
	Roberts Oil Co Inc Neantu, Pump N Save	2236	1744	2204 Menaul NE	Investigation, Responsible Party
	Roberts Oil E	3446	1737	5231 San Mateo NE	Investigation, Responsible Party
	Roberts Oil J	3235	1746	1001 Coors Blvd Southwest	Cleanup, Responsible Party
	Rodgers Drilling	407	30287	2615 Isleta Blvd Southwest	Aggr Cleanup Completed, St Lead, CAF
	Ryder Truck	6	30366	2225 First St	Cleanup, Responsible Party

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

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[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
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Cleanup: Physical removal of contamination ongoing
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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Albuquerque (cont.)	Ryder Truck 2	3551	30366	2225 First St	Cleanup, Responsible Party
	Ryder Truck 3	3552	30366	2225 First St	Cleanup, Responsible Party
	Sandia National Labs, Building 605	4452	30432	1515 Eubank SE	Investigation Federal Facility
	SANL 6500	291	27099	PO Box 5800	Investigation Federal Facility
	SANL 6587	369	27107	PO Box 5800	Cleanup, Federal Facility
	SANL 6596-5	2266	27115	PO Box 5800	Investigation, Responsible Party
	SANL 6630-1	2267	27125	PO Box 5800	Investigation Federal Facility
	SANL 6720-1	2268	27127	PO Box 5800	Investigation Federal Facility
	SANL 9970-1	2269	27150	PO Box 5800	Investigation Federal Facility
	SANL CCTF Bldg 9939 - 1	3191	27149	PO Box 5800	Cleanup, Federal Facility
	SANL TA3 Bldg 6523	3227	27102	TECH AREA III	Cleanup, Federal Facility
	SANL/605	672	27095	PO Box 5800	Cleanup, Federal Facility
	SANL/6587	2093	27108	PO Box 5800	Investigation Federal Facility
	SANL/6597	1811	27117	PO Box 5800	Investigation Federal Facility
	SANL/888	673	27137	PO Box 5800	Investigation Federal Facility
	Schwartzman Trust A	1160	30515	3301 2nd Street Southwest	Cleanup, Responsible Party

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

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Albuquerque (cont.)	SE Public Service, Joe G Maloof A	18	28764	523 Commercial St NE	Cleanup, Responsible Party
	Snodgrass Well	30	27249	Hwy 66 Carnuel Exit	Aggr Cleanup Completed, Federal Facility
	Snodgrass Well	30	27249	Hwy 66 Carnuel Exit	Referred to Ground Water Quality Bureau
	Stewart Site	1228	30784	7540 Isleta Southwest	Aggr Cleanup Completed, Resp Party
	St Joseph NE Heights Hospital	4714	30385	4701 Montgomery Blvd NE	Pre-Investigation, Confirmed Release
	Supervalu Bellamah Site	459	30842	1239 Bellamah Ave Northwest	Aggr Cleanup Completed, Resp Party
	Thriftway Islet	1244	1923	3339 Isleta Blvd Southwest	Aggr Cleanup Completed, Resp Party
	Truett Conoco	838	31216	4100 Pennsylvania	Cleanup, Responsible Party
	Travel Centers of America	3742	31184	2501 University NE	Investigation, Responsible Party
	Truetts Conoco	1271	31216	4100 Pennsylvania	Cleanup, Responsible Party
	Unocal Plaza	668	31184	2501 University NE	Investigation, Responsible Party
	Vickers 2494, JKSR LLC DBA Menaul Gas & Food	7	31486	2523 4th Northwest	Aggr Cleanup Completed, St Lead, CAF
	Western Mobile	2089	2007	1302 Menaul NE	Aggr Cleanup Completed, Resp Party

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

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Bernalillo County (cont.)					
Canoncito	Canoncito Grocery	2284	1018	Canoncito Day School Rd	Cleanup, Responsible Party
Tijeras	Canyon Auto Ser	1075	27210	844 E Hwy 66	Cleanup, State Lead with CAF
	East Mt Fuel Site, East Command Ctr	2563	973	15 S Zamora Road	Cleanup, Responsible Party
	Former Havens Trucking Site	4493	54524	State Rd 337	Investigation, Responsible Party
	Indian Hills/Canyon Auto	611	28654	800 E Hwy 66	Cleanup, State Lead with CAF
Valencia County					
Belen	A Market Place	2869	26331	1536 E River Rd	Cleanup, State Lead with CAF
	Akin Texaco	1071	26411	S Belen At I 25	Cleanup, Responsible Party
	Atex/T-Gas #206	2232	26720	1224 S Main St	Investigation, Responsible Party
	Bacas Auto Sales	1998	26826	1301 S Main	Cleanup, Responsible Party
	Caldwell Motor Co - Belen	4068	53039	401 N Main	Investigation, Responsible Party
	Casey Luna	118	27271	Po Drawer 1279	Referred to Ground Water Quality Bureau
	Casey Luna Ford	1608	27271	Po Drawer 1279	Aggr Cleanup Completed, Resp Party
	Castillo Ready Mix Concrete Inc.	4574	54663	06 Lopez Loop	Investigation, Responsible Party

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

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Valencia County (cont.)					
Belen (cont.)	Chevron 75644	462	27326	701 N Main	Cleanup, Responsible Party
	Giant DBA Gasman #7283	4605	26720	1224 S Main St	Investigation, Responsible Party
	Circle K 289	2149	1080	700 N Main St	Cleanup, Responsible Party
	City of Belen fuel yard	1650	26884	5th and Becker St	Aggr Cleanup Completed, Resp Party
	Diamond Shamrck	659	29412	1003 S Main	Cleanup, State Lead with CAF
	Former Fox LP Bell Gas #1187	4618	28156	19514 Hwy 314	Cleanup, Responsible Party
	Former Gugguno Property	4017	31021	616 N Main	Aggr Cleanup Completed, Resp Party
	Fox LP Gas Co Inc	4400	28156	19514 Hwy 314	Cleanup, Responsible Party
	Hodges Oil West Chavez Bulk Plant	4543	51213	West Chavez Ave	Pre-Investigation, Confirmed Release
	McCasland Motor Chev	227	29311	315 N Main	Aggr Cleanup Completed, Resp Party
	Mike's Auto Detail	4019	29415	1010 S Main	Cleanup, State Lead with CAF
	MRGCD Conservation District	361	29505	200 De Soto	Cleanup, State Lead with CAF
	National Guard Armory , State Army Board	351	29554	715 S Main	Cleanup, Responsible Party
	Nmshtd Belen	794	951	22 General E Baca Road	Cleanup, Responsible Party
	Ortegas Garage	3724	29810	200 E Reinken	Investigation, Responsible Party

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

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Valencia County (cont.)					
Belen (cont.)	Rio Commun. SVC Sta	1749	30239	400 Rio Communities Way	Cleanup, Responsible Party
	Rio Grande Oil Co.	2270	30245	222 N Main	Cleanup, Responsible Party
	S & L Svc Corp	1194	30370	344 Clara Lane	Cleanup, Responsible Party
	Shell N. Main	433	30575	500 Block N Main	Aggr Cleanup Completed, St Lead, CAF
	Tabet Lumber Co	2323	30927	606 Baca Ave	Investigation, Responsible Party
	Texaco Tonys	432	31153	19 Chavez Rd	Aggr Cleanup Completed, Resp Party
	Village Market	69	31505	601 Reiken	Cleanup, Responsible Party
Bosque	Bosque Trading Post	1868	27022	1006 B Old Hwy 85	Investigation, Responsible Party
	D&B Glass(Old Akin Texaco)	2412	27602	335 Bosque Farms Blvd	Investigation, State Lead, CAF
	Didios	3111	27739	16559 B	Aggr Cleanup Completed, Resp Party
Bosque Farms	Atex/T-Gas #150	2233	30005	650 Bosque Farms Blvd	Cleanup, Responsible Party
	Former CirclE K #751	2522	1124	Po Box 2455	Cleanup, Responsible Party
	Giant Gasamat 889/559	1008	28319	435 Bosque Farms Blvd	Aggr Cleanup Completed, Resp Party
	Jones Gulf and Pawn	2449	28789	2235 Bosque Farms Blvd	Investigation, Responsible Party
	Phillips 66 Bosque	2791	1636	1075 Bosque Farms Blvd	Investigation, Responsible Party
Jarales	Midway Grocery	4098	53478	414 A Jarales Rd	Investigation, Responsible Party
Los Chavez	Atex 354/Allsps 137	423	9814	4603 Hwy 85 Southwest	Aggr Cleanup Completed, Resp 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.

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Table 5-12. Leaking Underground Storage Tank Sites in the Middle Rio Grande Water Planning Region

City [a]	Release/Facility Name [b,c]	Release ID	Facility ID	Physical Address [c]	Status [d]
Valencia County (cont.)					
Los Lunas	Midway Grocery	4098	53478	414 A Jarales Rd	Investigation, Responsible Party
	Atex 354/Allsps 137	423	9814	4603 Hwy 85 Southwest	Aggr Cleanup Completed, Resp Party
	MIDWAY GROCERY	4098	53478	414 A Jarales Rd	Investigation, Responsible Party
	Atex 354/Allsps 137	423	9814	4603 Hwy 85 Southwest	Aggr Cleanup Completed, Resp Party
	Midway Grocery	4098	53478	414 A Jarales Rd	Investigation, Responsible Party
	Atex 354/Allsps 137	423	9814	4603 Hwy 85 Southwest	Aggr Cleanup Completed, Resp Party
	Midway Grocery	4098	53478	414 A Jarales Rd	Investigation, Responsible Party
	Atex 354/Allsps 137	423	9814	4603 Hwy 85 Southwest	Aggr Cleanup Completed, Resp Party
	Midway Grocery	4098	53478	414 A Jarales Rd	Investigation, Responsible Party
	Atex 354/Allsps 137	423	9814	4603 Hwy 85 Southwest	Aggr Cleanup Completed, Resp Party
	Midway Grocery	4098	53478	414 A Jarales Rd	Investigation, Responsible Party
Peralta	Peralta Shamrock	833	26788	3655 Hwy 47	Investigation, Responsible Party

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

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Table 5-13. Landfills in the Middle Rio Grande Water Planning Region

Page 1 of 2

County	Landfill Name [a]	Landfill Operating Status	Landfill Closure Date
Sandoval	Cochiti Lake	Closed	—
	Cochiti Pueblo	Closed	—
	Cuba Landfill	Closed	—
	Jemez Mountain	Closed	—
	Jemez Pueblo	Closed	—
	Pena Blanca	Closed	—
	Rio Rancho	Open	NA
	San Ysidro Landfill	Closed	—
	Sandia Pueblo	Closed	—
	Sandoval County Landfill and Composting Facility	Open	NA
	Santa Ana Pueblo	Closed	—
	Santa Domingo	Closed	—
Bernalillo	Albuquerque Downs	Closed	—
	Atrisco	Closed	1969
	Belen Landfill	Closed	—
	Cerro Colorado	Open	NA
	City River	Closed	1940s
	Coronado	Closed	1966
	Crawford (Dead Mans Curve)	Closed	1985
	KAFB	Closed	—
	Los Angeles	Closed	1983
	Mesa del Sol Landfill	Closed	—
	Nazareth	Closed	1972
	Nine Mile Hill	Closed	1978
	Riverside	Closed	1992
	Russ Pitney	Closed	1984
	Sacramento	Closed	1962
	San Antonio	Closed	1970
	Sandia Labs	Closed	—
	Santa Fe Pacific Coal	Closed	—
	Seay Brothers	Closed	1995

Sources: MRCOG and MRGWA, 2004; NMED, 2000, 2014b, 2015a, 2015b

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

NA = Not applicable

— = Information not available

Table 5-13. Landfills in the Middle Rio Grande Water Planning Region

Page 2 of 2

County	Landfill Name [a]	Landfill Operating Status	Landfill Closure Date
Bernalillo (cont.)	South Broadway (Mesa del Sol)	Closed	1990
	South Eubank	Closed	1978
	South Yale	Closed	1965
	Southwest (LLC) C&D	Open	NA
	Tijeras Canyon (Chamisoso Canyon)	Closed	1981
	W. W. Cox	Closed	1989
	Wyndham Hotel Fill	Closed	—
Valencia	Belen	Closed	—
	Isleta Pueblo	Closed	—
	Los Lunas Landfill	Closed	—
	Valencia County Landfill	Closed	—
	Valencia Regional Landfill and Recycling Facility	Open	NA

Sources: MRCOG and MRGWA, 2004; NMED, 2000, 2014b, 2015a, 2015b

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

NA = Not applicable

— = Information not available

5.4.1.5 Nonpoint Sources

Nonpoint source issues in the Middle Rio Grande region have been addressed through various watershed activities:

- In 2006 the Ciudad Soil and Water Conservation District prepared a Water Restoration Action Strategy (WRAS) for the Rio Grande Albuquerque reach. The WRAS was updated in 2012 (MRG-AR WG, 2012) with a focus on remediating fecal coliform bacterial contamination as characterized through a bacteria source tracking study (Parsons, 2005). Best management practices identified in the WRAS for addressing fecal coliform will also be helpful for addressing other contaminants.

- In 2012, the EPA issued National Pollutant Discharge Elimination System (NPDES) Permit No. NM000101 (U.S. EPA, 2012) for the Albuquerque MS4 co-permittees: Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), City of Albuquerque (COA), New Mexico Department of Transportation (NMDOT), and the University of New Mexico (UNM). These four entities have been participating under a 2003 cooperative agreement to jointly conduct stormwater quality monitoring in compliance with that permit. The final Watershed Based MS4 Permit NMR04A000, which covers the Middle Rio Grande Watershed, was published in December 2014, replacing the 2012 permit (No. NM000101). As defined by EPA, watershed-based NPDES permitting emphasizes addressing all stressors within a hydrologically defined drainage basin, rather than addressing individual pollutant sources.

- In a comment letter to the U.S. EPA regarding this permit, the NMISC expressed concern that ". . . the permit may result in actions that reduce the volume of stormwater that reaches the channel of the Rio Grande in parts of Sandoval County and much of Bernalillo County, New Mexico." The NMISC further notes concern that ". . . the Permit, as written, will result in increased depletion of water (by evaporation), without water rights being transferred to offset the new depletions, and thus less water will reach the river to support compact deliveries." In this letter, the NMISC requests that the U.S. EPA consider modifying the permit so that stormwater is not retained by water quality improvement projects, which allow for greater evaporation and/or infiltration and thereby reduce the volume of stormwater that reaches the Rio Grande.

- The Ciudad Soil and Water Conservation District also prepared a WRAS to address nitrogen and phosphorus loading on Tijeras Creek (CSWCD, 2004).

- The Rio Puerco Management Committee has been working to reduce erosion and sediment and to improve vegetative communities along the Rio Puerco drainage.

- The Jemez River Watershed Group has prepared a WRAS that identifies actions to improve watershed health and reduce contaminant loads on the Jemez River and tributaries (JRWG, 2005).

- Runoff, flooding, and debris flows following catastrophic wildfire are also important nonpoint source issues. The USGS New Mexico Water Science Center has developed a pre-wildfire assessment approach that can be used to decrease the hazard of post-wildfire debris flows and protect vital watersheds. An evaluation of the Sandia and Manzano mountains was published in 2014 (Tillery et al., 2014).

In addition to surface water issues, a primary water quality concern in the planning region is groundwater contamination due to septic tanks. Because septic systems are generally spread out over rural areas, they are considered a nonpoint source. Collectively, septic tanks and other on-site domestic wastewater disposal systems constitute the single largest known source of groundwater contamination in New Mexico (NMWQCC, 2002), with many of these occurrences in areas with shallow water tables, such as those located along the Rio Grande. In areas with shallow water tables or in karst terrain, septic system discharges can percolate rapidly to the underlying aquifer and increase concentrations of (NMWQCC, 2002):

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

Bernalillo County has implemented a septic tank ordinance, but they remain a water quality concern, particularly in the East Mountain area and in areas with shallow water tables, such as Corrales.

5.5 Administrative Water Supply

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

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

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

5.5.1 2010 Administrative Water Supply

The administrative water supply (i.e., total withdrawals) in 2010 for the Middle Rio Grande region, as reported in the *New Mexico Water Use by Categories 2010* report (Longworth et al., 2013), was 431,640 acre-feet. Of this total, 302,514 acre-feet were surface water withdrawals and 129,126 acre-feet were groundwater. The breakdown of these withdrawals among the various categories of use detailed in the *New Mexico Water Use by Categories 2010 report* is discussed in Section 6.1.

5.5.2 Drought Supply

The variability in surface water supply from year to year is a better indicator of how vulnerable a planning region is to drought in any given year or multi-year period than is the use of long-term averages. As discussed in Section 5.1.1, the PDSI is an indicator of whether drought conditions exist and if so, what the relative severity of those conditions is. For the four main climate divisions present in the Middle Rio Grande region (divisions 2, 4, 5, and 6), the PDSI classifications for 2010 were near normal for all four divisions (Figures 5-6a and 5-6b). Given that the water use data for 2010 represent a 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 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 Middle Rio Grande region, the gage with the minimum ratio of annual yield to 2010 yield is the Rio Grande at Albuquerque, with a ratio of 0.33 for a minimum annual yield (248,321 acre-feet in 1977) to 2010 yield (759,441 acre-feet) (USGS, 2014c). Based on the region's total administrative surface water supply of 302,514 acre-feet (Section 5.5.1), the drought-adjusted surface water supply is 99,829 acre-feet. With the 129,126 acre-feet of groundwater supply, the total drought supply is 228,955 acre-feet, or about 53 percent of a normal year administrative water supply. Thus, approximately 228,955 acre-feet will be available to divert in an extreme drought year.

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

6. Water Demand

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

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

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

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

6.1 Present Uses

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

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

The total surface water and groundwater withdrawals for each category of use, for each county, and for the entire region, are shown on Table 6-1 and Figures 6-1a through 6-1f. The predominant water use in 2010 in the Middle Rio Grande region was for irrigated agriculture, followed by public water supply use.

Most of the groundwater use in the Middle Rio Grande region in 2010 was for public water supply. Groundwater also supplied self-supplied commercial, domestic, industrial, livestock, mining, and power uses. 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.

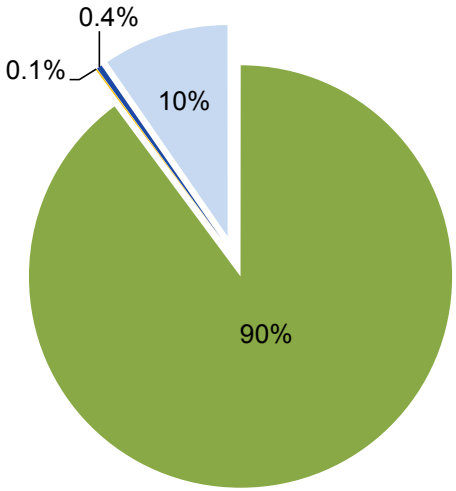
Table 6-1. Total Withdrawals in the Middle Rio Grande Water Planning Region in 2010

Water Use Category	Withdrawals (acre-feet) [a]														
	Sandoval County			Bernalillo County			Torrance County			Valencia 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
Public water supply	219	15,696	15,915	45,152	64,951	110,103	0	0	0	0	6,554	6,554	45,372	87,200	132,572
Domestic (self-supplied)	0	2,544	2,544	0	2,369	2,369	0	0	0	0	3,686	3,686	0	8,599	8,599
Irrigated agriculture	48,322	624	48,946	43,309	2,604	45,913	0	0	0	160,215	11,407	171,622	251,846	14,635	266,481
Livestock (self-supplied)	58	72	130	4	228	232	1	6	7	47	841	888	109	1,147	1,256
Commercial (self-supplied)	17	2,848	2,865	0	8,991	8,991	0	0	0	0	221	221	17	12,060	12,077
Industrial (self-supplied)	0	3,066	3,066	0	1,072	1,072	0	0	0	0	331	331	0	4,469	4,469
Mining (self-supplied)	0	275	275	0	89	89	0	0	0	0	179	179	0	543	543
Power (self-supplied)	0	0	0	0	466	466	0	0	0	0	6	6	0	472	472
Reservoir evaporation	5,170	0	5,170	0	0	0	0	0	0	0	0	0	5,170	0	5,170
Total	53,786	25,125	78,910	88,465	80,770	169,235	1	6	7	160,262	23,225	183,488	302,514	129,126	431,640

Source: Longworth et al., 2013

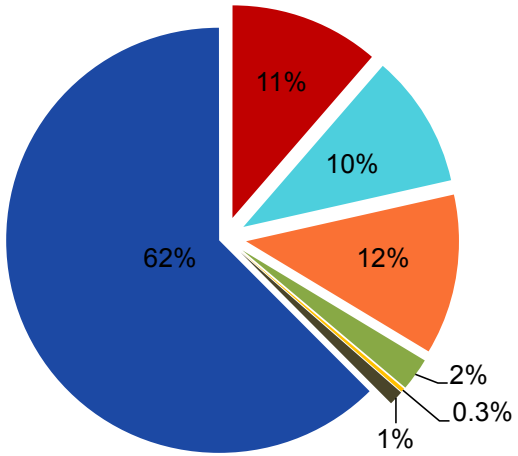
[a] Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this table.

Surface Water



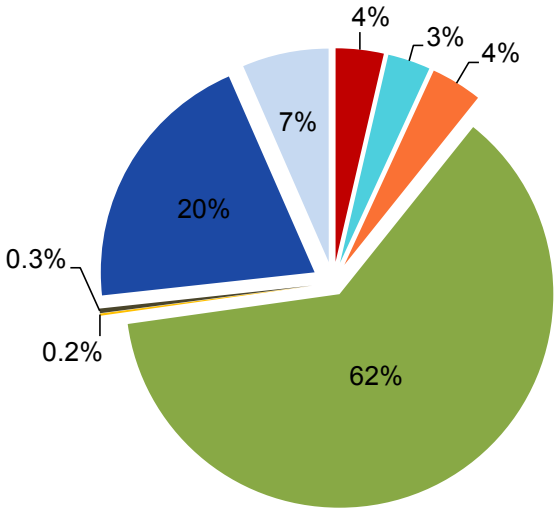
Total usage: 53,786 acre-feet

Groundwater



Total usage: 25,125 acre-feet

Total



Total usage: 78,910 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

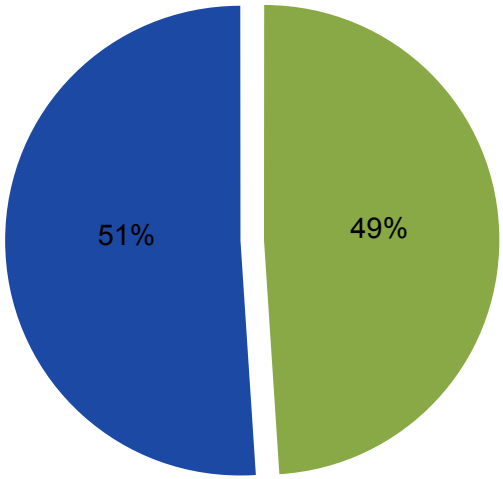
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Sandoval County Water Demand, 2010

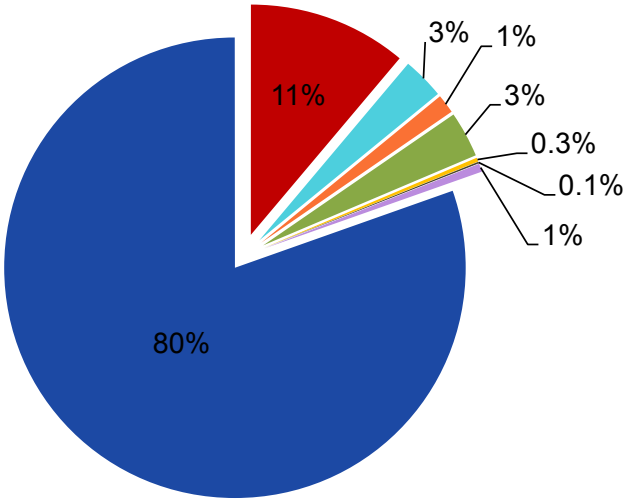
Figure 6-1a

Surface Water



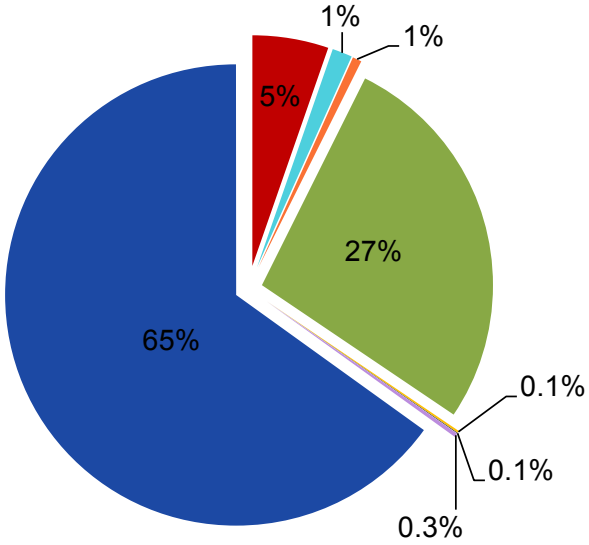
Total usage: 88,465 acre-feet

Groundwater



Total usage: 80,770 acre-feet

Total



Total usage: 169,235 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

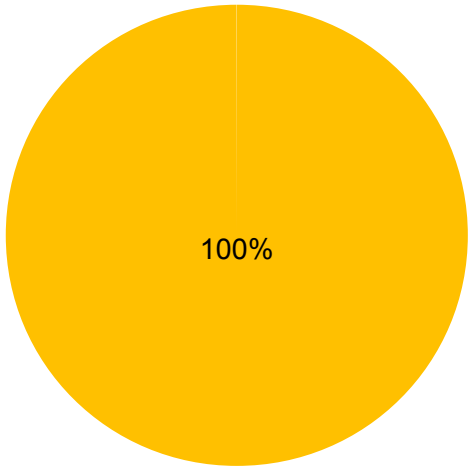
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Bernalillo County Water Demand, 2010

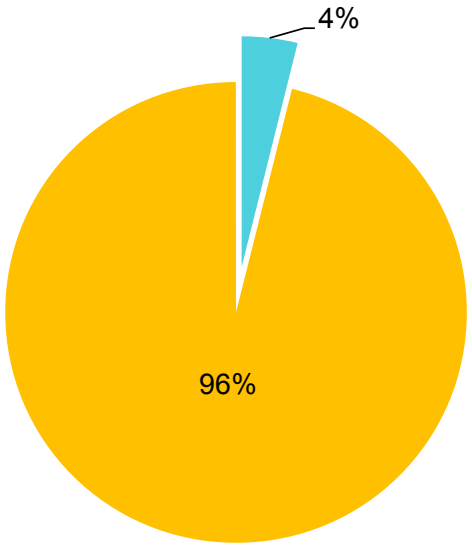
Figure 6-1b

Surface Water



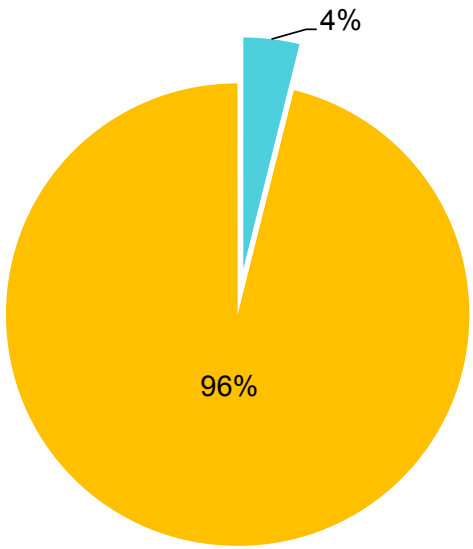
Total usage: 1 acre-foot

Groundwater



Total usage: 6 acre-feet

Total



Total usage: 7 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

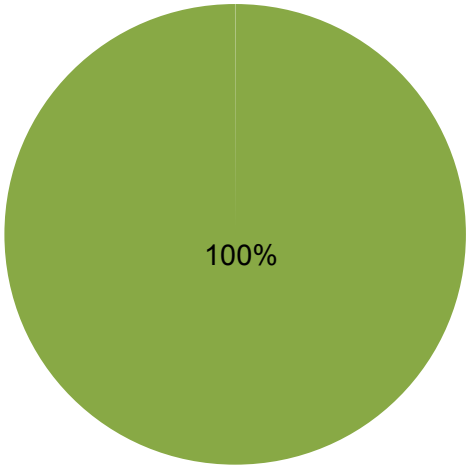
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Torrance County Water Demand, 2010

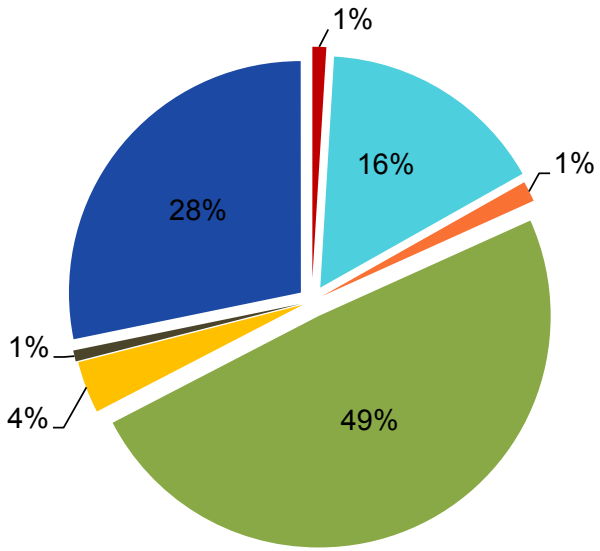
Figure 6-1c

Surface Water



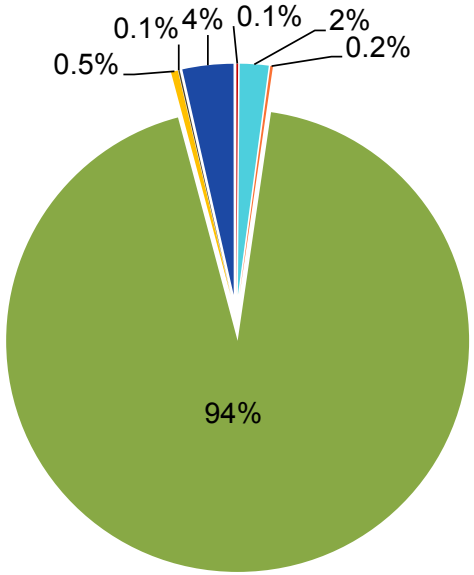
Total usage: 160,262 acre-feet

Groundwater



Total usage: 23,225 acre-feet

Total



Total usage: 183,488 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

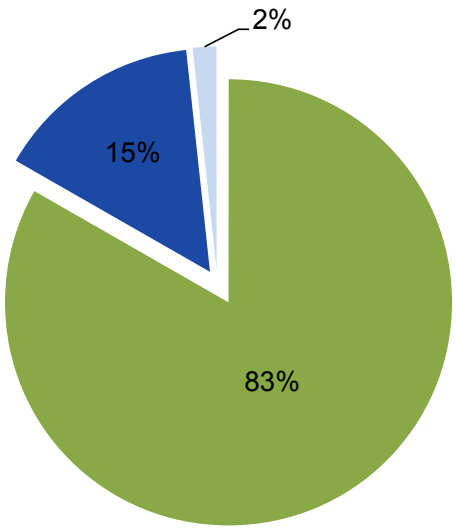
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Valencia County Water Demand, 2010

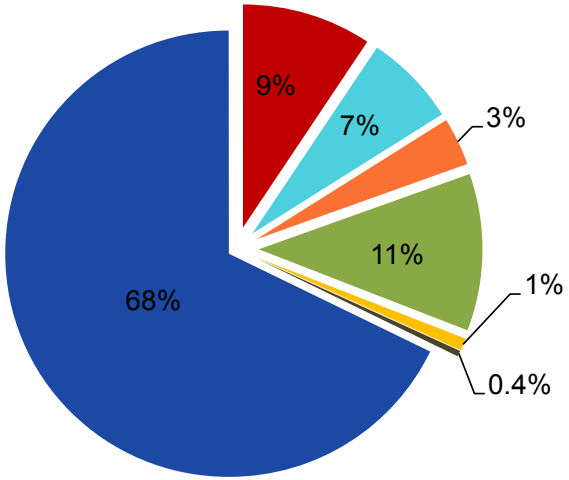
Figure 6-1d

Surface Water



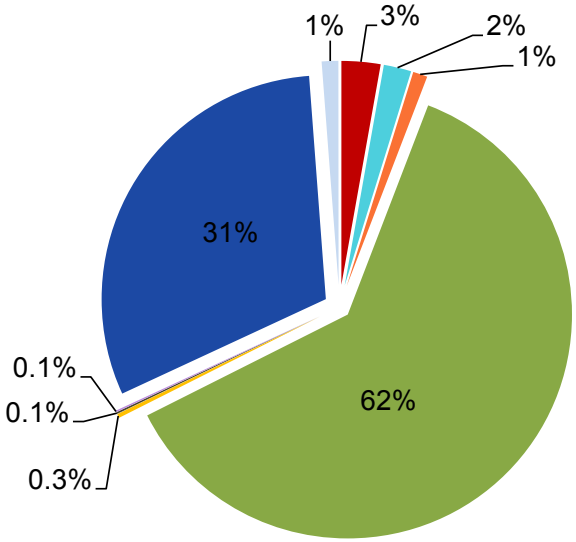
Total usage: 302,514 acre-feet

Groundwater



Total usage: 129,126 acre-feet

Total



Total usage: 431,640 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

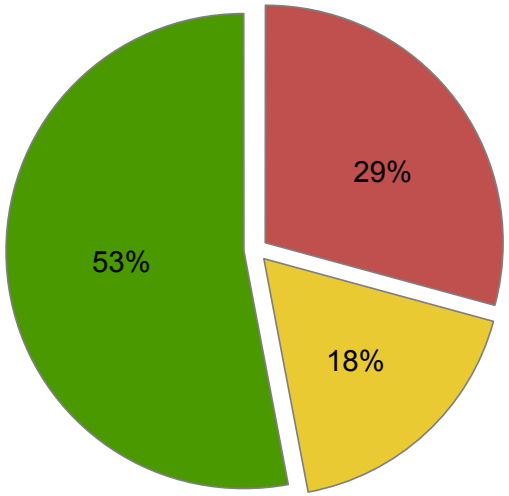
Notes:
1. Only categories with usage above 0.1% are shown.
2. Tribes and pueblos in New Mexico are not required to provide water use data to the State. Therefore, tribal water use data are not necessarily reflected in this figure.

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Total Regional Water Demand by Sector, 2010

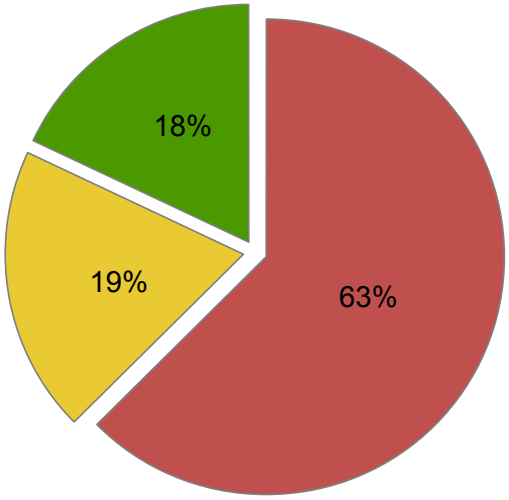
Figure 6-1e

Surface Water



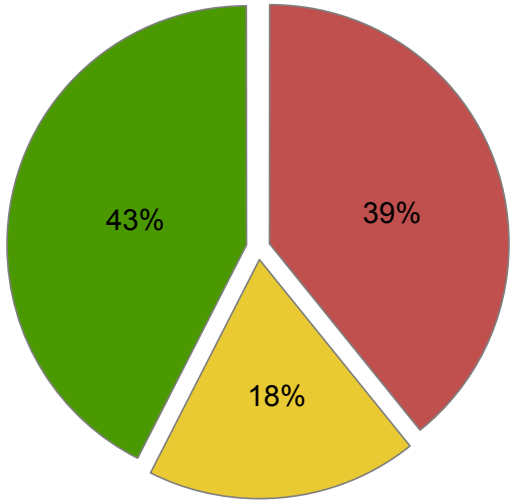
Total usage: 302,514 acre-feet

Groundwater



Total usage: 129,126 acre-feet

Total



Total usage: 431,640 acre-feet

Explanation

- Bernalillo
- Sandoval
- Valencia

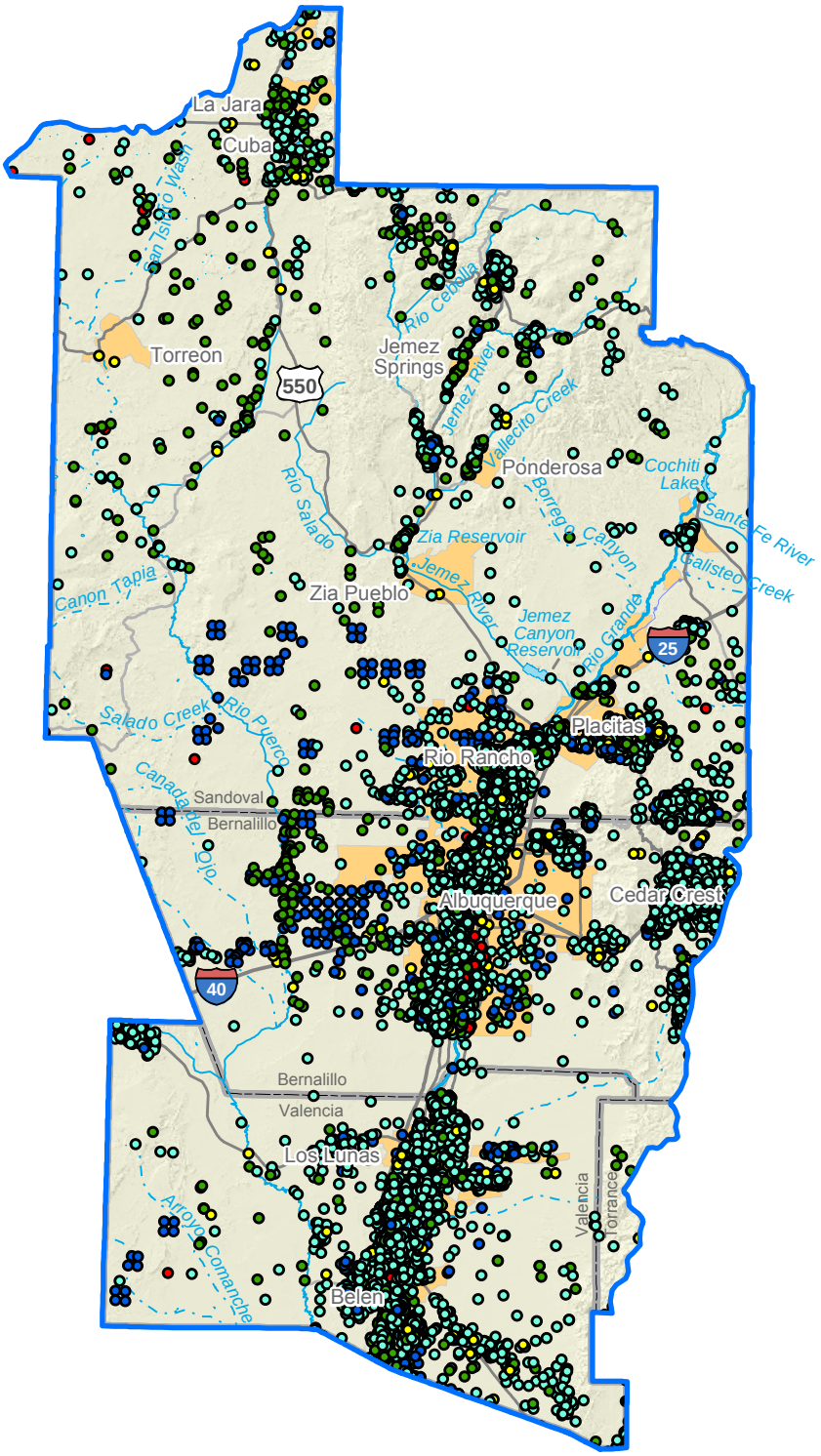
Source: Longworth et al., 2013

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.

Figure 6-1f

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Total Regional Water Demand by County, 2010



N

0 8 16 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

MIDDLE RIO GRANDE
REGIONAL WATER PLAN 2017

Groundwater Points of Diversion

Figure 6-2

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

- *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 (Section 7), 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. In the Middle Rio Grande region, the updated water budget estimated that riparian evapotranspiration in recent years was about 150,000 acre-feet per year.

- *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, to comply with endangered species requirements, and for 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 Middle Rio Grande Region includes the entirety of Valencia County and most of Bernalillo and

Sandoval counties. The 2013 populations of Sandoval, Bernalillo, and Valencia counties were 130,529, 656,267, and 76,569, respectively (U.S. Census Bureau, 2014a). As shown in Table 3-1a, the population all three counties experienced a high rate of population growth from 2000 to 2010; however, since 2010, growth has slowed in Bernalillo and Sandoval counties and population has declined slightly in Valencia County.

The Middle Rio Grande region is virtually coterminous with the Albuquerque Metropolitan Statistical Area (MSA), which also includes the small part of Torrance County located in the Middle Rio Grande region. The Albuquerque MSA is the major wholesale and retail trade center for the state of New Mexico. It also houses much of the state's manufacturing, including Intel, located near Rio Rancho. Albuquerque is the state's largest tourism destination (Tourism Economics, 2013) and the home to two of its three largest post-secondary institutions: the University of New Mexico and Central New Mexico Community College.

The largest employment categories in the region are education/healthcare, professional services, retail trade, and tourism-related services (arts, entertainment, recreation, hospitality, and food services). Manufacturing and construction are also important. Agriculture is the largest water user in Sandoval and Valencia counties, while public water supply is the largest sector in Bernalillo County.

As noted in Table 3-1d, milk from cows is the most valuable agricultural commodity in Valencia County. Livestock are important commodities in all three counties, with nurseries and greenhouses important in Bernalillo County. Land use in the region was described in the 2004 RWP and there have not been substantial changes.

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

6.2.1 Sandoval County

The City of Rio Rancho comprises about 70 percent of the population of Sandoval County. Sandoval County experienced an explosive rate of growth since 1970, with the population increasing from 17,492 in 1970 to 63,319 in 1990 and 131,561 in 2010. Since 2010, growth has been slower, with the population in 2013 estimated at 136,575 (U.S. Census Bureau, 2014a). Wage and salary employment has increased slightly, from 51,029 in 2010 to 51,509 in 2013.

The Arrowhead Center at NMSU analyzed the economy of Sandoval 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 Sandoval County, the primary basic industries in 2011 were manufacturing (LQ of 3.36), information (LQ of 1.75), and arts, entertainment, and recreation (LQ of 1.40). It should be noted that the LQ for manufacturing dropped from 3.87 in 2007 to 3.36 in 2011; it is likely that manufacturing LQs for more recent years would be somewhat lower, due to job reduction at Intel.

The economy and housing markets in Rio Rancho have slowed in recent years. In 2012, payroll declined by $315 million from 2011 (U.S. Census Bureau, as cited in Albuquerque Business First, 2014). Over that same year, 2,283 non-farm jobs were lost. Single-family residential housing starts peaked at 3,084 in 2005 and have dropped to less than 500 units per year for each of the past four years (City of Rio Rancho, 2014). It is anticipated that housing starts will be at the level of 500 units for the next few years (Geisel, 2015). Beyond that, the market is expected to settle at a level of about 1,000 units per year.

Despite the explosion of urban growth in the county, some agricultural activity still takes place. According to the Census of Agriculture, the most valuable agricultural commodities in Sandoval County are cattle and calves and hay and other related crops (USDA NASS, 2014). The number of farms and ranches increased by 58 percent, from 652 in 2007 to 1,029 in 2012, and the amount of land in farms and ranches increased by 61 percent, from 591,736 acres to 950,133 acres. During that same five-year period, irrigated acreage increased from 8,993 acres to 9,425 acres, a gain of 5 percent. In 2012, farmers participating in governmental agricultural support programs received an average of $7,913, up 44 percent from 2007, with a total of $815,000 in government payments going to farmers in Sandoval County. The average farm had a net cash operating loss of $1,100. The average age of a farmer in 2012 was 60.2.

Alfalfa and pasture grasses are the main crops, with some wheat grown as well. The vast majority of farms (90 percent) are family-owned and under 20 acres, with the bigger farms growing alfalfa. Livestock are primarily beef cattle; herds have been reduced by 30 to 50 percent in the southern part of the county in the past two years, but less so in the north. The majority of farmers are over age 50. Some farmers are looking to alternative crops, such as chile along the Rio Grande, while others are leaving their lands fallow.

6.2.2 Bernalillo County

The City of Albuquerque comprises about 82 percent of the population of Bernalillo County. The county experienced relatively steady growth over the past century, with the population of the entire county increasing from 23,606 in 1910 to 262,199 in 1960, 480,577 in 1990, and 662,564 in 2010. Since 2010, growth has been slower, and the population in 2013 was estimated to be

674,221 (U.S. Census Bureau, 2014a). Wage and salary employment has decreased slightly during the past three years, from 280,395 in 2010 to 279,142 in 2013.

The Arrowhead Center at NMSU analyzed the economy of Bernalillo County and identified the basic industries that support the economy (Arrowhead Center, 2013). In Bernalillo County, the primary basic industries in 2011 were professional, scientific, and technical services (LQ of 1.32), information (LQ of 1.43), accommodations and food services (LQ of 0.98), and federal government civilian employment (LQ of 1.20). Military employment is also a basic industry; however, its LQ declined from 0.90 in 2007 to 0.78 in 2011.

The top existing job centers in Albuquerque are the I-25 North Corridor with 38,030 jobs in 2010, the Kirtland Air Force Base area with 30,007 jobs, the downtown area with 24,424 jobs, the UNM main campus with 14,615 jobs, and the midtown industrial area with 13,056 jobs (MRCOG, 2010). By 2035 MRCOG projects that the approximate number of jobs in these areas will increase as follows:

- I-25 North Corridor: 6,000
- Kirtland Air Force Base: 2,000
- Downtown: 1,000
- UNM Main Campus: 4,000

In addition, MRCOG projects that there will be nearly 30,000 jobs at Mesa del Sol by 2035. Mesa del Sol is a new planned community located south of the Sunport on land that was held by the State Land Office. The master plan allows for up to 37,500 homes by 2060. It is projected that 150 to 250 homes will be built per year for the next few years, with an annual average of 600 units after 2017. Currently, 213 lots are completed, with 120 units built or under construction. The master plan would also allow 18,000,000 square feet of commercial space (but excludes heavy industrial uses). There will be a 1,485-acre employment center (equivalent to 9,000,000 square feet of space), with absorption projected at 20 to 25 acres per year.

Another large development project is Santolina, on the West Mesa within Western Albuquerque Land Holdings LLC properties (formerly SunCal's Westland Development Company). The master plan for Santolina was approved by the County Commission in June 2015. The master plan includes residential development for 95,000 people and large-scale commercial development on tracts of 200 to 2,000 acres. Water is expected to be provided by ABCWUA.

City of Albuquerque officials are optimistic about future economic growth and project an annual 2 to 3 percent economic growth rate. Some of the positives include:

- Increasing diversification of the mission at Kirtland Air Force Base

- The continued presence of Sandia National Laboratories, with Lockheed Martin under contract to continue its management role for another three years, along with its support of science and technology, including cybersecurity
- Growth in regional medical care
- Increasing technology commercialization in support of research and development
- The development of an 86-acre aviation technology park near the Sunport
- A resource management consortium at Mesa del Sol
- A lack of weather-related disasters providing a competitive advantage over locations in other states

While there are many positives that could support economic growth, there are also a number of negative factors:

- Albuquerque was unsuccessful in attracting the Tesla battery plant, which is now located in the Reno, Nevada area.
- Eclipse Aerospace recently announced layoffs, although new hiring could occur when the economy improves (Santa Fe New Mexican, 2014).
- Forbes Magazine recently reported a new study by Moody's Investors Service that ranked Albuquerque number 200 among 200 metro areas in future job growth. Albuquerque is projected to have annual job growth of 0.2 percent over the next three years.
- EMCORE announced in October 2014 that it will no longer have a presence in New Mexico once the sale of its space solar photovoltaics division to Veritas is complete. Veritas has announced that the current 275 Albuquerque employees will retain their jobs, pay rates, and benefits for at least one year (Mayfield, 2014c).

Although not a basic industry in Bernalillo County, some agricultural activity is present. According to the Census of Agriculture, the most valuable agricultural commodities in the county are livestock and poultry, nursery and greenhouse, and hay and other related crops. (USDA NASS, 2014). From 2007 to 2012 the number of farms and ranches increased by 58 percent, from 635 to 1,006, and the amount of land in farms and ranches grew by 47 percent, from 237,735 acres to 350,638 acres. This led to a small decrease in average farm size, from 374 acres to 349 acres in 2012. Between 2007 and 2012 irrigated acreage declined from 7,757 acres to 5,283 acres, a decrease of 32 percent. In 2012, farmers participating in governmental agricultural support programs received an average of $1,982, down 74 percent from 2007, with a total of $172,000 in government payments going to farmers in Bernalillo County. The average farm had a net cash operating loss of $4,262. The average age of a farmer in 2012 was 60.7.

In 2013, four dairies, with 2,900 cows, were located in the county, a decrease of one dairy from 2006. Bernalillo County accounts for about 1 percent of the milk production in New Mexico.

The majority of farms in the county are family-owned and under 10 acres in size, with larger farms mostly for grazing and alfalfa. Farmers are switching to less water intensive crops and using more greenhouses. Most farmers are in their 50s and 60s or older, but there is a resurgence of farming among people in their 20s. Increasing urbanization and pressure from developers is making agriculture more vulnerable, with some water rights being sold off and some farmland being leased out.

6.2.3 Valencia County

Los Lunas and Belen are the largest municipalities within Valencia County. A portion of Valencia County was taken to form Cibola County in 1981. From 1990 to 2010, the population of Valencia County has increased steadily, from 45,325 to 76,569, but since 2010, the population has declined slightly, with the population in 2013 estimated at 76,284 (U.S. Census Bureau, 2014a). Wage and salary employment has also decreased slightly from 28,104 in 2010 to 27,547 in 2013.

The Arrowhead Center at NMSU analyzed the economy of Valencia County and identified the basic industries that support the economy (Arrowhead Center, 2013). In Valencia County, the primary basic industries in 2011 were agriculture (LQ of 1.84), health care and social assistance (LQ of 1.40), transportation and warehousing (LQ of 3.09), and state government (1.18). The state government LQ reflects the large employment base of the Central New Mexico Correctional Facility in Los Lunas.

The Village of Los Lunas and the City of Belen are both pursuing economic development opportunities, and both of them have been competing for the new Valencia Regional Medical Center, which could provide up to 450 new jobs. Los Lunas also hopes to land a new west side campus for UNM and to recover jobs that were lost by a cabinet manufacturer. There is the potential for more retail development in Los Lunas, and three housing developers are active in the community. Future growth rates in Los Lunas are expected to exceed pre-recession levels.

In addition to competing for the medical center, Belen is adding a larger cross runway to the airport and will then create a new free trade zone adjacent to the airport. The city is also working on a downtown master plan. The Rancho Cielo subdivision proposal has been changed to the multi-modal center and some of the water rights acquired earlier have been transferred, some to Rio Rancho (Hebard, 2016).

According to the Census of Agriculture, the most valuable agricultural commodities in Valencia County are milk from cows, hay and other related crops, and cattle and calves (USDA NASS, 2014). The number of farms and ranches increased by 78 percent, from 901 in 2007 to 1,607 in 2012, and the amount of land in farms and ranches increased by 32 percent, from 505,682 acres

to 669,727 acres. Also, during that same five-year period, irrigated acreage increased from 20,951 acres to 23,106 acres, a gain of 10 percent. In 2012, farmers participating in governmental agricultural support programs received an average of $6,280, up 467 percent from 2007, with a total of $641,000 in government payments going to farmers in Valencia County. The average farm had a net cash operating loss of $3,672. The average age of a farmer in 2012 was 57.6, somewhat below the state average.

The major crops grown in the county are alfalfa and pasture grasses. There are also some small vegetable and chile farms. A family-owned 5-acre farm is typical, but there are many 2-acre farms as well and a few large ranches of roughly 60,000 acres. There are about an equal number of beef and dairy cattle. Herds were reduced by about 50 percent during the past two years. Three-fourths of farmers and ranchers are in their 50s and 60s, and some are selling off their land.

6.3 Projected Population Growth

The population projections for the 2004 RWP (MRCOG and MRGWA, 2004) encompassed three forecasts, each covering the period from 2010 through 2050. The projections were based on county-level population forecasts prepared by the Bureau of Business and Economic Research (BBER) at the UNM using data and historical trends from 1960 up to the 2000 Census. These forecasts were made for the entirety of the three counties.

The high projections for Bernalillo and Sandoval County contained in the water plan were relatively accurate, as compared with 2010 Census data (Table 6-2). The high projection for the total Bernalillo County 2010 population of 663,050 was very close to the census figure of 662,564. The water plan high projection of a 2010 population of 139,803 for all of Sandoval County was relatively close to the census figure of 135,383.

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

County	2004 Regional Water Plan Projected Population [a]		Actual Population 2010 U.S. Census [b]	
	High (Series A)	Low (Series C)	Entire County	County Portion Within Planning Region
Sandoval	139,803	123,764	135,383	130,529
Bernalillo	663,050	619,581	662,564	656,267
Valencia	98,083	86,089	76,569	76,569
Total Region	900,936	829,434	874,516	863,365

[a] MRCOG and MRGWA, 2004 (for entirety of counties)

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

Since 2008, drought and the national recession that started in 2007 have resulted in population growth in Valencia County that was slower than anticipated. Given these changes, the 2004 water plan high and low growth scenarios were each too optimistic for Valencia County (Table 6-2). The BBER and the Middle Region (formerly Middle Rio Grande) Council of Governments have each continued to revise population projections downward during the past 14 years to reflect slower growth than originally anticipated (BBER, 2008, 2012).

New Mexico has been one of the slowest states to recover from the recession, with much of the impact of the recession being felt within the Middle Rio Grande region, which comprises a large portion of the state's economy. The Albuquerque MSA has continued to lose jobs since the end of the recession nationally, with 1,578 jobs being lost from 2010 to 2013 (New Mexico Department of Workforce Solutions, 2014). The unemployment rate has decreased from 8.3 percent in 2010 to 7.2 percent in 2013; however, this decline is due to workers dropping out of the work force (some of whom have moved out of the state), rather than to increased hiring.

Persons who were interviewed for this project are, on the whole, somewhat pessimistic about the near-term future of the region's economy. A researcher who tracks industrial and retail developments of over 10,000 square feet states that currently, no new office construction, little industrial construction, and no new major retail projects are expected in 2015, and only a "minor uptick" in construction activity is expected over the next five years. Whereas the last ten years saw an average of 400,000 square feet added per year, he projects that there will be an average of 250,000 square feet built during each of the next five years. He does see some potential for construction of multi-family and assisted living units.

According to MRCOG, the peak year for residential building permits in the region was 2005, when 10,516 permits were issued. This number has decreased substantially since 2005, with only 1,710 permits issued in 2011.

The New Mexico Department of Workforce Solutions projected in 2013 that the Albuquerque MSA would gain 61,320 jobs between 2010 and 2020, an increase of 15.8 percent or about 1.5 percent per year. (Since the region lost 1,578 jobs between 2010 and 2013, this would imply an addition of 62,898 jobs between 2013 and 2020.) The industries with the greatest growth are expected to be health care and social assistance (an industry that is growing nationally because of the Affordable Care Act), tourism, education, retail, administration, and professional and scientific. Manufacturing is projected to lose 870 jobs, a decline of 5 percent. A more recent 2014 forecast projects a net gain of 56,724 jobs between 2012 and 2022, with a loss of 1,086 jobs in manufacturing.

The MRCOG recognizes that the BBER forecasts of 2012 were probably too optimistic. They have recommended that counties within the region adjust the BBER forecast for 2035, by replacing it with the lower BBER forecast for 2025.

For this regional water plan update population was projected through 2060 (Table 6-3) under two scenarios: one based on a moderately optimistic view of the economy for this region over the long-term and one that portrays a more pessimistic picture. The current (2012) BBER population projections through 2040 (Appendix 6-B) were used as a starting point for the high population projections, extrapolated through 2060, except that they were dampened for the 2010 to 2020 period to take into account the actual slower rate of growth that has occurred since 2010 compared to the forecast for 2020. Under these projections, it is assumed that major employers will create job opportunities within the region. Under the high scenario, population is projected to reach 1,096,253 in 2060 in Bernalillo County, 311,363 in Sandoval, and 115,943 in Valencia.

The low population projections are lower and assume a loss of the Intel plant and a lower rate of job growth. Under the low forecast, the population in 2060 is projected to reach 928,487 in Bernalillo County, 157,144 in Sandoval, and 97,713 in Valencia (Table 6-3).

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 Middle Rio Grande 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.

Table 6–3. Middle Rio Grande 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
Bernalillo	High	1.28	1.28	0.91	0.87	0.82
	Low	0.96	0.77	0.68	0.59	0.49
Sandoval	High	2.27	2.32	1.83	1.41	0.96
	Low	0.00	0.54	0.49	0.44	0.39
Valencia	High	0.90	1.10	0.81	0.72	0.63
	Low	0.59	0.54	0.49	0.44	0.39

b. Projected Population

County	Projection	Population					
		2010	2020	2030	2040	2050	2060
Bernalillo	High	656,267	745,322	846,835	926,946	1,010,371	1,096,253
	Low	656,267	721,894	779,645	834,220	884,274	928,487
Sandoval	High	130,529	163,357	205,405	246,137	283,058	311,363
	Low	130,529	130,529	137,708	144,593	151,100	157,144
Valencia	High	76,569	83,782	93,459	101,272	108,867	115,943
	Low	76,569	81,163	85,627	89,908	93,954	97,713

Source: Poster Enterprises, 2014

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
Sandoval County					
Rio Grande(Northern)	Cochiti Lake Water System [c]	114	156	0	20
	Pena Blanca MDWCA	465	82	0	42
Rio Grande (Middle)	Algodones WUA	675	24	0	18
	Anasazi Trails Water Cooperative	105	174	0	21
	Bernalillo Water System	9,200	117	0	1,209
	Cañon MDWCA	320	129	0	46
	Cedar Creek Water Cooperative Inc.	153	39	0	7
	Corrales Village [c]	83	191	0	18
	Cuba Water System	800	161	0	144
	Desert Sky Mountain Water Cooperative	114	90	0	11
	Hofheins/Marcel Thomas Assoc Coop Inc (Rio Grande)	83	69	6	0
	Homestead Village	120	52	0	7
	Jemez Canyon Estates DWCA	250	71	0	20
	Jemez Springs MDWCA (Rio Grande)	1,500	113	110	80
	La Jara Water Users Association (Rio Grande)	450	44	22	0
	La Mesa Water Co-Op	650	121	0	88
	La Puerta (Rio Grande)	30	172	5	0
	Las Acequias De Placitas (Rio Grande)	108	607	73	0
	North Ranchos de Placitas	426	98	0	47
	Orchard Estates Faculty Lane Water Assoc	36	152	0	6
	Overlook Water Cooperative/ J & J Utilities	122	89	0	12

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 surface water basin is provided in parentheses.

[c] Groundwater basin assumed based on geographical 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
Sandoval County (cont.)					
Rio Grande (Middle) (cont.)	Placitas Trails Water Co-op	375	105	0	44
	Placitas West Water Co-Op	110	116	0	14
	Ponderosa MDWCA	406	91	0	42
	Pueblo Los Cerros Browood	200	132	0	30
	Ranchos de Placitas Sanitation Dist	300	116	0	39
	Regina MDWCA (Rio Grande)	550	58	2	33
	Rio Rancho - City of	82,154	147	0	13,563
	Rio Rancho Estates (Mike Rowland) [c]	168	46	0	9
	San Ysidro	240	113	0	30
	Sierra Los Pinos Home Owners Ass	300	80	0	27
	Sile MDWCA	168	89	0	17
	Vista del Oro de Placitas	72	97	0	39
NA	Cielo Vista Water Cooperative	50	28	0	2
	La Cueva Hermosa	25	265	0	7
	Puesta Del Sol	30	77	0	3
	Sandoval County public water supply totals	100,952		219	15,696
	County-wide public water supply per capita use		141		
Rio Grande (Middle and Northern)	Rural self-supplied homes (Rio Grande)	19,966	80	0	1,789
Rio Grande (Middle)	Corrales self-supplied [c] (Rio Grande)	8,424	80	0	755
	Sandoval County domestic self-supplied totals	28,390		0	2,544
	County-wide domestic self-supplied per capita use		80		

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

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

[b] For systems supplied by surface water withdrawals, the surface water basin is provided in parentheses.

[c] Groundwater basin assumed based on geographical 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
Bernalillo County					
Estancia	Entranosa Water and Wastewater Coop [part]	7,844	59	0	519
Rio Grande (Middle)	ABCWUA (Rio Grande)	606,780	157	45,099	61,618
	Baker's/ Hamilton Mobile Home Park	200	133	0	30
	Barcelona Mobile Home Park	350	70	0	28
	Chamisa Mobile Home Park	55	100	0	6
	Coronado Village Country Club	870	97	0	95
	Desert Palms Mobile Home Park	210	101	0	24
	Green Acres Mobile Home Park	150	133	0	22
	Hamilton Mobile Home Park	69	59	0	5
	Homestead Mobile Home Community	185	46	0	10
	Kirtland Air Force Base	3,560	176	0	702
	La Mesa Villa Mobile Home Park, LLC1	85	95	0	9
	Mountain View Mobile Home Park	90	97	0	10
	NM Waterworks, LLC	115	100	0	13
	North Court Mobile Home Park	100	251	0	28
	Oakland Heights Homeowners Assn.	31	108	0	4
	Paakweree Village Water Co-Op Assoc, Inc	110	100	0	12
	San Luis Cabezon MDWCA	200	100	0	22
	Sandia Peak Utility Company	5,935	146	0	971
	South Hills water Company	600	88	0	59
	Sunburst Ranch--South Hills Wtr Co.	560	107	0	67

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 surface water basin is provided in parentheses.

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

gpcd = Gallons per capita per day
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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
Bernalillo County (cont.)					
Rio Grande (Middle) (cont.)	Sunset Hills Estates Homeowners Ass	75	375	0	31
	Tierra Monte WUA	85	71	0	7
	Tierra West Estates--MHP	2,000	100	0	224
	Tom's Mobile Home Park	50	56	0	3
	Tranquillo Pines Water System [part]	375	52	0	22
	Valle Grande Mobile Home Park	137	91	0	14
	Ventura Estates	100	215	0	24
Rio Grande (Middle) Sandia	Tijeras Village	500	49	0	27
Sandia	Cedar Crest MDWC & SWC	50	188	0	11
	Forest Park Property Owners Coop	235	75	0	20
	Fox Hills WUA	69	36	0	3
	Liesure Mountain Mobile Home Park	162	100	0	18
	Old Sandia Park Service CO-OP (Rio Grande)	200	238	53	0
	Sierra Vista Mutual Domestic Association/Sierra Vista Utilidades Co-op	300	127	0	43
	Sierra Vista South Water Co-Op	128	88	0	13
	The Rincon Water Cooperative	392	63	0	27
	Tijeras Land Estates Water System	170	90	0	17
	Vista Bonita Water Co-op	45	45	0	2
	Vista De Manana	80	50	0	4

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 surface water basin is provided in parentheses.

[c] Groundwater basin assumed based on geographical 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
Bernalillo County (cont.)					
NA	Juan Road Water System	34	69	0	3
	La Cueva Estates Community Association	300	144	0	48
	Lisa Property Water System	50	54	0	3
	New Mexico Water Service Company/Sandia Knolls/Independent Utility Co.	1,260	57	0	81
	Safariland Mobile Home Park	40	95	0	4
	Van Gelder, Charles	20	69	0	2
	Western Heights Mobile Home Park	168	250	0	47
Bernalillo County public water supply totals		635,124		45,152	64,951
County-wide public water supply per capita use			155		
Rio Grande (Middle)	Corrales self-supplied homes [part] [c] (Rio Grande)	382	100	0	43
Rio Grande (Middle) Sandia	Rural self-supplied homes (Rio Grande)	20,679	100	0	2,326
Bernalillo County domestic self-supplied totals		21,061		0	2,369
County-wide domestic self-supplied per capita use			100		
Valencia County					
Rio Grande (Middle)	Belen Water System	9,780	165	0	1,813
	Bosque Farms Water Supply System	4,000	76	0	339
	Bosque Gardens MDWCA	140	133	0	21
	Central New Mexico Correctional Facility	1,620	52	0	94
	Correo Water Association	222	100	0	25

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

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

[b] For systems supplied by surface water withdrawals, the surface water basin is provided in parentheses.

[c] Groundwater basin assumed based on geographical 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
Valencia County (cont.)					
Rio Grande (Middle) (cont.)	D & J Mobile Home Park	17	96	0	2
	El Shaddai Mobile Home Park	75	130	0	11
	Hi Mesa Estates Water Coop	134	72	0	11
	Highland Meadows Estates MDWCA	61	112	0	8
	JC Mobile Home Park	35	92	0	4
	Loma Escondida Water Association	50	100	0	6
	Los Lunas Water System	14,284	157	0	2,508
	Meadow Lake Water System [operator: NMWSC]	2,310	93	0	240
	Monterey Water Company, Inc.	1,840	49	0	101
	New Mexico Water Service Company [Cypress Gardens Water Users Association]	1,448	66	0	107
	New Mexico Water Service Company/Rio Del Oro/Rio Communities	7,305	152	0	1,245
	Santa Socorro Trailer Park	48	28	0	1
	Senior Living Systems, Inc.	50	49	0	3
	Silver Spruce Estates Water Company	70	130	0	10
	Trails End Mobile Home Park	120	28	0	4
	Trinity Mobile Home Park	50	30	0	2
Valencia County public water supply totals		43,659		0	6,554
County-wide public water supply per capita use			134		

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 surface water basin is provided in parentheses.

[c] Groundwater basin assumed based on geographical 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
Valencia County (cont.)					
Rio Grande (Middle)	Rural self-supplied homes (Rio Grande)	32,910	100	0	3,686
	Valencia County domestic self-supplied totals	32,910		0	3,686
	County-wide domestic self-supplied per capita use		100		
Torrance County					
Rio Grande (Middle)	Rural self-supplied homes (Rio Grande)	3	80	0	0
	Valencia County domestic self-supplied totals	3		0	0
	County-wide domestic self-supplied per capita use		80		

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

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

[b] For systems supplied by surface water withdrawals, the surface water basin is provided in parentheses.

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

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

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.
- 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 Middle Rio Grande region, Sandoval, Bernalillo, and Valencia counties currently have per capita use between 130 and 200 gpcd (141, 155, and 134 gpcd respectively [Table 6-4]), so their future per capita use is assumed to be reduced to 130 gpcd. In the projections, these reductions are phased in over time.

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

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

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

- Consumptive use occurs when water is permanently removed from the system due to crop evapotranspiration (i.e., evaporation and transpiration). Evapotranspiration is determined by factors that include crop and soil type, climate and growing season, on-farm management, and irrigation practices.
- Non-consumptive use occurs when water is temporarily removed from the stream system for conveyance requirements and is returned to the surface or groundwater system from which it was withdrawn.
- Incidental losses from irrigation are irrecoverable losses due to seepage and evapotranspiration during conveyance that are not directly attributable to crop consumptive use.
    - Seepage losses occur when water leaks through the conveyance channel or below the root zone after application to the field and is either lost to the atmosphere or remains bound in the soil column.
    - Evapotranspiration occurs as a result of (1) evaporation during water conveyance in canals or with some irrigation methods (e.g., flood, spray irrigation) and (2) transpiration by ditch-side vegetation.

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

Due to the complexities in agricultural irrigation efficiency, no quantitative estimates of savings are included in the projections. However, the regions are encouraged to explore strategies for agricultural conservation, especially those that result in consumptive use savings through changes in crop type or fallowing of land while concentrating limited supplies for greater economic value on smaller parcels. Section 8 outlines strategies developed by the Middle Rio Grande 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 require site-specific analyses that are not available; therefore no additional conservation savings are assumed in the water demand projections.

Reservoir evaporation. In many parts of New Mexico, reservoir evaporation is one of the highest consumptive water uses, but in the Middle Rio Grande region it is relatively low, 5,170 acre-feet in 2010. NMOSE tracks reservoir evaporation only in reservoirs greater than 5,000 acre-feet of storage and assigns the evaporation use to the county in which the reservoir is located. Therefore, while the Middle Rio Grande region relies on storage in upstream reservoirs (Heron, El Vado, and Abiquiu) and deliveries are required to Elephant Butte which has very high evaporation, those uses are not tracked in the region. To reduce usage in this category, some areas outside of the region have considered aquifer storage and recovery to replace some reservoir storage, and it may also be possible in some circumstances to gain some reduction in evaporation by storing more water at higher elevations or constructing deeper reservoirs with less surface area for evaporation. However, due to the legal, financial, and other complexities of implementing these techniques, no conservation savings are assumed in developing the reservoir evaporation demand projections for this region.

6.5 Projections of Future Water Demand for the Planning Horizon

To develop projections of future water demand a consistent method was used statewide. Section 6.5.1 provides a comprehensive discussion of the methods applied consistently throughout the state to project water demand in all the categories reported in the *New Mexico Water Use by Categories* reports, and some of the categories may not be applicable to the Middle Rio Grande region. The projections of future water demand determined using this consistent method, as applicable, for the Middle Rio Grande 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 Middle Rio Grande 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 use 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 use 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 use is expected, both the high and low projections are the same.

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

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

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

6.5.2 Middle Rio Grande 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, in the three main counties population is projected to grow in the high projection and at a lower rate in the low projection (the Torrance County population in the region is so small that it did not affect future water demand projections). The total projected water demand in the county in 2060 ranges from 464,069 to 511,064 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 under both scenarios, proportional to the increasing population projections, but the demand increase is moderated by phased-in conservation, as discussed in Section 6.4.

Projected water demand in the *commercial* and *domestic* categories is assumed to be proportional to the population growth rates. The high projection shows demand almost doubling by 2060 in these categories, and the low projection shows more moderate growth.

Despite the large urban area in the Middle Rio Grande, the highest water use in the region occurs in the *irrigated agricultural category*, and interviews (Section 6.2) indicated that this sector has trended toward increasing urbanization and pressure from developers. The agricultural projections are based on the assumption that the current drought and recent recession is thought to be driving recent declines in agricultural production. 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 irrigated farms and surface water rights in the region (Section 4), there is clearly a demand for agricultural water if it is available. Hence, water use in this category is projected to remain constant at 2010 levels throughout the planning period. This assumption is made recognizing that the basin is fully appropriated and any new use of water requires a like reduction in use of an existing water right within the Middle Rio Grande Basin.

The *livestock* category in the three counties is expected see a decline by 2020, but to recover to 80 to 85 percent of 2010 water usage in the low projection and to 90 to 95 percent in the high projections. Under the low scenario, it is expected that some ranches will go out of business because younger people, who do not view ranching as a desirable or economically viable career choice, will not replace the older generation of ranchers.

Economic activity in the region includes a considerable amount of industrial activity, along with some power plants and limited mining activity. To project potential future water demand, economists conducted interviews to determine if growth or decline is expected in these sectors. Based on these interviews, each of these sectors is discussed below with regard to future water demand.

Table 6-5. Projected Water Demand, 2020 through 2060 Middle Rio Grande Water Planning Region

Use Sector	Projection	Water Demand (acre-feet) [a]					
		2010 [b]	2020	2030	2040	2050	2060
Sandoval County							
Public water supply	High	15,915	19,822	24,653	29,137	33,004	36,175
	Low	15,915	15,915	16,753	17,523	18,220	18,897
Domestic (self-supplied)	High	2,544	3,190	4,017	4,818	5,544	6,101
	Low	2,544	2,544	2,685	2,821	2,949	3,068
Irrigated agriculture	Low/High	48,946	48,946	48,946	48,946	48,946	48,946
Livestock (self-supplied)	High	130	91	98	104	110	117
	Low	130	65	78	91	98	104
Commercial (self-supplied)	High	2,865	3,585	4,508	5,402	6,212	6,833
	Low	2,865	2,865	3,022	3,173	3,316	3,449
Industrial (self-supplied)	High	3,066	3,066	3,066	3,066	3,066	3,066
	Low	3,066	153	307	460	613	766
Mining (self-supplied)	Low/High	275	275	275	275	275	275
Power (self-supplied)	Low/High	0	0	0	0	0	0
Reservoir evaporation	High	5,170	5,220	5,270	5,331	5,411	5,451
	Low	5,170	5,170	5,170	5,170	5,170	5,170
Bernalillo County							
Public water supply	High	110,103	118,564	127,453	133,672	139,531	146,669
	Low	110,103	116,338	121,336	125,598	129,052	132,726
Domestic (self-supplied)	High	2,369	2,690	3,056	3,346	3,647	3,957
	Low	2,369	2,605	2,814	3,011	3,192	3,351
Irrigated agriculture	Low/High	45,913	45,913	45,913	45,913	45,913	45,913
Livestock (self-supplied)	High	232	162	186	197	209	220
	Low	232	139	162	174	186	197
Commercial (self-supplied)	High	8,991	10,212	11,602	12,700	13,843	15,020
	Low	8,991	9,891	10,682	11,430	12,115	12,721
Industrial (self-supplied)	High	1,072	1,340	1,608	1,876	2,144	2,412
	Low	1,072	1,126	1,179	1,233	1,286	1,340
Mining (self-supplied)	Low/High	89	89	89	89	89	89

[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)

Table 6-5 Projected Water Demand, 2020 through 2060
Middle Rio Grande Water Planning Region
Page 2 of 3

Use Sector	Projection	Water Demand (acre-feet) [a]					
		2010 [b]	2020	2030	2040	2050	2060
Bernalillo County (cont.)							
Power (self-supplied)	High	466	586	611	696	836	836
	Low	466	541	566	641	776	776
Reservoir evaporation	Low/High	0	0	0	0	0	0
Valencia County							
Public water supply	High	6,554	7,166	7,977	8,620	9,234	9,821
	Low	6,554	6,944	7,317	7,669	7,997	8,308
Domestic (self-supplied)	High	3,686	4,034	4,500	4,876	5,241	5,582
	Low	3,686	3,908	4,122	4,329	4,523	4,704
Irrigated agriculture	Low/High	171,622	171,622	171,622	171,622	171,622	171,622
Livestock (self-supplied)	High	888	533	622	710	755	799
	Low	888	444	533	622	666	710
Commercial (self-supplied)	High	221	242	270	292	314	335
	Low	221	234	247	260	271	282
Industrial (self-supplied)	High	331	381	430	480	530	579
	Low	331	348	364	381	397	414
Mining (self-supplied)	Low/High	179	179	179	179	179	179
Power (self-supplied)	High	6	61	61	61	61	61
	Low	6	56	56	56	56	56
Reservoir evaporation	Low/High	0	0	0	0	0	0
Torrance County							
Public water supply	Low/High	0	0	0	0	0	0
Domestic (self-supplied)	Low/High	0	0	0	0	0	0
Irrigated agriculture	Low/High	0	0	0	0	0	0
Livestock (self-supplied)	High	7	4	4	5	6	6
	Low	7	3	4	4	5	5
Commercial (self-supplied)	Low/High	0	0	0	0	0	0
Industrial (self-supplied)	Low/High	0	0	0	0	0	0
Mining (self-supplied)	Low/High	0	0	0	0	0	0

[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)

Table 6-5 Projected Water Demand, 2020 through 2060
Middle Rio Grande Water Planning Region
Page 3 of 3

Use Sector	Projection	Water Demand (acre-feet) [a]					
		2010 [b]	2020	2030	2040	2050	2060
Torrance County (cont.)							
Power (self-supplied)	Low/High	0	0	0	0	0	0
Reservoir evaporation	Low/High	0	0	0	0	0	0
Total region							
Public water supply	High	132,572	145,553	160,083	171,429	181,770	192,666
	Low	132,572	139,197	145,406	150,791	155,268	159,932
Domestic (self-supplied)	High	8,599	9,913	11,573	13,039	14,432	15,640
	Low	8,599	9,057	9,622	10,160	10,664	11,123
Irrigated agriculture	Low/High	266,481	266,481	266,481	266,481	266,481	266,481
Livestock (self-supplied)	High	1,250	786	906	1,011	1,074	1,136
	Low	1,250	648	773	887	950	1,011
Commercial	High	12,077	14,039	16,380	18,394	20,369	22,188
(self-supplied)	Low	12,077	12,990	13,951	14,862	15,703	16,452
Industrial (self-supplied)	High	4,469	4,787	5,104	5,422	5,740	6,057
	Low	4,469	1,627	1,850	2,074	2,296	2,520
Mining (self-supplied)	Low/High	543	543	543	543	543	543
Power (self-supplied)	High	472	647	672	757	897	897
	Low	472	597	622	697	832	832
Reservoir evaporation	High	5,170	5,220	5,270	5,331	5,411	5,451
	Low	5,170	5,170	5,170	5,170	5,170	5,170
Total regional demand	High	431,640	447,972	467,016	482,412	496,723	511,064
	Low	431,640	436,313	444,421	451,670	457,911	464,069

[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)

Within Bernalillo County, the high scenario for the *industrial* category is predicated on adding 25 percent of 2010 usage during each decade, while the low is based on adding 5 percent of 2010 usage each decade. In Valencia County, the high scenario assumes an additional 15 percent of 2010 usage during each decade, while the low assumes an additional 5 percent of 2010 usage in each decade.

The projections for the *power* plant sector are based on input received from PNM, based on their proposed Integrated Resource Plan, which is currently under review by the New Mexico Public Regulation Commission. That plan calls for the continued operation of the Reeves gas unit in Bernalillo County (which currently uses 466 acre-feet of water, of which 250 acre-feet serves the plant and the balance serves agriculture). Water usage by the plant is projected to increase to 516 acre-feet by 2020 under the low scenario and to 556 acre-feet under the high. It is also assumed that a new plant will be built in Bernalillo County by 2020 and will use an increasing amount of water over time, reaching 250 acre-feet by 2060 under the low scenario and 280 acre-feet under the high. Finally, it is assumed that the La Luz gas plant in Valencia County will be operational by 2020 and will use 50 acre-feet per year under the low scenario and 55 under the high.

For the *mining* sector, no change in water usage is projected through 2060. Most of the mines are relatively small, with the largest being the American Gypsum operation in Valencia County.

The Middle Rio Grande region projections include water use in the *reservoir evaporation* category from Cochiti and Jemez Canyon reservoirs. Cochiti is primarily a flood control reservoir that has little impact on water supply in the region. As discussed in Section 6.5.1, the projected demand is based on 2010 reservoir surface areas so that it can accurately be compared to the 2010 administrative water supply, with the high projection reflecting increased temperatures and evaporation rates. The reservoir evaporation category is included for statewide accounting, but has little bearing on the supply available to the region.

7. Identified Gaps between Supply and Demand

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

- Because of the nature of the Rio Grande Compact, the supply available to the Middle Rio Grande region is inextricably linked to that of the Jemez y Sangre and Socorro-Sierra regions. Issues that affect those regions could affect the Middle Rio Grande and vice-versa.
- Both supplies and demands vary considerably over time, and although long-term balanced supplies may be in place, the potential for drought or, conversely, high flows and flooding must be considered. In general, storage, including the capture of extreme flows for future use, is an important aspect of allowing surface water supplies to be used

when needed to meet demand during drought periods (i.e., reservoir releases may sustain supplies during times when surface water supplies are inadequate).

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

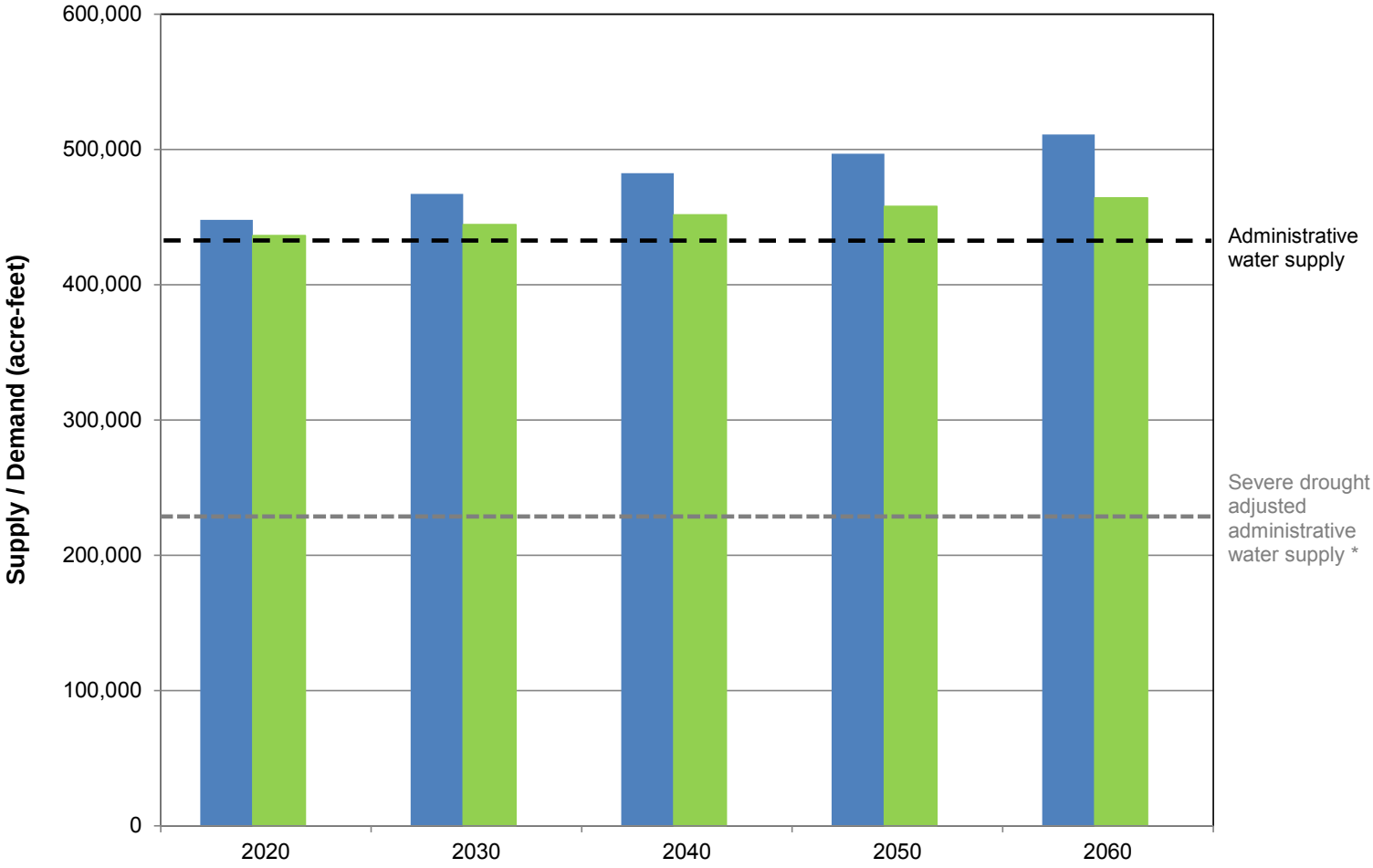
- Supplies in one part of the region may not necessarily be available to meet demands in other areas, particularly in the absence of expensive infrastructure projects. Therefore comparing the supplies to the demands for the entire region without considering local issues provides only a general picture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

- As discussed in Section 6.5.1, the fluctuations in reservoir evaporation are expected to be greater than the projected high/low range developed for this balance. When comparing the projected demands to the administrative water supply, which is based on 2010 water withdrawals, 2010 surface areas of reservoirs were used to avoid an unrealistic scenario of excess available water. The actual amount of water that will be used for reservoir evaporation is dependent on the surface area of the reservoir and temperatures.

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

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

Despite these limitations, it is useful to have a general understanding of the overall balance of the supply and demand. Figure 7-1 illustrates the total projected regional water demand under the high and low demand scenarios, and also shows the administrative water supply and the drought-adjusted water supply. As presented in Section 5.5, the region's administrative water supply is 431,640 acre-feet and the drought supply is 228,955 acre-feet, or about 53 percent of a normal year administrative water supply. Future water demand projections reflect moderate growth under the low projection and higher growth in high projection (Figure 7-1). Even without the projected growth in demand, major supply shortages are indicated in drought years. Because of its reliance on surface water, the region has a very high degree of vulnerability to drought, and the estimated annual shortage in drought years is expected to range from 207,357 to 282,108 acre-feet.



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

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

Figure 7-1

MIDDLE RIO GRANDE
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 supply and demand gap developed for this plan 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). The 2004 RWP for the Middle Rio Grande region identified over 40 recommended strategies to address this gap. The steering committee evaluated these strategies by first discussing the progress made on these recommendations and then rating them on priority for continued implementation.

This RWP is building on the 2004 RWP and is considering strategies that will enhance and update, rather than replace, the strategies identified in the accepted water plan. The status of strategies from the 2004 RWP is assessed in 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 8.3

8.1 Implementation of Strategies Identified in Previously Accepted Regional Water Plans

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

The steering committee carefully reviewed the strategies from Chapter 10 of the 2004 Middle Rio Grande RWP over several meetings in 2015. Surveys were distributed to steering committee members to gather information on new projects and programs developed since the 2004 RWP was published. Projects from current Water Trust Board and Infrastructure and Capital Improvement Plan (ICIP) databases were also compiled by NMISC consultants.

The 2004 RWP also contains two subregional plans for the Rio Puerco and Rio Jemez areas. The steering committee did not specifically evaluate the strategies described in these sub-region plans due to lack of representation from these areas on the committee.

Each of the 41 strategies was ranked on several criteria:

- Completeness: Y= Yes, complete; N=No, not started; S = Started, or partial achievement
- Progress/Effectiveness: 1 = Little to no progress and not effective → 5 = Well implemented and very effective

- Priority for Continued Implementation: 1 = low priority → 5 high priority

A summary of that ranking information is shown in Tables 8-1a and 8-1b, and a complete copy of this ranking is included in Appendix 8-A. Table 8-1a shows the ten projects that were ranked as having been implemented the most effectively (have made the most progress). Reduction of water use in the region was a great success over this planning period. Albuquerque-Metro area water users have consistently been lowering their per capita water usage, despite population growth. The MRGCD has also reduced water use. Some of these projects were so effective that the goals have been attained and new water savings are not likely (thus these projects ranked as a lower priority for continued implementation).

8.2 Water Conservation

In the Middle Rio Grande Water Planning Region, many water efficiency programs and practices are already in place, having been implemented as recommended in the 2004 RWP (Section 8.1). However, water providers in the region will continue to implement their existing water conservation programs and drought contingency plans as well as continue implementation of best management practices in the agricultural sector.

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

In addition to continuing with strategies from the 2004 RWP, the steering committee 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 steering committee and other stakeholders and reflect their interest and intent. The recommendations made by the steering committee and other stakeholders have not been evaluated or approved by NMISC. Regardless of the NMISC's acceptance of this RWP, inclusion of these recommendations in the plan shall not be deemed to indicate NMISC support for, acceptance of, or approval of any of the recommendations, PPP information, and collaborative strategies included by the regional steering committee and other stakeholders.

As described in Section 8.1, the steering committee revisited the 2004 strategies and ranked them on (1) progress since 2004 and (2) priority for future implementation. The steering committee typically ranked projects that support watershed and riverine habitat preservation as a high priority. Similarly, the tools needed for accurate planning, such as increased data collection, water modeling, and water resource databases were also a high priority. While Table 8-1b shows the strategies that rated a "5" for priority, it should be noted that the strategies in Table 8-1a typically rated a "4" or "5" for priority as well. These two tables combined contain the best paths for implementation of water saving measures.

Table 8-1a. Summary of the Ten Most Effective Strategies Implemented from the 2004 Middle Rio Grande Regional Water Plan

Strategy	Progress [a]	Priority [b]
Waterwise Growth of Parks and Golf Courses (R1-8)	5	1
Conversion to Low Flow Appliances (R1-4)	5	4
Urban Water Pricing (R1-5)	4	5
Level Irrigated Fields (R4-2)	5	3
Water Modeling (R7-4)	4	4
Outdoor Conservation Programs (A-18)	4	4
Conjunctive Use Management (R2-2)	4	5
Improved Water Quality Sampling and Testing (R5-2, R5-3)	4	4
Water Education (R9-1, R9-2)	4	4
Undeclared Water (R8-3)	5	1

[a] 1 = Little to no progress and not effective → 5 = Well implemented and very effective

[b] 1 = Low priority → 5 = High priority

Table 8-1b. High Priority Strategies for Continued Implementation

Strategy	Progress [a]	Priority [b]
Water Resource Database (R2-6)	3	5
Watershed Management Plans (R2-7)	3	5
Adjudication and Water Rights Settlement (R2-1)	1	5
Treated Effluent Reuse (R1-7)	3	5
Stormwater Management Plans (R2-9)	3	5
Funding Source for Water Activities (R2-3)	2	5
Establish a Local Marketing Infrastructure (R4-3)	2	5
Measure All Water Uses (R3-1)	2	5
Elephant Butte Loss Accounting (R2-4)	1	5

[a] 1 = Little to no progress and not effective → 5 = Well implemented and very effective

[b] 1 = Low priority → 5 = High priority

When the 2004 RWP was developed the strategies were carefully analyzed on several different feasibility rankings. For more details on the ranking and feasibility analysis in 2004 please refer to Chapters 8 and 10 of that plan.

8.3.1 Comprehensive List of Projects, Programs and Policies

In addition to reviewing the strategies from the 2004 RWP, information on new projects and programs that the stakeholders would like to see implemented was also gathered. Steering committee members were encouraged to discuss new PPPs at the committee meetings and to supply details for the plan. Surveys were available for steering committee members to provide to interested stakeholders so that they could also submit project information. A summary of the PPP information from committee members and interested stakeholders is found in Appendix 8-B.

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-B has not been ranked or prioritized; it is an inclusive table of all of the PPPs that regional stakeholders are interested in pursuing. It includes projects both regional in nature (designated R in Appendix 8-B) and those that are specific to one system (designated SS in Appendix 8-B). 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.

Some water projects were already identified through the State of New Mexico Infrastructure and Capital Improvement Plan (ICIP) and Water Trust Board, and those projects were collected by the NMISC consultants and included in the Middle Rio Grande PPP table. The projects included are from the 2016-2020 and 2017-2021 ICIP list, which is updated on an annual basis. A summary of these projects is found in Appendix 8-C.

The majority of the projects contained in these tables are infrastructure improvement projects. Well maintained infrastructure is vital for both small and large water users; however, the steering committee does not have the resources to evaluate or rank these individual projects. The steering committee urges decision makers to prioritize funding for projects based on following the priorities listed in the Tables 8-1a and 8-1b.

These projects represent a combined total in more than $400 million in water and wastewater projects for the region. Examples of some of the projects include:

- Stormwater infrastructure projects (such as the Canyon del Agua East flood control dam, Black Mesa Drainage Project)
- Tree thinning projects for watershed restoration and wildfire suppression
- Habitat restoration (such as the Pueblo of Sandia Bosque Program addressing river incising, Department of Game and Fish wetland and riparian restoration, and the Valle del Oro Project)

8.3.2 Key Strategies for Regional Collaboration

Prioritizing projects for funding is done by each funding agency/program, based on their current criteria, and projects are reviewed in comparison to projects from other parts of the state. Consequently, the regional water planning update program did not attempt to rank or prioritize projects that are identified in Appendix 8-B and 8-C. However, identifying larger regional collaborative projects 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 subregional impact and for which there is interest in collaboration to seek funding and for implementation.

To determine which projects might have the most momentum for implementation, the steering committee members identified projects that fit the priorities listed in Tables 8-1a and 8-1b. Those key collaborative projects identified by the steering committee are shown in Table 8-2. This exercise identified potential project leads and partners as well as possible funding sources. The topics identified include:

- Watershed Management
- Treated Effluent Reuse
- Water Resource Database
- Stormwater Management
- Regional Collaboration for Drinking Water Systems

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

Table 8-2. Key Collaborative Programs, Projects and Policies for Project Implementation
2016 Middle Rio Grande Regional Water Plan
Page 1 of 3

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Watershed Management					
Landscape-scale forest, watershed, and rangeland restoration in the Middle Rio Grande to limit catastrophic fires, mitigate negative effects of wildfire, and protect/restore water quality. The project includes: • Forest thinning/fuels reduction • Invasive species treatment • Stream and river restoration • Rangeland health and grazing management • Burn area rehabilitation	• Bernalillo, Sandoval, and Valencia counties • East Torrance, Claunch-Pinto, Ciudad and Coronado Soil and Water Conservation Districts (SWCDs) • Santa Fe and Cibola National Forests • Bureau of Land Management Albuquerque District • Pueblos • New Mexico Forestry Division	• State Land Office • National Park Service • Local landowners • New Mexico Association of Conservation Districts • New Mexico Coalition of Conservation Districts • U.S. Department of Agriculture (USDA) Rural Development • Livestock associations • Rural water associations • Farm Bureau	• Forest Service Collaborative Forest Restoration Program • New Mexico State Forestry • New Mexico Environment Department (NMED) 319 and River Stewardship Program • Water Trust Board • Restore New Mexico • State Capital Outlay • Federal HFR funding • Natural Resource Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP), Work in Progress (WIP), and Tribal EQIP • Local funding dedicated from counties, municipalities, and SWCDs to supplement federal and state funding.	• Prescription Fires: $125 to $200 per acre • Thinning: $250 to $2,500 per acre • Burned Area Emergency Response (BAER): $2,500 per acre • Environmental Compliance Surveys: $5,000-$30,000	• Lack of consistent funding • Engaging landowners, keeping them interested • Legal/permitting and social obstacles to using prescribed fire • Climate and weather (i.e., drought, major wildfires, flooding) • The cost of treatments vs. value of timber • Lack of biomass utilization • Lack of marketing for wood products • Complicated jurisdictions with checkerboard ownership

Table 8-2. Key Collaborative Programs, Projects and Policies for Project Implementation
2016 Middle Rio Grande Regional Water Plan
Page 2 of 3

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Treated Effluent Reuse					
Treatment and reuse of effluent could occur in three ways: • As irrigation water • Indirect potable reuse, where water will be stored below ground prior to being introduced into the potable water system • Direct potable reuse where highly treated effluent is introduced directly into the potable water system	• Albuquerque Bernalillo County Water Utility Authority (ABCWUA) • City of Rio Rancho (which has already conducted two pilot studies injecting up to 1 million gallons per day)	• City of Rio Rancho • Bernalillo County • NMED • New Mexico Office of the State Engineer • New Mexico Interstate Stream Commission (NMISC) • Bureau of Reclamation	• Water Trust Board • Federal grants • Municipalities	Millions (a wide range of prices depending on the project size and type of treatment).	• Permitting project to ensure protection of health • Development of reuse standards by NMED • These types of projects usually have a high benefit to cost ratio for the volume of water provided.
Water Resource Database					
See Section 10.2.2 Alternative R2-6 from 2004 plan. Key measurements for this region include Elephant Butte losses, increased data on agricultural diversions and returns, and domestic pumping.	• Bureau of Reclamation • United States Geological Survey (USGS) • Water Resources Research Institute (WRRI) • Mid-Region Council of Governments (MRCOG) • University of New Mexico	• NMISC • Farm Bureau • USDA • Association of Acequias • Pueblos • Municipalities • SWCDs • NMED • Universities in the region • U.S. Army Corps of Engineers (USACE) • Environmental groups	• Bureau of Reclamation • USGS • State • Federal	Begin the process by setting budgets for inventory of existing data and compare strategies used in other states for maintaining this type of data	• Ambiguity and inconsistency in what gets measured (i.e., wet water, permitted water, water rights, averages/ medians, time period of measurement) • Adjudication of water rights

Table 8-2. Key Collaborative Programs, Projects and Policies for Project Implementation
2016 Middle Rio Grande Regional Water Plan
Page 3 of 3

Project Description	Project Lead	Project Partners	Probable Funding Source(s)	Cost Range	Major Implementation Issues
Stormwater Management – Valle Del Oro Stormwater Retention Project					
Incorporate stormwater treatment into refuge wetlands and associated Rio Grande floodplain habitat. This would lead to incorporation of adjacent wetland restoration, water for endangered species, provide stormwater education opportunities	U.S. Fish and Wildlife Service (USFS)	• Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) • Bernalillo County • Middle Rio Grande Conservancy District (MRGCD) • USACE • New Mexico State Land Office • New Mexico Department of Transport	• AMAFCA • Bernalillo County • MS4 Permittees (public education, alternative projects, development community) • USFWS • Mesa del Sol • Via del Sol • General obligation bonds • Community block grants	$500,000 to $700,000	• Water rights associated with the water harvested • National Environmental Policy Act (NEPA) review • Endangered Species Act protection • Tribal water quality standard compliance
Regional Collaboration for Drinking Water Systems					
This project would involve collaboration to help small water systems in the region build capacity by sharing resources on issues such as accounting, use of equipment, planning, and, where feasible, water supply, and to create drought contingency plans.	• Rural Water Providers	• County emergency manager • NMED • Union of Concerned Scientists	State and local	Unknown	• Population is wide-spread across county. • Water treatment issues can make sharing of physical resources difficult. • Funding, capacity to move forward.

8.3.3 Key Program and Policy Recommendations

The legislation authorizing the state water plan was passed in 2003. This legislation requires that the state plan shall "integrate regional water plans into the state water plan as appropriate and consistent with state water plan policies and strategies" (§ 72-14-3.1(C) (10)). For future updates of the state water plan, NMISC has asked the regions to provide recommendations for larger programs and policies that would be implemented on a state level. These are distinct from the regional collaborative projects and 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.

As discussed in Section 8.3.2, there are several high priority strategies developed by the Middle Rio Grande region that should be addressed both statewide and regionally. Examples of both regional and statewide strategies include:

- Water Rights Adjudication
- Increased Water Rights Metering
- Water Resource Database (both statewide and regionally)
- Reservoir Loss Accounting
- Conjunctive Use Management
- Watershed Restoration (as supported by the New Mexico Forest Action Plan).

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

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Appendix 2-A

Master Stakeholder List

Middle Rio Grande Region 12 RWP Master Stakeholder List

Updated June 23, 2016

Last	First	Affiliation/Category
Coriz	Daniel	Governor, Santo Domingo
Daggett	Kevin	City of ABQ
Dekker	Dale	
Dixon	Deborah	Director, NMISC
Donnelly	Carolyn	Bureau of Reclamation
Dziuk	Tina	MD Consulting
Estrada-Lopez	Michelle T	USBR Pecos Division
Faris	Bart	City of ABQ
Fahey	James	
Fox	Ian	Cibola National Forest
Gaiser	Sandra	Planner, MRCOG
Gallegos	Steve	City of Rio Rancho
Garcia	Juanita	Bernalillo County
Garlisch	John	Cooperative Extension Service, NMSU
Gaume	Norm	
Gensler	David	Hydrologist, MRGCD
Glass	Steve	Ciudad SWCD
Gradi	Enrico	Bernalillo County
Guerrero	Daniel V.	
Haines	Todd	NM State Forestry
Hamman	Mike	MRGCD
Hart	Ted	Moriarty
Hausam	Sharon	Pueblo of Laguna
Haynes	Martin	BWTF
Hebard	Elaine	Water Assembly
Henrie	Michelle	Steering Committee Member
Hernandez	Danny	Board Member, AMAFCA
Hilton	Joanne	Hydrology Consultant
Jackson	Guy	
Jaramillo	Edwin	Isleta Pueblo Water Utilities
Jaramillo	Marian	Town of Bernalillo
Jarrett	Janet	
Jensen	Michael	
John	Jason	Branch Manager, Water Management Branch of Navajo Department of Water Resources
Keetso	Elroy	Pueblo of Laguna
Kennedy	Carolyn	Coronado SWCD

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.

Middle Rio Grande Region 12 RWP Master Stakeholder List

Updated June 23, 2016

Last	First	Affiliation/Category
Kretzmann	Eliza	State Forestry NRCS
Levine	Lacey	NM Dept. of Agriculture
Llewellyn	Dagmar	USBR
Lovato	Kenneth	Santo Domingo Pueblo
Coriz	Daniel	Governor, Santo Domingo
Lucero	Christina	Village Clerk, Village of San Ysidro
Lucero	Raymond	Laguna Pueblo
Lucero	Jerome	Zia Pueblo
Marcus	Mike	
Martinet	Maceo	US Fish & Wildlife Service Partners for Fish and Wildlife Program
Martinez	Jacobo	Public Works Director, Valencia County
McCarthy	Laura	The Nature Conservancy Rio Grande Fund
McCorkindale	Edward	GenQuest, Inc., Contractor to the Bureau of Land Management
McGeisey	Genevieve	Director, Pueblo of Zia Environmental Resources
McGregor	Dan	Bernalillo County
McKenna	Yvette Roybal	Program/Division Manager, Water Management Division
Megan	Marsee	NMED
Mendelow	Marvin	Coronado Soil & Water Conservation District
Montgomery	Lynn	Coronado Soil & Water Conservation District
Neas	Mike	
Oglesby	Adrian	MRCOG
Ortiz	Debbie	
Oweegon	Kathleen	Bridges of Peace
Pajarito	Steven	Santo Domingo Pueblo
Park	David	USFS, Santa Fe NF
Passell	Howard	Sandia Labs
Pegram	Page	NMISC
Perich	Steve	NM ACI
Powell	Lisa	Bernalillo County
Puelle	Mike	AGC
Reed	Ollie	Albuquerque Journal
Reyes	Sal	Algodones
Rich	Susan	NM State Forestry
Richardson	Rob	

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.

Middle Rio Grande Region 12 RWP Master Stakeholder List

Updated June 23, 2016

Last	First	Affiliation/Category
Riley	Zachary	
Rinaldi	Maria G.C.	Community Planning and Development, Town of Bernalillo
Ringia	Adam	Pueblo of Laguna
Rivera	Jose	UNM
Romero	Rosemary	Rosemary Romero Consulting
Roth	Frank	Alb/Bernalillo County Water Utility Authority
Rubin	Maida	MRCOG
Rudy	Donald	
Ruiz	Carlos	OCCAM/EC
Sanchez	Blaine	NM Water Resources Research Institute
Sanchez	Mark	Executive Director, Abq/Bern Water Utility Authority
Sandoval	Gilbert	NMAA
Sandoval	Michael T.	Governor, San Felipe Pueblo
Schultz	Krista	NMED
Sensanbaugher	Scott	City of Rio Rancho
Simmons	Rita-Loy	
Singleton	Ed	Adelante Consulting
Smythe	Brenda	Edgewood Soil & Water Conservation District
Springfield	Michael	Sandoval County
Steed	Anita	Water Resources Division Manager, Department of Natural Resources, Pueblo of Santa Ana
Stomp	John	Albuquerque Bernalillo Public Works
Stover	Debbie	
Sturgis	Laila	Amec Foster Wheeler
Swenka	Arthur	
Tafoya	Dale	Belen
Tarr	Dee	Claunch Pinto SWCD
Tashijan	Paul	U.S. Fish and Wildlife
Thomson	Bruce	AMAFCA
Torres	Jack	Mayor, Town of Bernalillo
Tovar	Yvette	Executive Director, The New Mexico Water Collaborative
Tracey	Jessica	Sandia Pueblo
Umshler	Sue	
VonAncken	Sean-Paul	
Walker	LizBeth	NRCS
Walker	Cody	Isleta Pueblo
Wanstall	Jim	NMDA

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.

Middle Rio Grande Region 12 RWP Master Stakeholder List

Updated June 23, 2016

Last	First	Affiliation/Category
Ward	Kelly	
Warren	Heidi	
Wrage	Marian	City of Rio Rancho
Wessely	Bob	Water Assembly
Wirth	Sharon	Audubon
Woodruff	Jason	USACE
Wrage	Marian	CORR, Rio Rancho
Yuhas	Katherine	Water Conservation Officer , ABCWUA
Zeigler	Ken	City of Albuquerque

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

Summary of Comments on Technical and Legal Sections (Single Comment Document) and Other Public Comments

Middle Rio Grande Regional Water Plan Comments

Please add your name to your comments so we can follow up if there are questions
Please indicate if the comment addresses a technical correction or a overall planning process comment

Comment Number	Page Number	Paragraph or Section Number	Comment	Comment Type (Technical or Process)	Commenter	Steering Committee Comments
1		5	This section would be improved with a description of the surface water contribution from the various forested area within the Middle Rio Grande. This information is already provided in Tables 5-4 and 5-5 and in Figure 5-8, and could be summarized in a bullet. Specifically, add "Streams originating in forested mountains within the Middle Rio Grande region are another source of surface water. These forests are primarily National Forest System lands, but also include many Tribal reservations, Bureau of Land Management and National Park Service holdings, as well as lands managed by New Mexico State Land Office and Departmen of Game and Fish. The most significant forested areas in the Middle Rio Grande region are in the Jemez Mountains. The East Mountain area also contributes to water supply, through streamflow, springs and mountain front recharge."	Technical	Nature Conservancy - Laura McCarthy	The Steering Committee agrees with Laura's comments in general. Laura is working directly with the ISC for specific new language to add.
2		5.1.2	Recent Climate Studies would be improved with a brief description of the effect of climate changes on wildfire timing, duration and severity, as this has a direct impact on forested areas that are important water sources. This data is already compiled in BOR Upper Rio Grande Impact Assessment http://www.usbr.gov/watersmart/wcra/reports/urgia.html. Specifically add a bullet on page 15 "Drought and higher temperatures lead to tree-stress and moisture-deficit, making forests more vulnerable to high-severity wildfires, leaving burn scars that repel rainwater, and affecting water supplies thorugh ash-laden floods and debris flows." The citation is Llewellyn and Vaddey, 2013. Upper Rio Grande Basin Impact Assessment: Westwide Climate Risk Assessment. Bureau of Reclamation."	Technical	Nature Conservancy - Laura McCarthy	The Steering Committee agrees with Laura's comments in general. Laura is working directly with the ISC for specific new language to add.
3		5.3.1	Regional Hydrogeography or Section 5.3.2 Aquifer Conditions would be improved with a clearer description of the role of mountain front recharge to groundwater. This is important because of the possibility that these mountain fronts could undergo an ecological type conversion and/or burn in a high-severity wildfire, potentially changing infiltration and groundwater recharge. Such as: "Recharge along the mountain front of the Sandias is an important contributor to groundwater, especially from the Sandia Mountains." But Katherine Yuhas may provide much better language and if she does please replace this with hers.	Technical	Nature Conservancy - Laura McCarthy	The Steering Committee agrees with Laura's comments in general. Laura is working directly with the ISC for specific new language to add.
4		5.4	Water Quality Assessment has a paragraph on impacts that does not include wildfire impacts, specifically post-fire, when rain falls on severely burned areas. The findings of a recent report by the USGS New Mexico Water Science Center analyzing wildfire potential and the probability of post-fire debris flow for the Sandia and Manzano Mountains should be incorporated http://pubs.usgs.gov/sir/2014/5161/ . In addition, a study using the same methodology for the Jemez Mountains will be published in April 2016 and could be incorporated before the Regional Water Planning deadline. Specifically add "Another problem contributing to water quality impairment is runoff, flooding and debris flows from catastrophic wildfire." (A.C. Tillery, J.R. Haas, L.W. Miller, J.H. Scott, M.P. Thompson. 2014. Potential Postwildfire Debris-flow Hazards: A Prewildfire evaluation for the Sandia and Manzano Mountains and Surrounding Areas, Central New Mexico. USGS. SIR 2014-5161.) Please also consult with Page Pegram, ISC, as the source for this sentence: "In some cases after the 2011 Las Conchas Fire, sediment mobilized after wildfire in a tributary canyons was substantial enough to create a plug of debris that has blocked the Rio Grande."	Technical	Nature Conservancy - Laura McCarthy	The Steering Committee agrees with Laura's comments in general. Laura is working directly with the ISC for specific new language to add.

Comment Number	Page Number	Paragraph or Section Number	Comment	Comment Type (Technical or Process)	Commenter	Steering Committee Comments
5		8.3	Proposed Strategies is currently in a table format. Several watershed restoration projects are considered. Without specific information about the geographical extent of those projects it is not possible to cross-reference the listed projects with the Rio Grande Water Fund high priority watershed restoration projects. If not already included, I respectfully request that the following projects be added, and if needed, I am able to complete a "future strategies checklist" for these projects: o Cedro Project on Cibola National Forest in the Tijeras Watershed o La Madera Project on Cibola National Forest in Las Huertas Watershed o Southwest Jemez Project on Santa Fe National Forest in the Jemez River Watershed o Las Conchas fire burned area rehabilitation, including Peralta Canyon on BLM land and Cochiti Pueblo land, and Cochiti and Bland Canyons on Santa Fe National Forest and Cochiti Pueblo and Santo Domingo Pueblo land. TNC is adding these to the PPP table.	Technical	Nature Conservancy - Laura McCarthy	The Steering Committee agrees with Laura's comments in general. Laura is working directly with the ISC for specific new language to add.
6		8.3	Proposed Strategies in the table includes 2 watershed restoration policies. I respectfully offer the following policy recommendations for consideration: o Headwater sources are critical for sustained streamflow and groundwater recharge. Overgrown forest conditions create conditions where snow accumulation is reduced and risk of catastrophic wildfire is increased. The extent and costs of restoring headwater source areas are significant and require substantial coordination among all levels of government and stakeholders. Federal and state programs are seeking to leverage investments with local funding match. Specifically: 1. Establish dedicated local funding sources through each County or Soil and Water Conservation Districts for watershed restoration to leverage and match federal and state funding. 2. Advocate for state policies that require agencies to coordinate their investments with each other — and with federal, local, tribal, and private investment—in priority areas for watershed restoration using locally-developed, science-based landscape restoration plans as a guide. TNC is adding these to the PPP table.	Technical	Nature Conservancy - Laura McCarthy	The Steering Committee agrees with Laura's comments in general. Laura is working directly with the ISC for specific new language to add.
7		8	After listening to the discussion among the Steering Committee and stakeholders at the February 9, 2016 meeting and reviewing the draft plan and strategy table, I am wondering if establishment of a groundwater management district was considered? The San Luis Valley in Colorado created a district that is leading to cooperative groundwater management, and was presented to a New Mexico audience on November 12, 2015 (see details at http://waterbank.nmsu.edu/). If this has not been discussed by the Steering Committee, I respectfully request that the concept be considered as a policy recommendation for the Santa Fe group aquifer system.	Technical	Nature Conservancy - Laura McCarthy	The Steering Committee agrees with Laura's comments in general. Laura is working directly with the ISC for specific new language to add.
8	2	Common Technical Approach	Please include some text explaining that because data on tribal diversions is not available, these may not be accurately reflected in the estimation of supply.	Technical	Pueblo of Laguna - Sharon Hausam	Steering committee agrees
9	9	Endangered Species	It would be more appropriate to indicate "federally protected species," as, of the four noted, the western yellow-billed cuckoo is currently listed as threatened. There are also a variety of protected plants in the region that are not discussed - the Pecos sunflower for example, present within the MRG region, could be impacted by changing hydrology, others may be as well. This section should reflect all the species indicated on pages 25-6 of the legal section, as well as any other protected plants in the region.	Technical	Pueblo of Laguna - Sharon Hausam	Steering committee agrees
10	11	Small and Rural drinking water systems	communities also need to improve community wastewater systems to protect water quality. Please include some text on this subject.	Technical	Pueblo of Laguna - Sharon Hausam	Steering committee agrees. Add sentence to end of bullet #3
11	18	Groundwater Resources first paragraph	Groundwater also supplies livestock wells. Please reword the second sentence as follows: "It provides back up supply to the ABCWUA when surface water cannot be diverted, and supplies most of the region's small drinking water systems and many livestock tanks."	Technical	Pueblo of Laguna - Sharon Hausam	Steering Committee prefers: "It provides supply to the region's municipal water providers and supplies most of the region's small drinking water systems, livestock tanks, agriculture, and small
12	24	2010 Administrative Water Supply	Please include a note explaining that because data on tribal diversions is not available, these may not be accurately reflected in the estimation of the administrative water supply.	Technical	Pueblo of Laguna - Sharon Hausam	Perhaps add a clear section (in the Common Technical Platform section) explaining how tribal data was treated and/or missing.
13	25	Present Uses	Please include a note explaining that because data on tribal withdrawals is not available, amounts are likely to be underestimated.	Technical	Pueblo of Laguna - Sharon Hausam	Same as Comment 18 - make a clear description on tribal data in the CTP section.

Comment Number	Page Number	Paragraph or Section Number	Comment	Comment Type (Technical or Process)	Commenter	Steering Committee Comments
14	30		Please update the information about the Santolina development.	Technical	Pueblo of Laguna - Sharon Hausam	Same Comment as Elaine Hebard (#150). Update to show it was approved by County Commission in June 2015.
15	38	Water Demand Projection Methods	Please include a note explaining that because data on tribal diversions is not available, these may not be accurately reflected in the estimation of administrative water supply, and thus, the use of administrative water supply may lead to underestimates of future demand.	Technical	Pueblo of Laguna - Sharon Hausam	Same as Comment 18 - make a clear description on tribal data in the CTP section.
16	40	paragraph on commercial self-supplied	Please include text noting that data on tribal commercial self-supplied wells was not available, and thus the use of this data may lead to underestimates of future demand.	Technical	Pueblo of Laguna - Sharon Hausam	Same as Comment 18 - make a clear description on tribal data in the CTP section.
17	1	Section 2	The chapter should only list the meetings for the region discussed in each plan, not the meetings in all of the regions, which are not relevant to this specific plan.	Technical	Pueblo of Laguna - Sharon Hausam	Steering Committee agrees
18	6	Section 2	Please remove Sharon Hausam's name from the list of steering committee members. Dr. Hausam and Mr. Adam Ringia have attended regional water planning meetings and provided comments on the planning process, and wish to continue to receive all information that is provided to the steering committee; however, the Pueblo of Laguna has not committed to formal representation on the steering committee, which could be misconstrued as approval of the plan. Furthermore, Dr. Hausam was not appointed by the Pueblo Governor, and has never stated that she was. We suggest that the plan include a list of participants in the planning process in lieu of or in addition to the list of steering committee members.	Process	Pueblo of Laguna - Sharon Hausam	Steering Committee has no comment. She is now listed as an observer on the steering committee list.
19	18	Section 4 - Legal	The Pueblo of Laguna's water code refers to the "sub-village," not the Village, of Philadelphia. Please correct this.	Technical	Pueblo of Laguna - Sharon Hausam	OK
20	18	Section 4 - Legal	Please provide a description of tribal Treatment as a State under federal law, and its relevance to the region, in the section on tribal water quality standards.	Technical	Pueblo of Laguna - Sharon Hausam	The Steering Committee suggest Sharon speak with the ISC legal department directly on this comment.
21	25	Section 4 - Legal	This section neglects the variety of protected plants that are in the region and may be impacted. Please update to reflect all of the species protected by the Act, not just the animals.	Technical	Pueblo of Laguna - Sharon Hausam	Steering Committee agrees
22	28	Section 4 - Legal	Please provide a description of tribal Treatment as a State under federal law, and its relevance to the region.	Technical	Pueblo of Laguna - Sharon Hausam	The Steering Committee suggest Sharon speak with the ISC legal department directly on this comment.
23		Section 8 - PPP table	The Pueblo appreciates the addition of some of the alternatives described in its June 8, 2015 letter. However, there appears to have been some misinterpretation, and some not included. **Community Water System Development:** This does not refer solely to converting homeowners on individual wells to community water systems. It also refers to improvements to existing community water systems that are prone to leakage and breakage. The subcategory should be "water system infrastructure." **R2-9, Storm Water Management and Implementation Plans:** This should not refer solely to plans, but also to actual implementation. The suggested wording was "Storm Water Management Planning and Implementation." **R4-1:** Please edit "Update Agricultural Conveyance" to "Upgrade Agricultural Storage and Conveyance," or add an alternative, "Improve Agricultural Water Storage," as previously requested. Agricultural storage facilities such as dams and stock tanks, as well as conveyance facilities, also need upgrades for water conservations. **Water Quality:** Please add "Water Quality Treatment" and "Community Wastewater System Development/Improvement," as previously requested. Water quality treatment to meet standards for various uses would improve water availability. Although "Mitigate Septic Tanks" is included, this does not address the need to improve existing wastewater systems that are prone to leakage and breakage. Improvements are needed to protect water quality.	Technical	Pueblo of Laguna - Sharon Hausam	Section 8 is still changing. The missing suggestions of Water System and Agricultural Infrastructure will be corrected. While the committee does not object to the name changes of the previous alternatives, the update does not rename the alternatives. The update assesses the impacts of the 2004 alternatives and lists current priorities. A clearer description of the priority alternatives will be in Section 8 narrative.
24		Figures	All maps of the region should show the boundaries of tribal lands.	Technical	Pueblo of Laguna - Sharon Hausam	The Steering Committee agrees, but also realizes that tribal boundaries can be difficult to map. The data is not easy to obtain.
25		Figures	In all maps, the heading "explanation" should be changed to "legend."	Technical	Pueblo of Laguna - Sharon Hausam	The steering committee did not think this was a priority
26		Figures	In all maps, the label "city," which is inaccurate for MANY of the jurisdictions in the region, should be changed. A more appropriate label might be "city/place," reflecting U.S. Census terminology.	Technical	Pueblo of Laguna - Sharon Hausam	No comment

Comment Number	Page Number	Paragraph or Section Number	Comment	Comment Type (Technical or Process)	Commenter	Steering Committee Comments
27		Figures	All figures depicting water demand and water supply (6-la, 6-lb, 6-lc, 6-ld, 6-le, 6-lf, 7-1) should include a note that estimates of water demand and water supply may not accurately reflect tribal water usage and systems.	Technical	Pueblo of Laguna - Sharon Hausam	The steering Committee did not agree. Explain this clearly in the CTP discussion, see Comment #18
28		Tables	Tables displaying diversions (6-1), withdrawals (6-4), and demand (6-5) should include a note that estimates of diversions may not accurately reflect tribal water usage and systems.	Technical	Pueblo of Laguna - Sharon Hausam	The steering Committee did not agree. Explain this clearly in the CTP discussion, see Comment #18. Make sure that the new description explicitly includes references to tables and figures.
29		Section 8 PPP table	Proposed Strategies should include the Augustin Plains Ranch project as a Regional (R) Project in the subcategory of Guidance. The Source of the Project Information will be the OSE hearing for the Project. The project as proposed would provide new water to Region 15 and other regions of the Rio Grande Basin. This new water would be delivered by pipeline to supplement or offset the effects of existing uses and new uses over a large part of the Basin, in order to reduce the stress on the current water supply. The plan should recommend that the ISC and the Region 15 jurisdictions evaluate the impacts of the project on the region as future supply to meet existing needs and growing demand.	Technical	Ascendant Program Services - Michel Jichlinski	The Steering Committee felt this falls under the importation of water alternative which they already discussed and do not generally support. This is also an issue better suited to the State plan than a regional one.
30		general	The ISC must be sure to note where pueblo/tribal data was and was not considered. Twelve tribes in the region encompass a significant land base, and it should be stated when tribal data was used, assumed, estimated, or excluded. Some specific places where this may apply are described below, but do not encompass every instance; therefore, this comment should be kept in mind and added by the ISC where appropriate throughout the plan.	Technical	Sandia Pueblo - Jessica Tracy	
31	2	Section 1	Supply based on diversions excludes tribal water which is largely unmeasured, both physically and administratively.	Technical	Sandia Pueblo - Jessica Tracy	
32	2	Section 1	Do projections of future demand include estimates of tribal water right quantification? Please note.	Technical	Sandia Pueblo - Jessica Tracy	
33	2	Section 1	Per the above, include a brief description of limitations to the Common Technical Approach.	Technical	Sandia Pueblo - Jessica Tracy	
34	5	Section 3.4	Does this section include statistical data of the 12 tribes in the study area? Please indicate this. It is important to know if tribal lands are included as 12 tribes certainly influence the demographics, economic overview, and land use of the planning region.	Technical	Sandia Pueblo - Jessica Tracy	
35	9	Section 5, first bullet	Add a new bullet after the first bullet that states something to the effect of: "River geomorphology has changed significantly from its natural state. Sediment removal by Cochiti Dam Reservoir has led to significant and continued incising between the Dam and Albuquerque. This sediment-starved reach of the Rio Grande is threatening bosque and river habitat, as well as infrastructure such as the Corrales Siphon (an 80-year old irrigation structure which was originally buried 8 feet below the river bed and has now become exposed). Conversely, excessive sedimentation south of Albuquerque creates costly river maintenance challenges. These changes in the river impact how water is managed as the region reacts to endangered species and water delivery mandates."	Technical	Sandia Pueblo - Jessica Tracy	
36	10	Section 5, second bullet	The significance of uncharacterized tribal water rights is not adequately described here. It is important that all stakeholders in the region understand that the unknown tribal-water component in the region likely causes substantial inaccuracies in data and water planning initiatives presented in the RWP, and should be plainly stated as such. Suggest rewording to: "The water rights of the 12 tribes in the planning region have not been fully characterized or quantified, yet they constitute the most senior water claims in the basin. These rights cannot be lost through forfeiture, abandonment or other forms of non-use. Uncertainties about the nature and quantities of tribal water rights may significantly impair the accuracy of the data and water planning initiatives presented in this document. "	Technical	Sandia Pueblo - Jessica Tracy	

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37	11	Section 5	new bullets for consideration: • Tally total number and quantity (acre-feet) of downstream to upstream water right transfers since the 2004 RWP and how the OSE/ISC accounts for the cumulative effects of those transfers in the affected reach. • Add the following, "In 2015 and 2016, a total of 400 ac-ft of San Juan Chama Project water was donated or sold by four of the middle Rio Grande Basin pueblos to Audubon New Mexico for habitat and environmental purposes; this was the first time water was managed in this way and for this purpose in the Middle Rio Grande." • Consider mentioning WaterSMART Basin Study initiative currently underway to be led by the Middle Rio Grande Conservancy District and the US Bureau of Reclamation, with the support of many other MRG stakeholders (which, at one time, included the ISC, City of Santa Fe, ABCWUA, and possibly others); or add mention of this to Section 5.1.2 (Recent Climate Studies)	Technical	Sandia Pueblo - Jessica Tracy	
38	16-23	Sections 5.2, 5.3, 5.4	Presumably, tribal water is not included in the discussion in these sections. Please make statement to that affect so that readers know that this is a gap in the data.	Technical	Sandia Pueblo - Jessica Tracy	
39	27	Section 6.2, 1st paragraph	Does this section include statistical data of the 12 tribes in the study area? Please indicate this. It is important to know if tribal lands are included as 12 tribes certainly influence the demographics, economic overview, and land use of the planning region.	Technical	Sandia Pueblo - Jessica Tracy	
40	28-32	Sections 6.2.1-6.2.3	Do the paragraphs toward the end of each of these sections describing agriculture include tribal Ag lands? Please specify in the plan. Mention of tribal agriculture recognizes a demographic that significantly contributes to economic and traditional values of the region, as well as stewardship of the land and its resources (i.e., water).	Technical	Sandia Pueblo - Jessica Tracy	
41	37 & 39	Section 6.5.1	For the irrigation agriculture category, please define how tribal agriculture is characterized here, if at all. The paragraph suggests a downward trend in agriculture; however, in the foreseeable future tribal agriculture is likely to remain stable or increase. This is important to note because an increase in tribal agriculture could result in a steady or increased water use in the Ag sector, not a decrease as one might infer by the information presented in this paragraph.	Technical	Sandia Pueblo - Jessica Tracy	
42	41	Section 6.5.1	Add a new paragraph and category for Environmental Use, and add language related to the 2003 Biological Opinion that mandates certain flow criteria, soon to be superseded by a new Biological Opinion, as discussed in Section 4.2.1.1.	Technical	Sandia Pueblo - Jessica Tracy	
43	45	Section 7	Add a last bullet to include administrative data gaps that result in inaccurate supply and demand data, such as uncharacterized tribal water rights, lack of OSE-required Proof of Beneficial Use filings, and other limitations inherent to water right administration (such as incomplete or inaccurate data in OSE's water rights database).	Common Technical Platform	Sandia Pueblo - Jessica Tracy	
44	general	Section 4 - legal	The 2004 MRG Water Plan, Section 5 (Legal Issues), included provisions of the Rio Grande Compact described in detail; however, the one provision dealing with tribal water rights was excluded. There doesn't seem to be an ideal place to add it in the update; however, Sandia Pueblo urges the New Mexico Interstate Stream Commission to acknowledge and add the following provision where appropriate in the update: ARTICLE XVI Nothing in this Compact shall be construed as affecting the obligations of the United States of America to Mexico under existing treaties, or to the Indian Tribes, or as impairing the rights of the Indian Tribes.	Technical	Sandia Pueblo - Jessica Tracy	
45	15	Section 4.1.3.1	Santa Clara Pueblo is not listed. Also Kewa is used here while Santo Domingo is used on page 4 of Section 3.1. Please make correction and ensure consistency in nomenclature.	Technical	Sandia Pueblo - Jessica Tracy	
46		Figures	Include boundaries of all 12 pueblos/tribes on all figures (or at least on one "master" figure showing the municipal and political boundaries of the region).	Technical	Sandia Pueblo - Jessica Tracy	
47	34	Second Paragraph, 7th sentence	The sentence reads: "Under these projections, it is assumed that the Intel jobs will be retained and other major employers will create job opportunities within the region". Intel has had a sharp decline in personnel and water use over the past three years and I recommend that reference to Intel be deleted. I recommend either the sentence be deleted entirely or that it reads "Under these projections, it is assumed that the major employers will create job opportunities within the region".	Technical	City of Rio Rancho - Marian Wrage	The steering committee discussed the decline at Intel and agrees the description should be updated.
48	1	Subsection 1, first Paragraph	The cited 2004 RWP is not included in the list of references.	Technical	Water Assembly - Bob Wessely	

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49	1	Subsection 1, third paragraph	information supplied by water stakeholders in the [MRG] region" did not, to our knowledge, include administrative water supply and demand information.	Technical	Water Assembly - Bob Wessely	
50	2	Subsection 1, 4th bullet	Why does Section 5 present data items for temp., precip., drought indices, etc., when Sections 5, 6, and 7 direct the use of Administrative Water Supply and Demand instead of those data?	Technical	Water Assembly - Bob Wessely	
51		Section 2	Our comment here contrasts the nature of the public process used in the current "update" effort to that undertaken by the MRG Water Assembly in the development of the 2004 RWP. Here we equate "public involvement" to "public participation," and define it as the active engagement of relevant stakeholders in planning, management and evaluation processes (these constitute "governance"). Effective participation: • is important for building trust and relationships among stakeholders with differing interests; • is critical for facilitating the learning and collective action needed to respond to stresses and disturbances in a social-ecological system (SES); • requires negotiation of fair rules for who participates, under which conditions participation is appropriate, and how participation takes place. Although government agencies – such as water suppliers and regulators – are well represented on the MRCOG/WRB-created "steering committee," as are business and development interests, other voices advocating non-market values are either not at the table or struggle to be heard. Lack of time and financial resources are offered as reasons for the failure of outreach efforts, but the narrow focus of the "update" process on "projects" (and, of late, "policies") precludes exploration of fundamental issues. Moreover, it convinces some, who might otherwise have reason to participate, that to do so would be irrelevant or even antithetical to their interests. For perspective on the update public involvement process, it should be noted that the 2004 RWP included over 100 general public meetings, 100 briefings to agencies, 60 Water Resources Board sessions, 500 Water Assembly meetings, and an aggregated 2200 signed in participants. For more, see Public Participation (DRAFT December 4, 2015) New Mexico Regional Water Planning Governance Study Group Issue Paper at http://nmwaterdialogue.org/library/water-governance/governance-study-group-issue-papers/	Technical	Water Assembly - Bob Wessely	
52		Section 2	We suggest it necessary to correct some terms that are used inconsistently and incorrectly in this document. "Previous plan" appears several times on pages 5 and 6, in reference to the existing MRG RWP. As Rosemary Romero stated at the February 9 meeting of the MRCOG Steering Committee, the 2004 plan remains in effect and will continue to be so except as modified by the update process. Moreover, it is not the Mid Region Water Plan. "Mid Region" is the name of the COG, encompassing a four-county area. The geographic scope of the water plan for the Middle Rio Grande (MRG) is a three-county area (Sandoval, Bernalillo, and Valencia) within the drainage of the Rio Grande.	Technical	Water Assembly - Bob Wessely	
53	4	Section 3.3	From a hydrology view, does it make sense for several areas to be a "part of the same Middle Rio Grande Underground Water Basin" and also be "hydrologically separate"? The sentence as is sounds counterintuitive.	Technical	Water Assembly - Bob Wessely	
54	7	Section 4.1.1.4	*Montgomery v. Lomos Altos* - The NM Supreme Court again recognized the supremacy of the system of priority administration of water rights. The OSE has an obligation to protect senior rights and their sources. It cannot determine any aspect of a water right, that task to remain with the Court. The OSE cannot improvise to administer rights, such as "de minimus" and must follow the letter of the law. The OSE and the Court are required to consider the criteria of "conservation of the resource" and "public welfare" in rights transfer cases. Regimens such as drought management paradigms are constitutional; however, the state already has one of these that is ignored as such: priority administration. Most of the ruling is ignored. Permits have been let without any analysis of detrimental overall impacts and the legality of providing water to them. The actual amount of permitted pumping far exceeds the sustainability of the resource, especially in uplands. The resource and the state's future are threatened by this neglect. "Cherry picking" one year wherein there is no "gap" shown is very unscientific and biased against finding strategies that work. To ask volunteer planners to accept this is patently wrong.	Technical	Water Assembly - Bob Wessely	

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55	8	Section 4.1.1.6	*Bounds v. State Engineer* - The NM Supreme Court found that the domestic well statute was constitutional and the OSE must grant a permit when receiving an application. However, the OSE can disallow or restrict pumping on the permit if, after required analysis, the pumping would impair senior rights by impairing sources. The most significant aspect of this ruling is the placing of groundwater pumping within the code of priority administration, whereby a senior right, ground or surface sourced, can call junior rights, including wells. The Court remarked that it is difficult to prove impairment when it comes to groundwater withdrawals, but as more is learned of the nature of the groundwater and aquifers, it could be much less difficult to do so. The OSE and ISC should be aware that a "calling war" could break out and cause chaos to water resource administration. Much caution should be shown when granting permits. This is another reason to stop avoiding adjudication of water rights in the region. The time to end justifying unseemly withdrawals by not conducting adjudication is here. The situation this creates makes the state vulnerable to outside interests. Taking destructive amounts of water from the resource must end.	Technical	Water Assembly - Bob Wessely	
56		Section 4	With the regional water plans supposedly being the basis for the State Water Plan, the regional planning process seems to have only selectively followed the requirements of the statutes. Please refer to NMSA 72-14-3.1 which contains an extensive litany of requirements for a State Water Plan (we chose not to re-list that litany here). It's less than obvious how the current regional water planning process will meet even a small fraction of those statutory requirements. The final version of this draft plan needs to take into account this statute more comprehensively. Present methodology used in the draft plan is very confusing and conflicts with common planning goals. To have three or four unadvertised tightly controlled meetings expecting large results is unrealistic. Not letting regions create and use their own data and water budgets is unreasonable. The current approach used by the ISC implies, perhaps incorrectly, their lack of consideration and respect for local planners when it force feeds data and budgets to the committee and does not allow consideration of the validity of doing this. It is insulting to volunteers who devote their valuable time to develop usable regional water plans, and amounts to deceit. This is not a proper process to achieve a product that goes beyond a project list (not a basis as called for in the statute) that would give some confidence in our ability to plan for the future. An example of this is the neglect of public welfare and the obsession of providing water we don't have to proposed subdivisions. Another is the complete lack of recognition of climate disruption threats, which will upend any "planning" desires and could cause the collapse of the resource and economy. Another is the omission of water for the ESA (or for ecosystem services more broadly). Another is the tendency to favor large projects that exceed the known capacity of our water supply. Besides statutory statements, there are ethical and moral considerations: When we consider only immediate needs and desires, we run the danger of robbing future generations of a decent future--indeed, any future. By taking all we want, which is what we do now, and justifying it by legal shell gaming and obfuscation, we deny the intent of the law. It is time for us to start treating ourselves more gently and altruistically. Public welfare must be taken more seriously. New Mexico needs to turn to the values contained in its diverse and wise cultures. That is the resource we have ignored. We must develop a better sense of ethics and morals and begin to show mercy to future generations. Good and decent planning demands it.	Process	Water Assembly - Bob Wessely	
57	5	Section 5	Water planning needs to consider the water resource as a whole, as a living entity, instead of the fragmented way it is being treated now. There has been no control over development of the uplands, groundwater pumping, floodplain connectivity, etc., and the resource continues to deteriorate. Recharge to the river is diminishing because of this, and in the future will result in a dry riverbed and an impaired resource. Planners must have the foresight to address this.	Process	Water Assembly - Bob Wessely	
58	6	Section 5	Rio Grande Compact sidebar – There's no indication of information change in the compact description from 2004. As indicated in above comment on Section 2, including unchanged information suggests this document is intended to be a replacement, rather than an update of the 2004 RWP	Technical	Water Assembly - Bob Wessely	
59	6-11	Section 5	Many of the bullets contain no new information since 2004 - for example, bullets 2, 3, 5, 7, 8, 9, 18. As indicated in above comment 5 (on Section 2), including unchanged information suggests this document is intended to be a replacement, rather than an update of the 2004 RWP	Technical	Water Assembly - Bob Wessely	

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60	6-11	Section 5	None of the bullets acknowledge the existence of the Rio Puerco and Rio Jemez sub-regions that are also a part of the Middle Rio Grande Region 12. Either we should look into updating the Rio Puerco and Rio Jemez plans (Chapter 12 in 2004 RWP) or we should explicitly say that this update excludes those subregions.	Technical	Water Assembly - Bob Wessely	
61	11-25	Section 5	Why does Section 5 present all those data items (temp., precip., drought indices, etc.) when Sections 5, 6, 7 direct the use of Administrative Water Supply and Demand only instead of those data?	Technical	Water Assembly - Bob Wessely	
62	12	5.1.1	It's inconvenient for the reader to keep three separate documents open so as to see text, tables, and figures. We assume that the final report version will integrated this information into the appropriate sections of the text.	Technical	Water Assembly - Bob Wessely	
63	13	5.1.1, 8th paragraph	Paragraph is incorrect as it stands. Grissino-Mayer did not indicate recent precipitation to be lower than long term average. In fact, Grissino –Mayer showed the last quarter of the 20th century to be far wetter than the long term average. Grissino-Mayer said nothing about the future. The 2004 RWP may have noted that after Grissino-Mayer data, the precipitation was lower than long term average.	Technical	Water Assembly - Bob Wessely	
64	14-16	5.1.2	This paragraph mentions potential future impacts of climate change. Yet, it does not provide an approach for how New Mexico should plan for climate change impacts when the technical data is simply the Administrative Water Supply.	Technical	Water Assembly - Bob Wessely	
65	16	5.2, 2nd Paragraph	The phrase "...but excluding potential compact limitations" places unrealistic constraints and extreme biases on water planning analysis in this draft plan. For the MRG, the RG Compact is one of the major constraints on supply. Ignoring this in this draft planning analyses would imply that the MRG region need not consider or contribute to future compact needs in years of shortage. If this is not true, then this statement and the associated results presented in this draft plan should be extensively revised.	Technical	Water Assembly - Bob Wessely	
66	18	5.3, 1st paragraph	Besides providing backup supplies to ABCWUA when surface water cannot be diverted, groundwater at other times provides significant augmenting supplies even when ABCWUA is diverting surface water.	Technical	Water Assembly - Bob Wessely	
67	18-19	5.3.2	The section talks about major wellfields in the area, but does not acknowledge the significant aggregate groundwater use by domestic, mutual domestic, and agricultural wells in the region. It is critical that analyses of these uses be included in any final plan for the region.	Technical	Water Assembly - Bob Wessely	
68	20	5.4	The entire subsection on water quality does not appear to acknowledge tribal water quality standards, which have non-trivial implications for the region's handling of water.	Technical	Water Assembly - Bob Wessely	
69	22	5.4.2, last two bullets	We commend the authors on finally acknowledging, albeit superficially, the Rio Puerco and Rio Jemez Subregions.	Technical	Water Assembly - Bob Wessely	
70	23	5.5, 2nd paragraph	In the explanation of Administrative Water Supply here, why is it assumed that the 2010 diversions were "permitted and in compliance with water rights policies"? Our understanding is that many demands/rights were not met in that year due to insufficient water supplies, that there were many diversions lacking permission, and, more critically, that water rights in our region are claimed but are not adjudicated.	Technical	Water Assembly - Bob Wessely	
71	24-25	5.3.2	This discussion of "Drought Supply" does not appear to acknowledge the impact of consecutive dry years, nor does it appear to acknowledge the impacts of RG Compact constraints on deployment of water. The final plan should include full analyses of these assessment gaps.	Technical	Water Assembly - Bob Wessely	
72	27	6.1, last paragraph	The phrase "depletions have not been quantified" is indicative of a key problem in this draft plan. For a many years the OSE issued depletion reports every five years. Depletions are critically important for the MRG region that is compact constrained. It is of critical importance that OSE resume issuing depletion reports.	Technical	Water Assembly - Bob Wessely	
73	27	6.2, 2nd paragraph	As we understand, Intel has been "defined" to be located in Sandoval County but not in Rio Rancho. If that is the case, "in" should be changed to "near" on this line of text.	Technical	Water Assembly - Bob Wessely	The steering committee agrees that Intel is not within the Rio Rancho city limits - see also the comments from Rio Rancho regarding Intel
74		6.2.1, 4th and 5th paragraph	The two paragraphs seem to contradict each other. The increases cited in the fourth paragraph vs. the shrinkages cited in the fifth paragraph need some words of explanation.	Technical	Water Assembly - Bob Wessely	
75	30	6.2.2, 4th paragraph	To our read, additional explanation or justification is needed here. The projected sudden jumps are counter-intuitive. For more than the past decade, a total of 213 homes were built on Mesa del Sol . Then, according to the draft plan, starting this year, building will jump to 150-200 homes per year. Then in 2018 it will again jump to 600 per year. Separately, the aggregate count is not right. 213+(3*200)+(43*600) is only about 70% of the 37,500 home buildout in 2060 that was promised on Line 4 of the paragraph.	Technical	Water Assembly - Bob Wessely	

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76	30	6.2.2, 6th paragraph	The text cites 2-3% annual economic growth. The last bullet on the page ("Forbes…") cites 0.2% annual growth. Again, for credibility, there should be some words discussing the mismatch in numbers.	Technical	Water Assembly - Bob Wessely	
77	32	6.2.3, 4th paragraph	The numbers sound inconsistent on their face. It says 16,000 new homes in 20 years, or 800 homes per year. It says only 100-200 permanent new jobs (is that each year or total in 20 years?). Regardless, how is it possible to get 16,000 families immigrating to Belen without offering them some employment? It not likely they will all find work outside of Belen, including Albuquerque.	Technical	Water Assembly - Bob Wessely	
78	34	6.4, 4th paragraph	Subsubsection entitled "Irrigated Agriculture", Fourth paragraph, Line 7 – It should probably be noted that changes in crop types, etc. may not be as easy as it is made to sound in this draft report. There are business operations and capital costs associated with such changes and soil/irrigation considerations that need to be addressed. To be more symmetric, the plan should include an assessment of changes in chip type to conserve water at electronics manufacturers.	Technical	Water Assembly - Bob Wessely	
79	42	6.5.2, 1st paragraph	Please clarify throughout whether three or four counties comprise the MRG planning region.	Technical	Water Assembly - Bob Wessely	
80	43	6.5.2, 4th paragraph	It does not seem reasonable to keep ag use constant when future water rights are projected by many as likely to be transferred to urban domestic or industrial use. Adding an assessment of alternative possible futures would be valuable here.	Technical	Water Assembly - Bob Wessely	
81	44	7, 2nd bullet	It's not obvious that "long term balanced supplies may be in place" when we consider groundwater depletions and climate change impacts to surface supply availability. To make this draft credible, the final should include assessments of how such factor can affect future supplies and demands, including an array of reasonable potential alternatives.	Technical	Water Assembly - Bob Wessely	
82	44-45	7	It is essential that this section include a quantitative assessment of the supply "gap". Now, this section has only broadly qualitative statements, lacking reasonable value for planning needs.	Technical	Water Assembly - Bob Wessely	
83	44-45	7	There should be added some acknowledgement of the risk from protracted (vice 1-2 year) drought, including the degrees of uncertainty related to those projections.	Technical	Water Assembly - Bob Wessely	
84		general	We believe history is not but should be considered in planning for our water. History contains lessons and omens. We cannot avoid realities including physical water availability above and below ground, the Rio Grande Compact, and legally binding senior rights, including those of the pueblos. The lack of adjudication continues to be an obstacle to coherent water management.	Technical	Water Assembly - Bob Wessely	
85		previously submitted comments	A 2010 tabulation, later submitted to the MRCOG Steering Committee, of the Water Assembly's perception of key actions or changes that have occurred since the 2004 Regional Water Plan (also includes list of the RWP recommendation titles): http://www.waterassembly.org/Archives/Water%20Assembly%20Documents/MRG-RWP-Update/RWP10w_1e-Recommendation%20ActionLists%20.pdf	Process	Water Assembly - Bob Wessely	
86		previously submitted comments	A December 17, 2013 list of concerns about the impending regional water planning process, submitted to the ISC Commissioners: http://www.waterassembly.org/Archives/Water%20Assembly%20Documents/MRG-RWP-Update/wa349p-CommentForISC-12-17-13.pdf	Process	Water Assembly - Bob Wessely	
87		previously submitted comments	A March 3, 2015 presentation to the MRCOG Steering Committee regarding the nature of the 2004 Regional Water Plan and the approach to updating that plan: http://www.waterassembly.org/Archives/Water%20Assembly%20Documents/MRG-RWP-Update/wa104h-BriefingToRWP-SC-IntroductionToThe2004-RWP.pdf	Process	Water Assembly - Bob Wessely	
88		previously submitted comments	A June 19, 2015 memorandum submitted to the MRCOG Steering Committee expressing some concerns about the RWP update: http://www.waterassembly.org/Archives/Water%20Assembly%20Documents/MRG-RWP- Update/6-19-15%20emh%20Comments.pdf	Process	Water Assembly - Bob Wessely	
89		previously submitted comments	A June 27, 2015 submission to the MRCOG Steering Committee as an update replacement to an earlier Water Assembly submission. It contains guiding principles for planning, considerations for Regional Water Plan Update, recommended future strategies, technical data, and a summary of the sixteenth water assembly convocation on climate disruption: http://www.waterassembly.org/Archives/Water%20Assembly%20Documents/MRG-RWP-Update/wa428b-AggregatedUpdate%20SubmissionToMRG-RWP-SC.pdf	Process	Water Assembly - Bob Wessely	

Comment Number	Page Number	Paragraph or Section Number	Comment	Comment Type (Technical or Process)	Commenter	Steering Committee Comments
90		previously submitted comments	A December 4, 2015 set of issue papers submitted to the ISC by the Governance Study Group (sponsored by the New Mexico Water Dialogue) regarding recommended improvements for regional water planning: http://www.waterassembly.org/Archives/Water%20Assembly%20Documents/GSG10b-Whole%20NM%20RWP%20Governance%20Study%20Group%202015-12-04.pdf	Process	Water Assembly - Bob Wessely	
91		previously submitted comments	A February 9, 2016 submission to the MRCOG Steering Committee and to the ISC at the first of three "Public" meetings regarding the draft update to the Regional Water Plan: http://www.waterassembly.org/Archives/Water%20Assembly%20Documents/MRG-RWP-Update/wa436k-Response%20to%20ISC%20MRGRWP%20Program.pdf	Process	Water Assembly - Bob Wessely	
92	2	Section 1, 4th bullet	Contradicts one from the other. Why include all of the data is we are to use the AWS? Otherwise, why not provide data for riparian evapotranspiration and other consumptive uses, readily available from BoR and other agencies?	Technical	Elaine Hebard	
93		Section 1, 4th bullet	What would be useful would be to say whether there has been a change in the average data sets.	Technical	Elaine Hebard	
94		Section 1, 4th bullet	What studies have been published since 2004 on riparian evapotranspiration and other components of the water budget in our region?	Technical	Elaine Hebard	
95	1	Section 2, Table 1	There is no need for this table to be in the regional plan, only the State Plan	Technical	Elaine Hebard	Steering Committee agrees.
96	2	Section 2.1, first paragraph	Include the Master Email list as an appendix to Section 2. Since the email list changed each time there was a meeting, every invite list should be included.	Technical	Elaine Hebard	
97		Section 2	Often the meetings were announced the day before if not the same day of the meeting.	Process	Elaine Hebard	
98		Section 2.2.1	Detail the "extensive efforts" in putting together the steering committee for this region in an appendix	Technical	Elaine Hebard	
99		Section 2.2.3	The description of Meeting #4 is incorrect. The group did not agree to move forward with the data provided by the NM ISC. I listened to the tape; this conversation never happened nor was there ever any agreement to use the AWS data.	Technical	Elaine Hebard	Meeting description changed by Laila Sturgis
100		Section 2.2.3	Correct the description of Meeting #9, 5/12/15. The second sentence implies that the ICIP and WTB projects were reviewed at this meeting. They were not. Clarify that meeting participants were given a draft of the table to discuss at the next meeting.	Technical	Elaine Hebard	Meeting description changed by Laila Sturgis
101		Section 2.2.3	Correct the description of Meeting #10. Remove the sentence that says "The ICIP list for this region is overwhelming and a helpful planning tool." First, the list should be a product of planning as opposed to used as a planning tool. Secondly, this was not the reasoning of the group. See the emails sent last summer, or the description of Meeting #11.	Technical	Elaine Hebard	Meeting description changed by Laila Sturgis
102		Section 2	The confusion over the PPP table comes in part from a presentation from Angela included in the 5/26/15 meeting report that says "The goal of this regional water plan is to provide guidance to funding agencies on how to prioritize project applications." However, Chapter 1, the Introduction, states "The purpose of this document is to update the 2004 RWP to reflect new and changed information related to water planning in the Middle Rio Grande region, as listed in the bullets below, and to evaluate projections of future water supply and demand for the region using a common technical platform approach applied to all 16 planning regions statewide. Accordingly, the following sections summarize key information in the 2004 plan and provide updated information regarding changed conditions and additional data that have become available. Specifically this update: Identifies strategies, including infrastructure projects, conservation programs, watershed management policies, or other types of strategies that will help balance supplies and projected demands and address the Middle Rio Grande region's future water management needs and goals. Discuss other goals or priorities as identified by stakeholders in the region." These are very different purposes. Without evaluating projects, programs and policies using a procedure similar to that used in the current Plan, the Steering Committee would be hard pressed to provide guidance as to what should be included and why. Considering the Update as a Progress Report allows the use of the current evaluations and simply a review of what's been done and what should be emphasized.	Process	Elaine Hebard	
103		Section 2.3.2	This language is identical to that in the Taos plan, which did actually have an inclusive process.	Technical	Elaine Hebard	
104		Section 2.3.2	Suggestion: make the May meeting a more advertised meeting at a more centralized location.	Process	Elaine Hebard	
105	1	Section 4.1.1	Add this as sentence 2: "Additional material for the Río Puerco y Río Jemez Subregions can be found in Section 11 of Chapter 12 together with its corresponding Appendix."	Technical	Elaine Hebard	

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106	1	Section 4.1.1	Should include the 40-yr water plans in the region	Technical	Elaine Hebard	
107	1	Section 4.1.1	Add this information: "In the case filed on March 21, 2016, entitled Wild Earth Guardians, Petitioner, v. Tom Blaine, in his capacity as the New Mexico State Engineer, Respondent, and the Middle Rio Grande Conservancy District, U.S. Bureau of Reclamation, Real Parties of Interest. No D-101-CV-2016-00734, N.M. Dist. Santa Fe, N.M., WEG seeks an Alternative Writ of Mandamus directed to the New Mexico State Engineer to perform his nondiscretionary duty to either set a due date for the District/Reclamation to demonstrate proof of beneficial use for Permit Nos. 0620 and 1690 or cancel the permits."	Technical	Elaine Hebard	
108	14	Section 4.1.2.4	Include Chapter 12 in the list of references in the last sentence of the paragraph	Technical	Elaine Hebard	
109	14	Section 4.1.3	Add a second sentence to the paragraph that says "New Mexico alleges that, since it has made its required Compact deliveries, any interception due to groundwater pumping allowed by the State Engineer would be a matter for state courts." Modify the third sentence to say "Colorado is also a Defendant in the lawsuit solely because as it is a signatory to the Rio Grande Compact."	Technical	Elaine Hebard	
110	14	Section 4.1.3	This section should say something about New Mexico's position.	Technical	Elaine Hebard	
111	15	Section 4.1.3.1	Define the aboriginal rights in the region	Technical	Elaine Hebard	A list of the Pueblos and Tribal land is given in the next sentence. Can you clarify what information you would like to see added?
112	16	Section 4.1.3.2, last paragraph	Add this sentence to the end of the last paragraph; "Deficit consumption in the MRG would aggravate the situation."	Technical	Elaine Hebard	
113	16	4.1.3.3	Add: and more substantially in Chapter 12-11	Technical	Elaine Hebard	
114	16	4.1.3.4	Add this information "Abiquiu Dam, operated by Army Corps for flood control, is used for storage purposes by ABCWUA, and through agreement, releases are timed to help recreation between El Vado and Abiquiu. Cochiti Dam, also operated by Army Corps for flood control, has a small recreational pool and has released water to boost the spring runoff for the benefit of the silvery minnow, an endangered species. "	Technical	Elaine Hebard	
115	17	4.1.3.5	Revise the last bullet regarding the Jemez Pueblo: "Adjudication resuming to litigate the claims of Pueblos of Jemez, Zia and Santa Ana for historic, existing and future uses (see below *and Chapter 12-11*).	Technical	Elaine Hebard	
116	18	4.1.4	Do San Ysidro, Cuba, Jemez Springs, etc have any such laws?	Technical	Elaine Hebard	
117	19	4.1.5.1	Add to the end of the first sentence of the section "Water use in Bernalillo County is regulated by ordinances, and guided by a Water Conservation Plan and the Albuquerque/Bernalillo County Comprehensive Plan (City of Albuquerque, as amended through 2013; *and which is being updated at this time*).	Technical	Elaine Hebard	
118	20	4.1.5.2	add this sentence to the end of the paragraph "It also has a Conservation Plan and has numerous restrictions on how new development is serviced."	Technical	Elaine Hebard	
119	26	4.2.1.1	Add this information "WEG sent a letter to the Secretary of Interior on January 6, 2016, alleging that the Bureau of Reclamation's action in assisting New Mexico's compliance with Compact deliveries by releasing prior and paramount water contradicts the Bureau of Indian Affairs' responsibility to protect tribes." http://www.wildearthguardians.org/site/DocServer/1.6.16_Letter_to_SOI_re_P_P_storage_releases_FINAL_and_a.pdf?docID=16985&AddInterest=1484	Technical	Elaine Hebard	
120	27	4.2.1.2	Long discussion in 4.2.1.2 about the New Mexico Wildlife Conservation Act. What does this mean to the RWP and "gap", water wise?	Technical	Elaine Hebard	
121	28	4.2.2	No mention of • paper water permits exceeding available wet water rights. • requirements to meet the compact and what that means, water wise. • RPyRJ Water Quality in Chapter 12.7 and Appendix 12.7	Technical	Elaine Hebard	
122		4	Many of the issues raised could be said to be driving forces for water management in the two watersheds comprising the Río Puerco and Río Jemez subregions. Information about Land Grants, United States v. Abousleman, Nacimiento Community Ditch Association, acequias, and water quality information was summarized in Chapter 12:11, http://www.ose.state.nm.us/Planning/RWP/Regions/12_MRG/2004/SEC12-11-IssuesAndConstraints.pdf, should be included. (Table of contents from Chapter 12-11 and Appendix 12-11 were included in comments) Why not at least acknowledge the existence of the RPyRJ plan?	Technical	Elaine Hebard	

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123	7	5, second bullet	The conclusion drawn from the Schmidt-Petersen presentation is not true. The citation is for a presentation by Rolf Schmidt-Petersen in 2011, included below. According to the presentation, the amount of irrigated lands includes Pueblo and recently reclaimed lands. These lands do not have "transferrable senior water rights" and are not available to offset effects. How many pre-1907 acres are actually available to offset additional urban demands?	Technical	Elaine Hebard	See more detail on this in the notes from Elaine
124	1	Intro	"• Identifies significant new research or data that provide a better understanding of current water supplies and demands in the Middle Rio Grande region. " What? The CTP and the draft chapters do not include such research or data. Suggest deleting sentence	Common Technical Platform	Elaine Hebard	
125	1	Intro	"The water supply and demand information in this RWP update is based on current published studies and data and information supplied by water stakeholders in the region. " Additional information and data was supplied, but was not included. Did not use the 1997 or 2014 Water Budgets done by the Assembly, nor the one prepared for the MRG Basin for the ISC. Suggest including Technical Data submission from Water Assembly as an appendix.	Common Technical Platform	Elaine Hebard	
126		Section 5, last bullet, 3rd sentence	Delete the following text "As a result, ABCWUA, which holds upward of 70 percent of the permitted post-1956 groundwater pumping rights in the region, does not need to aggressively pursue acquisition of pre-1907 water rights for offset purposes for several decades."	Technical	Elaine Hebard	
127	7	Section 5, last bullet, 3rd sentence	The statement does not follow. It is a conclusion based upon an opinion, and not one which is universally shared. Pumping rights are not water rights. The ABCWUA only owns ~27 kaf of water rights, with ~ 20 kaf of them being vested and acquired and ~7 kaf being pre-1907. For the last three years, those rights have not been sufficient to offset depletions, even with return flow credits. Not to mention, the ABCWUA is proposing to change the policy from reserving the aquifer for times of drought to managing the aquifer to a level of 110' below pre-development levels.	Technical	Elaine Hebard	
128		Section 5, last bullet, 3rd sentence	Why not say that ~2% of water demand is met with reused water? It would provide a reason to create a metric to improve.	Technical	Elaine Hebard	
129	8	Section 5, 3rd bullet	The bullet is true but there is a negative light on the irrigation district but not on the urban users. More over, there is no mention that "Since the accepted plan was completed, the MRGCD has reduced diversions by some 40%." (add this sentence)	Technical	Elaine Hebard	
130	9	Section 5, 2nd bullet	Revise the bullet with the added texts in italics "• The ABCWUA has investigated aquifer storage and recovery (ASR) projects through a demonstration project at Bear Canyon and obtained the first full-scale underground storage and recovery (USR) permit in the state in August 2014. *Using San Juan Chama water otherwise used by non-potable water users or available for drinking water purposes, water was stored in Bear Canyon.* Between November 2014 and March 2015, the project recharged 520.6 acre-feet into the aquifer. ABCWUA is implementing a second ASR demonstration project *to store up to 5,000 acre-feet of treated San Juan Chama* water *through injection wells located at the Drinking Water Treatment Plant* in the Rio Grande Valley *at a cost of $5.56 million, and* is currently evaluating other potential projects that would allow them to store more surface water, building up a drought reserve. " Information comes from HB 167 and SB 106.	Technical	Elaine Hebard	
131	9	Section 5, 4th bullet on pg 9	How much water is need to meet instream flow targets? Example of needed information	Common Technical Platform	Elaine Hebard	
132	10	Section 5, 4th bullet on pg 10	Revise the bullet to read: The Middle Rio Grande Water Assembly, a non-profit organization dedicated to assuring – through an open, inclusive, and participatory process – the effective implementation, monitoring and updating of the Middle Rio Grande Regional Water Plan. *(cf. Article II Purpose of the Water Assembly...)*	Technical	Elaine Hebard	
133	10	Section 5, 4th bullet on pg 10	Revise the bullet to read: As part of the original water planning effort, the Assembly developed a water budget for the Middle Rio Grande. Though this document uses a different approach from the common technical approach for all planning regions, the original water budget is still a useful tool that describes the water balance of supply and demand --including open water evaporation and riparian evapotranspiration-- in the Middle Rio Grande. The budget has recently been updated (Thomson et al., 2014) by the Middle Rio Grande Water Assembly Water Budget Task Force. "			

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134	11	Section 5, 2nd bullet on pg 11	Why is the last sentence on this bullet included, it should be deleted. There were many concerns (as there were with the ESA Biological Opinion).	Technical	Elaine Hebard	
135	15	5.1.2, 2nd paragraph on pg	CTP results aren't depicted with the steady decrease (as shown in the URGIA data).	Common Technical Platform	Elaine Hebard	
136	24	5.5.2, 1st bullet	The sentence "• The drought adjustment is applied only to the portion of the administrative water supply that derives from surface water " is incorrect. Change to read: "Drought and climate change impact both groundwater and surface water." New Mexico Universities Working Group on Water Supply Vulnerabilities, Final Report to the Interim Committee on Water and Natural Resources, August 31, 2015, https://www.documentcloud.org/documents/2461621-droughtworkinggroupreport-final.html	Common Technical Platform	Elaine Hebard	
137	16	5.1.2, 1st bullet on pg	If flows are projected to be "much lower" where is that gap reflected? How much is "much lower"?	Common Technical Platform	Elaine Hebard	
138	16	5.1 last paragraph	How does this mesh with the CTP? Either we are to plan to a never changing line - drought- or a graphic which says things are okay. How does that help with the "imperative"?			
139	16	5.2, 2nd Paragraph	The report states: "When evaluating surface water information, it is important to note that streamflow does not represent available supply, as there are also water rights and interstate compact 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." I'm confused. Does Longworth's 2005 and 2010 reports reflect the physical and legal limitations? If so, what was the point of creating a CTP? All that was needed was to multiply Longworth's results by the population estimates. The rest of the information is fairly irrelevant. If Longworth's report does not include water rights and interstate compact limitations, then how are those to be accounted?	Common Technical Platform	Elaine Hebard	
140		5.2	No mention of use of EBR for MRG water rights owners	Process	Elaine Hebard	
141	18	5.3, 1st paragraph	Change the 1st sentence to read: "Groundwater accounted for about 30 percent of all water diversions in the year 2010 (Longworth et al., 2013). It supplies most of the region's small drinking water systems and provides 40 -50% of supply to the ABCWUA"	Technical	Elaine Hebard	other's had the same comment and the wording should be revised
142	20	5.4, 3rd paragraph on pg	Add this information: "Another concern has to do with the mixed waste landfill on Kirtland affecting the regional aquifer in the Albuquerque. The last decade has seen an increasingly rapid growth in the hydraulic fracturing segment of the oil and gas industry. This new technology requires that unsustainable quantities of clean water be removed from the natural water cycle to recover previously irretrievable oil and gas in areas once considered non-profitable. Due to the lack of oil and gas ordinances in place, there is great potential for unregulated oil and gas exploration and development in the Albuquerque Basin. Without local regulation, local governments will not have the ability to regulate their oil and gas and water futures for themselves."	Technical	Elaine Hebard	
143	20	5.4, 3rd paragraph on pg	Add this information: Because of the growing worldwide market from these hydraulically fractured petroleum products, and the resulting economic pressures, every water plan and policy should include considerations for the realities of oil and gas production needs versus the essentials for a continuous adequate amount of clean water necessary for human survival."	Technical	Elaine Hebard	
144		8	Because of the growing worldwide market for these hydraulically fractured petroleum products, and the resulting economic pressures, every water plan and policy should include considerations for the realities of oil and gas production needs verses the essentials for a continuous adequate amount of clean water necessary for human survival.	Technical	Elaine Hebard	
145	22	5.4.2, 2nd bullet on pg	Delete bullet regarding ISC comment. Why is this in the MRG plan? There were lots of comment letters written, as there are on various actions. If one is included, must include them all. Or make a general comment regarding the issue.	Technical	Elaine Hebard	
146	24	5.5.1	"Diversions, which provide a measure of supply that considers both physical supply and legal restrictions." Is this what Longworth's report measures?	Technical	Elaine Hebard	
147		5.5.2	"The drought adjustment is applied only to the portion of the administrative water supply that derives from surface water." Problematic, see comment for 5.1.2 Recent Climate Studies	Common Technical Platform		

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148	24	5.5.2, last bullet on pg	The assumption keeps groundwater demand as a steady figure, but should surface water decline, groundwater usage is likely to increase. See, "the demand for water does not necessarily decrease when the supply is diminished." 6.5.1 Water Demand Projection Methods	Common Technical Platform	Elaine Hebard	
149	25	5.5.2, 2nd paragraph on pg	This paragraph describes the kind of data that is needed to provide a more accurate depiction of climate changes from year to year. Please see attached figure providing more variation than a single line, this is from the 1997 Water Budget, modified to show the predicted effects that a warmer climate will have on the surface water supplies	Common Technical Platform	Elaine Hebard	Figure attached in notes
150		5.5.2, 2nd paragraph on pg	Showing more variation than a single line, please see attached figure, modifying the 1997 Water Budget to show the predicted effects that a warmer climate will have on surface water supplies.	Common Technical Platform	Elaine Hebard	Figure attached in notes
151	26	6.1, bullet on Riparian ET	Re: not including riparian evapotranspiration in demand. Poof, if not included, it doesn't exist. But we know it does, and is a large consumptive use. It affects categories of users and thus options. Planning is not just to close a gap. It is linked to who is using what so that the gap can be closed. Add text "In the Middle Rio Grande region, the updated draft water budget estimated that riparian evapotranspiration in recent years was about 150,000 acre-feet per year." See additional attached notes.	Common Technical Platform	Elaine Hebard	See notes for references and further information on ET
152	26	Section 6.1	The CTP also does not include open water evaporation, another large consumer. As mentioned in 6.1, together in 1995, the two consumptive uses were roughly 44% of our water consumption. These two consumptions are not just a drop in the bucket, and they have to be included to be a part of the solution.	Common Technical Platform	Elaine Hebard	
153	26	Introduction, general	While data and information has been supplied, there is no indication that it has made any difference to what is included in the draft chapters	Common Technical Platform	Elaine Hebard	
154	26	Section 6.1, bullet on instream uses	("…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 projections in its policy, program, and project recommendations.") Delete this bullet. Why is this bullet included in present uses?	Technical	Elaine Hebard	
155	27	Section 6.1, 1st paragraph on pg	Re: depletions: Shomakers report showed that in 1995, withdrawals equaled 600 kaf and depletions 340. However, the users' percentages significantly changed. Again, if this is to be a plan to close a gap, one has to know whose actions are creating the problem and whose water is currently hurting or helping, and whose water is going to be used to solve it.	Common Technical Platform	Elaine Hebard	
156	29	Section 6.2.1, last sentence of the section	Remove the sentence that says "Little farmland has been sold, with most farmers and ranchers trying to hold on." Throughout the document, it is urban centric, and makes conclusions which may or may not be the case. How does this help the plan?	Technical	Elaine Hebard	
157	30	Section 6.2.2	Update the information on the Santolina development. "The master plan for Santolina was approved by the County Commission in June 2015. The master plan will provide for residential development for 95,000 people and large-scale commercial development on tracts of 200 to 2,000 acres. Water is expected to be provided by ABCWUA."	Technical	Elaine Hebard	
158	32	Section 6.2.3., 2nd paragraph on pg	Change test to: "The Rancho Cielo proposal has been changed to the multi-modal center and some of the water rights acquired earlier have been transferred, some to Rio Rancho."	Technical	Elaine Hebard	
159	34	Section 6.3, top of page	What about MRGOG's 2040 population projections?	Technical	Elaine Hebard	
160	35	Section 6.4, 3rd paragraph on pg	Per capita use is already 127 for ABCWUA.	Technical	Elaine Hebard	
161	36	Section 6.4	Add this information to the end of the paragraph on irrigated agriculture (top of page 36): "With the loss of agriculture, aquifer recharge may be reduced. Loss of agriculture will also result in loss of habitat, green belt, food security, air quality enhancement, and other benefits."	Common Technical Platform	Elaine Hebard	
162	36	Section 6.4	Better accounting is available showing recharge benefits and should be incorporated into the CTP.	Common Technical Platform	Elaine Hebard	

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163	36	Section 6.4, end of 2nd paragraph on pg	Modify the last sentence to read "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 **future uses** and downstream uses will be reduced.	Technical	Elaine Hebard	
164	36	Section 6.4, last paragraph on pg	Data exists to show much the benefits (of agricultural irrigation efficiency) and as such, would be helpful to have in order to plan.	Common Technical Platform	Elaine Hebard	
165	37	Section 6.4, last sentence on reservoir evap	Whose plan is this? 100-150 kaf evaporative loss, charged against total Compact consumption, and no change is assumed? How can we justify planning to reduce the consumptive use, perhaps with our neighbors?	Common Technical Platform	Elaine Hebard	
166	38	Section 6.5.1, 1st paragraph pg 38	The statement "..but the demand for water does not necessarily decrease when the supply is diminished" contradicts the extreme drought supply, 5.5.2, which assumes that demand stays the same.	Technical	Elaine Hebard	
167	38	Section 6.5.1, 1st paragraph pg 38	"Therefore, for planning purposes, it is assumed that existing rights, reflected in the administrative water supply, will be exercised by the owner when needed or may be leased to other users." This statement depends on who owns those rights and how they are currently being used.	Technical	Elaine Hebard	
168	40	Section 6.5.1, 2nd paragraph, last sentence	If water use changes (due to decline in the agricultural economy) the ways to plan for it will change too.	Technical	Elaine Hebard	
169	41	Section 6.5.1, paragraph on reservoir evap	How does the reduction in reservoir size - ie less evaporation - help or hinder the region, Compact-wise?	Technical	Elaine Hebard	
170	42	Section 6.5.1, top of pg 42	Why report the range of projections for reservoir evaporation? If not included to begin with, we don't have to account for it, right?	Common Technical Platform	Elaine Hebard	
171	42	Section 6.5.1, 2nd paragraph of pg	If the "..fluctuations in reservoir evap are expected to be much greater than the high/low range projected using this method.." than what method should be used? How much is the range? How is that reflected in the CTP?	Common Technical Platform	Elaine Hebard	
172	general	Section 6.5.1	Where are the climate change impacts? Drought is included but the steady decline of surface water supplies, the change in snow melt, --both amount and timing, the increase in ground temperatures represent information we need to plan for any gap and is not calculated in the CTP.	Common Technical Platform	Elaine Hebard	
173	42	6.5.2,2nd paragraph of section	Second paragraph of Section 6.5.2 states "Demand in the public water supply category is projected to increase under both scenarios, proportional to the increasing population projections, but the demand increase is **moderated** by phased-in conservation, as discussed in Section 6.4." How does the moderation impact the proportional increase? Remember the ABCWUA is already below 130 gpcd.	Technical	Elaine Hebard	
174	42	6.5.2, last sentence on pg	Earlier, the Update draft says that farmers are already selling out. What this seems to say is that those water rights will still be used, even if transferred. However, if transferred to urban groundwater use, the impacts and thus the solutions are quite different. What are the projections for such transfers?	Technical	Elaine Hebard	
175	43	6.5.2, 2nd paragraph on pg	Delete text: "Under the low scenario, it is expected that some ranches will go out of business ~~because younger people, who do not view ranching as a desirable or economically viable career choice, will not replace the older generation of ranchers.~~" Another example of urban-centric. The farm data provided shows an increase in acreage under production. Perhaps, given the exodus from Albuquerque, the plan should say, in a different section, that … because younger people, who do not view New Mexico as a desirable or economically viable career choice, will not replace the older generation of urban dwellers?	Technical	Elaine Hebard	
176		7	First part is not gaps but issues	Technical	Elaine Hebard	
177	44	Section 7, 1st bullet	The RG Compact affects the JyS and S/S regions also. What does this bullet mean? What should we do with this insight that the regions are linked?	Technical	Elaine Hebard	
178	44	Section 7, 3rd bullet	What proof is there that there will be "wet years ~~beyond~~ when more water is ~~what was~~ available than in 2010"?	Technical	Elaine Hebard	
179	44	Section 7, 4th bullet	Where are the subregional plans for the other two basins?	Technical	Elaine Hebard	

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180	45	Section 7, 1st bullet on pg	These challenges are some of the information we need to be able to plan. Where is the section on funding?	Technical	Elaine Hebard	
181	45	Section 7, last paragraph	"Even without the projected growth in demand, major supply shortages are indicated in drought years" In 2010 this "shortage" didn't exist, making this not a useful number (referring to the estimated annual shortage of 207,357-282,108 af in the text).	Technical	Elaine Hebard	
182	general		What does the observed increased evaporation and thus consumption at Elephant Butte Reservoir mean? See submitted notes and figures showing this data.	Technical	Elaine Hebard	see attached notes
183	Table	Table 5-2	keep in text	Technical	Elaine Hebard	
184	Table	Table 5-1, 5-3 through 5-5	move to an appendix. What would be interesting to know is whether there are any differences between the "Data from USGS monthly statistics averaged over the entire period of record" in 2004 versus in 2016.	Technical	Elaine Hebard	
185	Table	Table 5-6	keep in text	Technical	Elaine Hebard	
186	Table	Table 5-7	keep in text	Technical	Elaine Hebard	
187	Table	Table 5-8 to the end of the chapter	move to an appendix and summarize in text	Technical	Elaine Hebard	
188	Table	Table 6-1	keep in text (total diversions, surface and groundwater)	Technical	Elaine Hebard	
189	Table	Table 6-4	move to an appendix and summarize	Technical	Elaine Hebard	
190	Table	Table 6-5	Projected Water Demand, 2020 through 2060 - add surface and groundwater. Needs more explanation in text.	Technical	Elaine Hebard	
191	Figure	Figure 3-1	add Pueblo/Tribal Jurisdictions	Technical	Elaine Hebard	
192	Figure	Figure 4-1	either define the various maps (Hearn, etc) or omit them.	Technical	Elaine Hebard	
193	Figure	Figures 5-1 to 5-4	keep in text	Technical	Elaine Hebard	
194	Figure	Figures 5-5 to 5-6b	put in an appendix, together with table5-1	Technical	Elaine Hebard	
195	Figure	Figures 5-7 to 5-14	useful but text will be needed to explain their import. How does the variability at Otowi affect the amount available for demand? Has the past 10 years seen a difference in flows as compared with the last 30? If so, that should be noted.	Technical	Elaine Hebard	
196	Figure	Figures 6-1a to f	are very helpful. Given that Torrance County gets a chart for 7 acre feet, the Rio Puerco and the Rio Jemez merit at least one each.	Technical	Elaine Hebard	
197	Figure	Figure 7-1	graph the future demand between counties and between uses, like 6-1a to f (data is in first two pages of Table 6-5), and between surface and groundwater.	Technical	Elaine Hebard	
198	Figure	general	Consider using some of the example figures contained in the submitted notes.	Technical	Elaine Hebard	see attached notes
199		PPP table	The New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division and its partners are constantly identifying new projects for future funding. It can take months (and in some cases such as on federal lands, more than a year) to complete planning and environmental and cultural clearances and secure funding for these projects. The list of out-year projects ready for funding is updated regularly. Therefore, the Middle Rio Grande Regional Water Plan - and all Regional Water Plans - should include by reference any future projects designed to meet watershed objectives and priorities in the New Mexico Forest Action Plan.	Technical	Susan Rich, New Mexico Energy, Minerals and Natural Resources Department, Forestry Division	

Comment Number	Page Number	Paragraph or Section Number	Comment	Comment Type (Technical or Process)	Commenter	Steering Committee Comments
200		general	Attached are two publications for consideration as a reference leading to the final Middle Rio Grande and NM State Water Plan update. The first publication titled *Renewable Resource Journal; Congress on Sustaining Western Water* recently published by The Renewable Natural Resources Foundation (RNRF) is an I.R.C. §501(c) (3) nonprofit, public policy research organization, founded in 1972. It is a consortium of scientific, professional, educational, design and engineering organizations whose primary purpose is to advance science, the application of science, and public education in managing and conserving renewable natural resources. The second publication for consideration is *Measuring What Matters; Setting Measurable Objectives to Achieve Sustainable Groundwater Management in California* , published by the Union of Concerned Scientists (UCS). UCS uses science to solve problems. Staff experts believe that rigorous analysis is the best way to understand the world's pressing problems and develop effective solutions to them. Hope you find these two publications useful as water planning efforts unfold. We hope they are applicable to our regional and state wide water planning on-going challenges and New Mexico's very limited and available resources for water planning efforts.	Technical	Theresa Cardenas, Union of Concerned Scientists	see attached reports
201		general	The report titled Confronting Climate Change in New Mexico was distributed at the May 17th meeting and is included in the comment appendices	Technical	Theresa Cardenas, Union of Concerned Scientists	see attached reports

Appendix 6-A

List of Individuals Interviewed

Appendix 6-A. List of Individuals Interviewed Middle Rio Grande Water Planning Region

Name	Title	Organization	City
John Garlisch	Extension Agent	USDA	Albuquerque
Edwin Kitzes	Assistant Conservationist	USDA NCRS	Los Lunas
Steve Lucero	Director	USDA Cooperative Extension Program	Cuba
Dierdre Firth	Planner	City of Albuquerque Economic Development	Albuquerque
Ralph Mims	Manager	Los Lunas Economic Development	Los Lunas
Steve Tomita	Director	Belen Planning & Economic Development	Belen
Kendra Watkins	Socioeconomic Program Manager	MRCOG	Albuquerque
Matt Geisel	Business Relations & CVB Manager	City of Rio Rancho	Rio Rancho
Manny Barrera	Director of Engineering	Mesa Del Sol	Albuquerque
Marisa de Aragon	Research Director	Albuquerque Economic Development Inc.	Albuquerque
Lynn Anderson	Executive Director	NAIOP	Albuquerque
Ken Schaefer	Research Director	Colliers International	Albuquerque
Jim Chynoweth	Managing Director	CB Richard Ellis	Albuquerque
Mark Lautman	Principal	Lautman Economic Architecture Partners, LLC	Albuquerque
Mike Puelle	Director of Public Policy/Govt. Relations	Associated General Contractors of NM	Albuquerque
Mike Greene	Project Manager, Generation Asset Management	PNM	Albuquerque
Mark Cubbage	Plant Manager	American Gypsum	Albuquerque
Robert Hagevoort	Extension Dairy Specialist and Associate Professor	NMSU Agricultural Science Center	Clovis

Appendix 6-B

Projected Population Growth Rates, 2010 to 2040

Appendix 6-B. BBER Projected Five-Year Population Growth Rates, 2010 to 2040 Middle Rio Grande Water Planning Region

County	Five-Year Growth Rate (%)					
	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040
Bernalillo	8.50	8.19	7.06	6.13	5.14	4.11
Sandoval	16.32	14.43	12.86	11.41	10.04	8.90
Valencia	7.70	6.94	6.05	5.19	4.42	3.77

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

Review of 2004 Strategies

Appendix 8-A. Steering Committee Review of the 2004 Strategies

The 2004 strategies for meeting water demand were reviewed in 2015 Steering Committee meetings. The strategies were ranked based on the following criteria:

Project Complete: Y = Yes, N = No, S = started **Progress**: 1 = Not effective, 5 = Very effective **Priority**: 1 = Low priority; 5 = High priority

2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete[a]	Progress[b]	Priority[c]		
Urban and Rural Conservation Activities					
In these 2004 recommendations, separate policies were needed for residential, industrial, municipal, institutional and commercial uses. Recommendations R1-4, R1-5, and R1-7 within this category serve to protect the aquifers at the cost of making Rio Grande Compact deliveries more problematical.					
R1-1— Establish a Domestic Well Policy (A-61)	Y	3	3	The region is seen to be significantly increasing its draw upon water resources in many areas due to the installation of new domestic wells and their associated consumptions. The State Engineer should establish a policy to reduce pumping from domestic wells and restrict drilling of domestic wells where surface waters or the aquifer could be impaired.	Since 2004, the OSE has reduced domestic permits from 3 to 1 acre-feet, increased fees and restricted placement of domestic wells. The issue is important, the policy is good in theory, and public education has increased, but since overuse is difficult to monitor it has not had the successful impact it could have. The City of Rio Rancho has a domestic well ordinance.
R1-2— Outdoor Conservation Programs (A-18, A-22)	Y	4	4	Most of the urban and suburban consumptive use of water comes from outdoor uses, particularly lawns and trees. This recommendation is for local governments to implement incentive, regulatory, and/or public education policies so as to reduce high-water use landscaping and convert to xeriscaping to the greatest extent possible. It is recommended that existing programs are strengthened and that new programs broaden the geographical coverage so as to meet the target percentages provided in the Preferred Scenario in residential, municipal, industrial, commercial and institutional uses across the region.	Standards, such as Bernalillo County's *Water Conservation Standards and Guidelines for Multi-Family Residential; Commercial, Office, Institutional and Industrial Land Uses; and Residential Subdivisions with Less than Five Unit*s, have been adopted. Incentives to conserve water have been very successful in some parts of this planning region. More effort and increased incentives are needed to bring these programs to the remaining areas in the planning region.

[a] Y = Yes, N = No, S = started [b] Progress: 1 = Not effective, 5 = Very effective [c] Priority: 1 = Low priority; 5 = High priority

2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R1-3—Rainwater Harvesting (A-44)	S+	2	3	Most of the urban and suburban consumptive use of water comes from outdoor uses, particularly lawns and trees. This recommendation is for local governments to implement incentive, public education and/or, if deemed appropriate, regulatory policies to encourage rainwater harvesting to achieve the scenario targets.	Since 2004, residential rainwater harvesting has been promoted by Rio Rancho, ABCWUA and Bernalillo County. Rooftops as well as swales, berms and permeable paving have enabled some rainwater harvesting not in conflict with NMISC or EPA regulations. Incentives and programs are needed to further this work.
R1-4—Conversion to Low Flow Appliances (A-18)	Y	5	2	High flow appliances contribute to unnecessary use of water. Local governments should implement incentive, public education and/or, if deemed appropriate, regulatory policies so as to encourage all construction, new and old, to utilize effective low flow appliances such as toilets, clothes washing machines, dishwashing machines, showers, automatic shutoff faucets, and broken sprinkler cutoffs. This recommendation should be converted from the current casual to a highly vigorous campaign in residential, municipal, industrial, commercial and institutional uses across the region.	Conversions have been highly effective, as seen by the great reduction in per capita water use in Albuquerque metro area over the last decade.
R1-5—Urban Water Pricing (A-21)	Y	4	5	The plan recommends that jurisdictions examine a variety of water pricing mechanisms and adopt those that are most effective at conserving water.	Block pricing has been very effective in the communities that have implemented it.
R1-6—Greywater Reuse (A-24)	N	1	1	"Greywater" is water from showers and washing machines for use in outdoor plantings. It does not include toilet water or water from kitchen sinks. Funding technical and educational activities to promote safe and effective greywater reuse should also be considered. *(continued on next page)*	This Recommendation is not cost effective for home owners who would have to run the double plumbing needed to reuse greywater but could be considered for new construction. Rio Rancho and ABCWUA currently have nonpotable water projects.
R1-6—	N	1	1	Municipal and industrial (M&I) use of greywater should be	

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
Greywater Reuse (A-24) *(cont.)*				encouraged. Installation of dual piping may be appropriate for new M&I construction. Incentives should be provided to retrofit existing M&I to greywater reuse where the quantities are sufficiently large.	
R1-7—Treated Effluent Re-use (A-27)	S	3	5	Treated effluent reuse does not necessarily result in less overall system water consumption. However, it does result in less ground-water withdrawal. Because every utility system is different, each reuse option should be studied to correctly analyze reuse potential in terms of technical feasibility, conservation benefits and legal implications. It is recommended that treated effluent in urban areas be reused where safe and practical, especially in new construction where it can more easily be implemented. Dual piping should be installed where practical in new construction to facilitate this use.	Rio Rancho has received permits to inject treated effluent. In general, irrigation with the water is much easier, but increased use is desired.
R1-8—Growth of Parks and Golf Courses	Y	5	1	It is recommended that technologies be applied to achieve an 80% reduction in the current growth rate of water use in parks and golf courses.	The Recommendation that water use on golf courses and parks be reduced has been accomplished, including the near zero growth of new parks.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
Water Resources Planning and Management					
R2-1—Adjudication and Water Rights Settlement (A-71)	N	1	5	Identifying, quantifying and prioritizing water rights is paramount to better water management. Currently, the State Engineer uses the process of adjudication to accomplish this. It is recommended that this process be utilized in the region unless a more expedient, equitable, and less costly process is created. Alternative dispute resolution should be considered as an option. Furthermore, this plan recommends that the legislature appropriate and the State Engineer direct sufficient funds to prepare the necessary information, including hydrographic surveys, to identify, quantify and resolve priority ownership rights.	The Steering Committee agreed that adjudication was a high priority but that no action has been initiated on the MRG's section of the Rio Grande.
R2-2—Conjunctive Use Management (A-144)	N	3	5	Ground water and surface water are two parts of the same system in the Middle Rio Grande Region; each interacts with and markedly affects the other. For water resources in such a system to be managed effectively, they must be managed together, that is, "conjunctively." New Mexico is presently unable to conjunctively manage its ground and surface waters effectively because of state laws that are mutually incompatible and that have led to overdrafts that greatly exceed sustainability. *(continued on next page)*	The Albuquerque Bernalillo Water Users Authority (ABCWUA) has seen significant improvement in local groundwater conditions by reducing per capita water use and supplementing the groundwater supply with surface water supplies from the San Juan River, thus reducing pumping. On the operational side the ABCWUA has had great success with conjunctive management, but legislation on conjunctive management has yet to be achieved and is still needed. Conjunctive management is also a state plan recommendation.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-2—Conjunctive Use Management (A-144) *(cont.)*	N	3	5	Some of the main impediments to good conjunctive-use management are: junior ground-water rights that intercept and draw the flow of ground water away from nearby rivers, thereby impairing older surface-water rights; uncontrolled domestic well development in some local high density areas; inability to strictly apply the priority system; and woefully inadequate requirements for metering and reporting water diversions. This plan recommends strengthening conjunctive-use management by encouraging the state legislature to define state water management aims and by directly addressing aspects of New Mexico water law that now prevent conjunctive management of our ground and surface waters. What is needed at the most fundamental level are four things. First, the state should decide the fate of the priority system — including whether and how it should be modified. Second, the state should decide how to make the management of ground water and surface-water rights mutually consistent, and consistent with how water-right priorities are to apply. Third, it should decide what transitional adjustments will be needed to phase in any changes in a fair and equitable manner from our present unbalanced system. Fourth, it should provide clear guidance to its water officers, especially the State Engineer, on the philosophy and principles that are to govern administration of this state's water affairs.	

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-3—Funding Source for Water Activities (A-59, A-58)	Y	2	5	In order to have a reliable funding source for water projects, planning and conservation, a dedicated and reliable recurring revenue stream augmented with federal funds needs to be established. The state is seen as the most appropriate level of authority to impose such a revenue source and to manage the proceeds for the benefit of the state and for the region.	After the 2004 RWP, the Water Trust Board was created to take on such tasks, but the steering committee disagreed on how effective it has been. Consistent funding for RWP and implementation of projects has not been available.
R2-4—Elephant Butte Loss Accounting (A-51)	N	1	5	The Office of the State Engineer and Interstate Stream Commission (NMISC) should assure that evaporative losses from Elephant Butte Reservoir are apportioned fairly between the two water-planning regions, Socorro-Sierra and Middle Rio Grande. Spring 2004 information from the NMISC indicates that the compact has already apportioned the waters of the basin; evaporative losses are considered neither an asset nor a liability. Therefore, this does not seem to be a viable option.	Although not in the MRG RWP region, the evaporative losses from Elephant Butte represent a significant percentage of the MRG Basin's water budget. RG Compact delivery obligations affect all users of the Rio Grande. As such, the proposals to reduce the amount of water lost to evaporation (including surfactants to reduce direct evaporation, move water storage to more northern reservoirs, and using ASR) should be pursued.
R2-5—Active Administra-tion (A-143)	S	2	4	The plan encourages active administration by NMISC. The State Engineer should establish an improved enforcement program to ensure that only the necessary and allowable water is drawn for municipal uses, agriculture, and other uses. In addition, the region is increasing its draw upon water by transferring the rights from one point to another, and then continuing to consume water at the location from which the water rights were transferred. It is recommended that a program be instituted for enforcing water retirements after transfers (both permanent and temporary). It is particularly important that land whose water rights have been retired, transferred or leased not continue to use part or all wet water for which it had been previously entitled.	This Recommendation preceded the NMOSE's Active Water Resource Administration. What's still lacking is an enforcement of water retirements after transfers and administrative rules for the MRG.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-6—Water Resource Database (A-73)	Y	3	5	A regional water resource database needs to be established and maintained within the region and made accessible to all interested parties. This regional data and information can be available as a basis for historical trend analysis, current conditions profile, and future projections of water supply and demand. Currently, the data applicable to this region is maintained by a number of agencies and may not be suitable for centralized accumulation and storage. It is recommended that a regional compilation of data could be achieved through a cooperative networking process with a directory of source locations and other necessary references for retrieving the data. Technical studies calculating inflows, consumptive uses, and interaction between ground water and surface water in the region still contain uncertainties. While within reasonable ranges of each other, different studies yield somewhat different numbers. It is also recommended that further studies be conducted to enhance the credibility of the results and recommendations of this water plan, to help appraise the success in solving the region's water problems, and to guide the region to improve remedial actions. *(continued on next page)*	While data has been gathered and modeled (URGWOM, Statewide Water Assessment, ABCWUA, AWARDS ET Toolbox, etc.), much of the data and models are in formats that prevent communication, are not generally available to each other or the public, or do not enable success in solving the region's water problems. Links with spatial models, still lacking, would enable integrated planning.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-6—Water Resource Database (A-73) *(cont.)*	Y	3	5	On an operational basis, most of the larger public water supply, flood control, and irrigation system entities in the planning region already employ a geographic information system (GIS) as part of their overall system management practices. It is further recommended that use of GIS data be expanded and coordinated by establishing an integrated water use and water budget database and be compiled into a regional database organized according to standards that would allow for ready exchange of information. The data should include; but not be limited to; surface water gauging, ground water levels, public water supply, irrigation flows and returns, domestic wells, flood, and water quality data. This data can be available for historical trend analysis, current conditions profile, and future projections of water supply and demand. All of the databases and GIS should be integrated and be usable by different agencies and in different plans.	

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-7—Watershed Management Plans (A-66, A-33)	S	3	5	The preservation and management of water resources must be conducted on a regional basis of watersheds and geologic basins. It is recommended that specific watershed management plans should be established in the Middle Rio Grande planning region to achieve common objectives such as: increasing water yield; reducing storm water runoff and preventing soil erosion; improving woodland and rangeland health; increasing infiltration and protecting aquifer recharge zones, and ensuring water quality protection from non-point source pollution. However, watersheds should not be managed to increase water yield at the expense of habitat degradation. It is recommended that a basin-wide coordinating function be established. It is recommended that governmental jurisdictions, water management agencies, and private water system developers should utilize standard best management practices (BMPs) for watershed protection.	Important Recommendation. Several studies are ongoing or have been completed on watershed management. The Nature Conservancy is organizing the Rio Grande Fund, with many local, regional and state governments joining together with various interest groups to restore the RG watersheds. Healthy watersheds are also more resilient to fires, reducing the devastating impacts. More funding is required to continue and broaden this work. Soil & Water Conservation Districts have established erosion prevention measures and use soil and vegetation management techniques to reduce runoff and increase infiltration throughout the watershed, including forested mountains and uplands.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-8—Comprehen-sive, Integrated, and Con-tinued Water Planning (A-53)	Y	2	4	There must be connection and continuity between water resource planning and other major planning elements in the regional planning process. It is therefore recommended that local government jurisdictions and regional planning agencies work cooperatively to integrate water plans with planning for land use, transportation, economic development, and other planning efforts of regional significance. The scope of regional water resource planning must cover any and all water-related issues. Regional water planning should continue through an open, inclusive, and deliberative process to ensure diverse stake-holder participation in the decision making process (A-53). In implementing the regional water plan, the Water Resources Board and the Water Assembly should work together to establish a process for monitoring and measuring progress toward achieving success of the plan.	This Recommendation was deemed to be important, with RWP to be accomplished through an open, inclusive, and deliberative process to ensure diverse stakeholder participation in the decision making process. The Water Assembly's draft Water Budget Update is an example of a regional water budget to aid with planning. Without funding, authority and structure, regional planning has not progressed. In 2015, BoR entered into a partnership with the MRGCD, Audubon, The Nature Conservancy, Sandia Pueblo, and the MRG Water Assembly to develop a Plan of Study for a comprehensive MRG Basin Study.
R2-9—Storm Water Management Plans (A-34)	S	3	5	Storm water runoff can and should be utilized by the region when practicable. It is recommended that local government storm water plans be enhanced and expanded to control runoff, using swales, terraces and retention structures to minimize erosion, enhance infiltration, and recharge, and prevent pollution of surface and ground water. It is recommended that flood control authorities include infiltration, seepage, pollution control and aquifer recharge in their mission.	The mission of SSCAFCA, ESCAFCA and AMAFCA is flood control, and they are including seepage, pollution control and aquifer recharge in their work plans. The ABQ area is now governed by the MS-4 Permit. ABCWUA is investigating how to best utilize storm waters.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-10—Cooperative Regional Water Management (A-67)	S	2	4	Jurisdictions within the region are encouraged to work together to design implementation mechanisms for the plan that are effective, fair, wise, equitable, legal, and appropriate to local community concerns and meet the plan's mission and goals. This plan recommends that the local jurisdictions explicitly share the task of balancing the regional water use with renewable supply and implement sustainable water resource management to reduce water consumption, minimize impact on water resources, encourage conservation-oriented economic development; ensure adequate water supplies for any proposed development, protect and enhance the environment, and consider the carrying capacity and location of development, integrate with other major plans in the region. This recommendation could create a mechanism for funding larger projects by pooling resources.	Some regionalization in water management has occurred, particularly in the area of pooling resources, but the steering committee disagreed about expanding this further. The recommendation that the local jurisdictions explicitly share the task of balancing the budget has not been accomplished.
R2-11—Water Banking (A-67A)	S	1	4	Water banking is a term used for several different concepts for leasing water. Only senior water rights that can actually be fulfilled, taking into account the hydrologic system's demands on wet water, may be transferred or "banked". Leasing of water through a water-banking system or entity can only be workable if clearly defined policy is developed. Legislation is recommended that will provide individual and other vested water right holders with a range of options for short-term leasing of water (less than five years) for purposes such as aquifer recharge, Compact deliveries, environmental needs, and meeting demands of other senior users in times of shortage, thereby increasing water management flexibility. *(continued on next page)*	MRGCD operates a water bank for its customers based on district water rights. To expand this further to other classes of water would require water rights to be adjudicated or otherwise recognized by the OSE.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-11—Water Banking (A-67A) *(cont.)*	S	1	4	Agricultural forbearance should be investigated and, encouraged if feasible, to facilitate the leasing of agricultural water on a voluntary basis from farmers willing to enter into such. The scenario permits the emergency leasing of agricultural water to meet Rio Grande Compact obligations and environmental needs. It also proposes protective mechanisms to support the overall value of agricultural lands, including: • benefits to ecosystem health • potential in terms of recharge, compact delivery, food security and economics • cultural and historic value • contribution to the regional air quality and regional vistas • agricultural economy.	

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete[a]	Progress[b]	Priority[c]		
R2-12—Land Use Management and Planning (includes Growth Management A-52, A-30, In-fill Density A-28, and Conjunctive Management A-144)	S	1	3	Encourage local jurisdictions to integrate the land use, transportation, economic development, and water components of each of their comprehensive plans; and to integrate their comprehensive plans with the regional water plan. Local jurisdictions should: • Increase urban building densities and infill development through adoption of local government land use policies, incentives, and regulations. Higher-density development would reduce the relative footage of landscaping and associated water use. The following Items were approved by the Water Assembly, but the Water Resources Board wants to be on record as opposing their inclusion: • Prepare and adopt water budgets which provide specific annual targets/limits for new development based on known available water resources. Water budgets should be reviewed annually and revised as necessary. • Adopt policies to integrate land use and transportation planning and water resource management in all government jurisdictions in the Middle Rio Grande water planning region; and take water supply availability into account when making land use development decisions. Adopt policies that coordinate water impact considerations with all land development and other uses of water. *(continued on next page)*	Water use conservation goals based on type of development assist in reducing water use. Still needed are adoption of policies that coordinate water impact considerations with land development and other uses of water.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R2-12—Land Use Management and Planning (includes Growth Management A-52, A-30, In-fill Density A-28, and Conjunctive Management A-144) *(cont.)*	S	1	3	• Develop a sustainable and coordinated growth management plan for adoption and implementation by local governments in the middle Rio Grande region in order to: 1) reduce water consumption; 2) minimize impact on water resources; 3) encourage conservation-oriented economic development and 4) ensure adequate water supplies for any proposed development. Local governments and/or the state Legislature should establish a review process so that each new industrial, commercial, residential and municipal development be reviewed to ensure ongoing availability of adequate water supplies, including recognition of cumulative impacts on water. • Establish, assess and collect development impact fees that include the marginal full cost of extending the water service area and the marginal full cost to purchase and transfer associated water rights.	

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
Water Monitoring and Measurement					
R3-1— Measure All Water Uses (A-7, A-8, A-73)	S	2	5	Unmeasured water is seen to be a major encouragement to casual or excessive water use. The recommendation is that all uses of water in the region be measured and reported at the single user level. Measuring only particular types of users or particular individual users is publicly seen to be unfair. The recommendation is to establish the measuring program immediately for all new uses, and as a gradual retrofit to existing uses, as soon as possible. This recommendation is for local and state governments to implement incentive, regulatory, and/or public education policies so as to stimulate the prompt installation of appropriate retrofit measurement devices. Besides the direct benefit of water savings, this recommendation will enable much more incisive and efficient management of our surface-water and ground-water supplies. This will entail costs, and the appropriate bodies should consider how these costs would most fairly be borne.	On-farm metering and measurement is not complete, but other uses are pretty well metered. Retrofitting existing infrastructure is a high priority. High quality data is essential to manage the supply, understand use and enable conjunctive management.
Agriculture					
R4-1— Upgrade Agricultural Conveyance Systems (A-9)	S	2	3	The recommendation is to line or pipe a limited number of Middle Rio Grande Conservancy District and on-farm ditches so as to obtain a greater efficiency in delivering water to fields. Areas to be lined should be selected after consideration of the impact on water quality, domestic wells, riparian vegetation, wildlife habitat, and so as not lose vital shallow aquifer recharge. New turnouts and improved irrigation water management could also allow for a decrease in diversions while meeting crop needs. *(continued on next page)*	Lining ditches reduces recharge to the shallow aquifer, bringing benefits to some and losses to others. More analysis is needed to determine benefits (see current work by Oad and others). Some turnout upgrades have installed for MRGCD since 2004. This update should also include planning, design, and construction to improve community water treatment systems to ensure water quality for domestic and other users.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete [a]	Progress [b]	Priority [c]		
R4-1—Upgrade Agricultural Conveyance Systems (A-9) *(cont.)*	S	2	3	This savings in diversions would allow, when possible, stored water in upstream reservoirs to last longer in dry years, which would both help farmers and keep water in the river later in the irrigation season, and thus relieve some of the pressure for helping species and other environmental concerns. It is recommended that upstream reservoirs should be utilized to store saved water due to reduced diversion. This recommendation is seen to require some major funding and construction effort. Federal funding should be sought immediately. Work should commence as soon as funds are available. Because of existing and increasing Endangered Species Act pressure, progress on this recommendation is seen to be urgent. Irrigation efficiencies, studies, and programs as implemented in California should be studied as well.	
R4-2—Level Irrigated Fields (A-10)	Y	5	3	Many farm fields in the region have been laser-leveled. This recommendation is to encourage farmers through incentive programs to laser level those fields that have not been leveled or that may require a change in grade to facilitate an improved delivery system. This recommendation is for local and state governments (or federal if possible) to implement incentive, regulatory, and/or public education policies to facilitate more efficient delivery of water to those fields. Lobbying of all agencies to broaden the incentive program should commence immediately.	Over 85% of MRG fields over 2 acres in size have been laser leveled as this technology has become more affordable. Continued maintenance using this technique is encouraged.

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R4-3—Establish a Local Marketing Infrastructure (A-11)	N	2	5	A marketing infrastructure should be developed for locally-grown produce, value added products and low- water use alternative crops. In particular, increasing production of low-water alternative crops would reduce overall dependence on water. Research is required to identify the crops and the markets, and a plan for the transition.	The Recommendation focuses on low water use crops which are not very feasible. A regional sorting shed would benefit small farmers (feasibility studies are already done).
R4-4—Acequia Efficiency Programs (A-60)	N	2	3	Acequia culture and rights can be at risk in the environment of increased marketability of water and water rights. It is recommended that special measures be taken to help preserve traditional acequia culture and rights. Traditional community acequias in this region typically require assistance to improve the efficiency of their irrigation networks. The recommendation is that funding for traditional acequias should be made available for purposes of increasing water efficiency within the local acequia system. Recommendations further include providing education to farmers, ranchers, newcomers, and delivery system operators about available support programs and ways to operate more efficient water conveyance systems.	Founded in 2006, the South Valley Regional Ass'n of Acequias' overall goal is to "protect the social, economic, political, and cultural development of our community." MRGCD and USDA have educational and loan programs. More funding is needed to help irrigators improve their efficiency. Also see the related discussion in R4-1.

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	Complete [a]	Progress [b]	Priority [c]		
Water Quality					
R5-1—Mitigate Septic Tank Impacts (A-26, A-47)	Y	3	4	In some areas there is a potential health risk to water users or a contamination risk to the ground water resulting from conventional septic systems. It is recommended that, where such a potential health risk exists, conventional septic systems be replaced by the construction of new or expanded centralized or distributed wastewater treatment systems, including wetlands, or by the use of advanced technology or re-siting for on-site wastewater treatment.	The Valencia County Master Plan study looked at septic tank impacts. Bernalillo County has increased inspections of homes with septic (NMED regulations). Bernalillo County has initiated regulations.
R5-2—Improved Water Quality Sampling and Testing (A-47)	Y	4	4	It is recommended that the water testing and sampling capabilities be significantly upgraded. The additional testing capabilities should include all of the biological, chemical and radiological threats to public and environmental health that are described in existing state and national water quality guides. In addition, special sampling and testing programs are needed to identify any contaminants that may be introduced into the water supply system. In addition to upgrading the quality of testing of potable water, it is important to improve the quality of testing of wastewater, storm water, and large-scale greywater. Many of these may be continuous automatic testing programs and they may require advanced techniques, which might be developed in cooperation with the national laboratories, state universities and private industry.	Since 2004, storm water and Rio Grande water quality monitoring has increased. However, data reporting to the public needs improvement. New biological, chemical and radiological threats are expensive to test for, much less treat, requiring funds. Water quality treatment system upgrades (or new construction) to bring water to drinking water standards is needed for rural communities.

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2004 Strategy Name	2015 rankings			Strategy Description from Chapter 10.2 of 2004 Plan	2015 Steering Committee Comments
	Complete[a]	Progress[b]	Priority[c]		
R5-3—Protect Water from Contamination (A-47, A-50-*Well Head Protection*)	Y	4	4	It is recommended that programs be established to protect the region's water from contamination and to ensure compliance with federal, tribal, state and local standards for water quality pertaining to surface waters, drinking water, storm water, and wastewater. It is also recommended that programs be established to enforce and protect wellheads from contamination on all public water supply wells within local government jurisdictions.	Improved reporting would help the agricultural community so that irrigation timing could avoid times of high contamination or suspended sediment load. Sediment is a contaminant concern that can be often overlooked in testing and reporting.
Bosque and Other Riparian Habitats					
R6-1—Riparian Habitat Restoration (A-1, A-2)	S	1	4	This Regional Water Plan recommends that a program of restoration of the Bosque and other key riparian areas throughout the region be instituted. Restore and manage the Bosque and other riparian habitat to reduce evapotranspiration and improve habitat by selectively removing non-native vegetation and promoting native plants. Non-native species in the Bosque and other riparian areas consume large quantities of water. Provided replacement vegetation is appropriately chosen, removal of non-native species is seen to present an opportunity to substantially reduce consumption in the region. The major effect would be to provide more water in the river to meet Compact obligations and to meet environmental obligations. This would reduce the pressure from various sources to divert water from other consumptive uses for Compact and environmental purposes.	Since 2004, substantial resources have been spent studying and then restoring riparian habitat. 1,000 acres of 30,000 have been restored in the efforts to create minnow habitat. The Bosque del Apache has been seeing improvements in available water with non-native removal.

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R6-2—Constructed Wetlands (A-36)	S	2	3	This recommendation calls for considering the creation of constructed wetlands for ground-water recharge, storm water capturing, habitat improvement, and hydrological management of riparian areas.	Constructed wetlands can be found in Metro ABQ and the Valle del Oro NWR.
R6-3—River Restoration (A-63)	S	3	4	In meeting the water needs of the state, the needs of the region's rivers should not be neglected. River restoration will provide for the needs of wildlife, provide residents of the region with opportunities for outdoor recreation, and assure that the state is in compliance with endangered species requirements. It is recommended that the state provide the required cost share, if any, of federal restoration programs. The state should also engage in and collaborate with programs designed with the goal of restoring the ecological functioning of the region's rivers and floodplains, including replication of the natural hydrograph of the rivers within the levees. The state should seek to assure that an appropriate quantity of water is available for endangered species and river needs without depriving priority water rights holders or San Juan-Chama Project water contractors of their water except from willing sellers or lessors. To allow support of the river and its riparian environment, the scenario includes recognizing instream flow as a beneficial use.	While water savings are unclear, significant ESA work (restoring natural flow patterns and flood banks, etc.) has happened since 2004. (See, for instance, the annual *RG Compact Commission Report* from the BoR.) Failure to adjudicate has been an impediment to acquiring water rights for instream flow. Federal agencies are collaborating with the various tribal entities on vegetation planting and monitoring effort as well as pursing investigation on the specific hydraulic and geomorphic conditions.

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Water Storage to Reduce Evaporative Losses					
R7-1—Implement Upstream Surface Water Storage (A-45)	N	1	4	An average of 140,000 afpy evaporates from Elephant Butte Reservoir (EBR) due to the large surface area and the hot, dry, windy conditions. EBR could be used to store water up to the top of the narrows (i.e., the deep water portion of the reservoir), thereby greatly reducing surface area, and still be used to make downstream deliveries. The recommendation is to obtain the necessary permissions to store water in upstream reservoirs with lower evaporation rates if this can be done without significant harm to the riparian environment. So as to minimize impact to the local economy of Elephant Butte, it would be desirable to manage flows to keep Elephant Butte Reservoir storing steady but minimal quantities of water e.g., 400,000 acre-feet of usable water to allow storage of water in upstream reservoirs constructed after 1929 per Rio Grande Compact requirements. Usable water is that water legally available for release for downstream use and is defined as the combined content of Elephant Butte and Caballo Reservoirs less any New Mexico or Colorado credit water and less any San Juan Chama project water in Elephant Butte Reservoir. The OSE should pursue necessary agreements and authorizations to permit this upstream storage.	This recommendation might require changes to the Rio Grande Compact or a reauthorization for reservoir storage. In 2006, a symposium was held to discuss options for reservoir reoperation (uttoncenter.unm.edu/projects/reservoir-symposium.php). While favorably considered, they would be difficult to implement.

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R7-2—Implement Upstream Aquifer Water Storage (A-46)	S	2	3	Pump surplus water into the aquifer so as to supplant the requirements to store large quantities in Elephant Butte Reservoir. Technology assessment and engineering feasibility for this recommendation should be started so as to determine whether the option is really practical within this region.	Recommendation was to store water in the aquifer as opposed to in EBR but no action has been initiated.
R7-3—Implement Aquifer Storage and Recovery for Drought (A-46)	S	2	3	Subject to water rights and environmental issues, in order to ameliorate the short term fluctuations is regional supply, it is recommended that surplus water be pumped into the depleted aquifers during wet years, and be retrieved for use during dry years. This system would be smaller than one used to supplant EBR evaporation. Technology assessment and engineering feasibility for these recommendations should be started so as to determine whether these options are really practical within this region.	This Recommendation was to inject surplus surface flows, such as storm water, into the aquifer. Aquifer storage is becoming reality for ABCWUA and Rio Rancho's municipal water. Both are also considering how storm water might be stored.
R7-4—Water Modeling (A-38, A-143, A-144)	Y	4	4	The state and appropriate federal agencies should improve and increase monitoring and modeling of the surface water system, improve water management at the watershed level, and retain excess water flow from EBR during wet cycles. It is recommended that the state use the modeling data to anticipate and manage EBR spills and to better administer upstream retention and aquifer recharge.	The need for accurate and up-to-date water data on the aquifer and river system remains critical for planning decisions (see R2-6).

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Desalination and Transfer of Water					
The 1994 Regional Water Planning Handbook states that "all future water needs must be met by management of the water supply currently available to the region. If that is not feasible, as supported by analysis in the planning report, other sources of supply may be proposed if feasible in economic and engineering analysis." The following 2004 recommendations were proposed to augment the supply from sources outside the region as indicated in the analyses of substantial regional shortfall.					
R8-1— Develop New Water Supplies through Desalination (A-39)	N	1	1	Substantial supplies of brackish and saline water exist in New Mexico. It is estimated that increases in the price of water, project development time, and technological improvements will make the desalination and importation of brackish water practical within twenty years. The recommendation is for the region to explore the possibility of developing brackish and saline water supplies, both from sources within and outside of the region. The region should track technological advances that would make desalination cost effective. It is further recommended that the region implement projects that will make such water available for use within the region or provide the region with appropriate Rio Grande Compact credits.	In 2011, Sandoval Co. investigated this option (www.sandovalcounty.com/departments/ planning-zoning/p-z-water-studies). Better technology for dealing with the produced salts and minerals and for extremely saline groundwater is needed to make this feasible. Given its finite nature, it should only be considered as a supplemental resource.
R8-2— Investigate the Potential for Importing Water (A-69)	N	1	1	Examine the potential of securing and importing large volumes of water from currently unused sources. This option should be interpreted broadly to include the availability of water from sources such as abandoned mines, and desalinated seawater. Water should not be imported where it would cause environmental harm or economic hardship to communities in the watershed from which water is being imported, or where projects rely upon large federal subsidies provide limited economic benefits.	The 1994 RWP Handbook states that "all future water needs must be met by management of the water supply currently available to the region," making this Recommendation generally unfavored. Taking water from other regions does not solve problems, just delays their impacts while at the same time takes water from another region that may need it.

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R8-3—Undeclared Water (A-39, A-69, A-143)	Y	5	1	The State Engineer should declare all waters in the state, regardless of depth and quality, so as to enable proper administration and protection of all of the waters in the state.	This Recommendation was implemented by the OSE after 2004.
Public Education					
R9-1—Develop a Water Education Curriculum for Schools (A-56)	Y	4	4	This plan recommends that school curricula and projects be developed to teach children the importance and value of water in the region. Especially important are issues of water conservation, where water comes from, and cultural values associated with water.	ABQ and Rio Rancho have good educational programs, but more needed in other communities.
R9-2—Implement Adult Public Education Programs	Y	4	4	Establish region-wide and local public education programs to encourage a more complete awareness of the full range of water related subjects among the citizenry, and to enhance voluntary water conservation programs recommended elsewhere in this section.	See R9-1.

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Appendix 8-B

Recommended Projects, Programs, and Policies

Regional Water Planning Update

Projects, Programs, and Policies Submissions for the 2016 Plan Update

Water Planning Region 12: Middle Rio Grande

Planning Region	County	Regional or System Specific (R), (SS)	Strategy Type (Project, Program or Policy)	Subcategory	Project Name	Source of Project Information	Description	Project lead (Entity or Organization)	Partners or participants	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or reason for the project, program, or policy	Comments
Middle Rio Grande	Bernalillo	SS	Project	Water Planning	**Integrated Resource Master Planning**	ABCWUA Decade Plan	Comprehensive and integrated water resource master planning for all water, wastewater and nonpotable reuse supply, distribution and treatment facilities.	ABCWUA		2016-2017		$ 1,000,000		
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**Second College Reservoir**	ABCWUA Decade Plan	An additional reservoir to provide more system reliability and redundancy for the College Trunk when College Reservoir 1 is taken out of service for rehabilitation.	ABCWUA		2016-2018		$ 3,045,000		
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**Second Corrales Reservoir No. 6**	ABCWUA Decade Plan	A second 2.3MG reservoir at the Corrales 5 site to double the storage capacity that supplies Ventana Ranch and the north half of Paradise Hills.	ABCWUA		2022-2023		$ 3,000,000		
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**Second Coronado Reservoir**	ABCWUA Decade Plan	Reservoirs needed to provide reaction time for disinfection, storage to meet peak demands and for control of well and booster station pumps.	ABCWUA		2022-2023		$ 3,050,000		
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**Second Leyendecker Reservoir**	ABCWUA Decade Plan	See above	ABCWUA		2022-2023		$ 3,050,000		
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**Second Charles Wells Reservoir**	ABCWUA Decade Plan	Needed for use during rehabilitation of the existing Charles reservoir.	ABCWUA		2020-2021		$ 3,000,000		
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**New Corrales Trunk 5W Reservoir and Transmission Line**	ABCWUA Decade Plan	A 6MG reservoir and 36-inch transmission line to supply a future gravity distribution system in Zone 5W.	ABCWUA		2018-2019		$ 4,100,000		
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**Second Don Reservoir**	ABCWUA Decade Plan	Provide more system reliability and redundancy for the Atrisco Trunk when Don Reservoir No. 1 is taken out of service for rehabilitation.	ABCWUA		2018-2020		$ 3,050,000		
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**Aquifer Storage and Recovery**	ABCWUA Decade Plan	Planning, design, engineering services, construction, permitting and related activities to construct an aquifer storage and recovery project to store San Juan Chama water in the aquifer.	ABCWUA		2016-2023		$ 5,390,000		
Middle Rio Grande	Bernalillo	SS	Project	Water System Infrastructure	**Steel Waterline Rehabilitation**	ABCWUA Decade Plan	Rehabilitation of steel water lines	ABCWUA		2016-2025		$ 11,370,000		
Middle Rio Grande	Bernalillo	SS	Project	Water System Infrastructure	**AMR Meters**	ABCWUA Decade Plan	Replacement of existing meters with AMI equipped "smart" meters allowing for increased customer usage information and leak detection	ABCWUA		2016-2025		$ 20,000,000		
Middle Rio Grande	Bernalillo	R	Program	Education	**Water Conservation Education**	ABCWUA Water Resources Management Strategy	TV, radio, outdoor education for all residents of the Middle Rio Grande region	ABCWUA		2015-ongoing		$250,000 annually		
Middle Rio Grande	Bernalillo	R	Program	Education	**Water Resources Education Field Trips**	ABCWUA Water Resources Management Strategy	Provide a day-long field trip to the Rio Grande for every fourth-grader in the service area to learn about our water resources and conservation	ABCWUA		2015-ongoing		$200,000/ annually		
Middle Rio Grande	Bernalillo	SS	Program	Education	**WaterSmart Classes**	ABCWUA Water Resources Management Strategy	Provide rebates to customers who attend classes on reducing water use outdoors for lawns, xeriscapes and gardens.	ABCWUA		2015-ongoing		$55,000 annually		
Middle Rio Grande	Bernalillo	SS	Program	Water Conservation	**Water Conservation Rebates**	ABCWUA Water Resources Management Strategy	Provide rebates for water efficient appliances and xeric landscaping conversions	ABCWUA		2015-ongoing		$1,200,000 annually		
Middle Rio Grande	Bernalillo	SS	Program	Water Planning	**Water Budget Model Development**	ABCWUA Water Resources Management Strategy	Develop a water budget management tool to inform water resources management decisions	ABCWUA		2015-ongoing		$200,000/ annually		
Middle Rio Grande		R	Program	Water Supply	**Weather Modification (A-42)**	Alternative from previous water plan with updates from Steering Committee discussion	This alternative contemplated weather modification, such as cloud seeding, to increase water supply.							The steering committee does not generally support this alternative, it should be removed from the alternatives.
Middle Rio Grande	Sandoval	SS	Project	Water Planning	**Non-revenue Water Gap Analysis**	City of Rio Rancho		City of Rio Rancho		2015	2015	$ 20,000		
Middle Rio Grande	Sandoval	SS	Project	Water Rights	**Purchase Water Rights**	City of Rio Rancho		City of Rio Rancho		Annually	Began 2007	$13,000 to $18,000 per acre foot		748 acre feet every 5 years
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**AMR Trend**	City of Rio Rancho		City of Rio Rancho		Current	Current	In-house		Sample set to get more consistent profile in meter categories
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Redrill 1200 gpm Well**	City of Rio Rancho		City of Rio Rancho		1 year	PER 2015	$6-7 million		Awaiting RFP for hydrologist
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Equip 1600 gpm Well**	City of Rio Rancho		City of Rio Rancho		3 years	Completed	$12-15 million		High arsenic and total dissolved solids, needs advanced treatment
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Replace 1400 gpm Well**	City of Rio Rancho		City of Rio Rancho		2 years	Pending	$ 7,000,000		
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Service Line Replacement**	City of Rio Rancho		City of Rio Rancho		Annually	2014 and on	$1-1.5 million/year		Replacing polyethylene service lines with copper
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Rebuild WWPT #1 to MBR**	City of Rio Rancho		City of Rio Rancho		Currently under review	PER 2015	$11-15 million		To get class 1A water for reuse
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Septic Dump Station**	City of Rio Rancho		City of Rio Rancho		Unknown	2014	$ 5,000,000		

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Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Upgrade 3 lift stations**	City of Rio Rancho		City of Rio Rancho		2 years		$ 2,500,000		LS10 being relocated now as part of NMDOT project
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Rebuild WWTP #3 to MBR**	City of Rio Rancho		City of Rio Rancho		5 years	Not started	$ 10,000,000		
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Purified Water Storage Tank**	City of Rio Rancho		City of Rio Rancho		2015	2013	$ 5,000,000		Aquifer injection for potable reuse
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Equip the advanced water treatment**	City of Rio Rancho		City of Rio Rancho		2015	2013	$ 5,300,000		Aquifer injection for potable reuse
Middle Rio Grande	Sandoval	SS	Project	Water Supply	**Placitas Acequias Reservoirs Improvements**	Corondado SWCD ICIP Plan FY 2017-2021	Design and construct improvements to six exsisting reservoirs of varying sizes to improve irrigation for the three acequia communities of Placitas. Easements to the land where the reservoirs are situated are owned by the acqueias and have been in use for over 150 years. In Phase One, Coronado SWCD procured professional engineering design services from INTERA Inc. by competitive bid for improvements to all six reservoirs. The acequia commissioners subsequently decided that only five reservoirs were in need of repair. On 3/11/15 the commissioners of each acequia approved the 30% design work, and will approve plans for succeeding phases. By mid-April of 2015, 100% of the design work of the three reservoirs and 90% of the design work the fourth reservoir and partial design work for the fifth reservoir had been completed and the initial $75,000 capital outlay grant fully expended. Phases Two through Five will be completion of design work, construction and installation of improvements determined in Phase One. Coronado SWCD will procure services and materials by competitive bid. The project will be phased primarily by number of people served by each acequia, secondarily by completing one reservoir for each acequia, and thirdly by estimates determined in Phase One. Each acequia is the owner/operator and fiscal agent for the reservoirs.	Coronado SWCD		FY 2017-2020		$ 570,000	The current drought forces the acquieas to make improvements to the structures that were used in past times in order to irrigate with little water. The three acqueias use reservoirs constructed in the 1800's to develop a head of water to enable flow to the lower reaches of their ditches. Because of deterioration, as well as present and projected future drought conditions, only the Las Acqueias de Placitas reservoirs are able to be used this way, but even those are in need of repair. The project will benefit approximately 500 parciantes of the three acqueias, which are political subdivisions.	Project ID# 28992
Middle Rio Grande	Cibola, Sandoval, Valencia, Bernalillo	SS	Project	Water Infrastructure	**Community Water System Development**	Pueblo of Laguna	Convert homeowners on individual wells to community water systems and improve existing water systems to reduce breakage and enhance system redundancy. This can promote conservation and protect water quality.	Rio Puerco and Rio Jemez Water Users						
Middle Rio Grande	Cibola, Sandoval, Valencia, Bernalillo	SS	Project	Wastewater Infrastructure	**Community Wastewater System Development**	Pueblo of Laguna	Plan, design, and construct improvements or reconstruct community water wastewater treatment systems to esnure protection of water quality. This is in addition to mitigating septic tanks, which does not address the need to improve existing wastewater systems that are prone to breaking and leakage.	Rio Puerco and Rio Jemez Water Users						
Middle Rio Grande	Cibola, Sandoval, Valencia, Bernalillo	R		Water Planning	**Water-Efficient Energy Production**	Pueblo of Laguna	Decrease reliance on energy generation that consumes water (e.g., coal-fired steam turbines) and encourage growth of renewable energy such as wind, solar, etc., that does not rely on water.	Rio Puerco and Rio Jemez Water Users						
Middle Rio Grande	Cibola, Sandoval, Valencia, Bernalillo	SS	Project	Water Quality	**Water Quality Treatment**	Pueblo of Laguna	Plan, design, and construct or improve community water quality treatment systems as needed to ensure water quality for domestic and other uses	Rio Puerco and Rio Jemez Water Users						
Middle Rio Grande	Cibola, Sandoval, Valencia, Bernalillo	R	Policy	Water Planning	**Community Resilience Planning and Implementation**	Pueblo of Laguna	Planning to make communities more drought resilient and able to cope with climate change	Rio Puerco and Rio Jemez Water Users						
Middle Rio Grande	Cibola, Sandoval, Valencia, Bernalillo	R	Project	Agriculture Water System	**Agriculutural Water Storage**	Pueblo of Laguna	This is in addition to improving agricultural conveyance, this would improve agricultural storage in reservoirs, also benefitting water conservation. This includes restoring livestock ponds and tanks, increasing the number of closed storage tanks, spreading water with water lines and drinkers, and increasing capacity with solar mills.	Rio Puerco and Rio Jemez Water Users						
Middle Rio Grande	Cibola, Sandoval, Valencia, Bernalillo	R	Policy	Watershed Restoration	**Forest Restoration**	Pueblo of Laguna	This is a subset of the Watershed Management Planning and implementation that would encourage a focus on forest restoration and wildfire management	Rio Puerco and Rio Jemez Water Users						
Middle Rio Grande	Cibola, Sandoval, Valencia, Bernalillo	R	Policy	Watershed Restoration	**Rangeland Restoration**	Pueblo of Laguna	This is a subset of the Watershed Management Planning and Implementation that would encourage a focus on rangeland restoration.	Rio Puerco and Rio Jemez Water Users						

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Middle Rio Grande	Sandoval and Bernalillo	R	Project	Watershed Restoration	**Remediate River Incising between Cochiti and Isleta**	Pueblo of Sandia Bosque Program	River incising between Cochiti Dam and Isleta Pueblo has significantly changed the natural system of the Rio Grande, resulting in a sediment starved, incised river. The result is lost habitat for Bosque ecosystems including various endangered species. Additionally, traditional and cultural activities are negatively impaired by this changing system. This project would look to study this reach of the river with various stakeholders, develop mitigation options, and move forward with the construction of engineered solutions and/or policy changes.	Pueblo of Sandia (in Sandia reach)	Army Corps of Engineers US Bureau of Reclamation MRGCD	2016-2026	Initial discussion with agencies have been initiated.	$ 10,000,000	To address degradation of habitat, infrastructure, and cultural and traditional uses in this reach of the Rio Grande.	
Middle Rio Grande	Sandoval and Bernalillo	SS	Project	Agriculture Water System	**Irrigation Infrastructure Improvement Projects on Sandia Pueblo**	Pueblo of Sandia Water Resources Program	This project would repair or replace aging irrigation (surface water) delivery infrastructure. This project will improve water use efficiency and result in conservation of water.	Pueblo of Sandia	MRGCD US Bureau of Reclamation US Bureau of Indian Affairs	2016-2026		$ 6,000,000	To repair or replace aging infrastructure to improve irrigation efficiency and conservation of water.	This project is currently underway. Some studies on irrigation infrastructure have been completed, as well as collaboration with MRGCD, US Bureau of Reclamation, and US Bureau of Indian Affairs.
Middle Rio Grande	Sandoval and Bernalillo	SS	Project	Water Planning	**Water Resources Plan**	Pueblo of Sandia Water Resources Program	This project would allow the Pueblo of Sandia to develop a long term plan that incorporates robust technical support to protect the Pueblos water resources.	Pueblo of Sandia	None	2016-2026		$ 500,000	To obtain technical support and/or studies to Pueblo of Sandia to develop water resources plan to protect tribal water resources. Such support or studies may include water budgets, growth projections, regional water policy analysis, conservation initiatives, watershed studies, and adjudication plans.	This project is currently underway. Some studies have been completed such as an aquifer characterization study, Pueblo well drilling rules and regulations drafted, and general drafting of text for plan.
Middle Rio Grande	Sandoval and Bernalillo	SS	Project	Water Supply	**New Irrigation Drought Relief Wells**	Pueblo of Sandia Water Resources Program	This project would include geotechnical testing and groundwater investigations on Pueblo of Sandia land, and if found to be feasible, develop irrigation drought relief wells. This project is important to maintain the tradition, culture, and livelihood of agriculture on Pueblo lands in times of surface water shortages.	Pueblo of Sandia	None	2016-2026		$ 600,000	To provide supplementary irrigation water for Pueblo farmers in times of surface water shortages.	This project is currently underway. Some geotechnical testing has been done and consultant recommendations obtained on how to proceed have been received by the Pueblo.
Middle Rio Grande	Sandoval and Bernalillo	SS	Project	Water Supply	**Rehabilitate/Replace Wells**	Pueblo of Sandia Water Resources Program	This project would repair or replace aging well infrastructure in order to conserve existing infrastructure and supply additional irrigation water to Pueblo Lands in times of surface water shortages.	Pueblo of Sandia	None	2016-2026		$ 300,000	To repair or replace aging well infrastructure.	Preliminary planning has begun, to include identification of wells needing rehabilitation and potential long-term usefulness of those wells.
Middle Rio Grande	Sandoval and Bernalillo	SS	Project	Water System Infrastructure	**Rehabilitate/Replace Wells**	Pueblo of Sandia Water Resources Program	This project would repair or replace aging well infrastructure in order to conserve existing infrastructure and supply additional irrigation water to Pueblo Lands in times of surface water shortages.	Pueblo of Sandia	None	2016-2026	Preliminary planning has begun, to include identification of wells needing rehabilitation and potential long-term usefulness of those wells.	$ 300,000	To repair or replace aging well infrastructure.	
Middle Rio Grande	Bernalillo	R	Project	Water Planning	**NM Strategic Reserve**	USFWS	Place some of the water associated with the Valle de Oro NWR into the NM Strategic Reserve for broader endangered species needs within the middle Rio Grande	USFWS	MRGCD, AMAFCA, NMOSE, BOR					
Middle Rio Grande	Bernalillo	R	Project	Watershed Restoration	**Riparian Habitat Restoration**	USFWS	The Valle de Oro project is restoring wetlands associated with the former Price Dairy property and associated Rio Grande bosque adjacent to the property	USFWS	AMAFCA, Bernalillo County, US Army Corp of Engineers, NM State Lands Office					
Middle Rio Grande	Sandoval, Bernalillo	R	Program	Education	**Public Education and outreach on healthy ecosystems**	USFWS	Valle de Oro NWR is serving as an educational focal point for youth and adults. Community involvement in this project has been strong and instrumental to its nascent success. It is envisioned that the Refuge will play an instrumental role in current and future education about the importance of healthy native ecosystems of the Rio Grande and its Tributaries.	USFWS						

Regional Water Planning Update

Projects, Programs, and Policies Submissions for the 2016 Plan Update

Water Planning Region 12: Middle Rio Grande

Planning Region	County	Regional or System Specific (R), (SS)	Strategy Type (Project, Program or Policy)	Subcategory	Project Name	Source of Project Information	Description	Project lead (Entity or Organization)	Partners or participants	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or reason for the project, program, or policy	Comments
Middle Rio Grande	Bernalillo	R	Project	StormWater System Infrastructure	**SE Valley Storm Water detention at Valle de Oro National Wildlife Refuge**	USFWS	Incorporate storm water treatment into the wetlands of the Refuge and associated Rio Grande floodplain habitat	USFWS	AMAFCA					
Middle Rio Grande	Bernalillo, Sandoval, Valencia	R	Program	Guidance	**Develop a Roadmap for Action**	Water Assembly	This proposal is to create a common infrastructure for water planning, incorporating issues such as water rights ownership, lack of common data sets, and lack of common institutional framework. Consider ways to link decision makers with available water resources, including impacts of climate change. The recently updated California Water Plan could be a good example: 1. Strengthen Integrated Regional Water Management 2. Use and Reuse Water More Efficiently 3. Expand Conjunctive Management of Multiple Supplies 4. Protect and Restore Surface Water and Groundwater Quality 5. Practice Environmental Stewardship 6. Improve Flood Management Using an Integrated Water Management Approach 7. Prepare Prevention, Response, and Recovery Plans 8. Reduce the Carbon Footprint of Water Systems and Water Uses 9. Improve Data, Analysis, and Decision-Support Tools 10. Invest in Water Technology and Science 11. Strengthen Tribal/State Relations and Natural Resources Management 12. Ensure Equitable Distribution of Benefits 13. Protect and Enhance Public Access to the State's Waterways, Lakes 14. Strengthen Alignment of Land Use Planning and Integrated Water Management 15. Strengthen Alignment of Government Processes and Tools 16. Improve Integrated Water Management Finance Strategy and Investments							
Middle Rio Grande	Bernalillo, Sandoval, Valencia	R	Project	Regulatory Change	**Modify MRG Administrative Area Guidelines to Encourage Reuse**	Water Assembly	The State should modify the MRGAA Guidelines to encourage reuse and recycling of water. For example, prohibit a 1-1 return flow credit (especially junior water users) to offset impacts to senior water rights holders. This would result in less water being pumped and more recycling and reuse. Less waste flows could be offset by additional reservoir releases to offset the flow depletions from past actions. Reduced flow depletions in future years would provide more water for endangered species. Policy changes like these would need to be modeled to determine their full impact							
Middle Rio Grande	Bernalillo, Sandoval, Valencia	R	Project	Water Budget	**Water Budget Studies**	Water Assembly	During the next five years, in preparation for the next regional water plan review and update, several regional reports should be undertaken and updated, such as considering the impacts from a reduction in irrigation water in the MRG. Supply and demand data should be broken out into annual numbers, which would help show the variability of supply and demand.							
Middle Rio Grande	Bernalillo, Sandoval, Valencia	R	Project	Water Planning	**Interactive Water Budget Modeling**	Water Assembly	Create an open-access, nonproprietary, web-based application for viewing outcomes of specific water management decisions as reflected in changes in land use, including a GIS model for visualization							
Middle Rio Grande	Sandoval	SS	Project	StormWater System Infrastructure	**Algodones Flood Control System**	2017-2021 ICIP Project List (from ESCAFCA)		Eastern Sandoval County Flood Control Authority (ESCAFCA)		2017-2019		$ 1,400,000		
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**Mid Bernalillo Flood Conveyance Phase 1, Acequia**	2017-2021 ICIP Project List (from ESCAFCA)		Eastern Sandoval County Flood Control Authority (ESCAFCA)		2017-2020		$ 1,620,000		
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**South Hill Flood Water Conveyance**	2017-2021 ICIP Project List (from ESCAFCA)		Eastern Sandoval County Flood Control Authority (ESCAFCA)		2017-2021		$ 2,320,000		
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**Athena Storm Sewer Extension**	2017-2021 ICIP Project List (from ESCAFCA)		Eastern Sandoval County Flood Control Authority (ESCAFCA)		2018 and 2020		$ 1,415,000		
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**Flood Control - Piedra Liza Outfall**	2017-2021 ICIP Project List (from ESCAFCA)		Eastern Sandoval County Flood Control Authority (ESCAFCA)		2017-2019		$ 400,000		
Middle Rio Grande	Bernalillo	R	Project	Watershed Restoration	**Sulphur Project Sub Unit-A (Cibola National Forest)**	State of New Mexico Energy, Minerals and Natural Resources Department	Forest thinning/fuels reduction for forest and watershed health.	New Mexico State Forestry	US Forest Service					
Middle Rio Grande	Bernalillo, Valencia	R	Project	Watershed Restoration	**Sulphur Project Sub Unit-B (Cibola National Forest)**	State of New Mexico Energy, Minerals and Natural Resources Department	Forest thinning/fuels reduction for forest and watershed health.	New Mexico State Forestry	US Forest Service					

Regional Water Planning Update

Projects, Programs, and Policies Submissions for the 2016 Plan Update

Water Planning Region 12: Middle Rio Grande

Planning Region	County	Regional or System Specific (R), (SS)	Strategy Type (Project, Program or Policy)	Subcategory	Project Name	Source of Project Information	Description	Project lead (Entity or Organization)	Partners or participants	Timeframe (Fiscal Year)	Planning Phase	Cost	Need or reason for the project, program, or policy	Comments
Middle Rio Grande	Sandoval	R	Project	Watershed Restoration	**Mormon Canyon Watershed Restoration (Valles Caldera National Preserve)**	State of New Mexico Energy, Minerals and Natural Resources Department	Forest thinning/fuels reduction for forest and watershed health.	New Mexico State Forestry	National Park Service					
Middle Rio Grande	Bernalillo, Sandoval, Valencia	R	Project	Watershed Restoration	**Rio Grande Riparian Restoration Projects (all three counties, ongoing)**	State of New Mexico Energy, Minerals and Natural Resources Department	Forest thinning/fuels reduction for forest and watershed health.	New Mexico State Forestry	Multiple partners					
Middle Rio Grande	Valencia	R	Project	Watershed Restoration	**Manzano State Park Fuels Reduction**	State of New Mexico Energy, Minerals and Natural Resources Department	Forest thinning/fuels reduction for forest and watershed health.	New Mexico State Forestry	Multiple partners					
Middle Rio Grande	Sandoval	R	Project	Watershed Restoration	**Jemez Mountains Resilient Landscapes Fuels Reduction**	State of New Mexico Energy, Minerals and Natural Resources Department	Forest thinning/fuels reduction for forest and watershed health.	New Mexico State Forestry	Multiple partners					
Middle Rio Grande	Sandoval, Bernalillo, Valencia	R	Program	Watershed Restoration	**New Mexico Forest Action Plan**	State of New Mexico Energy, Minerals and Natural Resources Department	The main objectives for the Forest Action Plan: • Help natural resource agencies and the NM State Forestry Division use the available resources efficiently by identifying priority landscapes for the Division's programs and Districts. • Give clear guidance to Forestry Division employees and communicate the agency's priorities to cooperators and partners. • Provide a strategic vision for the Division to meet resource objectives over the next five years. • Identify landscapes and resource programs where collaborative watershed restoration projects will benefit multiple partners.	New Mexico State Forestry						
Middle Rio Grande	Sandoval, Bernalillo, Valencia	R	Program	Watershed Restoration	**NM Forestry Division Watershed Projects**	State of New Mexico Energy, Minerals and Natural Resources Department	The Forestry Division and its collaborative partners are constantly identifying and planning new watershed health and wildfire risk reduction projects that meet state objectives and target priority landscapes in the New Mexico Forest Action Plan. The State's list of out-year projects is updated regularly as planning and environmental and cultural clearances are completed and funding is secured. http://www.emnrd.state.nm.us/SFD/statewideassessment.html	New Mexico State Forestry						
Middle Rio Grande	Sandoval, Bernalillo, Valencia	R	Program	Water Planning	**Confronting Climate Change in New Mexico**	Union of Concerned Scientists	Action plans for addressing climate change							
Middle Rio Grande	Sandoval, Bernalillo, Valencia	R	Program	Water Planning	**Renewable Resource Journal; Congress on Sustaining Western Water recently published by The Renewable Natural Resources Foundation (RNRF)**	Union of Concerned Scientists	The RNRF is an I.R.C. §501(c) (3) nonprofit, public policy research organization, founded in 1972. It is a consortium of scientific, professional, educational, design and engineering organizations whose primary purpose is to advance science, the application of science, and public education in managing and conserving renewable natural resources.							
Middle Rio Grande	Sandoval, Bernalillo, Valencia	R	Program	Water Planning	**Measuring What Matters; Setting Measurable Objectives to Achieve Sustainable Groundwater Management in California**	Union of Concerned Scientists	Published by the Union of Concerned Scientists (UCS). UCS uses science to solve problems. Staff experts believe that rigorous analysis is the best way to understand the world's pressing problems and develop effective solutions to them.							

Appendix 8-C

Infrastructure Capital Improvement and Water Trust Board Projects

Regional Water Planning Update

Infrastructure Captial and Improvement Plan (ICIP) and Water Trust Board (WTB) 2016-2017 Projects

Water Planning Region 12: Middle Rio Grande

Planning Region	County	Regional or System Specific (R), (SS)	Strategy Type (Project, Program or Policy)	Subcategory	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
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Acequia de Arenal Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Arenal	Acequia de Arenal			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Acequia de Atrisco Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Atrisco	Acequia de Atrisco			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Acequia de Los Padillas Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Los Padillas	Acequia de Los Padillas			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Acequia de Pajarito Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Pajarito	Acequia de Pajarito			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Acequia Madre de Carnuel Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Madre de Carnuel	Acequia Madre de Carnuel			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Acequia Madre de San Antonio Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia Madre de San Antonio	Acequia Madre de San Antonio			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Alamos de los Gallegos Acequia Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Alamos de los Gallegos Acequia	Alamos de los Gallegos Acequia			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Arenal Improvements**	Statewide Acequia Survey, NMAA	To plan, design, and construct improvements to Arenal (Silt Removal)	Arenal			Pre-Planning		Silt Removal	
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Don Gabino Andrade Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Don Gabino Andrade	Don Gabino Andrade			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Don Telesfor Acequia Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Don Telesfor Acequia	Don Telesfor Acequia			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Indio Lateral Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Indio Lateral	Indio Lateral			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Los Padillas Improvements**	Statewide Acequia Survey, NMAA	Te plan, design, and construct improvements as Los Padillas ()	Los Padillas			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Los Ranchos de Armijos Acequia Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Los Ranchos de Armijos Acequia	Los Ranchos de Armijos Acequia			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Normit Acequia Association Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Normit Acequia Association	Normit Acequia Association			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Pajarito Improvements**	Statewide Acequia Survey, NMAA	Te plan, design, and construct improvements to Pajarito (Silt Removal)	Pajarito			Pre-Planning		Silt Removal	
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Pueblo Lateral Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Pueblo Lateral	Pueblo Lateral			Pre-Planning			
Middle Rio Grande	Bernalillo	SS	Project	Acequia Infrastructure	**Storm Ditch Improvements**	Statewide Acequia Survey, NMAA	Te plan, design, and construct improvements ch Storm Ditch (Diversion Dam)	Storm Ditch			Pre-Planning		Diversion Dam	
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**10 So Valley Flood Reduct/Dist 2 Storm Drain Proj**	2017-2021 ICIP Project List						$23,000,000		Project ID 21683
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**133 Bishop Court Storm Drain**	2017-2021 ICIP Project List						$5,308,400		Project ID 21690
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**135 Joe Sanchez Road Storm Drain**	2017-2021 ICIP Project List						$2,400,000		Project ID 21696
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1610 Garduno Road Storm Drain**	2017-2021 ICIP Project List						$1,600,000		Project ID 26343
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1616 Sunset-Trujillo Storm Drain Area 1 Phs 2**	2017-2021 ICIP Project List						$5,000,000		Project ID 26342
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1635 Black Mesa Drainage Project**	2017-2021 ICIP Project List						$28,515,727		Project ID 28398
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1656 Arenal and Coors to Isleta Drain Storm Drain**	2017-2021 ICIP Project List						$2,700,000		Project ID 30366
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1660 Barcelona--Valverde to Armijo Drain Stm Drns**	2017-2021 ICIP Project List						$542,000		Project ID 26340
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1671 Blake and Tapia Storm Drains**	2017-2021 ICIP Project List						$846,000		Project ID 30353

Regional Water Planning Update

Infrastructure Captial and Improvement Plan (ICIP) and Water Trust Board (WTB) 2016-2017 Projects

Water Planning Region 12: Middle Rio Grande

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Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1675 Blake-Isleta to Perry Pnd(Vista del Rio Ph.4)**	2017-2021 ICIP Project List						$8,191,550		Project ID 28631
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1677 Bridge- Atrisco to Isleta Drain Storm Drain**	2017-2021 ICIP Project List						$1,483,000		Project ID 30354
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1708 Foothill Drive and Thompson Lane Storm Drain**	2017-2021 ICIP Project List						$718,000		Project ID 30355
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1713 Gun Club E of Los Padillas Drain Storm Drain**	2017-2021 ICIP Project List						$394,000		Project ID 30356
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**1800 Sunset Storm Drain**	2017-2021 ICIP Project List						$4,000,000		Project ID 28633
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**2075 Sunset-Trujillo Storm Drain Area 1**	2017-2021 ICIP Project List						$9,600,000		Project ID 28400
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**2076 North Albuquerque Acres Drainage**	2017-2021 ICIP Project List						$1,120,372		Project ID 23027
Middle Rio Grande	Bernalillo	SS	Project	StormWater System Infrastructure	**Stormwater Quality System Improvements**	2017-2021 ICIP Project List						$186,000		Project ID 18063
Middle Rio Grande	Bernalillo	SS	Project	Wastewater System Infrastructure	**1614 1470 Carnuel Water & Sanitary Sewer**	2017-2021 ICIP Project List						$36,000,000		Project ID 21711
Middle Rio Grande	Bernalillo	SS	Project	Wastewater System Infrastructure	**1647 Rio Bravo-Del Rio-Sunstar & Fr Rd Sew Ln Phs2**	2017-2021 ICIP Project List						$1,730,000		Project ID 28629
Middle Rio Grande	Bernalillo	SS	Project	Wastewater System Infrastructure	**1651 Lagunitas Sewer Lines**	2017-2021 ICIP Project List						$3,300,000		Project ID 28630
Middle Rio Grande	Bernalillo	SS	Project	Wastewater System Infrastructure	**1652 Lagunitas-Clark Sewer Lines**	2017-2021 ICIP Project List						$5,300,000		Project ID 30329
Middle Rio Grande	Bernalillo	SS	Project	Wastewater System Infrastructure	**1918 Monticello Sanitary Sewer Lines**	2017-2021 ICIP Project List						$3,000,000		Project ID 28627
Middle Rio Grande	Bernalillo	SS	Project	Wastewater System Infrastructure	**1960 SSHA-WW1 Sandia Heights Sewer Line Extension**	2017-2021 ICIP Project List						$51,541,565		Project ID 28658
Middle Rio Grande	Bernalillo	SS	Project	Water Supply	**1629 Phase 7 South Valley Drinking Water**	2017-2021 ICIP Project List						$5,300,000		Project ID 28647
Middle Rio Grande	Bernalillo	SS	Project	Water System Infrastructure	**1648 Rio Bravo-Del Rio-Sunstar & Front Rd WL Phs2**	2017-2021 ICIP Project List						$420,000		Project ID 28656
Middle Rio Grande	Bernalillo	SS	Project	Water System Infrastructure	**1954 8" Water Line-I-40 N Frontage Rd Wat Serv Ln**	2017-2021 ICIP Project List						$796,800		Project ID 28652
Middle Rio Grande	Bernalillo	SS	Project	Water System Infrastructure	**1981 4" Water Line-I40 N Frontage Rd Wat Serv Line**	2017-2021 ICIP Project List						$273,400		Project ID 28654
Middle Rio Grande	Bernalillo	SS	Project	Water System Infrastructure	**Village of Tijeras Water System**	2015 WTB application	642	Tijeras, Village of				$603,500		
Middle Rio Grande	Bernalillo	SS	Project	Water System Infrastructure	**Water System Improvements**	2015 WTB application	818	Green Ridge MDWCA				$300,000		
Middle Rio Grande	Bernalillo	SS	Project	Watershed Restoration	**Water System Protection and Wildfire Safety in a Wildland Urban Interface**	2015 WTB application	833	Ciudad Soil & Water Conservation				$61,494		

Regional Water Planning Update

Infrastructure Captial and Improvement Plan (ICIP) and Water Trust Board (WTB) 2016-2017 Projects

Water Planning Region 12: Middle Rio Grande

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Middle Rio Grande	Bernalillo, Rio Arriba, Santa Fe, Valencia	R	Project	Watershed Restoration	**Riparian Restoration Project through the Greater Rio Grande Watershed Alliance**	2015 WTB application	618	Claunch-Pinto SWCD				$600,000		
Middle Rio Grande	Bernalillo, Santa Fe, Torrance	R	Project	Watershed Restoration	**Estancia Basin Watershed Health, Restoration and Monitoring Project**	2015 WTB application	612	Claunch-Pinto SWCD				$600,000		
Middle Rio Grande	Bernalillo, Socorro, Valencia, Sandoval	R	Project	Watershed Restoration	**Middle Rio Grande ESA Habitat Restoration and Captive Propagation Facility Improvements**	2015 WTB application	542	Office of the State Engineer/Interstate Stream Commission				$450,000		
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Acequia de Cecilia Cecilia Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de Cecilia (Cecilia Ditch)	Acequia de Cecilia (Cecilia Ditch)			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Acequia de los Pinos Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia de los Pinos	Acequia de los Pinos			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Acequia del Vallecito Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia del Vallecito	Acequia del Vallecito			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Acequia La Rosa de Costilla Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Acequia La Rosa de Costilla	Acequia La Rosa de Costilla			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Adam Russell Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Adam/Russell	Adam/Russell			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Archibeque Ditch Assoc Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Archibeque Ditch Assoc.	Archibeque Ditch Assoc.			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Ballejos Nacimiento Nacimiento Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Ballejos #1 (Nacimiento)	Ballejos #1 (Nacimiento)			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Canon Community Acequia Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Canon Community Acequia	Canon Community Acequia			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Canon Community Improvements**	Statewide Acequia Survey, NMAA	Ta plan, design, and construct improvements ty Canon Community (Widening acequia)	Canon Community			Pre-Planning		Widening acequia	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Canyon Community Improvements**	Statewide Acequia Survey, NMAA	Ta plan, design, and construct improvements ts Canyon Community (Culverts)	Canyon Community			Pre-Planning		Culverts	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Copper City Nacimiento Nacimiento Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Copper City #1 (Nacimiento)	Copper City #1 (Nacimiento)			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Domingo Vigil Acequia Nacimiento Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Domingo Vigil Acequia (Nacimiento)	Domingo Vigil Acequia (Nacimiento)			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**East Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to East Ditch	East Ditch			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**East Sandoval Improvements**	Statewide Acequia Survey, NMAA	Ta plan, design, and construct improvements al East Sandoval (Silt Removal)	East Sandoval			Pre-Planning		Silt Removal	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**East West Sandoval Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to East/West Sandoval Ditch	East/West Sandoval Ditch			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**East/West Sandoval Ditch Improvements**	Statewide Acequia Survey, NMAA	Ta plan, design, and construct improvements pr East/West Sandoval Ditch ()	East/West Sandoval Ditch			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Gabriel Montoya Nacimiento Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Gabriel Montoya #7 (Nacimiento)	Gabriel Montoya #7 (Nacimiento)			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Jemez Pueblo Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Jemez Pueblo	Jemez Pueblo			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Jemez River Basin Acequia Coalition Improvements**	Statewide Acequia Survey, NMAA		Jemez River Basin Acequia Coalition				300000	Improvements including concrete lining, No design, Cost est $300,000.	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Jemez Springs Community Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Jemez Springs Community Ditch	Jemez Springs Community Ditch			Pre-Planning		Silt Removal	

Regional Water Planning Update

Infrastructure Captial and Improvement Plan (ICIP) and Water Trust Board (WTB) 2016-2017 Projects

Water Planning Region 12: Middle Rio Grande

Planning Region	County	Regional or System Specific (R), (SS)	Strategy Type (Project, Program or Policy)	Subcategory	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
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Jemez Springs South Upper Acequia Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Jemez Springs South Upper Acequia	Jemez Springs South Upper Acequia			Pre-Planning		Banks	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**La Ciruela Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to La Ciruela	La Ciruela			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**La Rosa de Castilla Improvements**	Statewide Acequia Survey, NMAA	Ta plan, design, and construct improvements me La Rosa de Castilla ()	La Rosa de Castilla			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Las Huertas Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Las Huertas	Las Huertas			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Madalena Atencio Nacimiento Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Madalena Atencio #2 (Nacimiento)	Madalena Atencio #2 (Nacimiento)			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Main Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Main Ditch	Main Ditch			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Molino Acequia Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Molino Acequia	Molino Acequia			Pre-Planning		Culverts	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Nacimiento Community Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Nacimiento Community Ditch	Nacimiento Community Ditch			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Nerio Montoya Acequia Nacimiento Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Nerio Montoya Acequia (Nacimiento)	Nerio Montoya Acequia (Nacimiento)			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Pecos Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Pecos Ditch	Pecos Ditch			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Ponderosa Community Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Ponderosa Community Ditch	Ponderosa Community Ditch			Pre-Planning		Silt Removal	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Pueblo de Jemez and East West Pecos Improvements**	Statewide Acequia Survey, NMAA		Pueblo de Jemez and East West Pecos			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Rancho Chico Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Rancho Chico	Rancho Chico			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Russel Adams Improvements**	Statewide Acequia Survey, NMAA	Ta plan, design, and construct improvements ms Russel Adams (Diversion Dam)	Russel Adams			Pre-Planning		Diversion Dam	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**San Ysidro Community Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to San Ysidro Community Ditch	San Ysidro Community Ditch			Pre-Planning		Adverse grade	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**South Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to South Ditch	South Ditch			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Troy Williams Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Troy Williams	Troy Williams			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**West Ditch Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to West Ditch	West Ditch			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**West Mooney Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to West Mooney	West Mooney			Pre-Planning		Silt Removal	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**West Sandoval Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to West Sandoval	West Sandoval			Pre-Planning		Silt Removal	
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Zia Pueblo Improvements**	Statewide Acequia List (NMAA)	To plan, design, and construct improvements to Zia Pueblo	Zia Pueblo			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	Acequia Infrastructure	**Zia Pueblo Main and South Improvements**	Statewide Acequia Survey, NMAA	Ta plan, design, and construct improvements th Zia Pueblo Main and South ()	Zia Pueblo Main and South			Pre-Planning			
Middle Rio Grande	Sandoval	SS	Project	StormWater System Infrastructure	**Canon del Agua East flood control dam**	2015 WTB application	804	Eastern Sandoval County Flood Control Authority (ESCAFCA)				$100,000,000		
Middle Rio Grande	Sandoval	SS	Project	StormWater System Infrastructure	**Construction of flood control dam**	2015 WTB application	785	Southern Sandoval County Arroyo Flood Control Authority (SSCAFA)				$950,000		
Middle Rio Grande	Sandoval	SS	Project	Wastewater System Infrastructure	**Equipping water treatment facility**	2015 WTB application	783	Rio Rancho, City of				$4,800,000		
Middle Rio Grande	Sandoval	SS	Project	Wastewater System Infrastructure	**Phase II Treatment System Improvements**	2015 WTB application	835	Cuba, Village of				$1,995,141		
Middle Rio Grande	Sandoval	SS	Project	Water Reuse	**Water reuse storage reservoir**	2015 WTB application	789	Rio Rancho, City of				$3,750,000		

Regional Water Planning Update

Infrastructure Captial and Improvement Plan (ICIP) and Water Trust Board (WTB) 2016-2017 Projects

Water Planning Region 12: Middle Rio Grande

Planning Region	County	Regional or System Specific (R), (SS)	Strategy Type (Project, Program or Policy)	Subcategory	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
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**North end Upgrade**	2015 WTB application	830	Regina MDWCA				$500,000		
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**Rehabilitation of well**	2015 WTB application	803	Bernalillo, Town of				$750,000		
Middle Rio Grande	Sandoval	SS	Project	Water System Infrastructure	**waterline installation**	2015 WTB application	769	Bernalillo, Town of				$1,200,000		
Middle Rio Grande	Sandoval	SS	Project	Watershed Restoration	**Forest Restoration**	2016-2020 ICIP Project List	29763					$75,000		
Middle Rio Grande	Statewide	R	Project	Watershed Restoration	**Watershed Restoration and Community Wildfire Protection**	2017-2021 ICIP	The Forestry Division of EMNRD is requesting $10,000,000 as a standalone project and will request equal amounts annually for funding other thinning projects that will restore public watersheds. Projects will help protect public lands in areas that have been identified as high value and risk to water quality and supplies from wildfires. Forest thinning creates vigor and resiliency of the remaining trees while preventing attacks from insect infestations, disease and wildfire and can deter the lasting effects of drought. Thinning projects not only improve the health of the forest, but it also protects the health and safety of New Mexico communities and their valuable drinking water supplies. New Mexico State Forestry has an excellent track record of implementing projects that add value to the entire state. Agreements have been entered into with federal, state, county, municipal and soil water conservation districts to distribute theses funds. It is estimated that these state funds will help employ or create jobs for 160-200 New Mexicans while the efforts of thinning will produce 6,600 to 8,400 acres.	Energy, Minerals and Natural Resources - Forestry Division	NM Forestry			$ 58,070,919		Project ID# 30464
Middle Rio Grande	Statewide	R	Project	Watershed Restoration	**Wildlife, Fisheries, and Riparian Habitat Restoration**	2017-2021 ICIP	The agency is involved in the planning, design, and completion of wildlife habitat and watershed restoration projects across jurisdictional boundaries throughout the state of New Mexico. These projects include prescribed burning, thinning of woodland and forests, reseeding of rangeland, and the restoration of wetlands and riparian areas. Each project is a multi-year effort with design and archeological and environmental compliance activities preceding treatment implementation on the ground. Past funds have supported or are earmarked for compliance and/or implementation activities across more than 250,000 acres on US Forest Service, Bureau of Land Management, Department of Game & Fish, and NM State Land Office properties in New Mexico. FY17 funds will increase the number of acres with completed compliance and/or with active restoration on the ground by up to 100,000 acres.	Department of Game and Fish	US Forest Service, Bureau of Land Mangament, NM State Land Office			$ 8,100,000		Project ID# 29353
Middle Rio Grande	Valencia	SS	Project	StormWater System Infrastructure	**Storm Water Plan**	2017-2021 ICIP Project List						$100,000		Project ID 28668
Middle Rio Grande	Valencia	SS	Project	StormWater System Infrastructure	**Valencia Levee Reconstruction**	2017-2021 ICIP Project List						$500,000		Project ID 27868
Middle Rio Grande	Valencia	SS	Project	Wastewater System Infrastructure	**Detention Pond**	2015 WTB application	779	Belen, City of				$925,000		
Middle Rio Grande	Valencia	SS	Project	Water System Infrastructure	**transmission line installation**	2015 WTB application	722	Los Lunas, Village of				$2,400,000		