New Mexico
Water Use By Categories
2015

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New Mexico Office of the State Engineer

Technical Report 55

NEW MEXICO
WATER USE BY CATEGORIES
2015

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EXECUTIVE SUMMARY

The *New Mexico Water Use by Categories* report (Report) is prepared once every five years by the Water Use and Conservation Bureau of the New Mexico Office of the State Engineer. The purpose of the Report is to provide the public with the most comprehensive, current, and useful water use data available.

The Report contains statewide water use data for the 2015 calendar year. Water withdrawals in New Mexico counties and river basins were tabulated for nine water use categories:

1. Public Water Supply
2. Self-Supplied Domestic
3. Irrigated Agriculture
4. Self-Supplied Livestock
5. Self-Supplied Commercial
6. Self-Supplied Industrial
7. Self-Supplied Mining
8. Self-Supplied Power
9. Reservoir Evaporation

Each water use category is defined in the chapters of this Report. The general procedures used to quantify withdrawals are presented in a step-by-step format. Water use tables, located in **Appendix B** and organized by county and river basin, provide details on the state's water use.

State Summary

The population of New Mexico increased from 2,059,179 in 2010 to 2,099,856 in 2015, an increase of 40,677 or almost 2%.

In 2015, withdrawals for all water use categories combined totaled 3,114,255 acre-feet (AF). Surface water accounted for 1,629,968 AF (52.34%) of the total withdrawals, and groundwater accounted for 1,484,287 AF (47.66%) of the total withdrawals. A summary of withdrawals for 2015 by category and source is provided below.

Public Water Supply accounted for 284,157 AF (9.12%) of the total withdrawals, consisting of:

- 87,399 AF (30.76%) of surface water
- 196,758 AF (69.24%) of groundwater

Self-Supplied Domestic accounted for 27,949 AF (0.90%) of the total withdrawals, consisting entirely of groundwater.

Irrigated Agriculture accounted for 2,376,065 AF (76.30%) of the total withdrawals, consisting of:

- 1,255,440 AF (52.84%) of surface water.
- 1,120,625 AF (47.16%) of groundwater.

  Surface water diverted for irrigation resulted in off-farm conveyance losses in canals and laterals, which amounted to 425,618 AF (33.90% of the diversion total).

The total estimated acreage irrigated (TAI) on farms in 2015 was 749,769 acres. Approximately 226,870 acres (30.26%) were irrigated with surface water, 408,628 acres (54.50%) were irrigated with groundwater, and 114,271 acres (15.24%) were irrigated with a combination of groundwater and surface water.

Total drip irrigation (TDA) accounted for 23,466 acres (3.13%), total flood irrigation (TFA) accounted for 340,780 acres (45.45%), and total sprinkler irrigation (TSA) accounted for 385,523 acres (51.42%). In some areas of the state, surface water was not sufficient to meet the irrigation demand.

Livestock accounted for 36,046 AF (1.16%) of the total withdrawals, consisting of:

- 2,904 AF (8.06%) of surface water.
- 33,142 AF (91.94%) of groundwater.

Commercial uses accounted for 57,526 AF (1.85%) of the total withdrawals, consisting of:

- 12,326 AF (21.43%) of surface water.
- 45,199 AF (78.57%) of groundwater.

Industrial uses accounted for 8,718 AF (0.28%) of the total withdrawals, consisting of:

- 0 AF (0%) of surface water.
- 8,718 AF (100%) of groundwater.

Mining accounted for 42,294 AF (1.36%) of the total withdrawals, consisting of:

- 1,141 AF (2.70%) of surface water.
- 41,153 AF (97.30%) of groundwater.

Power accounted for 50,419 AF (1.62%) of the total withdrawals, consisting of:

- 39,677 AF (78.69%) of surface water.
- 10,742 AF (21.31%) of groundwater.

Evaporation from reservoirs with a storage capacity of 5,000 AF or more amounted to 231,081 AF (7.42%) of total withdrawals.

Basin Summary

The State of New Mexico contains six river basins:

1. Arkansas-White-Red
2. Lower Colorado
3. Pecos
4. Rio Grande
5. Texas Gulf
6. Upper Colorado

Figure ES1: Map of Major New Mexico River Basins

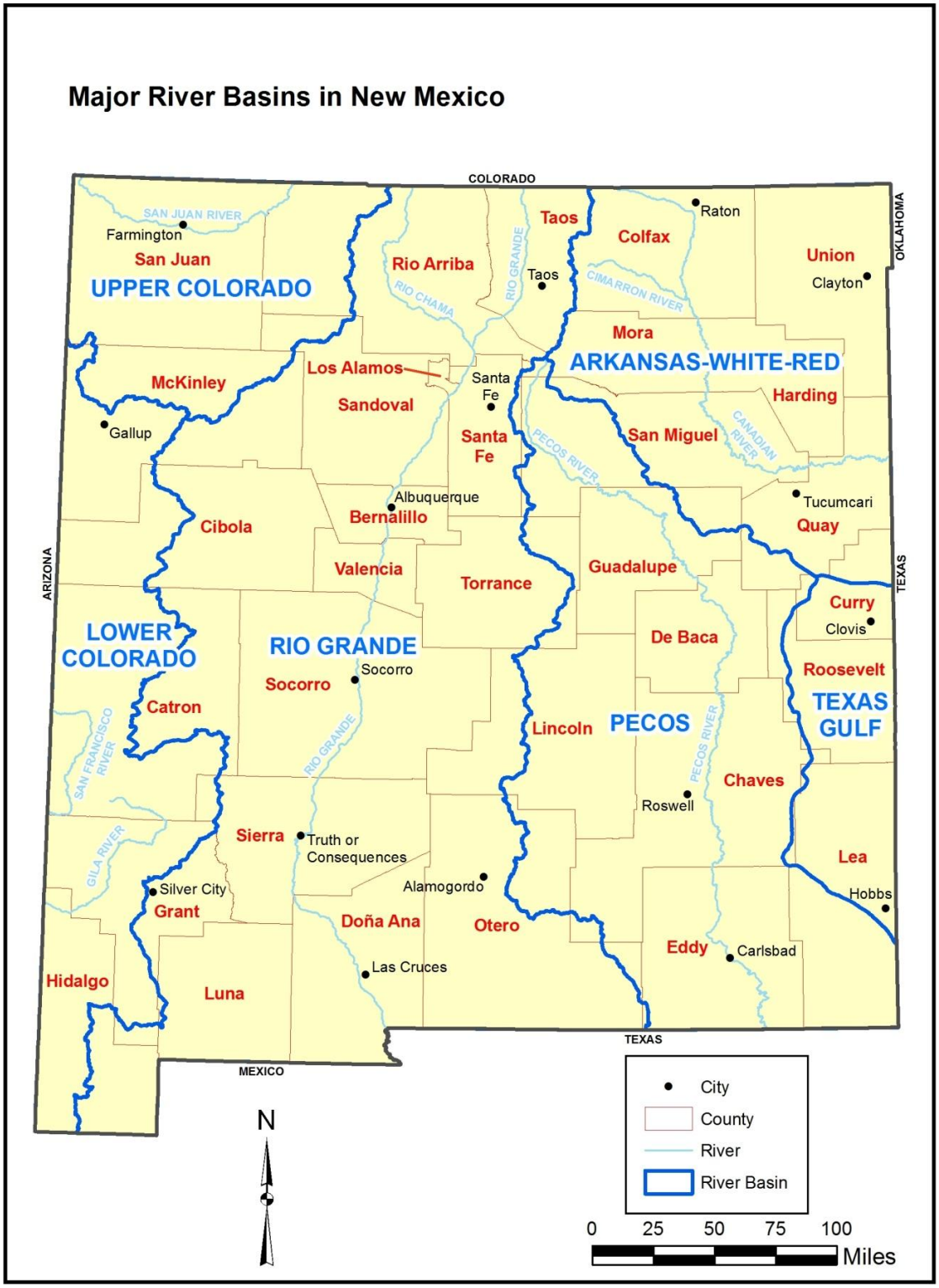
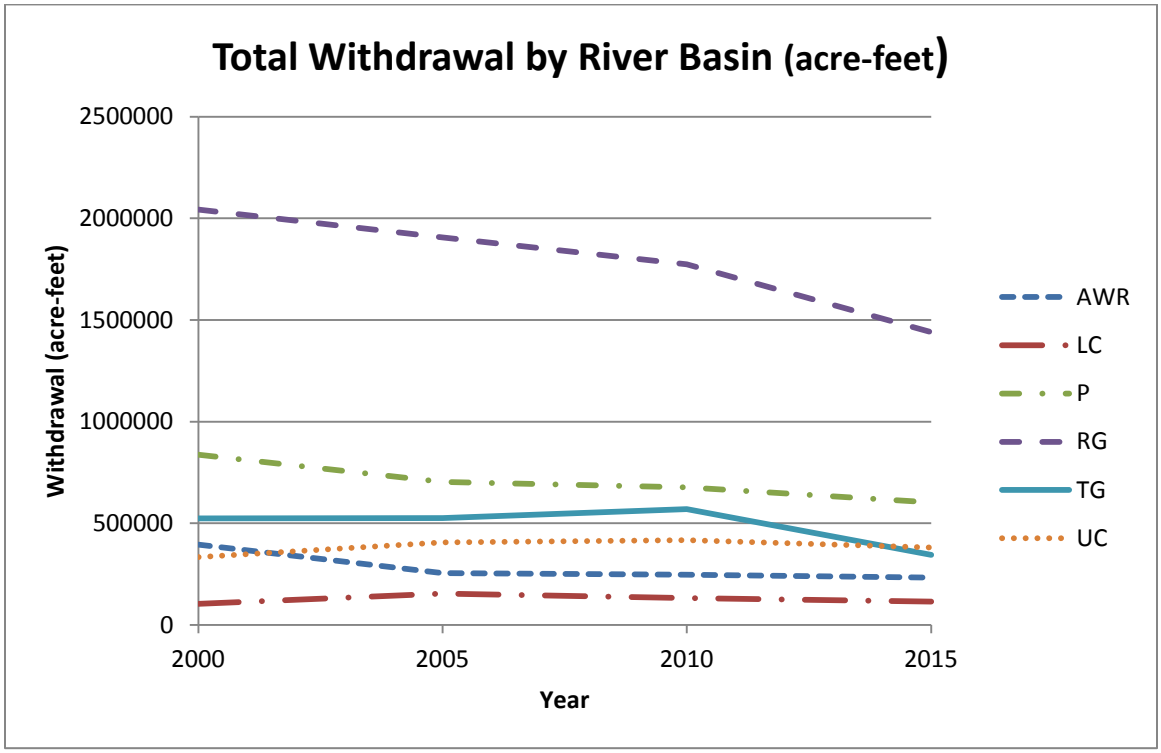


Table ES.1. Summary of population and withdrawals in acre-feet for New Mexico's six river basins.

River Basin	2015 Population	Withdrawals Surface Water (WSW)		Withdrawals Groundwater (WGW)		Total Withdrawals (TW)	
		acre-feet	% of basin total	acre-feet	% of basin total	acre-feet	% of state total
Arkansas-White-Red	34,159	148,489	64	84,658	36	233,147	7
Lower Colorado	69,090	56,235	49	57,770	51	114,005	4
Pecos	190,496	245,411	41	356,410	59	601,821	19
Rio Grande	1,532,954	802,029	56	637,720	44	1,439,749	46
Texas Gulf	132,284	190	0	344,425	100	344,615	11
Upper Colorado	140,873	377,614	99	3,303	1	380,917	12
State Totals	**2,099,856**	**1,629,968**		**1,484,287**		**3,114,255**	**100**

Figure ES.1. Total withdrawals in acre-feet for New Mexico's six river basins.



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ACRONYMS AND ABBREVIATIONS

ABCWUA	Albuquerque Bernalillo County Water Utility Authority
AF	acre-feet
A_g	gross irrigated acreage
A_n	net irrigated acreage
AWR	Arkansas-White-Red River Basin
BCCP	Blaney-Criddle Computer Program
CIR	Consumptive Irrigation Requirement
CIR_a	the Weighted Consumptive Irrigation Requirement recomputed using the consumptive use predicted by the crop production function for alfalfa
CIR_m	Multi-Crop Adjusted Consumptive Irrigation Requirement
CIR_w	Weighted Consumptive Irrigation Requirement
E_c	off-farm conveyance efficiency
E_f	on-farm irrigation efficiency
EPAct	Energy Policy Act of 1992
ET	evapotranspiration
FDR	farm delivery requirement
gal	gallon(s)
GPCD	gallons per capita per day
gpm	gallons per minute
LC	Lower Colorado River Basin
LRG	Lower Rio Grande Basin
MBC method	Modified Blaney-Criddle method
MDWC	Mutual Domestic Water Community/Co-op
MDWCA	Mutual Domestic Water Community/Co-op Association
MDWUA	Mutual Domestic Water Users Association
NASS	National Agriculture Statistics Service (USDA)
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMISC	New Mexico Interstate Stream Commission
NMOSE	New Mexico Office of the State Engineer
NMSA	New Mexico Statutes Annotated (1978)
NMSU	New Mexico State University
NMTRD	New Mexico Taxation and Revenue Department
NOAA	National Oceanic and Atmospheric Administration
OBC method	Original Blaney-Criddle method
P	Pecos River Basin
PDR	Project Diversion Requirement
PNM	Public Service Company of New Mexico

POP	population
PWS	Public Water Supplier
R	Monthly Rainfall
R_e	Effective Rainfall
REEM	Regional Evapotranspiration Estimation Model
Report	Water Use by Categories Report
RG	Rio Grande Basin
SCS	Soil Conservation Service
SIC	Standard Industrial Classification
T	temperature
T or C	Truth or Consequences
TAI	total acreage irrigated
TDA	acreage irrigated by drip
TFA	acreage irrigated by flood
TG	Texas Gulf River Basin
TSA	acreage irrigated by sprinkler
TW	total withdrawals
U *or* u_m	Consumptive Use
UC	Upper Colorado River Basin
UNM GPS	University of New Mexico Geospatial and Population Studies
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey
WEC	Water exchange codes
WGW	withdrawal groundwater
WSW	withdrawal surface water
WUA	Water Users Association
WUCB	Water Use and Conservation Bureau
WWC	Water Withdrawal Code

1 INTRODUCTION

The inventory of water use in the State of New Mexico is a necessary activity, with formal investigations dating back to at least 1896 (Follett). The New Mexico Office of the State Engineer (NMOSE) began its regular quantitative estimates of water use for the state in 1975, and has since prepared reports every five years. These reports are valuable resources to the NMOSE, the New Mexico Legislature, various state and federal agencies, state and regional water planners, municipalities, consultants, and others. This *New Mexico Water Use by Categories* report (Report) presents water use as withdrawals for the 2015 calendar year. The purpose of this Report is to make the most comprehensive, current, and useful water use withdrawal data available to the public.

Data from this Report can be used for varied analyses, most notably for regional planning and for tracking changes in water use in various categories over time. For example, as communities in the Rio Grande Basin continue to experience population growth, a correlated increase in public water supply use may also be observed. Over time, other areas of the state may observe changes in the amount of irrigated acreage and livestock in production. Legislators may find it helpful to consider trends in water use when determining budget allocations for projects. Making this type of data available to citizens throughout the state will help ensure that informed decisions can be made with regard to our limited water resources.

The results of the 2015 water use inventory are presented in this Report. Categories inventoried include:

- Public Water Supply and Self-Supplied Domestic (Chapter 2)
- Irrigated Agriculture (Chapter 3)
- Self-Supplied Livestock (Chapter 4)
- Self-Supplied Commercial, Industrial, Mining, and Power (Chapter 5)
- Reservoir Evaporation (Chapter 6)

1.1 History of Water Use Inventories

In 1950, the U.S. Bureau of Reclamation (USBR) published water withdrawals and depletions in drainage basins and the state for the period from 1945 to 1949. Reynolds (1959) reported similar data for 1955 to the U.S. Senate Select Committee on National Water Resources. The NMOSE compiled withdrawals and depletions for 1965, which were published by New Mexico State Planning Office in 1967. Data for 1970 were compiled by the NMOSE and published by the USBR and the New Mexico Interstate Stream Commission (NMISC) in 1976. Data for 1975, 1980, 1985, 1990, 1995, 2000, 2005, and 2010 were compiled and published by the NMOSE.

1.2 The 2015 Water Use Report

The 2015 Report is similar to the 2010 Report in text, format, and content. As in the 2010 Report, depletion calculations are excluded from the Report. Therefore, the statistics presented here are principally withdrawals. Significant work has been completed by the NMISC to calculate depletions in some of the state's interstate river basins (e.g., Pecos River, Colorado River, and Rio Grande Basins). However, incorporation of depletion calculations is beyond the resources allocated for this Report.

Previous water use reports included a definition for each water use category and a series of category classification numbers established by the Standard Industrial Classification (SIC) Manual (U.S. Office of Management and Budget, 1987) to facilitate the assimilation of data into the USGS National Water Use Information Program. In 2002, the SIC Manual was significantly modified to comply with the North American Free Trade Agreement. While the definition of each water use category is still included in this Report, the identification of the category reporting codes has been discontinued. Previous water use reports also contained lengthy discussions on topics such as water requirements for various types of turfgrass, benchmark studies of indoor water use, factors that affect water use in communities, causes of poor irrigation efficiency, and factors that affect livestock water use. This type of information is still valuable and can be reviewed in Technical Report 51 (Wilson, et al., 2003) and Technical Report 52 S (Longworth, et al., 2008).

Chapters 2 through 6 contain information pertinent to the nine water use categories.

Chapter 2, Public Water Supply and Self-Supplied Domestic, includes total withdrawals for residential purposes, as well as a description of the procedures used to calculate residential water use in gallons per capita per day (GPCD). Additionally, it identifies some of the unique water circumstances experienced by communities across the state and how those conditions are accounted for in this Report.

Chapter 3, Irrigated Agriculture, describes the procedures used to determine irrigation withdrawals, and provides information on two significant New Mexican crops, alfalfa and pecans. Explanations of the Blaney-Criddle and Modified Blaney-Criddle methods for calculating consumptive use and the subsequent calculation of consumptive irrigation requirements (CIRs) for a cropping pattern are also included in Chapter 3.

Chapter 4, Self-Supplied Livestock, presents trends in livestock populations throughout the state, with an emphasis on the dairy industry, and explains the procedure for calculating livestock withdrawals.

Chapter 5, Self-Supplied Commercial, Industrial, Mining, and Power, discusses the general procedure used to calculate withdrawals for the Self-Supplied Commercial, Industrial, Mining, and Power categories.

Chapter 6, Reservoir Evaporation, presents two methods for calculating reservoir evaporation in New Mexico.

Appendix A contains a county table and maps.

Appendix B contains a series of tables that report population and water use data for New Mexico counties and river basins for 2015. Withdrawals are calculated for each of the nine water use categories.

- Table 1: Population data for the Self-Supplied Domestic and Public Water Supply categories, by river basin
- Table 2: Summary of withdrawals by category, in acre-feet (AF)
- Table 3: Summary of withdrawals expressed as a percentage of the total withdrawals in the state, by category
- Table 4: Summary of the percentage of measured withdrawals for each category
- Table 5: Summary of water use by county and category
- Table 6: Summary of water use by river basin
- Table 7: Details of the Public Water Supply and Self-Supplied Domestic categories, including individual water systems by county and river basin and information on population, per capita water use, and withdrawals by source
- Table 8: Summary of statewide irrigated agriculture by river basin, including information on irrigated acreage, withdrawals, and conveyance losses.
- Table 9: Summary of irrigated agriculture by river basin and irrigation type
- Table 10: Summary of irrigated agriculture by county and water source type
- Table 11: Summary of irrigated agriculture by county and irrigation type
- Table 12: Summary of irrigated agriculture by county, river basin, locale, and irrigation type including information on irrigated acreage, CIRs, efficiencies, withdrawals, and conveyance losses

Note: There are three terms frequently used when discussing water use that may be confusing or misunderstood. They are (1) consumed, (2) consumption, and (3) consumptive use.

Water consumed and water consumption are terms often thought of as water delivered to a water user, whether the user is a water utility, individual household, or commercial or industrial enterprise. Water consumption in this context **is not** synonymous with consumptive use as it is defined in this report.

When water consumed and water consumption are used in reference to a human or an animal taking a drink of water, or water that is evaporated from a water body or land surface, these terms become synonymous with consumptive use.

Appendix C contains a glossary of terms used in the Report.

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2 PUBLIC WATER SUPPLY AND SELF-SUPPLIED DOMESTIC

This chapter includes:

- Definitions of water supply categories
- Summaries of state and county populations for 2015
- An explanation of the Gallons per Capita per Day (GPCD) values used to calculate withdrawals for self-supplied domestic uses
- A description of the procedure used to quantify self-supplied domestic withdrawals
- A description of the procedure used to quantify public water supply withdrawals and GPCD
- Water exchange codes
- Water withdrawal codes
- Information about individual water systems

A summary of 2015 public water supply and self-supplied domestic withdrawals can be found in **Appendix B, Table 7.** (Note: Tables in the appendices that use abbreviations include a key at the bottom of the page.) Total withdrawals are computed by county and river basin.

2.1 Definition of Categories

2.1.1 Public Water Supply

The Public Water Supply category includes community water systems that rely on both surface water and groundwater diversions, and that consist of common collection, treatment, storage, and distribution facilities operated for the delivery of water to multiple service connections. For the purposes of this Report, these systems will be known as Public Water Suppliers (PWS) and this definition will include mutual domestic systems, mutual domestic water user associations, etc. Following are examples of multiple service connection systems:

- Municipalities that serve residential, commercial, and industrial water users
- Prisons
- Residential and mixed-use subdivisions
- Mobile home parks

The Public Water Supply category also captures other water uses supplied by PWSs such as irrigation of golf courses, parks, athletic fields, or ponds/lakes.

Wells permitted by the NMOSE under 72-12.1 New Mexico Statues Annotated (NMSA) 1978 are not included in this section.

2.1.2 Self-Supplied Domestic

The Self-Supplied Domestic category includes self-supplied residences that may be single family or multi-family dwellings with well permits issued by the NMOSE under 72-12-1.1 NMSA 1978. This category includes water used for domestic purposes as defined under 19.27.5.7.F New Mexico Administrative Code (NMAC).

2.2 Population

2.2.1 State Population

New Mexico had a 1.98% growth rate between 2010 and 2015, ranking 33th in the country, based on U.S. Census data. The total population for 2015 was 2,099,856, based on population estimates provided by University of New Mexico Geospatial and Population Studies (UNM GPS). Growth in New Mexico from 2010-2015 lagged behind the national growth rate of 3.89%. New Mexico's neighboring states rank in the top ten for growth, see Table 2.1.

Table 2.1. Annual population estimates for selected western states.

Geographic Area	2010 Census Data[1]	Population Estimates July 1, 2015[2]	Percent Growth 2010-2015	National Rank of % Growth 2010-2015
United States	**308,745,538**	**320,742,673**	**3.89%**	-
Texas	25,145,561	27,486,814	9.31%	2
Colorado	5,029,196	5,452,107	8.41%	3
Utah	2,763,885	2,982,497	7.91%	4
Arizona	6,392,017	6,833,596	6.91%	6
New Mexico	2,059,179	2,099,856[3]	1.98%	33

[1]Source: U.S. Census Bureau, 2010 Census

[2] Source: U.S. Census Bureau, Population Division Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2018. Release Date: December 2018.

[3]Source: UNM GPS: February 2017.

2.2.2 County Populations

County populations are provided in **Table 2.2**. Counties are ranked from highest to lowest based on percentage change from 2010. Counties with the highest growth rate are Lea (9.51%), Eddy (6.58%), Sandoval (5.60%), Curry (4.51%), and Doña Ana (3.51%). Twenty-one counties (compared to sixteen counties in 2010) experienced a decrease in population during the five-year period. Eight of the 33 counties in the state grew faster than the 1.98% state growth rate.

Table 2.2. County populations by percent growth change.

County Number	County	2010 Census[1]	Population Estimates July 1, 2015[2]	Percent Change
State of New Mexico		2,059,179	2,099,856	1.98
25	Lea	64,727	70,881	9.51
15	Eddy	53,829	57,372	6.58
43	Sandoval	131,561	138,928	5.60
31	McKinley	71,492	75,397	5.46
9	Curry	48,376	50,560	4.51
13	Doña Ana	209,233	216,577	3.51
49	Santa Fe	144,170	148,238	2.82
1	Bernalillo	662,564	679,810	2.60
6	Cibola	27,213	27,590	1.39
35	Otero	63,797	64,656	1.35
55	Taos	32,937	33,287	1.06
5	Chaves	65,645	66,168	0.80
28	Los Alamos	17,950	17,905	-0.25
61	Valencia	76,569	76,312	-0.34
21	Harding	695	692	-0.43
17	Grant	29,514	29,288	-0.77
41	Roosevelt	19,846	19,639	-1.04
29	Luna	25,095	24,806	-1.15
39	Rio Arriba	40,246	39,752	-1.23
53	Socorro	17,866	17,465	-2.24
27	Lincoln	20,497	19,954	-2.65
3	Catron	3,725	3,602	-3.30
33	Mora	4,881	4,714	-3.42
47	San Miguel	29,393	28,264	-3.84
59	Union	4,549	4,370	-3.93
57	Torrance	16,383	15,731	-3.98
51	Sierra	11,988	11,466	-4.35
19	Guadalupe	4,687	4,471	-4.61
45	San Juan	130,044	123,979	-4.66
37	Quay	9,041	8,581	-5.09
11	De Baca	2,022	1,902	-5.93
7	Colfax	13,750	12,917	-6.06
23	Hidalgo	4,894	4,582	-6.38

[1] Source: Data from U.S. Census Bureau, 2010 Census

[2] Source: UNM GPS: April 1, 2010 to July 1, 2015. Release Date: February 2017.

Appendix B, Table 1, provides the distribution of population by river basin in New Mexico. The distribution was determined by tabulating the total population served for the Public Water Supply and Self-Supplied Domestic categories for each of the six river basins. The populations for each basin are as follows:

- Rio Grande – 1,532,954
- Pecos – 190,496
- Upper Colorado – 140,873
- Texas Gulf – 132,284
- Lower Colorado – 69,090
- Arkansas-White-Red – 34,159

2.3 Per Capita Water Use for the Self-Supplied Domestic Category

For the purpose of estimating withdrawals for the self-supplied domestic population, in most counties, an area-wide average of 80 GPCD was used. This GPCD value was selected based upon research completed by Brown and Caldwell (1984), which is summarized in **Table 2.3**. In counties where, due to climatic conditions, additional water requirements for landscape irrigation and evaporative cooling are required, an area-wide average of 100 GPCD was used. In Catron, Cibola, McKinley, and San Juan counties, where a segment of the population does not have indoor running water, an area-wide average of 70 GPCD was used.

Table 2.3. Indoor water use in single- and multi-family dwelling units without water-conserving plumbing fixtures and appliances, in gallons per capita per day (GPCD).

Items and Assumptions	GPCD[1]
Toilets (5.5 gal/flush x 4 flush/capita day)	22
Toilet leakage (0.17 x 24 gal/capita day)	4.1
Showers (3.4 gpm x 4.8 minute)	16.3
Baths (50 gal/bath x .14 bath/capita day)	7
Faucets (estimated)	9
Dishwasher (14 gal/load x .17 load/capita day)	2.4
Washing machine (55 gal/load x .30 load/capita day)	16.5
Total	77.3
Note: Evaporative cooling and water softener regeneration may increase the water requirements by up to 25 GPCD.	

[1]Source: Brown and Caldwell, 1984.

During the development of this Report, the GPCD data that were utilized for this category did not include indoor water conservation measures. The Brown and Caldwell (1984) research utilized studies completed in the 1980s. The most recent NMOSE indoor GPCD estimations are provided in NMOSE's Technical Report No. 48 (Wilson, 1996). Technical Report No. 48 includes conservation measures available during the early 1990s, and estimates an indoor GPCD of 58.9. It is well established that there have been significant advances in the efficiency of indoor plumbing fixtures since both the Brown and Caldwell study and Technical Report No. 48 were

published. The values provided from Technical Report No. 48 are intended for planning or benchmarking purposes.

As part of the New Mexico Water Use by Categories 2010 report, an assessment was completed (NMOSE & Aquacraft, 2013) to review recent studies that directly measured indoor water use. This assessment provided information on three efficiency classes:

- Class 1 represents high-efficiency homes that comply with United States Environmental Protection Agency (USEPA) Water Sense Standards.
- Class 2 represents homes that are intermediate-efficiency homes and generally fall into compliance with the Energy Policy Act of 1992 (EPAct) standards.
- Class 3 represents home groups that generally pre-date the EPAct standards.

The result of this assessment supported the conclusion that indoor water use can be reduced with USEPA Water Sense and EPAct fixtures. **Table 2.4,** below, provides a breakdown, by fixture, of the average measured water use for each class. All of these values are lower than the GPCD values utilized in this Report. This information also provides evidence that reductions in water use are obtainable with conservation measures.

Table 2.4. Indoor water use in single family dwelling unit plumbing fixtures and appliances, in gallons per capita per day (GPCD).

Items and Assumptions	Class 1	Class 2	Class 3
Toilets	9.2	12.34	16.6
Leakage	5.68	8.11	11.49
Showers	10.89	11.66	9.8
Baths	2.09	1.19	1.64
Faucets	8.43	9.47	9.46
Dishwasher	0.85	0.67	1.02
Washing machine	8.03	10.46	14.57
Other (includes miscellaneous uses that do not fit other categories)	0.38	1.26	2.44
Total	45.55	55.16	67.02

Given the resources available for this Report, it is not possible to disaggregate Self-Supplied Domestic Use by class of water users. Therefore, the withdrawal values utilized in this Report should be considered conservative in nature. In other words, they are higher than what was found in the assessment. This is an area for consideration in future reports.

2.4 Procedure for Quantifying Self-Supplied Domestic Withdrawals

Step 1. Determine Self-Supplied Domestic Population

The self-supplied domestic population in a county is determined by subtracting the population served by PWSs from the total population in that county. When a county has two or more river basins, the total county population must be calculated by its basin components. The distribution of the population in each county by river basin is based upon ratios derived from 1990 census block and tract data that were overlaid with hydrologic cataloging units. The population served by

PWSs in each basin is then subtracted from the total population of the respective basins to yield the self-supplied domestic population.

Step 2. Determine Total Withdrawals
Self-supplied domestic withdrawals are computed using the following equation:

$$W = (POP)(GPCD)/892.74 \quad (2.1)$$

where W is the annual withdrawal in acre-feet, POP is the population, and GPCD is gallons per capita per day.

2.5 Procedure for Quantifying Public Water Supply Withdrawals and GPCD

Step 1. Identify All PWSs
The first step toward quantifying public water supply withdrawals is to identify all PWSs in the state. The NMOSE used the list of PWSs from 2010 and cross-checked/consolidated that list with a 2015 list of active and inactive PWSs provided by the New Mexico Environment Department (NMED). For the purposes of this Report, the NMOSE's definition of PWSs is reasonably consistent with the NMED non-transient community water systems. The NMOSE also contacted some of the listed PWSs to resolve questions concerning the status of those PWSs.

Step 2. Distribute Surveys to PWSs
Many PWSs are required by permit conditions to report their annual withdrawals (sometimes referred to as diversions) to the NMOSE. However, some PWSs are not subject to annual reporting requirements because they have pre-basin wells that do not have such conditions. To obtain information from both reporting and non-reporting PWSs, the NMOSE's Water Use and Conservation Bureau (WUCB) sends a survey to all PWSs.

Step 3. Determine Total Withdrawals for Each PWS
Withdrawal data for the majority of PWSs were obtained from NMOSE meter records or via the aforementioned surveys. For entities for which data were unavailable, information was either taken from NMED's Water & Sewer Rate Surveys, or estimated based on population and the appropriate GPCD value for the Self-Supplied Domestic category.

Step 4. Determine Public Water Utility Population Served
In census years, population figures for many of the communities served by water utilities can be extracted from statistics published by the U.S. Census Bureau. It is important that these figures be compared with the data reported by PWSs. Any discrepancies between census data and PWS data are investigated and resolved prior to calculating PWS withdrawals. **An important step in determining the utility's population served is to separate the population of self-supplied residents from the total population of the larger community served by the PWS.**

Populations for communities not identified in the census are obtained from the water system manager, city clerk, regulatory agency, or estimated by some other means. Many water utilities estimate, with reasonable accuracy, the population they serve based on the total number of connections and the average number of residents per connection.

In noncensus years, the population must be estimated. Methodologies may range from a simple linear extrapolation to complex correlations based on the demographic characteristics of individual communities. Additional population data is obtained from the NMED, UNM GPS, and military bases.

Step 5. Determine the GPCD
Equation 2.1 is rearranged to solve for GPCD:

$$GPCD = (W)(892.74)/POP \qquad (2.2)$$

where W is the sum of the annual surface water and groundwater withdrawals in acre-feet, and POP is the population. The GPCD may be used to check the water use figures reported by the water supplier. An unusually high or low GPCD indicates a possible error in either the population data or the water withdrawal data. When data appear to be suspect, the water supplier is contacted by phone to discuss the discrepancies.

The state's most popular resort areas have a number of communities with a very small year-round residential population. These communities experience a large seasonal influx of residents for the summer and/or winter months and the fluctuating population affects the GPCD.

A similar phenomenon occurs on the state's military bases, but on a daily basis. While the residential population of enlisted personnel and their families may be relatively small, there is a large influx of civilians working on the base during the day. In addition, many military installations have a golf course, resulting in an unusually high GPCD relative to the residential population. (Military golf courses are discussed in more detail in Chapter 5.)

The withdrawals reported in this inventory for seasonal communities are reflected in the total water use. Due to the population and per capita water requirements being reported based on the number of New Mexico residents who live in the community year-round, these seasonal communities will generally exhibit a higher GPCD.

An alternative method to calculating the GPCD using the formula provided above is to use NMOSE's GPCD Calculator. The NMOSE developed the GPCD Calculator to provide a standardized methodology for GPCD calculations. The methodology provides the PWS with a categorized baseline of historical and current water use, which can be used to assist the PWS in planning, tracking, programming, and reporting water uses.

2.6 Water Exchange Codes

Water exchange codes (WEC) are used in this Report to identify water exchange transactions that occur among PWSs. These exchanges occur outside of the NMOSE water rights transfer permit process. WECs cover the following types of transactions:

- Water imports and exports over or between political and physical boundaries.
- The transfer of water from one PWS to another.
- The transfer of water from a PWS to a facility that is also self-supplied.
- Other aspects of a water system that may be of interest.

The codes were developed using information provided by PWSs, military bases, and by internal knowledge of a particular water system. Explanations of the WECs are provided in **Table 2.5,** and the WECs are used in **Appendix B, Table 7.**

Table 2.5. Water exchange codes.

Water Exchange Code (WEC)	Explanation
0	No water exchanges occurred.
1	Water is **imported** over or between political and physical boundaries.
2	Water is **exported** over or between political and physical boundaries.
3	Water delivered to customers (e.g., a water utility, commercial and industrial enterprises, or individual residences) outside of the city or village in which the water supplier is based **is not** included in the withdrawal shown.
4	Water delivered to customers outside of the city or village in which the water supplier is based **is** included in the withdrawal shown, and the population reported also reflects the additional population served.
5	Water delivered to customers outside of the city or village in which the water supplier is based **is** included in the withdrawal shown, but a reasonable estimate of the additional population served is unavailable; or customers served are commercial and industrial enterprises for which population figures are not relevant.
6	All water distributed in this community is received from another water utility.
7	Part of the water distributed in this community is received from another water utility and is included in the withdrawal shown.
8	Part of the water used at this self-supplied facility is received from a water utility or another organization. The water transferred to this facility is not included in the withdrawal shown.
9	Water is provided to seasonal visitors in addition to the established residential population. The withdrawal shown reflects the total water use. However, the population and per capita use reported are based on the number of residents who live in the community year-round.
10	This military installation experiences a daily influx of civilian workers. The withdrawal shown reflects the total water use. However, the population and per capita use reported are based on the number of residents who live on the installation year-round.
11	This water utility provides water to a facility that experiences a daily influx of population. The withdrawal shown reflects the total water use. However, the population and per capita water use reported are based on the potential number of people who visit the center on a daily basis.
12	This water utility provides water to a training facility that houses a constant population year-round. The withdrawal shown reflects the total water use. However, the reported population and per capita use are based upon the facility's residential population.
13	This water utility provides water to a golf course.

2.7 Water Withdrawal Codes

Water withdrawal codes (WWC) in this Report are used to identify PWSs where either data could not be obtained or data was quantified using the NMOSE GPCD Calculator. Where data could not be obtained, withdrawals were estimated or computed.

A WWC identifies:

- PWSs with no 2015 withdrawal data
- PWSs that submitted 2015 NMOSE GPCD calculator data

The codes were developed based on the way the withdrawal was estimated or computed. Explanations of the WWCs are listed in **Table 2.6,** below, and are used in **Appendix B, Table 7.**

Table 2.6. Water withdrawal codes.

Water Withdrawal Code (WWC)	Explanation
1	Withdrawals were computed using the rural-supply GPCD.
2	Withdrawals were obtained from NMED's Water & Sewer Rate Surveys
3	Withdrawals were computed using a nearby system's 2015 GPCD.
4	Withdrawals were obtained from the NMOSE GPCD calculator.

2.8 Information About Individual Water Systems

Specific information about individual water systems is organized by county in the text that follows. County numbers are identified in parentheses (00). Only counties having unique circumstances related to their water systems are included below. Except where stated otherwise, water exchanged from one water utility to another is added to the withdrawal of the receiving organization and is subtracted from the withdrawal of the utility from which the water was purchased.

Bernalillo County (01):

- The Albuquerque Bernalillo County Water Utility Authority (ABCWUA) serves the City of Albuquerque as well as some population outside the city limits. This total does not include the residential population at Kirtland Air Force Base, which has its own water system and is reported separately in **Appendix B, Table 7.**
- Due to report format the ABCWUA population numbers and GPCD are different than those presented in the ABCWUA 2015 NMOSE GPCD Calculator. ABCWUA supplies water to the Puerto del Sol golf course.
- ABCWUA supplied approximately 530 AF of effluent water to Los Altos golf course (due to collapse of their well) therefore, the water used for irrigation purposes at the golf course was not reported separately as part of the Commercial category.
- Kirtland Air Force Base treated effluent is reused to irrigate the Tijeras Arroyo golf course.
- ABCWUA treated effluent is reused to irrigate the Tanoan Country Club.
- ABCWUA includes Paradise Hills-NM Utilities.
- The Entranosa Water Co-op delivers water to a population of about 5,389 in Bernalillo County and 2,975 in Santa Fe County.

- The Lost Horizon Co-op Association purchases all of its water from ABCWUA.

Chaves County (05):

- In addition to producing municipal drinking water, the Village of Dexter also pumps groundwater to maintain the water level in Lake Van, which is outside the village limits, and to irrigate park areas around the lake; therefore, Dexter's GPCD appears elevated relative to the population.
- The Roswell Municipal Water System supplies approximately 60 AF of water to the Spring River golf course; therefore, the city's GPCD appears elevated relative to the population. The golf course also uses approximately 260 AF of self-supplied water and is reported separately as part of the Commercial category.

Cibola County (06):

- Grants reuses treated sewage effluent to irrigate the Coyote del Malpais Golf Course; therefore, the water used for irrigation purposes at the golf course was not reported separately as part of the Public Water Supply or Commercial categories.

Colfax County (07):

- The Raton Domestic Water System exports approximately 8 AF of water to the Carisbrook Property Owners Association; therefore this withdrawal is included under the Raton Domestic Water System in **Appendix B, Table 7.**
- The Village of Angel Fire provides water to the Angel Fire Resort for snow making and to the golf course.
- Springer Water System supplies all water to French MDWCA, Springer Tract and the Correctional Facility; these withdrawals and populations are reported under the Springer Water System.

Doña Ana County (13):

- The population served by the Hatch water system as reflected in **Appendix B, Table 7,** includes residents in Placitas and Rodey, which are outside the Hatch city limits.
- The population served by the Las Cruces Municipal water system excludes residents served by private water systems within the city.
- Due to report format the Las Cruces Municipal water system's population numbers and GPCD are different than those presented in the Las Cruces Municipal 2015 NMOSE GPCD Calculator.
- Doña Ana MDWCA supplies water to Evergreen Mobile Home Park, Farview Estates Water System, Fort Selden, and Picacho Hills Water System.
- Fort Selden Water Company is now part of Doña Ana MDWCA.
- The Mountain View MDWCA and Butterfield Park are now part of the Lower Rio Grande Public WWA East Mesa.
- Berino Water Users Association (WUA), Desert Sands, La Mesa MDWCA, Mesquite MDWCA and Vado MDWCA were combined to form the Lower Rio Grande Public Water Works Authority.
- Jornada Water Company delivers water to Hacienda Acres Water System, Las Altures Estates, Mesilla Park Manor Water System, Raasaf Hills Water System, San Pablo MDWCA, and San Andres Estates Water System, these populations are reported under Jornada in Appendix B, Table 7.

- Evergreen MHP imports approximately 11 AF of water from Doña Ana Mutual Domestic Water; this amount was combined with their metered withdrawal data.
- Santa Teresa Water System and Sunland Park Water Systm are now part of Camino Real Regional Utility Authority.
- Lower Rio Grande Public Water Works Authority (LRGPWWA) purchased the Valle De Rio Water System.
- LRGPWWA provides water to Big Sky dairy and other entities.
- Las Cruces Municipal Water System provides all the water to Dove Canyon LLC.
- Las Cruces Municipal Water System provides approximately 415 AF of effluent water to the Sonoma Ranch golf course. The golf course also uses approximately 260 AF of self-supplied water and is reported separately as part of the Commercial category.
- Lake Section Water Company supplies all water to Orogrande Mutual Domestic Water Consumers Association.

Eddy County (15):

- The population served by the Carlsbad Municipal System includes residents in La Huerta, which is outside of the city limits and it is reported as such in **Appendix B, Table 7.**
- The 2015 irrigation withdrawals for the Lake Carlsbad Golf Course, which is a self-supplied municipal facility, are included in the withdrawal reported for the Carlsbad Municipal System; therefore, the city's GPCD appears elevated relative to the population.
- Carlsbad Municipal System supplies water to Brantley Lake State Park and the Waste Isolation Pilot Plant.
- While Loving supplies all of the water distributed in Malaga, withdrawals for both cities are reported separately in the withdrawal column in **Appendix B, Table 7.**
- Caprock imports all water from Morwest Corporation.

Grant County (17):

- Silver City delivers water to Arenas Valley, Pino Altos, Rosedale and Tyrone MDWCA; these withdrawals are reported separately in **Appendix B, Table 7.**
- Silver City's treated sewage effluent is reused to irrigate the Silver City Golf Course; therefore, the golf course was not included in the Commercial category.
- Bayard Municipal Water System exports 5.1 AF to Hanover Water Association; these withdrawals are reported in **Appendix B, Table 7.**
- The Hurley Water System imports approximately 165 AF from Freeport-McMoRan Chino Mines.
- The Hurley Water System exports approximately 33 AF to North Hurley MDWCA; these withdrawals are reported separately in **Appendix B, Table 7.**

Guadalupe County (19):

- Vaughn exports water to Duran and Encino in Torrance County; these withdrawals are reported under Vaughn in **Appendix B, Table 7.**
- Santa Rosa Water Supply exports to Hollywood Ranch Domestic WUA, Rio Pecos Villa MDWCA, Riveras MDWUA, and Puerto de Luna MDWCA; these water systems were excluded from **Appendix B, Table 7.**
- Sangre de Cristo MDWCA exports water to Anton Chico MDWCA, Dilia MDWCA, Los Sisneros MDWCA, and Upper Dilla MDWCA; these water systems were excluded from **Appendix B, Table 7.**

Lea County (25):

- Eunice provides part of the water used at Urenco USA's Enrichment Facility located outside of the city limits. This withdrawal was included in the city's withdrawal and was not included in the Industrial category of this Report.

Lincoln County (27):

- Alto Lakes Golf Course & Country Club receives water from Alto Lakes Water Co-op therefore the GPCD appears elevated relative to the population.
- Ruidoso Downs purchased the Agua Fria Water Company in 2000; therefore, this withdrawal is included under Ruidoso Downs.
- Lincoln Hills Water Co-op supplies water to Woodwinds RV Resort.
- Lincoln Hills Water Co-op provides approximately 106 AF of water to the Outlaw Golf Course, this withdrawal is reported for the Lincoln Hills Water Co-op; therefore, the GPCD appears elevated relative to the population.

Los Alamos County (28):

- Withdrawals from the Los Alamos National Laboratory and the City of White Rock were included as part of City of Los Alamos withdrawals in the Public category.
- Los Alamos and White Rock's treated sewage effluent is reused to irrigate the Los Alamos golf course and numerous athletic fields, and for cooling tower makeup water at electric power generating stations; it was not accounted for in any other category within this Report.

McKinley County (31):

- The City of Gallup delivers water to Fort Wingate and Gamerco.
- The City of Gallup's treated effluent is reused to irrigate the Fox Run Golf Course.

Otero County (35):

- Alamogordo's treated sewage effluent is reused to irrigate the Desert Lakes Golf Course; therefore, the water used for irrigation purposes at the golf course will not be listed under the Public Water Supply or Commercial categories.
- Alamogordo delivers water to Oasis Mobile Home Park. Oasis also has their own water supply which is used for irrigation.
- Lake Section Water Company delivers all water to Orogrande.
- Orogrande delivers water to the Bureau of Land Management, the U.S. Forest Service, and two private ranches. Since the withdrawal reported for Orogrande reflects these deliveries, the GPCD appears elevated relative to population.
- Holloman Air Force Base supplies water to White Sands National Momument.
- Cloud Country Estates WUA maintains a fishing pond therefore the GPCD appears elevated relative to the population.

Quay County (37):

- Irrigation water for the Tucumcari Golf Course was supplied by the City of Tucumcari and is included in the city's withdrawals; therefore, the City of Tucumcari's GPCD appears to be slightly elevated relative to the population.

- The City of Tucumcari supplies all of the water distributed by Hills Village Water System, Liberty MDWUA, and Rad Water Users Coop; these withdrawals are reported separately in **Appendix B, Table 7.**
- Logan Water system supplies all of the water distributed by San Jon Water Supply; these withdrawals are reported separately in **Appendix B, Table 7.**

Rio Arriba County (39):

- The City of Española supplies all of the water distributed by Cuatro Villas WUA.

Roosevelt County (41):

- The City of Portales supplies all of the water distributed by the Roosevelt County Water Co-op; these withdrawals are reported separately in **Appendix B, Table 7.**

Sandoval County (43):

- Rio Rancho's treated sewage effluent is reused to irrigate the Chamisa Hills Golf & Country Club; therefore, the water used for irrigation purposes at the golf course was not reported separately as part of the Commercial category.

San Juan County (45):

- The City of Aztec supplies water to the Southside WUA and Flora Vista Water Users; withdrawals and population data were reported separately in **Appendix B, Table 7.**
- The City of Aztec supplies water to Hydro Pure Technology Inc.
- Bloomfield supplies water to the Aztec and Blanco Mutual Domestic Water Consumers Associations; these withdrawals are reported separately in **Appendix B, Table 7.**
- The City of Farmington supplies Bluff View Power plant with approximately 230 AF of water; this withdrawal is reported separately as part of the Power category.
- The City of Farmington supplies water to Flora Vista Water Users; withdrawals and population data were reported separately in **Appendix B, Table 7.**
- The Lower Valley WUA supplies water to Upper La Plata WUA; these withdrawals are reported separately.
- Irrigation water for the Civitan Golf Course and Piñon Hills Golf Course was supplied by the City of Farmington and is included in the city's withdrawals; therefore, the City of Farmington's GPCD appears to be slightly elevated relative to the population.

Santa Fe County (49):

- In 2015, the City of Santa Fe supplied approximately 1,050 AF of treated effluent water to the following entities: Santa Fe River, Marty Sanchez Golf Course (multi-use recreation), Las Campanas, Santa Fe Country Club Golf Course, and the Santa Fe Downs. The water used for irrigation purposes at the golf course was not reported separately as part of the Commercial category.
- Las Campanas golf course uses approximately 520 AF of self-supplied water and is reported separately as part of the Commercial category.
- The City of Santa Fe supplies water to Hyde Park Estates; these withdrawals are reported separately in **Appendix B, Table 7**.
- Santa Fe County supplies Las Campanas Water System with approximately 222 AF of water; these withdrawals are reported separately in **Appendix B, Table 7**.
- Thunder Mountain Water System imports water from the town of Estancia in Torrance County; this withdrawal and population is reported under the Estancia water system.

- Santa Fe County supplies water to the Quail Run Golf Course.
- Glorieta MDWCA, Glorieta Estates, East Glorieta and the Village of Glorieta were combined to form the Greater Glorieta MDWCA.
- The New Mexico State Penitentiary receives all its water from the City of Santa Fe and Santa Fe County; therefore they are not listed separately in **Appendix B, Table 7.**

Sierra County (51):

- Water supplied to the Truth or Consequences (T or C) golf course by the City of T or C is treated effluent water and therefore is not accounted for separately in this Report.

Socorro County (53):

- The Socorro Water System supplies approximately 26 AF of water to the Energetic Materials Research and Testing Center; therefore, the Socorro's GPCD appears to be slightly elevated relative to the population.

Taos County (55):

- Treated sewage effluent is reused to irrigate the Taos Country Club Golf Course and therefore is not accounted for separately in this Report.
- The Twining Water and Sanitation District (also known as the Taos Ski Valley) supplies all of the potable water for the condominiums, hotels, restaurants, and shops in Taos Ski Valley. The water used for snowmaking at Taos Ski Valley is reported in the Commercial category rather than in the Public Water Supply category since it is permitted separately.

Torrance County (57):

- Duran and Encino both import water from the City of Vaughn in Guadalupe County; these withdrawals are reported separately in **Appendix B, Table 7.**
- The Thunder Mountain Water System, located in Santa Fe County, imports water from the town of Estancia; this withdrawal and population are reported under the Estancia water system.
- Town of Estancia population number includes the Torrance County Detention Facility.

3 IRRIGATED AGRICULTURE

This chapter includes:

- A definition of the water supply category.
- An overview of the Original Blaney-Criddle (OBC) method and Modified Blaney-Criddle (MBC) method for computing the consumptive use and subsequently the consumptive irrigation requirement (CIR) of crops.
- A description of the procedure used to quantify irrigation withdrawals.
- A discussion of the methods used to calibrate the consumptive use for two important New Mexican crops: alfalfa and pecans.
- An overview of the irrigated acreage data used in this Report.
- A discussion of surface water shortages.

The Irrigated Agriculture category had the highest amount of water withdrawals in 2015, which accounted for 2,376,065 AF, or 76.30% of total withdrawals. Summaries of irrigation withdrawals can be found in **Appendix B, Tables 8-12.**

CIRs in this Report are primarily calculated using the OBC method, however, the MBC method is used to compute consumptive use in the Upper Colorado River Basin to maintain consistency with NMISC compact accounting. Additionally, this Report uses Colorado River Basin withdrawal data consistent with those reported by the NMISC.

3.1 Definition of Category

The Irrigated Agriculture category includes all withdrawals of water for the irrigation of crops grown on farms, ranches, and wildlife refuges.

3.2 The OBC Method

3.2.1 Consumptive Use (U)

The OBC method (Blaney and Criddle, 1950, 1962) for determining consumptive use was born out of studies conducted in New Mexico during 1939 and 1940 for the Pecos River Joint Investigation initiated by the National Resources Planning Board.

The OBC method uses mean monthly air temperatures (T) expressed in degrees Fahrenheit, monthly percentage of annual daylight hours (P) based on latitude of the area under study, seasonal consumptive use coefficients (K), and length of growing season. These are used to estimate the total consumptive use (U), or evapotranspiration (ET), of water during the growing season for a crop. The consumptive use in inches for each month is expressed in equation 3.1 as:

$$U=ET=[(T)(P)/100](K) \qquad (3.1)$$

Adding the consumptive use computed for each month yields the total consumptive use for a specific crop during the growing season.

The distinctive feature of this method is that the consumptive use coefficient (K) remains constant throughout the frost-free period. A different consumptive use coefficient is used for that part of a crop's growing season that occurs before the last spring frost (T<32°F) or past the first fall frost

(T<32°F). The consumptive use coefficient during the frost period is lower than the consumptive use coefficient during the frost-free period of the growing season. For crops that have a growing season that begins before or extends beyond a frost date—in a month in which a frost occurs—the days inside and outside the frost-free period must be counted separately so that the appropriate consumptive use coefficients can be applied. In a month during which the growing season begins or ends, the consumptive use coefficient is multiplied by the ratio of the number of days in the month the crop is "growing" to the total number of days in that month.

3.2.2 USBR Effective Rainfall (R_e)

The amount of rainfall available to crops is influenced by the following factors:

- Duration and intensity of rainfall
- Antecedent moisture condition of the soil
- Infiltration capacity of the soil
- Presence of surface seals and crusts
- Slope of fields
- Root development of the crop
- Interception by the plant canopy

The OBC method did not have a procedure for estimating effective rainfall. In 1962, Blaney and Criddle adopted a USBR method. The USBR method expresses effective rainfall (R_e) as a percentage of the total monthly rainfall. For each 1-inch increment in rainfall, there is a corresponding decrease in the percentage of effective rainfall. This method was originally published as a table of values that has since been changed to a set of equations (**Table 3.1**). **Note: Effective rainfall (R_e) cannot exceed the consumptive use (U).** Adding the effective rainfall computed for each month yields the total effective rainfall for a specific crop during the growing season.

Table 3.1. USBR effective rainfall.

Monthly Rainfall (R) (inches)	Effective Rainfall (R_e) (inches)
$1 \leq R$	$R_e=0.95R$
$1 < R \leq 2$	$R_e=0.95+0.90(R-1)$
$2 < R \leq 3$	$R_e=1.85+0.82(R-2)$
$3 < R \leq 4$	$R_e=2.67+0.65(R-3)$
$4 < R \leq 5$	$R_e=3.32+0.45(R-4)$
$5 < R \leq 6$	$R_e=3.77+0.25(R-5)$
$R > 6$	$R_e=4.02+0.05(R-6)$
Key: (<) means less than; (≤) means less than or equal to; (>) means greater than	

3.3 The MBC Method

3.3.1 Consumptive Use (u_m)

The U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) introduced the MBC method in 1967. In 1970 it was revised and published (USDA, 1970).

The MBC method uses mean monthly air temperatures (t) expressed in degrees Fahrenheit, monthly percentage of annual daylight hours (p) based on the latitude of the area under study, monthly consumptive use coefficients (k), and length of growing season to estimate the total monthly consumptive use (u_m) of water for a crop that is well watered and free of disease. The consumptive use in inches for each month is expressed as:

$$u_m = [(t)(p)/100](k) \qquad (3.2)$$

where $k = (k_t)(k_c)$. The climatic coefficient (k_t) equals 0.0173t-0.314, and k_c is the crop growth stage coefficient.

The procedure used to calculate the final *monthly* consumptive use coefficient (k) distinguishes the MBC method from the OBC method, which uses a *seasonal* consumptive use coefficient.

- The climatic coefficient (k_t), expressed as a function of the mean monthly temperature, is computed.
- The value of the crop growth stage coefficient (k_c) is obtained from a curve plotted on a graph. Because the growth characteristics of each crop are different, a separate curve is generally required for each crop. Curves for a limited number of crops were published in SCS Technical Release 21 (USDA, 1970).
- Multiplying k_t by k_c yields the final consumptive use coefficient (k) for a specific crop and month.
- In a month in which the growing season begins or ends, the consumptive use coefficient is multiplied by the ratio of the number of days in the month the crop is "growing" to the total number of days in that month.
- Adding the consumptive use computed for each month yields the total consumptive use for a specific crop during the growing season.

3.3.2 SCS Effective Rainfall (r_e)

The SCS developed a method for estimating effective rainfall as a function of consumptive use and rainfall. This method was established as the result of research that analyzed the soil-moisture balance from 50 years of precipitation records at each of 22 Weather Bureau stations in the United States (now part of the National Weather Service). To calculate effective rainfall (r_e) in inches, the SCS method uses the following equation:

$$r_e = (0.70917r^{0.82416} - 0.11556)(10^{0.02426u_m})(f) \qquad (3.3)$$

where r is the rainfall in inches, u_m is the monthly consumptive use in inches, and

$$f = 0.531747+0.295164D-0.057697D^2+0.003804D^3 \qquad (3.4)$$

where D is the net depth of irrigation water in inches normally applied to the field.

In New Mexico, the default depth of irrigation is three inches. If other depth information is available, it is used in equation 3.4. **Note: The effective rainfall (r_e) cannot exceed the**

consumptive use (u_m). The monthly CIR for each crop in the cropping pattern is computed by subtracting the effective rainfall (r_e) from the consumptive use (u_m). Adding the computed effective rainfall for each month yields the total effective rainfall for a specific crop during the growing season.

3.4 Procedure for Quantifying Irrigation Withdrawals

This section discusses irrigation water requirements, separated by irrigation system type and water source, as well as factors that influence the CIR and how the CIR is computed using the Blaney-Criddle Computer Program (BCCP) developed by NMOSE staff (Wilson, 1990). The BCCP uses three electronic data files that include (1) crop acreages, (2) temperature and precipitation data, and (3) growing season data. Summaries of irrigation withdrawals can be found in **Appendix B, Tables 8-12.**

Note: Multiple steps are necessary to calculate the final CIR. The steps used to calculate the final CIR vary as a function of the crop species and cropping pattern. Interim CIRs, represented by CIR_w, CIR_a, and CIR_m, are used in this procedure as placeholders for entry into Step 8 as CIR. A final CIR is calculated in Step 11.

The step-by-step procedure used for quantifying irrigation withdrawals is described below.

Step 1. Calculate Gross Actively Irrigated Acreage by Type of Irrigation System
Accurate cropping patterns and irrigated acreage data were more difficult to obtain for this Report than for past reports due to the following reasons:

- The USBR no longer requires irrigation districts to fill out Crop and Water Data reports.
- The USDA Farm Service Agency and the National Agricultural Statistics Service can both provide county data, but they are unable to provide county data by location in the county. The NMOSE needs location information in order to attribute irrigated acreage to the correct river basin.
- New Mexico State University (NMSU) County Extension Agents are increasingly unable to provide irrigated acreage and cropping pattern data due to limited resources.

Due to these limitations, irrigated acreage for the Report was compiled using the USDA Cropland Data Layer (CDL). The CDL is a georeferenced crop-specific land cover classification product with a 30 meter resolution that is produced annually. GIS was used to integrate the CDL crop types with a layer of potentially irrigated polygons covering the entire state. WUCB staff analyzed the results using aerial imagery to ensure accuracy. During this process, edits were made as needed to reflect on-the-ground conditions. For example, areas in the eastern part of the state that appeared to be dryland farmed were removed from the analysis.

Ancillary data from the USBR, USDA Farm Service Agency, National Agricultural Statistics Service, NMISC, NMOSE district offices, irrigation districts, conservancy districts, and county extension agents were used to help validate and refine the totals obtained from the CDL and subsequent analysis.

Some of the locale names in this Report differ from those used in previous years. Name changes were made as necessary for consistency and to better reflect the actual geographic location of the locales.

The irrigated acreage in each county, river basin, and locale was compiled by crop type and irrigation method. On-farm irrigation efficiencies are used to determine farm delivery requirements, and these vary by the irrigation method. The types of irrigation methods used to irrigate cropland are classified as drip, flood, and sprinkler.

Once irrigated acreages and cropping patterns were identified, the gross irrigated acreage for each individual crop was tabulated by irrigation method. The gross irrigated acreage is the sum of the irrigated acreage and the multiple-cropped acreage.

Step 2. Obtain Temperature and Precipitation Data

Calculations in this Report used 2015 weather data from weather stations around the state. Parameter-elevation Regressions on Independent Slopes Model (PRISM) climate mapping system data were used in situations where weather stations were no longer in operation, or when gaps in weather data existed. Per the PRISM Climate Group website (http://prism.oregonstate.edu/), *"PRISM is a unique knowledge-based system that uses point measurements of precipitation, temperature, and other climatic factors to produce continuous, digital grid estimates of monthly, yearly, and event-based climatic parameters."*

The average temperature and total recorded rainfall for each month were obtained from the weather station or PRISM location most representative of a specific locale. In some instances, data from two weather stations were averaged to obtain the temperature and precipitation for calculations for an irrigated area.

Precipitation amounts for much of the 2015 growing season in Eastern New Mexico were significantly above average which may have impacted the irrigation requirements in that section of the state.

Step 3. Determine Irrigation Season

The irrigation season for each crop is defined by the earliest and latest moisture-use dates. For annual crops, the earliest moisture-use date is assumed to be the planting date, and the latest moisture-use date is assumed to be the day before harvest begins. Additionally, for some annual crops such as corn, spring small grains, and cotton, farmers may apply a pre-plant irrigation. Readily available documents were reviewed to identify areas where these practices are common. In such cases, a 15-day pre-plant irrigation period was added to the date of planting, resulting in a longer growing season and therefore a higher consumptive use.

For perennial crops such as alfalfa and permanent pasture grasses, the earliest moisture-use date correlates with the mean daily air temperature that activates the transpiration process. This date is extrapolated from mean monthly temperature values. The latest moisture-use date correlates with the mean daily air temperature that signals the cessation of transpiration on the next day.

Step 4. Calculate Weighted Consumptive Irrigation Requirement (CIR_w)

The CIR for each crop in the cropping pattern was computed using the BCCP. The BCCP uses three electronic data files that include (1) crop acreages, (2) temperature and precipitation data, and (3) irrigation season data as determined above in Step 3. Separate CIRs are computed for each type of irrigation method (drip, flood, and sprinkler). The BCCP calculates additional information such as the crop distribution ratio, effective rainfall, and theoretical consumptive use for individual crops by irrigation method. Wilson (1992b) describes the calculation procedures and resulting outputs in detail.

The CIR was multiplied by the crop distribution ratio to obtain the weighted CIR for a crop. The weighted CIRs for each crop were added to obtain the weighted CIR (CIR_w) for the cropping pattern.

Step 5. Alfalfa Adjustment of CIR_w

For cropping patterns that contain alfalfa, Section 3.5.1 of the Report discusses how to determine if an alfalfa yield adjustment to the CIR_w is necessary.

- If an alfalfa adjustment is made, the CIR_w is recomputed using the consumptive use predicted by the crop production function for alfalfa. The adjusted CIR_w is renamed CIR_a and is used in the remaining steps outlined below.
- If no alfalfa yield adjustment is made, the CIR_w value and nomenclature remain unchanged.

Step 6. Calculate the Multi-Crop Adjusted CIR (CIR_m)

If the cropping pattern includes multiple-cropped acreage, that is, acreage on which two or more crops are produced in the same year, the appropriate CIR (CIR_w or CIR_a) must be adjusted. It is important to establish whether the cropping pattern in question includes multiple-cropped acreage. If multiple-cropped acreage exists, the CIR must be adjusted upward to account for the increase in water requirements necessary to produce more than one crop on the same land. This multi-crop adjustment (CIR_m) is made by multiplying the CIR_w or CIR_a, as appropriate (see Steps 4 and 5 above), by the ratio of the gross irrigated acreage (A_g) to the net irrigated acreage (A_n):

$$CIR_m = CIR_{(w,a)}[A_g/A_n] \qquad (3.5)$$

The net irrigated acreage is the difference between the gross irrigated acreage and the multiple-cropped acreage ($A_n = A_g - A_m$).

If no multi-crop adjustment is made, the CIR_w or CIR_a value and nomenclature, as appropriate, remain unchanged.

Note: There are two potential adjustments that could be made to the weighted CIR established in Step 4:

1. Alfalfa adjustment (Step 5), which results in CIR_a, and/or
2. Multi-crop adjustment (Step 6), which results in CIR_m.

Consequently, there are three possible CIRs that may be entered into the remaining steps used to calculate the irrigation withdrawals: CIR_w, CIR_a, or CIR_m. For convenience, the appropriate consumptive irrigation requirement value will be referred to simply as CIR in the remaining steps.

Step 7. Identify Irrigation Water Source

The irrigated acreage tabulated for each type of irrigation method is further identified by irrigation water source. Sources of water include surface water, groundwater, and combined water. Combined water exists when a field is irrigated with both groundwater and surface water. Combined water typically uses surface water as the primary source, and groundwater pumped from a well as a supplemental source.

Step 8. Calculate Farm Delivery Requirement

The farm delivery requirement (FDR) is computed by dividing the appropriate CIR (see steps 4-7, above) expressed as a depth or volume by the on-farm irrigation efficiency (E_f):

$$FDR = CIR/E_f \quad (3.6)$$

For example, if the CIR is 2.0 acre-feet per acre and E_f = 60%, using equation 3.6, the FDR = 2.0/0.60 = 3.33 acre-feet per acre.

The on-farm irrigation efficiency is affected by farm and field conditions, such as:

- Soil type
- Slope, length, and width of field
- Land surface preparation (leveling and tillage)
- Root depth of crop at the time of each irrigation event (the root depth of annual crops changes throughout the growing season)
- Antecedent soil moisture conditions
- Quality of irrigation water
- Type of irrigation system
- Available head at the farm headgate
- Frequency and amount of water applications
- Farm water management practices

To be consistent with previous water use reports, historic on-farm efficiencies have been used for 2015. If the type of irrigation method changed, the on-farm efficiency was updated.

Step 9. Calculate Project Diversion Requirement
The project diversion requirement (PDR), or off-farm diversion requirement, is computed by dividing the farm delivery requirement (FDR) by the off-farm conveyance efficiency (E_c).

$$PDR=FDR/ E_c \quad (3.7)$$

For example, if the FDR=3.33 acre-feet per acre, and E_c=70%, the PDR = 3.33/0.70 = 4.76 acre-feet per acre. If the water source is located on the farm, there is no E_c.

Step 10. Determine Amounts of Groundwater and Surface Water Used
Acreage irrigated by combined water must be separated into its groundwater and surface water components. The components are calculated after the withdrawal has been computed. In 2015, 52% of the total withdrawals for irrigation purposes were measured (**Appendix B, Table 4**). Where measured withdrawals are not available, the groundwater and surface water components must be estimated. Estimates are made by (1) examining historical water right diversion records, (2) comparing recorded stream flows with the estimated demand, (3) contacting personnel in the County Extension Service, Natural Resources Conservation Service, or individual farmers with local familiarity, or (4) using component estimates from the previous *Water Use by Categories* report.

If records of measured withdrawals are available, the groundwater and surface water components for combined water can be determined by comparing the total withdrawal (PDR) with the measured withdrawal. If a shortage occurs, that is, the measured surface water withdrawal is less than the computed withdrawal; it is assumed that the difference is made up with groundwater. The acreage irrigated by surface water is then calculated as the product of the surface water withdrawal and irrigation efficiency divided by the CIR. The acreage irrigated by groundwater is the difference between the total acreage irrigated and the computed acreage irrigated by surface water.

When separating combined water into its groundwater and surface water components, it is important that the correct irrigation efficiencies are used. Irrigation efficiencies can differ substantially between surface water (with an off-farm source) and groundwater (with an on-farm source).

Step 11. Adjust CIR
Any event or condition imposed by man or nature that affects the health of irrigated crops during the growing season will generally reduce the amount of water consumptively used by plants to a level below that predicted by the Blaney-Criddle methods. Thus, it may be necessary to adjust the CIR and estimated diversion requirements to reflect these conditions. Conditions that should be taken into consideration when estimating crop water requirements include meteorological, soil, biological, and economic, as well as farm management and operations.

When measured withdrawals are available, they are compared with computed withdrawals. CIRs are adjusted downward where measured withdrawals are less than the computed withdrawals. A superscript in **Appendix B, Table 12,** indicates the locales where the CIR was adjusted. When measured withdrawals are not available, water shortages and necessary adjustments to CIRs may be estimated by comparing recorded stream flows with irrigation demand.

In 2015, groundwater meter data and surface water diversion data were used for reporting withdrawal numbers for agricultural water use in the Lower Rio Grande (LRG), located within Sierra and Doña Ana counties. This is the second Report in which groundwater meter data was available and used for the LRG. Surface water diversion data, obtained from the USBR, was prorated between these counties based on Elephant Butte Irrigation District irrigated acreage. Reports prior to 2010 used the aforementioned method for calculating CIRs within the LRG.

3.5 Calibration of Consumptive Use for Alfalfa and Pecans

In New Mexico, the primary use of irrigation water is for the production of alfalfa. NMSU has conducted extensive research on alfalfa water use. This research has been incorporated into the water use estimates in this Report, as described in Section 3.5.1.

In 2015, the value of pecan production totalled slightly under $182,500,000, the second highest in the nation (NMDA, 2016). Pecan water use has been the subject of much research, and for this Report, water use was estimated as described in Section 3.5.2.

3.5.1 Alfalfa

Many researchers have developed crop production functions for alfalfa that relate ET (for these equations, ET is the same as consumptive use, with ET being the more common terminology) and yield. To adjust the ET for alfalfa to reflect reported yields, the NMOSE evaluated several of the equations that have been used in New Mexico. Equations developed in different climates/ elevations/latitudes or using yields outside of the range of reported yields for New Mexico were not considered for this analysis.

Sammis Crop Production Function
In the late 1970s, researchers at NMSU developed a crop production function for alfalfa that correlates annual ET (consumptive use) with annual crop yield (Sammis et al., 1982). The Sammis crop production function was developed for statewide use.

This crop production function is a linear relationship expressed in the following equation:

$$Y = 0.1473\ ET - 0.553 \qquad (3.8)$$

where Y is the annual yield in tons per acre at 0% moisture content, and ET is the annual evapotranspiration in inches. Rearranging equation 3.8 to solve for ET results in the following expression:

$$ET = (Y + 0.553)/0.1473 \qquad (3.9)$$

Smeal Crop Production Function

In the 1980s, an alfalfa water use study at the NMSU Agricultural Science Center in Farmington, New Mexico, resulted in a regional crop production function for alfalfa. The results of this research were published in 1995 in Agricultural Experiment Station Bulletin 770 (Smeal et al., 1995). Farmington is located in northwestern New Mexico, and for this reason, this regional crop production function is more applicable in this area than the statewide function. The Smeal crop production function is used to estimate ET based upon reported alfalfa yields.

The Smeal crop production function is shown in the following equation (in English units):

$$Y = -3786+403\ ET \qquad (3.10)$$

where Y is the annual yield in pounds per acre at 0% moisture content, and ET is the seasonal evapotranspiration in inches. Rearranging equation 3.10 to solve for ET results in the following expression:

$$ET = (Y + 3786)/403 \qquad (3.11)$$

Since consumptive use is synonomous with ET, substituting the annual yield reported for a specific calendar year into equation 3.9 results in consumptive use. The weighted CIR for the cropping pattern is adjusted if the conditions described below are met.

For the purpose of this water use inventory, alfalfa yields reported by the New Mexico Agricultural Statistics Service for 2015 (or yields from adjacent or same region counties) were used in either equation 3.9 or equation 3.11 to calibrate ET for alfalfa in several counties. If the ET predicted by equation 3.9 or equation 3.11 was higher than the value obtained using the OBC method, then the predicted ET was used in determining the CIR for alfalfa. Using this method results in a higher estimate of water use and was only done in cases where sufficient water was available to meet irrigation demand. The Smeal crop production function was used for Bernalillo, Cibola, McKinley, Rio Arriba, Sandoval, San Juan, Santa Fe, and Taos counties if the above criteria were met. The Sammis crop production function was used for the remaining counties in the state if the above criteria were met. For the 2015 Report, the alfalfa adjustment was made in Hidalgo, Otero, and Torrance counties.

3.5.2 Pecan Orchards

It is generally accepted among pecan producers and agricultural researchers that the water requirements for pecan orchards are much higher than those for other deciduous orchards. Studies conducted in the Rio Grande Valley near Las Cruces, New Mexico, and El Paso, Texas, by the USBR in 1972-73 and Seiichi Miyamoto in 1981 (Miyamoto, 1983), indicate that the growing season consumptive water use of mature pecan trees ranges from 3.3 to 4.3 AF, depending on the tree size and planting density.

Historically, the NMOSE has estimated the water requirement for pecan orchards using the OBC method and a seasonal consumptive use coefficient (K) of 0.65. The research conducted by the USBR and Miyamoto indicates that a K of 0.65 is much too low and needs to be revised. Evidence also suggests that the threshold temperatures normally used to define the growing season for deciduous orchards are inappropriate for pecan orchards. Transpiration in these orchards generally begins when the mean daily air temperature reaches 60°F in the spring, and it ends in the fall after a reasonably hard freeze (Miyamoto, 1983). Because the first fall frost of 28°F or below is a readily available date, it is considered the end of the growing season.

By using the above temperature criteria to define the growing season—and assuming the growing season consumptive use of water is at least 39.36 inches and the consumptive use coefficient outside the frost-free period is 0.40—the NMOSE has calibrated the seasonal consumptive use coefficient for the frost-free period. This calibration results in a seasonal consumptive use coefficient (K) of 0.90 inside the frost-free period. This value was used to calculate the CIR of pecan orchards included in 2015 cropping patterns. Various researchers are currently investigating pecan water use; consumptive use coefficients may be revised in the future.

3.6 Irrigated Acreage

This Report uses irrigated crop acreage and weather data for the 2015 calendar year. The data was complied by WUCB staff. The NMISC conducted irrigated acreage inventories for the Upper Colorado River Basin in 2015, and this Report uses their data for portions of McKinley and Rio Arriba counties, and all of San Juan County. The Report also uses NMISC's irrigated acreage and diversion data for the Gila River Basin.

The total acreage irrigated (**Appendix B, Table 8**) on farms in 2015 was 749,769 acres; 226,870 acres, or 30.26%, were irrigated with surface water, and 408,628 acres, or 54.50%, were irrigated with groundwater (**Appendix B, Table 8**). The remaining 114,271 acres (15.24%) were irrigated with a combination of surface water and groundwater.

The total acres irrigated in New Mexico for the time period 1980-2015 are summarized in **Table 3.2.** The number of irrigated acres in production has varied substantially over the past 30 years. The 749,769 acres in production in 2015 represents a 14% decrease from the 872,664 acres in production in 2010.

Table 3.2. Irrigated acreage in New Mexico, 1980-2015, and percent change in irrigated acreage.

	Acres	Percent Change from Previous Inventory
1980	1,087,120	-
1985	941,245	-13.42
1990	984,285	4.57
1995	963,050	-2.16
1999	998,793	3.71
2005	875,415	-12.35
2010	872,664	-0.31
2015	749,769	-14.08

Acreage irrigated by drip (TDA), flood (TFA), and sprinkler (TSA) methods, as well as sources of irrigation water in New Mexico counties in 2015, are presented in **Appendix B, Table 11.** Drip irrigation accounted for 23,466 acres (3.12%); flood irrigation accounted for 340,780 acres (45.45%); and sprinkler irrigation accounted for 385,523 acres (51.42%). These percentages are largely unchanged from those presented in the 2010 Report.

3.7 Surface Water Shortages

Due to the year-to-year variability in precipitation in New Mexico, irrigators relying on surface water often experience shortages. In most cases, shortage adjustments were made to the CIR as reflected in **Appendix B, Table 12** (see superscript next to the locale).

Table 3.3 summarizes the percentage of surface water shortages, by river basin, for 2015. The Texas Gulf basin did not experience surface water shortages.

Table 3.3. 2015 Surface water shortages.

River Basin	Shortage Location	Surface Water Shortage (%)
Arkansas-White-Red	Colfax County (Canadian River)	8
	Colfax County (Cimarron River)	32
	Vermejo Conservancy District	70
Lower Colorado	Catron and Grant Counties (Gila and San Francisco Rivers)	up to 62
Pecos	Eddy County (Carlsbad Irrigation District)	0, offset by supplemental well pumping
Rio Grande	Cibola County	69
	Doña Ana County	0, offset by supplemental well pumping
Upper Colorado	San Juan County (Chaco River)	80
	San Juan County (La Plata River)	65

4 SELF-SUPPLIED LIVESTOCK

This chapter includes:

- A definition of the water supply category.
- A summary of the livestock population changes from 2010 to 2015 for non-dairy cattle, dairy cattle, sheep, hogs, chickens, and horses, as well as details regarding the changes in dairy cattle populations in several counties over the 35-year history for which this Report has been produced.
- An explanation of the per capita water use assumptions for livestock.
- A description of the procedure used to quantify self-supplied livestock withdrawals.

Withdrawals for self-supplied livestock totaled 36,046 AF, or 1.16 % of total withdrawals in 2015 (**Appendix B, Tables 2 and 3**).

4.1 Definition of Category

The Livestock category includes water used to raise livestock, maintain self-supplied livestock facilities, and provide for on-farm processing of poultry and dairy products.

4.2 Livestock Population

All livestock totals are reported in **Table 4.1**. The 2015 year-end totals for non-dairy cattle in New Mexico were estimated at 1,079,749 head, a 19% decrease from 2010. The number of dairy cows in 2015 was estimated at 315,001, a decrease of 1% from 2010. The sheep and lamb population decreased by 61%, from 123,679 in 2010 to 48,754 in 2015. The New Mexico Agricultural Statistics Service no longer reports the number of hogs, pigs, and chickens. Data for swine and horses were obtained from the New Mexico Taxation and Revenue Department (NMTRD). The swine population increased from 2010 to an estimated 987, while the horse population declined to 30,979. The number of chickens is estimated to have declined by 91% to 70,143. This decline is the result of chicken production facility(ies) closures within the state.

Table 4.1. New Mexico livestock population in 2010 and 2015.

Species[1]	2010	2015	Percent Change
All Cattle (Non-dairy)	1,327,584	1,079,749	-18.67
Dairy Cows	319,552	315,001	-1.42
Sheep/Lambs	123,679	48,754	-60.58
Hogs/Pigs (swine)	801	987	23.22
Chickens	807,660	70,143	-91.32
Horses	34,287	30,979	-9.65

[1]Sources: New Mexico Department of Agriculture, county assessor offices, and NMTRD.

Dairies continue to be a dominant component of the Livestock category in the eastern and southeastern portions of the state and in Doña Ana County, located in the Lower Rio Grande Basin (**Table 4.2**). However, there was a decrease in the number of dairy cows in most of these areas.

Table 4.2. Number of milk cows in Chaves, Doña Ana, Roosevelt, and Curry counties as of January 1 for selected years during the period from 1976 to 2015.

Year[1]	Chaves		Doña Ana		Roosevelt		Curry	
	No. Head	Percent Change	No. Head	Percent Change	No. Head	Percent Change	No. Head	Percent Change
1976	2,700	–	5,500	–	5,000	–	400	–
1980	4,000	48	9,200	67	5,100	2	1,200	200
1985	12,000	200	23,800	159	7,600	49	1,600	33
1990	19,000	58	24,000	1	9,000	18	1,100	-31
1995	70,000	268	31,000	29	20,400	127	13,000	1082
2000	80,000	14	36,000	16	35,000	72	30,000	131
2005	99,797	25	58,227	62	65,000	86	76,820	156
2010	82,000	-18	49,000	-16	60,000	-8	65,000	-15
2015	80,000	-2	37,000	-24	50,000	-17	75,000	+15

[1]Sources: New Mexico Department of Agriculture-Agricultural Statistics Service, county assessor offices, and NMTRD.

4.3 Per Capita Water Use for Livestock

As with the human consumption of water, livestock water used for drinking and other uses, such as dairy sanitation, are estimated on a per capita basis. Daily requirements in gallons per capita for all livestock species analyzed in this Report are presented in **Table 4.3.** Dairy cows require the most water (primarily for drinking and facility sanitation).

Recent efforts have been made by the dairy industry to reduce the amount of water used in facility sanitation. Reports prior to 2010 used a GPCD of 100 for dairy cows, but based upon current information from area studies and experts, a GPCD of 65 was used in calculations for water use for this Report. Comparisons of dairy cow water use in 2015 to pre-2010 reports of dairy cow water use will reflect this change.

Table 4.3. Drinking and miscellaneous water requirements for livestock in gallons per capita (animal) per day (GPCD).

Species	Drinking Water (GPCD)[1]	Miscellaneous Water (GPCD)[1]	Total (GPCD)[1]
Non-Dairy Cattle	9	1	10
Chickens	0.06	0.02	0.08
Hogs	2	1	3
Horses and Mules	12	1	13
Dairy Cows	38	27	65
Sheep	2	0.2	2.2

[1]Sources: Beef cattle—Sweeten et al., 1990; Horses—Van der Leeden et al., 1990; Dairy cattle—Hagevoort, 2012 correspondence, and Lovelace, 2009; all others—Soil Conservation Service, 1975; Sykes, 1955.

4.4 Procedure for Quantifying Livestock Withdrawals

Step 1. Determine Number of Livestock (by Species) per County

The New Mexico Department of Agriculture, Agricultural Statistics Service, reports livestock population data annually, by species and county, in a report titled 2015 *New Mexico Agricultural Statistics* (NMDA, 2016). Livestock population data for this Report were taken not only from the agricultural statistics report, but also from the NMTRD. Where discrepancies existed among sources, data were chosen based on previous reports and local knowledge. For dairy cattle, the number of dairy cows was separated out from the total dairy cattle (which also includes bulls, heifers, calves, and non-lactating cows) to enable more accurate water use estimates. When a county includes two or more river basins, the number of livestock in each basin was estimated based on information such as location of ranches, feedlots, and dairies.

Step 2. Determine Withdrawals

Withdrawals were calculated and reported for each species by county and river basin. Measured withdrawals, when available, were used in this Report. Most notably, all dairies in Chaves County are metered. Non-metered withdrawals were computed using the following equation:

$$W = (GPCD)(POP)/892.74 \qquad (4.1)$$

where W is the annual withdrawal in acre-feet, POP is the population of each species, and GPCD is gallons per capita per day (taken from **Table 4.3** above). Only 17% of withdrawals for livestock were measured in 2015 (**Appendix B, Table 4**). The remaining 83% of withdrawals were calculated using **equation 4.1.** It is assumed in this Report that water for chickens, hogs, horses, mules, and dairy cows comes from groundwater sources. It is also assumed that drinking water for non-dairy cattle and sheep comes from a combination of groundwater and surface water sources (groundwater sources are used where surface water supplies are either unreliable as a year-round source or offer unsatisfactory quality for livestock consumption).

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5 SELF-SUPPLIED COMMERCIAL, INDUSTRIAL, MINING, AND POWER

This chapter includes:

- Definitions of water supply categories.
- A description of the general procedure used to quantify withdrawals.
- A summary of withdrawals for each of the following self-supplied categories:
  - Commercial
  - Industrial
  - Mining
  - Power

Withdrawals for the Self-Supplied Commercial, Industrial, Mining, and Power categories accounted for 159,168 AF, or 5.11% of total withdrawals in 2015 (**Appendix B, Tables 2** and **3**).

5.1 Definition of Categories

5.1.1 Commercial

The Commercial category includes:

- Self-supplied businesses (e.g., motels, restaurants, recreational resorts, and campgrounds).
- Public and private institutions (e.g., public and private schools and hospitals) involved in the trade of goods or provision of services.
- Self-supplied golf courses that are not supplied by entities covered in the Public Water Supply category.
- Greenhouses and nurseries that both produce and sell products to the general public on the same premises.
- Off-stream fish hatcheries that produce fish for release.
- Non-metered schools.

The procedures used to calculate withdrawals for these categories are described in Sections 5.2 and 5.3.

5.1.2 Industrial

The Industrial category includes self-supplied enterprises that process raw materials or manufacture durable or nondurable goods. This category also includes water used for the construction of highways, subdivisions, and other construction projects.

5.1.3 Mining

The Mining category includes the following self-supplied enterprises that extract minerals occurring naturally in the earth's crust:

- Solids, such as potash, coal, and smelting ores.
- Liquids, such as crude petroleum.

- Gases, such as natural gas.

This category includes water used for oil and gas production (well drilling and secondary recovery of oil), quarrying, milling (crushing, screening, washing, flotation, etc.), and other processing done at the mine site or as part of a mining activity, as well as water removed from underground excavations (mine dewatering) and stored in—and evaporated from—tailings ponds. The Mining category also includes water used to irrigate new vegetative covers at former mine sites that have been reclaimed. It does not include the processing of raw materials, such as smelting ores, unless this activity occurs as an integral part of a mining operation and is included in an NMOSE permit.

New Mexico continues to be one of the top 20 mineral resource producing states in the nation. Section 5.5 describes some of the mining activities that occur in New Mexico and their associated water use.

5.1.4 Power

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. Section 5.6 describes some power generating facilities and their associated water use.

5.2 General Procedure for Quantifying Withdrawals

The procedures for quantifying withdrawals for facilities in the Self-Supplied Commercial, Industrial, Mining, and Power categories are similar. The following steps outline the general procedure.

Step 1. Compile Metered Withdrawals
Some facilities in the Self-Supplied Commercial, Industrial, Mining, and Power categories report their metered diversions to NMOSE, and those reports are identified in agency databases or through district office communications. NMOSE agency databases identify withdrawals by use, which are then used to separate the metered withdrawal categories in this chapter.

Step 2. Estimate Non-Reported Withdrawals Having a Metering Requirement
While most self-supplied facilities are required to be metered and to report their annual water use, many do not. When metered records for the water-use inventory year are incomplete, water use is estimated based on earlier records (as with other categories in this Report) or prorated based on similar operations.

Step 3. Compile Non-Metered Withdrawals
Some facilities are unmetered, and these can be difficult to identify if a declaration has never been filed with the NMOSE. Consequently, many of these facilities are not captured in the water-use inventory. When possible, these entities are identified through directories maintained by various business associations and/or regulatory agencies. The executive director or operator is then contacted by phone or mail to obtain an estimate of water use.

5.3 Self-Supplied Commercial Withdrawals

5.3.1 Schools

Water withdrawals for K-12 schools that are not metered, but are self-supplied as identified by NMED, are computed by multiplying the student population by a per capita water requirement. For this Report, the requirements listed in **Table 5.1,** below, were used to quantify water use in non-metered schools.

Table 5.1. Water requirements in gallons per capita per day (GPCD) for schools without water conserving plumbing fixtures (Vickers, 2001).

Type of Facility	Water Requirement (GPCD)
Day school	20
Boarding school	100

5.3.2 Golf Courses

In many communities, self-supplied golf courses are the largest water users in the Commercial category. There are approximately 85 golf courses in New Mexico, and they range from 9-hole par-three courses that cover as little as 20 acres to 18-hole courses that cover 200 acres or more. The major urban areas of the state usually have some combination of public, private, university, and military golf courses.

The amount of water used at golf courses varies significantly. Annual water use ranges from less than 100 AF to more than 500 AF, depending upon climate, species of turfgrass, irrigation management practices, the number of ponds, and clubhouse facilities. Many well-established 18-hole private courses have clubhouse facilities that include a snack bar and restaurant, locker rooms with showers, and swimming pools, all of which can increase water withdrawals.

There are four types of water that golf courses can use: groundwater, surface water, municipal treated drinking water, and municipal treated effluent. Accounting for how these facilities obtain their water is a challenge. They may have only one source, or they might use several.

Public and private golf courses that are self-supplied are included in this category. If a golf course is supplied with municipal treated effluent, the withdrawal has already been accounted for in the Public Water Supply category. Regardless of the type of water used at military and university courses, they are always categorized as either Public Water Supply (military) or Commercial (university). Golf courses for which water use is categorized as Public Water Supply are included in the Chapter 2 discussions.

Many golf course water supply systems in the state are metered and report their annual diversions to NMOSE. For the self-supplied courses that are not metered, withdrawals are estimated using the procedure outlined in Chapter 3, Irrigated Agriculture. This procedure requires knowledge or estimation of the acreage that is irrigated and the species of turfgrass. It is important that the species of turfgrass be identified because the CIR will vary depending on the type of grass that is grown and local climatic conditions. The CIR is assumed to be 100% met by the irrigation of the golf course. Withdrawals are then calculated by dividing the CIR by an assumed efficiency.

5.4 Self-Supplied Industrial Withdrawals

Water is used in the manufacturing industry for heating, cooling, conveying materials, washing, pollution control, and as part of product sales (AWWA, 1985). Water used for restrooms, showers, cafeterias, air conditioning, landscaping, fire protection, and other minor uses normally accounts for less than 5% of industrial intake water. Manufacturing-plant water intake depends on the type of raw material involved, the product produced, the design of the plant, and the efficiency of the industrial process (California Department of Water Resources, 1982). In many industrial plants water is recirculated, particularly water used for cooling. As identified by Kollar and Brewer (1980), the quantity of intake water that is recirculated is affected by the following factors:

- The availability and cost of water delivered to the plant.
- The quality of raw water.
- Plant processes and technology.
- Recovery of materials, by-products, and energy.
- Consumptive loss.
- Air and water pollution control regulations.
- Cost avoidance.
- The age of the plant.

Water separated from petroleum during processing (produced water) is usually either discharged into lagoons where it is evaporated or injected into deep aquifers. Produced water quantities are not readily available and are outside the scope of this Report. Therefore, those quantities are not reported.

5.5 Self-Supplied Mining Withdrawals

New Mexico ranks fifteenth in the U.S. in the production of non-energy minerals. During 2015, New Mexico ranked twelfth in the production of coal, the state's most significant mineral commodity. Additionally, New Mexico ranked second in the production of copper and first in the production of potash. New Mexico is also a leading producer of industrial minerals, and the top producer of perlite and zeolite in the nation (New Mexico Energy, Minerals and Natural Resources Department, 2016).

Before opening any mining operation, the operator must register the mine, mill, smelter, or pit with the Mining and Minerals Division of the New Mexico Energy, Minerals, and Natural Resources Department. A directory of all of the mining facilities registered in the state is updated annually. This directory is used to identify the mines and mills that are not required to report their annual water withdrawals directly to the NMOSE. Those operations are then contacted by mail or phone to obtain withdrawal data.

Saline/brine water which is pumped and then returned by injection into deep saline aquifers is not included in this inventory as the impact on the net supply of fresh water is zero. However, water pumped from freshwater aquifers for the secondary recovery of oil, which is later disposed of by injection into deep brine aquifers or spread on the land surface where it evaporates, is treated as a withdrawal.

The mining industry accounted for 42,294 AF, or 1% of the total withdrawals in the state (**Appendix B, Tables 2** and **3**). A breakdown of the major industries in the Mining category and their associated percentage of water withdrawals are identified in **Table 5.2.** The production of

metals, including copper, molybdenum, gold, silver, and manganese, accounted for over half of the water withdrawals in the Mining category (46%). Potash mining also used significant quantities of water (38%). The remaining portion of water use, about 16%, is used in oil and gas production and to produce aggregate (i.e., sand, gravel, crushed rock, base course, and caliche), industrial materials and minerals (i.e., calcite, silica, flux, pumice, mica, humate, gypsum, zeolites, perlite, limestone, and travertine), coal, and coalbed methane.

Table 5.2. Percent water use by mining industry, 2015.

Mining Industry	Percent Water Use
Metals	46.47
Oil & Gas	9.53
Potash	38.07
Aggregate	4.06
Industrial	1.86
Coal	0.01
Geothermal	trace
Total	100.0

5.6 Self-Supplied Power Withdrawals

The New Mexico Public Regulation Commission maintains a directory of all power-generating facilities in the state. This directory is used to identify electric utility companies that are not required to report their annual withdrawals directly to NMOSE. As with other non-reporting entities, these facilities are contacted by mail and/or phone to obtain withdrawal data.

BHP (formerly BHP Billiton) in San Juan County has a complex water budget. For this Report, the water used at BHP's Navajo Mine, and the water that evaporates from Morgan Lake (which supplies the Arizona Public Service Four Corners Power Plant and is filled by water pumped from the San Juan River) is included in the Self-Supplied Power category rather than the Self-Supplied Mining category. For similar reasons, the Public Service Company of New Mexico's San Juan Generating Station and BHP's La Plata and San Juan coal mines are also accounted for in the Self-Supplied Power category.

Withdrawals in the Self-Supplied Power category decreased approximately 14% between 2010 and 2015. Of these withdrawals, 39,677 AF (78.7%) were from surface water and 10,742 AF (21.3%) were from groundwater sources.

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6 RESERVOIR EVAPORATION

This chapter includes:

- A definition of the water supply category.
- An overview of the National Weather Service Class A Pan.
- A description of the procedure for estimating reservoir evaporation using the pan approach.
- A description of the procedure for estimating evaporation from small reservoirs using empirical data.

Reservoirs provide many benefits such as drinking and irrigation water to New Mexicans, but due to evaporation from their exposed water surfaces, they consume a significant part of available surface water supplies. Average annual gross evaporation from reservoirs ranges from around 40 inches in the mountains of northern New Mexico to about 75 inches in the valleys near the southern border of the state. In 2015, this amounted to 231,081 AF, or 7.42%, of total withdrawals.

In many cases, evaporation information for a reservoir was provided by the agency responsible for operation of that reservoir, and the computational method was not provided. Reservoir evaporation is generally calculated using National Weather Service Class A Pan data. The pan approach is discussed in detail in this chapter, along with an empirical method that is applied when there is a lack of data. Where no data were available, evaporation quantities from the 2000 Water Use by Categories report (Wilson et. al., 2003) were used.

Stock pond evaporation calculations are not included in the Report for the following reasons: (1) there is no comprehensive and accurate accounting of stock ponds for the state, and (2) the volume of water and associated surface area varies from pond to pond, and throughout the year for an individual stock pond. The associated evaporation is very difficult to quantify under these conditions.

Please see **Appendix B, Table 6,** for a summary of evaporation withdrawals by river basin.

6.1 Definition of Category

For the purpose of this water use inventory, reservoir evaporation is defined as net evaporation from man-made reservoirs with a storage capacity of approximately 5,000 AF or more. In 2015 evaporation was estimated for 25 reservoirs in the state.

As a matter of convenience, net evaporation from the Bosque del Apache Wildlife Refuge is also included in this category due to the large volume of water that is diverted from the Rio Grande and ultimately evaporated from the wetlands.

6.2 The National Weather Service Class A Pan

It is generally accepted that the most practical method for estimating reservoir evaporation is the pan approach because the hydrologic and meteorological data required is readily available. A description of the National Weather Service Class A Pan and a procedure for application of the pan approach are outlined below.

The National Weather Service Class A Pan is 4 feet in diameter and 10 inches deep (**Figure 6.1** (Photo source: Wikipedia™)). It is made of unpainted, 22-gage galvanized iron and sits on a wooden pallet so that the bottom of the pan is raised 6 inches above the ground, allowing air to circulate. Site requirements specify that the pan be located on level ground, unobstructed by trees or buildings, so maximum exposure to sunlight is possible. The pan is filled with water to within 2 inches of the top and is refilled as soon as the water level drops 1 inch. The depth of water is measured with a micrometer hook gage located in a stilling well that supports the gage. An anemometer, which is used to measure wind movement, is mounted on the pallet, with the cups positioned 24 inches above the base of the pan. Maximum/minimum thermometers (which are stored in an instrument shelter) and a rain gage are also installed at the site. A 5-foot-high wire-mesh fence encloses the entire installation. A pan reading is taken every morning.

Figure 6.1. Class A Pan

Unlike a lake, the Class A pan permits considerable transfer of heat to and from its sides and bottom due to radiation exchange and transfer of sensible heat caused by a difference in water and air temperature. The effects of pan color and water depth on emission and absorption of radiant energy, the effects of pan rims on air turbulence, and the convection of heat within the water in the pan, produce an evaporation rate that is greater than that from a lake or reservoir surface. The ratio of lake evaporation to pan evaporation is referred to as "the pan coefficient."

Studies conducted by the USDA indicate that coefficients for Class A land pans range from 0.60 to 0.82; however, a coefficient of 0.70 is recommended for most applications (Subcommittee on Evaporation, 1934). A coefficient of 0.77 is used in the Pecos River Basin, consistent with the Pecos River Master's Manual (NMISC, 2003) used to calculate annual Pecos River Compact delivery obligations to Texas.

While the pan approach has a wide application, consideration should be given to the fact that in winter months in cold climates, water in the pan may freeze while water in the reservoir remains unfrozen.

6.3 Procedure for Estimating Reservoir Evaporation Using the Pan Approach

Step 1. **Determine Average Monthly Reservoir Gage Height (Content)**
Compute the average gage height of the water surface level, or the average reservoir content for each month, from daily measurements reported by the agency responsible for managing the reservoir. Sources of data include the NMISC, the U.S. Army Corps of Engineers, the USBR, the USGS, the National Oceanic and Atmospheric Administration (NOAA), and irrigation districts.

Step 2. Determine Reservoir Surface Area
Determine the average water surface area in acres for each month from a curve or equation that correlates gage height or content with surface area. Area-gage height or area-capacity data can be obtained from the agencies mentioned in Step 1.

Step 3. Account for Winter Ice Surface Area
Winter evaporation estimates must take into account the possible effects of ice cover. Partial ice cover will inhibit evaporation; complete ice cover will reduce water surface evaporation to zero. Thus, the average surface area computed in Step 2 must be adjusted to reflect the surface area covered by ice. For large reservoirs, daily measurements of ice cover may be available. Some agencies have developed tables showing the percentage of ice cover by month, based on historical records, which may be used when no other data are available.

Step 4. Obtain Class A Pan Evaporation Data
Obtain Class A pan evaporation data recorded for each month from the weather station that best represents climate conditions in the study area. Measurements of monthly and annual evaporation from U.S. Weather Bureau Class A pans are generally available from NOAA.

Step 5. Calculate Monthly Gross Evaporation Rate
The gross evaporation rate for each month is computed by multiplying the pan evaporation, which is expressed as a depth of water in feet, by the pan coefficient. In winter, if the evaporation pan is iced over, but the water surface of a nearby reservoir remains unfrozen, agencies such as the USBR have developed empirical equations based on temperature that can be used to estimate gross evaporation.

Step 6. Obtain Rainfall Data
Obtain the total rainfall recorded for each month. These data are published monthly for most weather stations operated by the NOAA. When a reservoir is completely covered with ice for part of a month, recorded precipitation should include only those days when the water surface was exposed.

Step 7. Calculate Monthly Net Evaporation Rates
The net evaporation rate for each month, expressed as a depth of water in feet, is calculated by subtracting the measured rainfall, in feet, from the gross evaporation rate obtained in Step 5.

Step 8. Calculate Monthly Evaporation (AF)
The net volume of water evaporated in each month, expressed in acre-feet, is calculated by multiplying the exposed surface area, expressed in acres, by the net evaporation rate, expressed in feet.

Step 9. Calculate Annual Evaporation (AF)
Add the net evaporation for each month to get the net evaporation for the calendar year.

6.4 Procedure for Estimating Evaporation from Small Reservoirs Using Empirical Data

In some areas there are small reservoirs that are not monitored on a regular basis. Many of these are not equipped with a gage to measure the water level, and area capacity curves are frequently not available. The NMOSE Dam Safety Bureau provided the most up-to-date area capacity data where possible for use in estimating evaporation. Because these reservoirs are small, and hydrological and meteorological data are typically unavailable, spending extensive time and effort to estimate annual evaporation is not recommended. The following procedure was used to estimate evaporation for these smaller reservoirs.

Step 1. Obtain Reservoir Surface Area
Refer to the area capacity curves to obtain the mean reservoir surface area using the mean gage height of the reservoir.

Step 2. Estimate Annual Gross Evaporation
The annual gross evaporation is estimated by reading values from isopleths drawn on maps prepared by the Soil Conservation Service (NMSE/SCS, 1972).

Step 3. Estimate Monthly Rainfall
The monthly rainfall is obtained from nearby climate stations.

Step 4. Calculate Net Evaporation Rate
Subtract the rainfall from the gross evaporation rate to get the net evaporation rate.

Step 5. Calculate Annual Net Evaporation (acre-feet)
Multiply the mean water surface area, expressed in acres, by the net evaporation rate, expressed in feet, to get the net evaporation for the calendar year in acre-feet.

7 APPENDICES

7.1 APPENDIX A: COUNTIES, RIVER BASINS, AND MAPS

Table 1. County code numbers (CN) are established by the National Bureau of Standards, and whole or part counties are included in each river basin.

County Number (CN)	County Name	River Basin					
		Arkansas-White-Red (AWR)	Lower Colorado (LC)	Pecos (P)	Rio Grande (RG)	Texas Gulf (TG)	Upper Colorado (UC)
1	Bernalillo				X		
3	Catron		X		X		
5	Chaves			X			
6	Cibola		X		X		
7	Colfax	X					
9	Curry	X				X	
11	DeBaca			X			
13	Doña Ana				X		
15	Eddy			X			
17	Grant		X		X		
19	Guadalupe	X		X			
21	Harding	X					
23	Hidalgo		X		X		
25	Lea			X		X	
27	Lincoln			X	X		
28	Los Alamos				X		
29	Luna		X		X		
31	McKinley		X		X		X
33	Mora	X		X			
35	Otero			X	X		
37	Quay	X		X			
39	Rio Arriba				X		X
41	Roosevelt			X		X	
43	Sandoval				X		X
45	San Juan						X
47	San Miguel	X		X	X		
49	Santa Fe			X	X		
51	Sierra				X		
53	Socorro				X		
55	Taos				X		
57	Torrance			X	X		
59	Union	X					
61	Valencia				X		

Figure 1. Major river basins in New Mexico

Figure 2. Water Use Report Locales: Northwest New Mexico

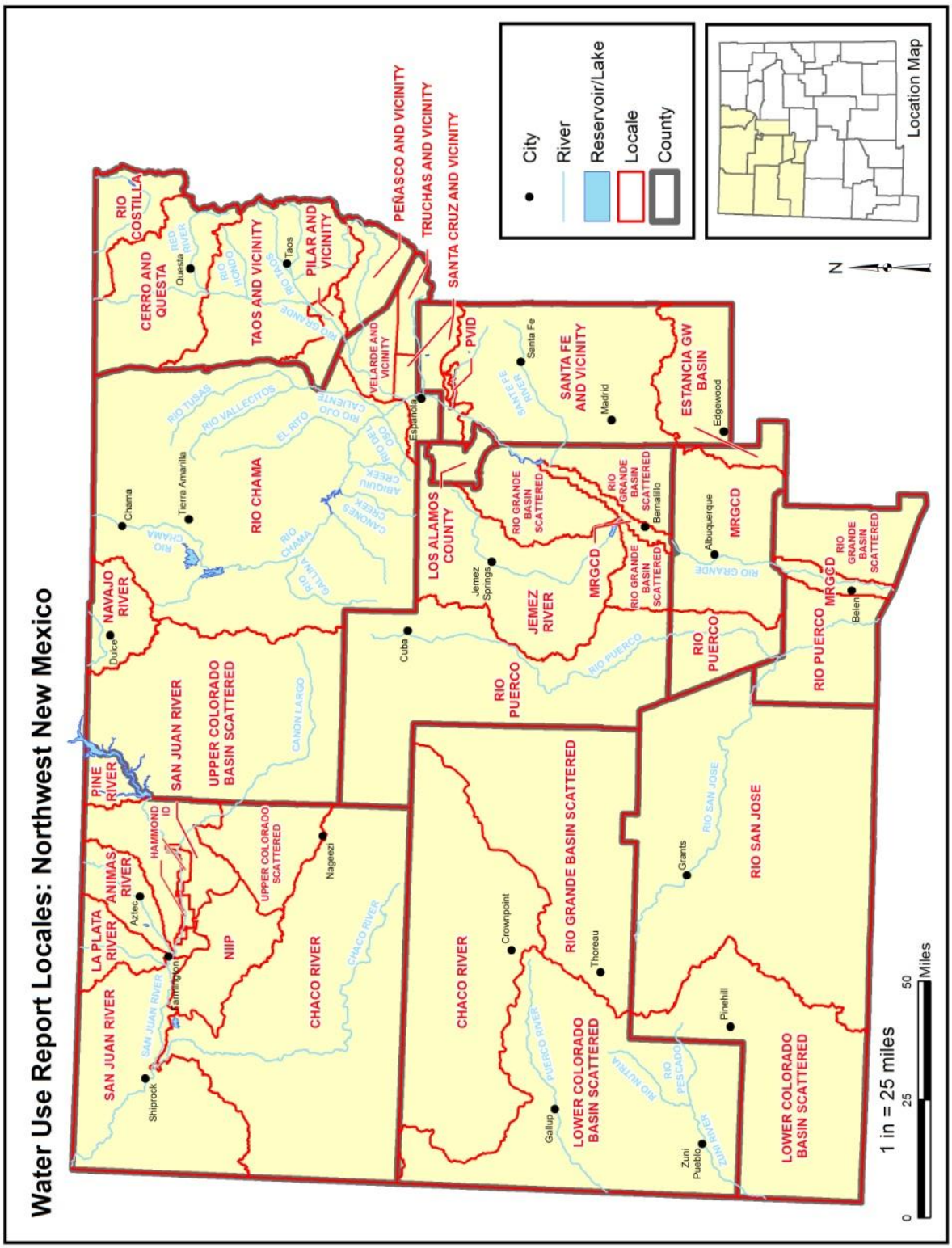


Figure 3. Water Use Report Locales: Northeast New Mexico

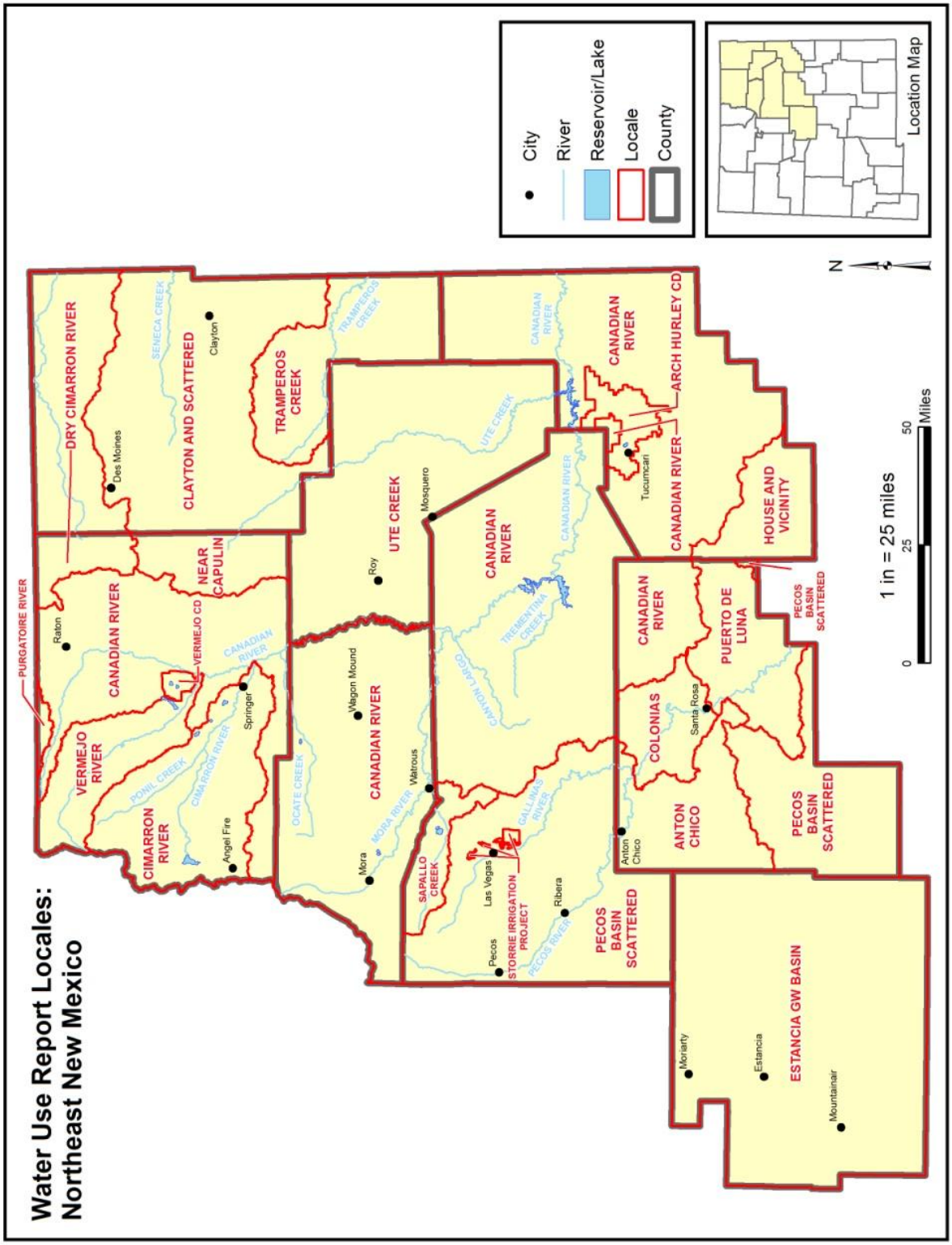


Figure 4. Water Use Report Locales: Southwest New Mexico

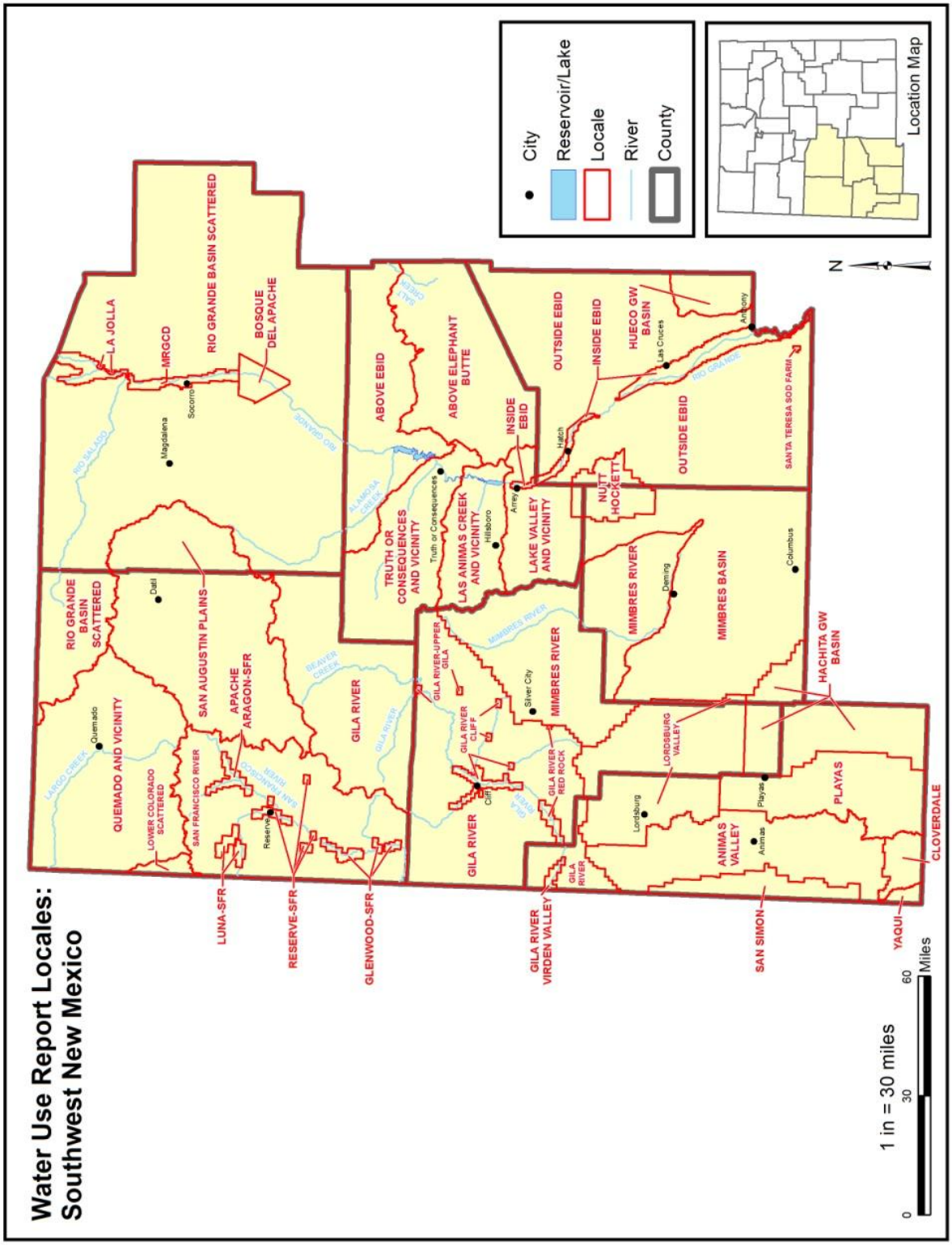
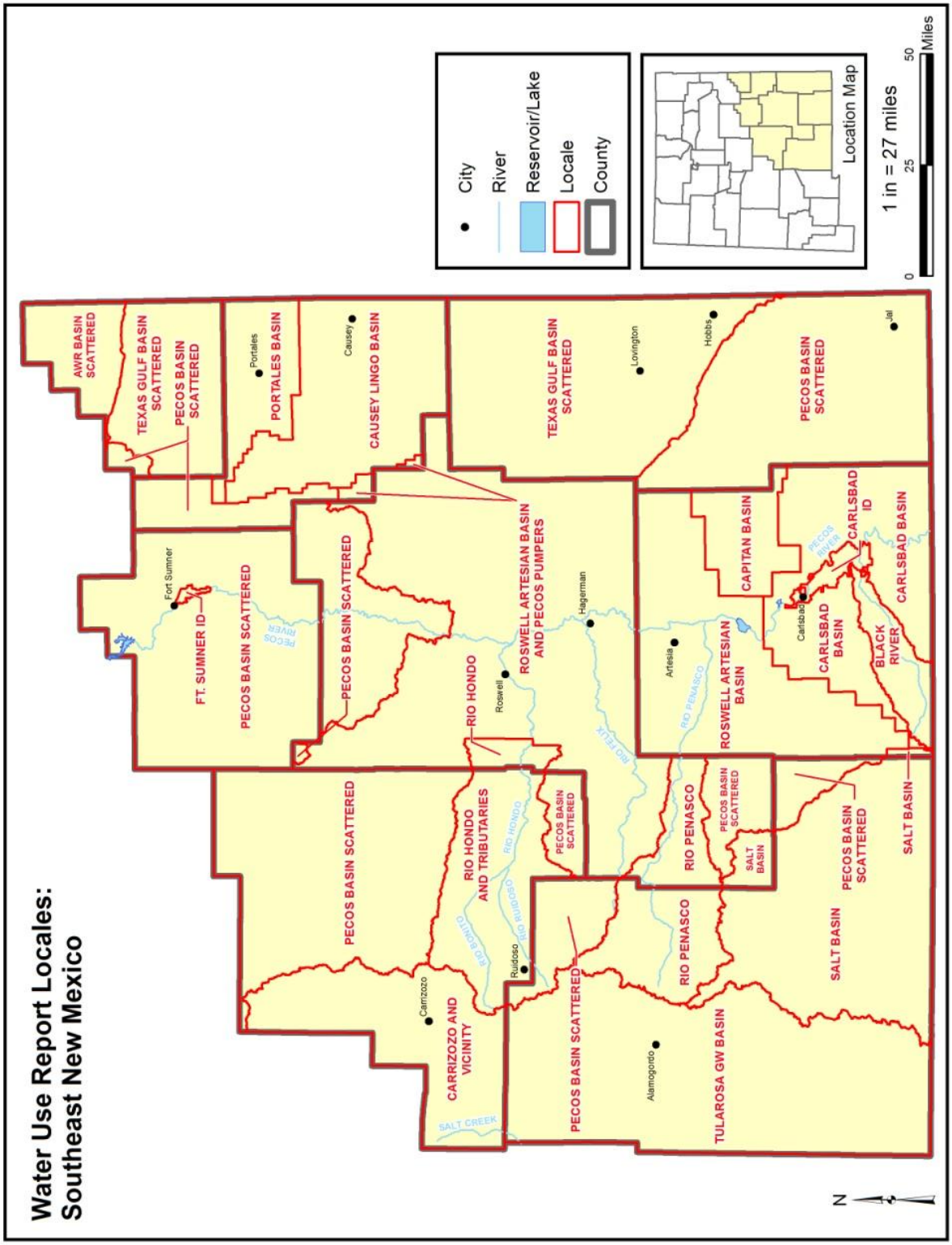


Figure 5. Water Use Report Locales: Southeast New Mexico



7.2 APPENDIX B: 2015 POPULATION AND WATER USE TABLES

The water use tables summarize the data in the Report. This appendix contains the following 12 water use tables:

Table 1. Populations in New Mexico River Basins, 2015.

Table 2. Summary of withdrawals (acre-feet) in New Mexico, 2015.

Table 3. Water use by category expressed as a percentage of state totals in New Mexico, 2015.

Table 4. Percent of withdrawals measured in each water use category in New Mexico, 2015.

Table 5. Summary of water use in acre-feet in New Mexico counties, 2015.

Table 6. Summary of withdrawals in acre-feet in New Mexico river basins, 2015.

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015.

Table 8. Irrigated Agriculture. Summary of acreage irrigated, withdrawals, and conveyance losses (acre-feet) in New Mexico river basins, 2015.

Table 9. Acreage irrigated by drip, flood, and sprinkler application methods and sources of irrigation water in New Mexico river basins, 2015.

Table 10. Irrigated acreage and sources of irrigation in New Mexico counties, 2015.

Table 11. Acreage irrigated by drip, flood, and sprinkler application methods and sources of irrigation water in New Mexico counties, 2015.

Table 12. Irrigated Agriculture. Withdrawals in acre-feet in New Mexico counties, 2015.

The equations listed below were used to compute the irrigation withdrawals shown in this appendix:

$$TFWSW=CIRSW(ASWO+ASWC)/E_f$$

$$TFWGW=CIRGW(AGWO+AGWC)/E_f$$

$$TPWSW=TFWSW/Ec \text{ where } Ec > 0$$

TPWGW=TFWGW (assuming the source of water is on-farm)

CLSW=TPWSW-TFWSW

Results from these calculations are presented in **Tables 8, 10, and 12.** Listed below are descriptions of the acronyms used in these equations. These acronyms appear as column headings in **Tables 8, 9, and 12.**

AGWC	Groundwater component of acreage irrigated with both surface water and groundwater (combined water)
AGWO	Acreage irrigated with groundwater only
ASWC	Surface water component of acreage irrigated with both surface water and groundwater (combined water)
ASWO	Acreage irrigated with surface water only
CIRGW	Consumptive irrigation requirement for acreage irrigated with groundwater
CIRSW	Consumptive irrigation requirement for acreage irrigated with surface water
CLSW	Surface water conveyance losses in canals and laterals from stream or reservoir to farm headgate
E_f	On-farm irrigation efficiency
E_c	Off-farm conveyance efficiency
TFWGW	Total farm withdrawal, groundwater
TFWSW	Total farm withdrawal, surface water
TPWGW	Total project withdrawal, groundwater
TPWSW	Total project withdrawal, surface water

Table 1. Populations in New Mexico river basins, 2015.

River Basin	Category	Population	% Population
Arkansas-White-Red	Domestic (self-supplied)	4,834	0.23
Arkansas-White-Red	Public Water Supply	29,325	1.40
	River Basin Totals	34,159	1.63
Lower Colorado	Domestic (self-supplied)	32,006	1.52
Lower Colorado	Public Water Supply	37,084	1.77
	River Basin Totals	69,090	3.29
Pecos	Domestic (self-supplied)	24,929	1.19
Pecos	Public Water Supply	165,567	7.88
	River Basin Totals	190,496	9.07
Rio Grande	Domestic (self-supplied)	183,181	8.72
Rio Grande	Public Water Supply	1,349,773	64.28
	River Basin Totals	1,532,954	73.00
Texas Gulf	Domestic (self-supplied)	17,472	0.83
Texas Gulf	Public Water Supply	114,812	5.47
	River Basin Totals	132,284	6.30
Upper Colorado	Domestic (self-supplied)	33,091	1.58
Upper Colorado	Public Water Supply	107,782	5.13
	River Basin Totals	140,873	6.71
	State Totals	2,099,856	100

Table 2. Summary of withdrawals (acre-feet) in New Mexico, 2015

Category	WSW	WGW	TW
Public Water Supply	87,399	196,758	284,157
Domestic (self-supplied)	0	27,949	27,949
Irrigated Agriculture	1,255,440	1,120,625	2,376,065
Livestock (self-supplied)	2,904	33,142	36,046
Commercial (self-supplied)	12,326	45,199	57,525
Industrial (self-supplied)	0	8,718	8,718
Mining (self-supplied)	1,141	41,153	42,294
Power (self-supplied)	39,677	10,742	50,419
Reservoir Evaporation	231,081	0	231,081
State Totals	1,629,968	1,484,287	3,114,255

Key: WSW= withdrawal surface water; WGW=withdrawal ground water; TW=total withdrawal

Table 3. Water use by category expressed as a percent of state totals in New Mexico, 2015. Surface water and ground water component of each category is identified.

Category	% of Statewide Withdrawal	% WSW	% WGW
Public Water Supply	9.12	30.76	69.24
Domestic (self-supplied)	0.90	0.00	100.00
Irrigated Agriculture	76.30	52.84	47.16
Livestock (self-supplied)	1.16	8.06	91.94
Commercial (self-supplied)	1.85	21.43	78.57
Industrial (self-supplied)	0.28	0.00	100.00
Mining (self-supplied)	1.36	2.70	97.30
Power (self-supplied)	1.62	78.69	21.31
Reservoir Evaporation	7.42	100.00	0.00
State Totals	**100.00**		

Key: WSW= withdrawal surface water; WGW=withdrawal ground water.

Table 4. Percent of withdrawals measured in each water use category in New Mexico, 2015.

Category	MSW	MGW	MTW
Public Water Supply	98	96	97
Domestic (self-supplied)	0	0	0
Irrigated Agriculture	62	42	52
Livestock (self-supplied)	0	19	17
Commercial (self-supplied)	96	62	69
Industrial (self-supplied)	0	100	100
Mining (self-supplied)	97	67	67
Power (self-supplied)	100	100	100
Reservoir Evaporation	96	0	96

Key: MSW= percent of measured surface water; MGW= percent of measured ground water; MTW= percent of total withdrawals that were measured

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
1	Bernalillo	Commercial (self-supplied)	0	6,352	6,352
1	Bernalillo	Domestic (self-supplied)	0	1,440	1,440
1	Bernalillo	Industrial (self-supplied)	0	1,417	1,417
1	Bernalillo	Irrigated Agriculture	36,646	2,543	39,189
1	Bernalillo	Livestock (self-supplied)	5	58	63
1	Bernalillo	Mining (self-supplied)	0	114	114
1	Bernalillo	Power (self-supplied)	0	288	288
1	Bernalillo	Public Water Supply	52,720	44,884	97,607
1	Bernalillo	Reservoir Evaporation		0	0
		County Totals	89,371	57,096	146,470
3	Catron	Commercial (self-supplied)	2,135	20	2,155
3	Catron	Domestic (self-supplied)	0	175	175
3	Catron	Industrial (self-supplied)	0	0	0
3	Catron	Irrigated Agriculture	18,538	0	18,538
3	Catron	Livestock (self-supplied)	167	186	354
3	Catron	Mining (self-supplied)	0	2	2
3	Catron	Power (self-supplied)	0	0	0
3	Catron	Public Water Supply	0	183	183
3	Catron	Reservoir Evaporation		0	0
		County Totals	20,840	567	21,407
5	Chaves	Commercial (self-supplied)	1,774	2,054	3,828
5	Chaves	Domestic (self-supplied)	0	1,007	1,007
5	Chaves	Industrial (self-supplied)	0	0	0
5	Chaves	Irrigated Agriculture	5,422	205,682	211,104
5	Chaves	Livestock (self-supplied)	192	7,073	7,265
5	Chaves	Mining (self-supplied)	0	293	293
5	Chaves	Power (self-supplied)	0	0	0
5	Chaves	Public Water Supply	0	15,060	15,060
5	Chaves	Reservoir Evaporation		0	0
		County Totals	7,388	231,169	238,557
6	Cibola	Commercial (self-supplied)	0	113	113
6	Cibola	Domestic (self-supplied)	0	1,141	1,141
6	Cibola	Industrial (self-supplied)	0	426	426

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
6	Cibola	Irrigated Agriculture	886	1,628	2,514
6	Cibola	Livestock (self-supplied)	24	105	129
6	Cibola	Mining (self-supplied)	0	448	448
6	Cibola	Power (self-supplied)	0	0	0
6	Cibola	Public Water Supply	0	2,607	2,607
6	Cibola	Reservoir Evaporation	493	0	493
		County Totals	1,403	6,469	7,872
7	Colfax	Commercial (self-supplied)	67	91	158
7	Colfax	Domestic (self-supplied)	0	14	14
7	Colfax	Industrial (self-supplied)	0	0	0
7	Colfax	Irrigated Agriculture	50,350	0	50,350
7	Colfax	Livestock (self-supplied)	386	402	788
7	Colfax	Mining (self-supplied)	0	4	4
7	Colfax	Power (self-supplied)	0	0	0
7	Colfax	Public Water Supply	1,381	642	2,023
7	Colfax	Reservoir Evaporation	6,381	0	6,381
		County Totals	58,564	1,153	59,718
9	Curry	Commercial (self-supplied)	0	501	501
9	Curry	Domestic (self-supplied)	0	551	551
9	Curry	Industrial (self-supplied)	0	0	0
9	Curry	Irrigated Agriculture	0	71,060	71,060
9	Curry	Livestock (self-supplied)	107	6,426	6,533
9	Curry	Mining (self-supplied)	0	29	29
9	Curry	Power (self-supplied)	0	0	0
9	Curry	Public Water Supply	0	5,825	5,825
9	Curry	Reservoir Evaporation		0	0
		County Totals	107	84,392	84,499
11	De Baca	Commercial (self-supplied)	0	266	266
11	De Baca	Domestic (self-supplied)	0	21	21
11	De Baca	Industrial (self-supplied)	0	0	0
11	De Baca	Irrigated Agriculture	35,906	7,707	43,613
11	De Baca	Livestock (self-supplied)	65	265	330
11	De Baca	Mining (self-supplied)	0	61	61

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
11	De Baca	Power (self-supplied)	0	0	0
11	De Baca	Public Water Supply	0	275	275
11	De Baca	Reservoir Evaporation	9,900	0	9,900
		County Totals	45,871	8,596	54,467
13	Doña Ana	Commercial (self-supplied)	0	6,261	6,261
13	Doña Ana	Domestic (self-supplied)	0	550	550
13	Doña Ana	Industrial (self-supplied)	0	29	29
13	Doña Ana	Irrigated Agriculture	136,235	197,214	333,449
13	Doña Ana	Livestock (self-supplied)	81	3,036	3,117
13	Doña Ana	Mining (self-supplied)	0	17	17
13	Doña Ana	Power (self-supplied)	0	2,023	2,023
13	Doña Ana	Public Water Supply	0	37,055	37,055
13	Doña Ana	Reservoir Evaporation		0	0
		County Totals	136,316	246,184	382,500
15	Eddy	Commercial (self-supplied)	0	833	833
15	Eddy	Domestic (self-supplied)	0	259	259
15	Eddy	Industrial (self-supplied)	0	2,023	2,023
15	Eddy	Irrigated Agriculture	114,249	50,612	164,861
15	Eddy	Livestock (self-supplied)	62	1,044	1,106
15	Eddy	Mining (self-supplied)	0	18,490	18,490
15	Eddy	Power (self-supplied)	0	0	0
15	Eddy	Public Water Supply	0	15,070	15,070
15	Eddy	Reservoir Evaporation	20,920	0	20,920
		County Totals	135,231	88,330	223,561
17	Grant	Commercial (self-supplied)	0	96	96
17	Grant	Domestic (self-supplied)	0	219	219
17	Grant	Industrial (self-supplied)	0	0	0
17	Grant	Irrigated Agriculture	31,589	4,985	36,574
17	Grant	Livestock (self-supplied)	149	170	319
17	Grant	Mining (self-supplied)	162	14,991	15,153
17	Grant	Power (self-supplied)	0	0	0
17	Grant	Public Water Supply	0	2,787	2,787
17	Grant	Reservoir Evaporation		0	0

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
		County Totals	31,900	23,249	55,149
19	Guadalupe	Commercial (self-supplied)	6,159	43	6,202
19	Guadalupe	Domestic (self-supplied)	0	46	46
19	Guadalupe	Industrial (self-supplied)	0	0	0
19	Guadalupe	Irrigated Agriculture	10,241	668	10,909
19	Guadalupe	Livestock (self-supplied)	75	298	373
19	Guadalupe	Mining (self-supplied)	0	14	14
19	Guadalupe	Power (self-supplied)	0	0	0
19	Guadalupe	Public Water Supply	0	659	659
19	Guadalupe	Reservoir Evaporation	10,670	0	10,670
		County Totals	27,145	1,728	28,873
21	Harding	Commercial (self-supplied)	0	0	0
21	Harding	Domestic (self-supplied)	0	21	21
21	Harding	Industrial (self-supplied)	0	0	0
21	Harding	Irrigated Agriculture	0	3,214	3,214
21	Harding	Livestock (self-supplied)	61	252	313
21	Harding	Mining (self-supplied)	0	0	0
21	Harding	Power (self-supplied)	0	0	0
21	Harding	Public Water Supply	0	84	84
21	Harding	Reservoir Evaporation	0	0	0
		County Totals	61	3,571	3,633
23	Hidalgo	Commercial (self-supplied)	0	246	246
23	Hidalgo	Domestic (self-supplied)	0	164	164
23	Hidalgo	Industrial (self-supplied)	0	14	14
23	Hidalgo	Irrigated Agriculture	5,003	42,623	47,626
23	Hidalgo	Livestock (self-supplied)	54	222	276
23	Hidalgo	Mining (self-supplied)	0	1,910	1,910
23	Hidalgo	Power (self-supplied)	0	30	30
23	Hidalgo	Public Water Supply	0	1,936	1,936
23	Hidalgo	Reservoir Evaporation	0	0	0
		County Totals	5,056	47,145	52,201
25	Lea	Commercial (self-supplied)	0	1,541	1,541
25	Lea	Domestic (self-supplied)	0	1,510	1,510

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
25	Lea	Industrial (self-supplied)	0	1,780	1,780
25	Lea	Irrigated Agriculture	0	117,366	117,366
25	Lea	Livestock (self-supplied)	43	2,658	2,702
25	Lea	Mining (self-supplied)	0	1,603	1,603
25	Lea	Power (self-supplied)	0	4,472	4,472
25	Lea	Public Water Supply	0	11,407	11,407
25	Lea	Reservoir Evaporation	0	0	0
		County Totals	43	142,338	142,381
27	Lincoln	Commercial (self-supplied)	0	1,433	1,433
27	Lincoln	Domestic (self-supplied)	0	91	91
27	Lincoln	Industrial (self-supplied)	0	0	0
27	Lincoln	Irrigated Agriculture	8,031	2,439	10,470
27	Lincoln	Livestock (self-supplied)	184	208	392
27	Lincoln	Mining (self-supplied)	0	382	382
27	Lincoln	Power (self-supplied)	0	0	0
27	Lincoln	Public Water Supply	1,016	3,899	4,915
27	Lincoln	Reservoir Evaporation	0	0	0
		County Totals	9,231	8,451	17,683
28	Los Alamos	Commercial (self-supplied)	0	0	0
28	Los Alamos	Domestic (self-supplied)	0		0
28	Los Alamos	Industrial (self-supplied)	0	0	0
28	Los Alamos	Irrigated Agriculture	0	0	0
28	Los Alamos	Livestock (self-supplied)			0
28	Los Alamos	Mining (self-supplied)	0	0	0
28	Los Alamos	Power (self-supplied)	0	0	0
28	Los Alamos	Public Water Supply	38	3,391	3,429
28	Los Alamos	Reservoir Evaporation	0	0	0
		County Totals	38	3,391	3,429
29	Luna	Commercial (self-supplied)	0	302	302
29	Luna	Domestic (self-supplied)	0	903	903
29	Luna	Industrial (self-supplied)	0	0	0
29	Luna	Irrigated Agriculture	4,364	79,727	84,091
29	Luna	Livestock (self-supplied)	65	821	886

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
29	Luna	Mining (self-supplied)	0	143	143
29	Luna	Power (self-supplied)	0	1,091	1,091
29	Luna	Public Water Supply	0	3,373	3,373
29	Luna	Reservoir Evaporation	0	0	0
		County Totals	4,429	86,360	90,789
31	McKinley	Commercial (self-supplied)	0	119	119
31	McKinley	Domestic (self-supplied)	0	3,290	3,290
31	McKinley	Industrial (self-supplied)	0	45	45
31	McKinley	Irrigated Agriculture	94	0	94
31	McKinley	Livestock (self-supplied)	25	102	126
31	McKinley	Mining (self-supplied)	0	91	91
31	McKinley	Power (self-supplied)	0	2,834	2,834
31	McKinley	Public Water Supply	0	3,644	3,644
31	McKinley	Reservoir Evaporation	0	0	0
		County Totals	119	10,125	10,243
33	Mora	Commercial (self-supplied)	302	12	314
33	Mora	Domestic (self-supplied)	0	63	63
33	Mora	Industrial (self-supplied)	0	0	0
33	Mora	Irrigated Agriculture	24,917	0	24,917
33	Mora	Livestock (self-supplied)	122	150	272
33	Mora	Mining (self-supplied)	0	0	0
33	Mora	Power (self-supplied)	0	0	0
33	Mora	Public Water Supply	0	375	375
33	Mora	Reservoir Evaporation	0	0	0
		County Totals	25,341	601	25,941
35	Otero	Commercial (self-supplied)	163	1,646	1,809
35	Otero	Domestic (self-supplied)	0	1,621	1,621
35	Otero	Industrial (self-supplied)	0	4	4
35	Otero	Irrigated Agriculture	11,282	6,415	17,697
35	Otero	Livestock (self-supplied)	92	98	190
35	Otero	Mining (self-supplied)	476	256	732
35	Otero	Power (self-supplied)	0	0	0
35	Otero	Public Water Supply	4,212	3,292	7,504

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
35	Otero	Reservoir Evaporation	0	0	0
		County Totals	16,224	13,334	29,557
37	Quay	Commercial (self-supplied)	0	40	40
37	Quay	Domestic (self-supplied)	0	63	63
37	Quay	Industrial (self-supplied)	0	0	0
37	Quay	Irrigated Agriculture	22,741	32,971	55,712
37	Quay	Livestock (self-supplied)	41	381	422
37	Quay	Mining (self-supplied)	0	6	6
37	Quay	Power (self-supplied)	0	0	0
37	Quay	Public Water Supply	0	1,418	1,418
37	Quay	Reservoir Evaporation	14,123	0	14,123
		County Totals	36,905	34,878	71,783
39	Rio Arriba	Commercial (self-supplied)	4	3,961	3,965
39	Rio Arriba	Domestic (self-supplied)	0	1,336	1,336
39	Rio Arriba	Industrial (self-supplied)	0	0	0
39	Rio Arriba	Irrigated Agriculture	96,232	1,169	97,401
39	Rio Arriba	Livestock (self-supplied)	166	182	348
39	Rio Arriba	Mining (self-supplied)	0	158	158
39	Rio Arriba	Power (self-supplied)	0	0	0
39	Rio Arriba	Public Water Supply	385	1,563	1,948
39	Rio Arriba	Reservoir Evaporation	27,337	0	27,337
		County Totals	124,124	8,369	132,493
41	Roosevelt	Commercial (self-supplied)	0	71	71
41	Roosevelt	Domestic (self-supplied)	0	149	149
41	Roosevelt	Industrial (self-supplied)	0	0	0
41	Roosevelt	Irrigated Agriculture	0	115,446	115,446
41	Roosevelt	Livestock (self-supplied)	72	4,300	4,372
41	Roosevelt	Mining (self-supplied)	0	2	2
41	Roosevelt	Power (self-supplied)	0	0	0
41	Roosevelt	Public Water Supply	0	3,046	3,046
41	Roosevelt	Reservoir Evaporation	0	0	0
		County Totals	72	123,014	123,086
43	Sandoval	Commercial (self-supplied)	716	2,050	2,766

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
43	Sandoval	Domestic (self-supplied)	0	3,132	3,132
43	Sandoval	Industrial (self-supplied)	0	2,583	2,583
43	Sandoval	Irrigated Agriculture	35,890	573	36,463
43	Sandoval	Livestock (self-supplied)	30	48	78
43	Sandoval	Mining (self-supplied)	0	439	439
43	Sandoval	Power (self-supplied)	0	0	0
43	Sandoval	Public Water Supply	132	12,526	12,658
43	Sandoval	Reservoir Evaporation	4,718	0	4,718
		County Totals	41,486	21,350	62,836
45	San Juan	Commercial (self-supplied)	464	16	480
45	San Juan	Domestic (self-supplied)	0	1,315	1,315
45	San Juan	Industrial (self-supplied)	0	18	18
45	San Juan	Irrigated Agriculture	283,395	0	283,395
45	San Juan	Livestock (self-supplied)	26	129	156
45	San Juan	Mining (self-supplied)	30	23	53
45	San Juan	Power (self-supplied)	39,677	0	39,677
45	San Juan	Public Water Supply	20,727	359	21,086
45	San Juan	Reservoir Evaporation	28,387	0	28,387
		County Totals	372,707	1,860	374,567
47	San Miguel	Commercial (self-supplied)	522	370	892
47	San Miguel	Domestic (self-supplied)	0	641	641
47	San Miguel	Industrial (self-supplied)	0	0	0
47	San Miguel	Irrigated Agriculture	24,188	0	24,188
47	San Miguel	Livestock (self-supplied)	225	273	498
47	San Miguel	Mining (self-supplied)	0	14	14
47	San Miguel	Power (self-supplied)	0	0	0
47	San Miguel	Public Water Supply	1,975	508	2,483
47	San Miguel	Reservoir Evaporation	18,043	0	18,043
		County Totals	44,953	1,806	46,759
49	Santa Fe	Commercial (self-supplied)	0	1,138	1,138
49	Santa Fe	Domestic (self-supplied)	0	2,527	2,527
49	Santa Fe	Industrial (self-supplied)	0	0	0
49	Santa Fe	Irrigated Agriculture	5,042	16,109	21,151

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
49	Santa Fe	Livestock (self-supplied)	32	46	78
49	Santa Fe	Mining (self-supplied)	0	17	17
49	Santa Fe	Power (self-supplied)	0	0	0
49	Santa Fe	Public Water Supply	4,660	7,083	11,743
49	Santa Fe	Reservoir Evaporation	0	0	0
		County Totals	9,734	26,919	36,653
51	Sierra	Commercial (self-supplied)	0	795	795
51	Sierra	Domestic (self-supplied)	0	199	199
51	Sierra	Industrial (self-supplied)	0	0	0
51	Sierra	Irrigated Agriculture	7,447	22,069	29,516
51	Sierra	Livestock (self-supplied)	41	278	318
51	Sierra	Mining (self-supplied)	0	51	51
51	Sierra	Power (self-supplied)	0	0	0
51	Sierra	Public Water Supply	0	1,717	1,717
51	Sierra	Reservoir Evaporation	82,142	0	82,142
		County Totals	89,630	25,109	114,739
53	Socorro	Commercial (self-supplied)	0	931	931
53	Socorro	Domestic (self-supplied)	0	505	505
53	Socorro	Industrial (self-supplied)	0	1	1
53	Socorro	Irrigated Agriculture	86,746	27,278	114,024
53	Socorro	Livestock (self-supplied)	43	1,047	1,090
53	Socorro	Mining (self-supplied)	0	23	23
53	Socorro	Power (self-supplied)	0	0	0
53	Socorro	Public Water Supply	60	2,207	2,267
53	Socorro	Reservoir Evaporation	7,570	0	7,570
		County Totals	94,419	31,992	126,411
55	Taos	Commercial (self-supplied)	17	12,670	12,687
55	Taos	Domestic (self-supplied)	0	819	819
55	Taos	Industrial (self-supplied)	0	0	0
55	Taos	Irrigated Agriculture	65,496	1,109	66,605
55	Taos	Livestock (self-supplied)	39	57	96
55	Taos	Mining (self-supplied)	473	1,334	1,807
55	Taos	Power (self-supplied)	0	0	0

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 5. Summary of water use in acre-feet, in New Mexico counties, 2015.

CN	COUNTY	CATEGORY	WSW	WGW	TW
55	Taos	Public Water Supply	92	2,439	2,531
55	Taos	Reservoir Evaporation	226	0	226
		County Totals	66,343	18,427	84,771
57	Torrance	Commercial (self-supplied)	0	486	486
57	Torrance	Domestic (self-supplied)	0	441	441
57	Torrance	Industrial (self-supplied)	0	0	0
57	Torrance	Irrigated Agriculture	0	49,504	49,504
57	Torrance	Livestock (self-supplied)	33	528	560
57	Torrance	Mining (self-supplied)	0	42	42
57	Torrance	Power (self-supplied)	0	0	0
57	Torrance	Public Water Supply	0	1,625	1,625
57	Torrance	Reservoir Evaporation	0	0	0
		County Totals	33	52,626	52,659
59	Union	Commercial (self-supplied)	0	207	207
59	Union	Domestic (self-supplied)	0	156	156
59	Union	Industrial (self-supplied)	0	0	0
59	Union	Irrigated Agriculture	450	52,064	52,514
59	Union	Livestock (self-supplied)	177	1,604	1,782
59	Union	Mining (self-supplied)	0	9	9
59	Union	Power (self-supplied)	0	0	0
59	Union	Public Water Supply	0	585	585
59	Union	Reservoir Evaporation	171	0	171
		County Totals	799	54,626	55,425
61	Valencia	Commercial (self-supplied)	4	536	540
61	Valencia	Domestic (self-supplied)	0	3,581	3,581
61	Valencia	Industrial (self-supplied)	0	377	377
61	Valencia	Irrigated Agriculture	134,059	8,452	142,510
61	Valencia	Livestock (self-supplied)	21	693	714
61	Valencia	Mining (self-supplied)	0	186	187
61	Valencia	Power (self-supplied)	0	4	4
61	Valencia	Public Water Supply	0	5,232	5,232
61	Valencia	Reservoir Evaporation	0	0	0
		County Totals	134,084	19,061	153,144
		State Totals	**1,629,968**	**1,484,287**	**3,114,255**

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 6. Summary of withdrawals in acre-feet, in New Mexico river basins, 2015.

RVB	CATEGORY	WSW	WGW	TW
AWR	Commercial (self-supplied)	369	535	904
AWR	Domestic (self-supplied)	0	450	450
AWR	Industrial (self-supplied)	0	0	0
AWR	Irrigated Agriculture	108,400	77,416	185,816
AWR	Livestock (self-supplied)	924	3,026	3,950
AWR	Mining (self-supplied)	0	31	31
AWR	Power (self-supplied)	0	0	0
AWR	Public Water Supply	1,409	3,200	4,609
AWR	Reservoir Evaporation	37,387		37,387
	River Basin Totals	148,489	84,658	233,147
LC	Commercial (self-supplied)	2,135	460	2,595
LC	Domestic (self-supplied)	0	2,527	2,527
LC	Industrial (self-supplied)	0	58	58
LC	Irrigated Agriculture	53,842	46,317	100,159
LC	Livestock (self-supplied)	226	469	695
LC	Mining (self-supplied)	32	3,524	3,556
LC	Power (self-supplied)	0	0	0
LC	Public Water Supply	0	4,415	4,415
LC	Reservoir Evaporation	0	0	0
	River Basin Totals	56,235	57,770	114,005
P	Commercial (self-supplied)	8,455	6,119	14,574
P	Domestic (self-supplied)	0	2,606	2,606
P	Industrial (self-supplied)	0	2,024	2,024
P	Irrigated Agriculture	190,175	278,316	468,491
P	Livestock (self-supplied)	659	9,245	9,904
P	Mining (self-supplied)	0	20,783	20,783
P	Power (self-supplied)	0	0	0
P	Public Water Supply	3,301	37,318	40,619
P	Reservoir Evaporation	42,821	0	42,821
	River Basin Totals	245,411	356,410	601,821
RG	Commercial (self-supplied)	903	36,731	37,634
RG	Domestic (self-supplied)		17,783	17,783
RG	Industrial (self-supplied)	0	4,839	4,839
RG	Irrigated Agriculture	614,794	415,079	1,029,873
RG	Livestock (self-supplied)	820	7,091	7,911

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 6. Summary of withdrawals in acre-feet, in New Mexico river basins, 2015.

RVB	CATEGORY	WSW	WGW	TW
RG	Mining (self-supplied)	1,079	16,662	17,740
RG	Power (self-supplied)	0	6,271	6,271
RG	Public Water Supply	61,947	133,265	195,212
RG	Reservoir Evaporation	122,486	0	122,486
	River Basin Totals	802,029	637,720	1,439,749
TG	Commercial (self-supplied)	0	1,328	1,328
TG	Domestic (self-supplied)		1,957	1,957
TG	Industrial (self-supplied)	0	1,779	1,779
TG	Irrigated Agriculture	0	303,496	303,496
TG	Livestock (self-supplied)	190	13,094	13,284
TG	Mining (self-supplied)	0	130	130
TG	Power (self-supplied)	0	4,472	4,472
TG	Public Water Supply	0	18,169	18,169
TG	Reservoir Evaporation	0	0	0
	River Basin Totals	190	344,425	344,616
UC	Commercial (self-supplied)	464	26	490
UC	Domestic (self-supplied)	0	2,627	2,627
UC	Industrial (self-supplied)	0	18	18
UC	Irrigated Agriculture	288,229	0	288,229
UC	Livestock (self-supplied)	85	217	302
UC	Mining (self-supplied)	30	23	53
UC	Power (self-supplied)	39,677	0	39,677
UC	Public Water Supply	20,742	392	21,133
UC	Reservoir Evaporation	28,387	0	28,387
	River Basin Totals	377,614	3,303	380,917
	State Totals	1,629,968	1,484,287	3,114,255

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal.

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
1	RG	ABCWUA	641,992	131	4	4	Y	Y	52,698	41,600
1	RG	Baker's/ Hamilton Mobile Home Park	109	167	0			Y		20
1	RG	Barcelona Mobile Home Park	439	89	0			Y		44
1	RG	Bearcat Homeowners Assn.	59	61	0			Y		4
1	RG	Cedar Crest MDWC & SWC	49	100	0	1				5
1	RG	Chamisa Mobile Home Park	49	89	0			Y		5
1	RG	Chilili WUA	195	100	0	1				22
1	RG	Coronado Village Country Club	585	154	0			Y		101
1	RG	Desert Palms Mobile Home Park	205	138	0			Y		32
1	RG	Entranosa Water and Wastewater Co-op (part)	5,389	139	1			Y		840
1	RG	Forest Park Property Owners Co-op	229	45	0			Y		12
1	RG	Fox Hills WUA	67	100	0	1				8
1	RG	Green Acres Mobile Home Park	146	186	0			Y		31
1	RG	Green Ridge MDWCA	127	86	0			Y		12
1	RG	Hamilton Mobile Home Park	246	16	0			Y		4
1	RG	Homestead Mobile Home Community	180	47	0			Y		10
1	RG	Juan Road Water System	24	100	0	1				3
1	RG	Kirtland Air Force Base	3,043	131		3				447
1	RG	La Cueva Estates Community Assn.	214	212	0			Y		51
1	RG	La Mesa Villa Mobile Home Park, LLC	88	100	0	1				10
1	RG	Leisure Mountain Mobile Home Park	158	30	0			Y		5
1	RG	Mountain View Mobile Home Park	88	100	0	1				10
1	RG	New Mexico Water Service Company/Sandia Knolls/Independent Utility Co.	1,229	100	0	1				138
1	RG	NM Waterworks, LLC	112	62	0			Y		8
1	RG	North Court Mobile Home Park	98	98	0			Y		11

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
1	RG	Oakland Heights Homeowners Assn.	30	148	0			Y		5
1	RG	Old Sandia Park Service Co-op	195	100	0	1			22	
1	RG	Paakweree Village Water Co-op Assn., Inc	123	100	0	1				14
1	RG	Rural Self-Supplied Homes	12,857	100	0					1,440
1	RG	Safariland Mobile Home Park	39	100	0	1				4
1	RG	Sandia Peak Utility Company	5,852	140	0			Y		915
1	RG	Sierra Vista Mutual Domestic Assn./Sierra Vista Utilidades Co-op	322	92	0			Y		33
1	RG	Sierra Vista South Water Co-op	125	71	0			Y		10
1	RG	South Hills Water Company	585	76	0			Y		50
1	RG	Sunset Hills Estates Homeowners Assn.	98	205	0			Y		22
1	RG	The Rincon Water Cooperative	371	63	0			Y		26
1	RG	Tierra Monte WUA	83	102	0			Y		10
1	RG	Tierra West Estates--MHP	2,044	100	0	1				229
1	RG	Tijeras Village	528	45	0			Y		26
1	RG	Tijeras Water Cooperative (Tijeras Land Estates Water System)	166	68	0			Y		13
1	RG	Tom's Mobile Home Park	49	100	0	1				5
1	RG	Tranquillo Pines Water System	731	37	0			Y		30
1	RG	Valle Grande Mobile Home Park	121	104	0			Y		14
1	RG	Ventura Estates	98	208	0		Y	Y		23
1	RG	Vista Bonita Water Co-op	44	67	0			Y		3
1	RG	Vista De Mañana	68	44	0			Y		3
1	RG	Western Heights Mobile Home Park	164	100	0	1				18
		River Basin Subtotals	679,810						52,720	46,325
		County Totals	679,810						52,720	46,325
3	LC	Aragon Mutual Domestic	22	199	0			Y		5

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
3	LC	Coyote Creek Mutual Domestic WUA	213	70	0	1				17
3	LC	Homestead Landowners Assn.	100	25	0			Y		3
3	LC	Mojave Academy	40	70	0	1				3
3	LC	Pie Town MDWCA	150	27	0			Y		5
3	LC	Quemado Lake Water Assn.	158	23				Y		4
3	LC	Quemado Municipal Water & SWA	245	70	0	1				19
3	LC	Rancho Grande Water Assn.	142	333	0			Y		53
3	LC	Reserve Water Works	298	224	0			Y		75
3	LC	Rural Self-Supplied Homes	1,921	70	0					151
		River Basin Subtotals	3,289							334
3	RG	Rural Self-Supplied Homes	313	70	0					25
		River Basin Subtotals	313							25
		County Totals	3,602							359
5	P	Berrendo WUA	3,999	322	0			Y		1,444
5	P	Country Acres Mobile Home Park	30	100	0	1				3
5	P	Cumberland WUA	583	199	0			Y		130
5	P	Dexter Municipal Water System	1,526	574	0			Y		980
5	P	Fambrough Water Co-op	436	199	0			Y		97
5	P	Greenfield MDWCA	263	209	0			Y		62
5	P	Hagerman Water System	1,303	300	0			Y		438
5	P	Lake Arthur Water Co-op	436	186	0			Y		91
5	P	Roswell Municipal Water System	48,600	217	0			Y		11,814
5	P	Rural Self-Supplied Homes	8,992	100	0					1,007
		River Basin Subtotals	66,168							16,067
		County Totals	66,168							16,067
6	LC	Rural Self-Supplied Homes	3,784	70		1				297

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
		River Basin Subtotals	3,784							297
6	RG	Bibo Mutual Domestic Water Assn.	203	70	0	1				16
6	RG	Bluewater Acres Water Assn.	371	34	0			Y		14
6	RG	Bluewater Water & Sanitation District	462	79	0			Y		41
6	RG	Grants Domestic Water System	8,700	212	0			Y		2,070
6	RG	Milan Community Water System	2,000	168	4			Y		376
6	RG	Moquino Water Users Assn.	76	70	0	1				6
6	RG	Plano Colorado Estates	28	70	0	1				2
6	RG	Rural Self-Supplied Homes	10,771	70	0	1				845
6	RG	San Mateo MDWCA	150	4	0			Y		1
6	RG	San Rafael Water & Sanitation Dist.	866	70	0	1				68
6	RG	Seboyeta Water System	179	70	0	1				14
		River Basin Subtotals	23,806							3,452
		County Totals	27,590							3,748
7	AWR	Angel Fire Services Corp.	1,197	425	0			Y		570
7	AWR	Angel Nest Apartments	60	80	0	1				5
7	AWR	Cimarron Water System	987	52	0		Y		57	
7	AWR	Eagle Nest (Village Of)	298	131	0			Y		44
7	AWR	Maxwell Cooperative Water	154	80	0	1				14
7	AWR	Maxwell Water System	254	80	0	1			23	
7	AWR	Miami WUA	136	74	0		Y		11	
7	AWR	Raton Domestic Water System	8,027	124	4				1,116	
7	AWR	Rural Self-Supplied Homes	154	80	0	1				14
7	AWR	Springer Water System	1,550	100			Y		174	
7	AWR	Val Verde 5 Property Owners Assn.	100	80	0	1				9
		River Basin Subtotals	12,917						1,381	656

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
		County Totals	12,917						1,381	656
9	AWR	Grady Water System	107	168	0			Y		20
9	AWR	Rural Self-Supplied Homes	737	100	0					83
		River Basin Subtotals	844							103
9	TG	Cannon Air Force Base	2,893	100	10	1				324
9	TG	Desert Ranch Water System	93	100	0	1				10
9	TG	EPCOR Water New Mexico/NM American Water Co.--Clovis	39,508	117	2	2		Y		5,177
9	TG	Ideal Mobile Home Park	145	100	0	1				16
9	TG	Longhorn Estates Water System	270	100	0	1				30
9	TG	Melrose Water System	1,099	79	0			Y		97
9	TG	Rural Self-Supplied Homes	4,178	100	0					468
9	TG	Tall Pines Water Assn.	90	59	0			Y		6
9	TG	Texico Water System	1,215	96	0			Y		131
9	TG	Turquoise Estates Wtr Co-op--Clovis	225	51	0			Y		13
		River Basin Subtotals	49,716							6,273
		County Totals	50,560							6,376
11	P	Fort Sumner Municipal Water System	1,200	174	3			Y		234
11	P	Rural Self-Supplied Homes	234	80	0					21
11	P	Valley WUA	467	80	6	1				42
		River Basin Subtotals	1,901							296
		County Totals	1,901							296
13	RG	Alameda Mobile Home Park	279	87	0			Y		27
13	RG	Alto de Las Flores MDWCA	756	85	0			Y		72
13	RG	Anthony Water & Sanitation	7,742	146	0			Y		1,262
13	RG	Camino Real	18,133	141				Y		2,870
13	RG	CBG Water Company	1,056	169	0			Y		200

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Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
13	RG	Chamberino MDW & SA	499	99	0			Y		56
13	RG	Cielo Dorado Estates Homeowners Assn.	258	71	0			Y		21
13	RG	Country Estates LLC/Skoshi Mobile Home Park	133	49	0			Y		7
13	RG	Country Mobile Manor	217	108	0			Y		26
13	RG	Covered Wagon Mobile Home Park	98	109	0			Y		12
13	RG	De La Te Mobile Manor	154	44	0			Y		8
13	RG	Desert Aire	754	103	0			Y		87
13	RG	Doña Ana MDWCA	12,494	116	0			Y		1,629
13	RG	El Patio Mobile Home Park	84	84	0			Y		8
13	RG	Garfield MDWCA	2,477	117	0			Y		323
13	RG	Hatch Water Supply	2,310	151	0			Y		390
13	RG	High Valley Water Users	70	107	0			Y		8
13	RG	Jornada Water Co	9,034	188	0			Y		1,899
13	RG	La Union MDWCA	919	74	0			Y		76
13	RG	Lake Section Water Company	13,498	146	7			Y		2,214
13	RG	Las Cruces Mobile Home Park	157	93	0			Y		16
13	RG	Las Cruces Municipal Water System	105,515	165	3	4		Y		19,487
13	RG	Leasburg MDWCA	803	122	0			Y		110
13	RG	Lower Rio Grande Public Water Works Authority	14,233	105	0			Y		1,677
13	RG	Madrid Mobile Home Park/Charles Madrid Mobile Home Park	71	93	0			Y		7
13	RG	Mesa Development Center	882	77	0			Y		76
13	RG	Mesilla Water System	2,109	122	6			Y		289
13	RG	Miller's Mobile Manor	83	123	0			Y		11
13	RG	Moongate Water System	11,168	214	0			Y		2,672
13	RG	Picacho MDWCA	808	125	0			Y		113

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Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
13	RG	Rancho Vista Mobile Home Park	118	66	0			Y		9
13	RG	Rincon Water Consumers Co-op	539	201	4			Y		121
13	RG	Rural Self-Supplied Homes	4,907	100	0	1				550
13	RG	Silver Spur Mobile Home Park	129	98	0			Y		14
13	RG	St John's Mobile Home Park	421	99	0			Y		47
13	RG	Summer Wind Mobile Home Park	466	87	0			Y		45
13	RG	Summit Gardens LLC	431	58	0			Y		28
13	RG	Talavera Water Co-op	147	115	0			Y		19
13	RG	Teresa Moreno Water System/Billy Moreno Water System	38	139	0			Y		6
13	RG	Villa Del Sol Mobile Home Park	428	221	0			Y		106
13	RG	Vista Del Rey Estates MDWCA	41	361	0			Y		17
13	RG	Vista Real Mobile Home Park	128	148	0			Y		21
13	RG	West Mesa Water Company Inc	250	171	0			Y		48
13	RG	White Sands Missile Range	1,582	514	10			Y		911
13	RG	Winterhaven MDWA	160	56	0			Y		10
		River Basin Subtotals	216,578							37,605
		County Totals	216,578							37,605
15	P	Artesia Domestic Water System	12,366	379	3			Y		5,250
15	P	Artesia Rural Water Co-op	1,957	150	0			Y		328
15	P	Carlsbad Municipal Water System	28,792	239	0			Y		7,692
15	P	Cottonwood Water Cooperative	1,472	127	0			Y		210
15	P	Happy Valley Water Co-op	700	96	0			Y		75
15	P	Hope Water System	272	134	0			Y		41
15	P	Jewel St. Water Co-op	25	94	0			Y		3
15	P	Loving Water System	1,665	93	3			Y		173

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
15	P	Malaga Water Users Co-op	658	253	6			Y		186
15	P	Morningside Water Cooperative	358	100	6	1				40
15	P	North Park MDWCA	300	43	0					14
15	P	Otis Water Co-op	5,800	105	7			Y		684
15	P	Pecos Mobile Home Park/Westwind Mobile Home Park	232	100	0	1				26
15	P	Riverside WUA	230	92	0			Y		24
15	P	Rural Self-Supplied Homes	2,308	100	0					259
15	P	White's City	40	4,452	0			Y		199
		River Basin Subtotals	57,175							15,205
15	TG	Caprock Water Company	197	556	3			Y		123
		River Basin Subtotals	197							123
		County Totals	57,372							15,328
17	LC	Piños Altos MDWCA	350	57	6			Y		22
17	LC	Rural Self-Supplied Homes	617	80	0					55
17	LC	Trout Mountain Assn., Inc	49	80	0	1				4
17	LC	Tyrone Water System	795	78				Y		70
		River Basin Subtotals	1,811							151
17	RG	Arenas Valley MDWCA	1,522	68	6			Y		117
17	RG	Bayard Municipal Water System	2,591	81	0			Y		234
17	RG	Casas Adobes Water Company	343	80	0	1				31
17	RG	Hachita Water System	53	84	0			Y		5
17	RG	Hanover MDWCA	237	117	0	2		Y		31
17	RG	Heights Water Users Assn.	22	61	0			Y		2
17	RG	Hurley Water Supply System	1,297	113	6			Y		165
17	RG	Lake Roberts Water Users/Subdivision	68	43	0			Y		3
17	RG	North Hurley MDWCA	365	80	6	1				33

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Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
17	RG	Rio De Arenas, LLC	277	80	0	1				25
17	RG	Rosedale MDWCA	235	61				Y		16
17	RG	Rural Self-Supplied Homes	1,829	80	0					164
17	RG	Santa Clara Water System	2,694	32	0			Y		97
17	RG	Silver City Water System	15,745	109	3			Y		1,916
17	RG	Tyrone MDWCA	100	80	6	1				9
17	RG	Whiskey Creek Mobile Ranch	99	80	0	1				9
		River Basin Subtotals	27,477							2,855
		County Totals	29,288							3,007
19	AWR	Rural Self-Supplied Homes	341	80	0					31
		River Basin Subtotals	341							31
19	P	Riveras MDWUA	60	149	0	2				10
19	P	Rural Self-Supplied Homes	169	80	0					15
19	P	Sangre de Cristo MDWCA	346	80	0	1				31
19	P	Santa Rosa Water Supply	2,931	171	3	4	Y	Y		562
19	P	Vaughn - Duran Water System	624	80		1				56
		River Basin Subtotals	4,130							674
		County Totals	4,471							705
21	AWR	Mosquero Water System	125	80	0	1				11
21	AWR	Roy (Village Of)	332	196	0			Y		73
21	AWR	Rural Self-Supplied Homes	235	80	0	1				21
		River Basin Subtotals	692							105
		County Totals	692							105
23	LC	Glen Acres Community Water System	185	213	0			Y		44
23	LC	Lordsburg Water Supply System	2,300	217	0			Y		559
23	LC	Rodeo WUA	77	80		1				7

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
23	LC	Rural Self-Supplied Homes	931	80	0					83
23	LC	Virden Water System	129	80	0	1				12
		River Basin Subtotals	3,622							705
23	RG	New Mexico Tech, Playas Facility	65	18,059	0			Y		1,315
23	RG	Rural Self-Supplied Homes	895	80	0					80
		River Basin Subtotals	960							1,395
		County Totals	4,582							2,100
25	P	Eunice Water Supply System	3,677	351	5	2		Y		1,446
25	P	Jal Water Supply System	2,554	250	0	4		Y		716
25	P	Mescalero Ridge Water Co-op	50	198	0			Y		11
25	P	Monument WUA	271	100	0	1		Y		30
25	P	Rancho Dal Paso, LLC DBA Adobe Village	75	100	0	1				8
25	P	Rural Self-Supplied Homes	1,348	100	0					151
		River Basin Subtotals	7,975							2,363
25	TG	Hobbs Municipal Water Supply	37,877	183	0			Y		7,755
25	TG	Lovington Municipal Water Supply	11,762	100	0	1				1,318
25	TG	Rural Self-Supplied Homes	12,134	100	0	1				1,359
25	TG	Tatum Water System	948	100	0	1				106
25	TG	Triple J Trailer Park--Hobbs	185	81	0					17
		River Basin Subtotals	62,906							10,555
		County Totals	70,881							12,917
27	P	Alpine Village Sanitation District	120	52	9			Y		7
27	p	Alto Alps Homeowners Assn.	298	43	0			Y		14
27	P	Alto Lakes Water and Sanitation District	1,603	197	0			Y		354
27	P	Alto North Water Co-op	111	73	0			Y		9
27	P	Apple Blossom & White Angel Mesa	24	87	0			Y		2

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
27	P	Capitan Water System	1,400	122	7			Y		191
27	P	CDS Rainmakers Utility LLC Rancho Ruidoso	775	226	0			Y		197
27	P	Corona Water System	200	179	0	2				40
27	P	Fawn Ridge Homeowners Assn.	150	80	0	1				13
27	P	Fort Stanton Facility	135	80	6	1				12
27	P	High Sierra Estates	80	68	0			Y		6
27	P	Lazy Days RV Park/Rocky Mountain Mobile Home & RV Pk	200	17	0			Y		4
27	P	Lincoln Hills Water Co-op	150	711				Y		119
27	P	Lincoln MDWCA	75	124	0			Y		10
27	P	Ruidoso Downs Water System	2,800	143	9			Y		449
27	P	Ruidoso Water System	8,520	317	9	4	Y	Y	1,016	2,010
27	P	Rural Self-Supplied Homes	609	80	0					55
27	P	Sun Valley Sanitation Dist.	380	30	9			Y		13
27	P	The Riverbend	75	80	0	1				7
		River Basin Subtotals	17,705						1,016	3,512
27	RG	Carrizozo Water System	998	333	7	2				372
27	RG	Cedar Creek Cabin Owners Assn.	260	80	0	1				23
27	RG	Enchanted Forest Water Co	350	91	0			Y		36
27	RG	Loma Grande Estates Water Assn.	175	30	0			Y		6
27	RG	Nogal MDWCA	60	61	6			Y		4
27	RG	Rural Self-Supplied Homes	406	80	0					36
		River Basin Subtotals	2,249							477
		County Totals	19,954						1,016	3,990
28	RG	Los Alamos County	17,905	171	4		Y	Y	38	3,391
		River Basin Subtotals	17,905						38	3,391
		County Totals	17,905						38	3,391

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
29	RG	Columbus Water System	1,619	115	0			Y		209
29	RG	Deming Municipal Water System	14,523	190	0	4		Y		3,090
29	RG	Hidden Valley Water System	417	100		1				47
29	RG	Pecan Park MDWCA	105	156	0			Y		18
29	RG	Peoples Water Co-op	80	100	0	1				9
29	RG	Rural Self-Supplied Homes	8,062	100	0					903
		River Basin Subtotals	24,806							4,276
		County Totals	24,806							4,276
31	LC	Block a Well Co-op/ William Acres	67	70	0	1				5
31	LC	Coal Basin Water Assn.	57	70	0	1				4
31	LC	D & S Trailer Ranch	100	70	0	1				8
31	LC	Gallup Water System	23,515	107		4		Y		2,904
31	LC	Manuelito Navajo Childrens Home	65	70	0	1				5
31	LC	Ramah Water & Sanitation Dist.	500	70	0	1				39
31	LC	Rob Roy Trailer Park	95	70	0	1				7
31	LC	Rural Self-Supplied Homes	24,753	70	0					1,941
31	LC	Sagebrush Water Co-op	56	70	0	1				4
31	LC	St Williams Mobile Home Park	84	70	0	1				7
31	LC	Whispering Cedars Water Assn.	350	5	0			Y		2
31	LC	White Cliffs MDWUA	210	50	0	1				12
31	LC	Yah Ta Hey W&SD	430	45				Y		22
31	LC	Zuni Pueblo Water Works	6,302	70	0	1				494
		River Basin Subtotals	56,584							5,455
31	RG	Bluewater Lake MDWCA	135	63	0			Y		10
31	RG	Cedar Ridge Trailer Park	76	70	0	1				6
31	RG	Greers Subdivision	125	88	0			Y		12

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
31	RG	Rural Self-Supplied Homes	3,775	70	0					296
31	RG	Thoreau Water & Sanitation District	1,277	72	0			Y		103
		River Basin Subtotals	5,388							427
31	UC	Rural Self-Supplied Homes	13,425	70	0					1,053
		River Basin Subtotals	13,425							1,053
		County Totals	75,397							6,934
33	AWR	Agua Negra MDWCA	200	80	0	1				18
33	AWR	Agua Pura MDWCA	284	80	0	1				25
33	AWR	Buena Vista MDWCA	216	80	0	1				19
33	AWR	Cleveland MDWCA	270	80	0	1				24
33	AWR	Del Rio MDWCA	150	80	0	1				13
33	AWR	El Alto MDWCA	170	80	0	1				15
33	AWR	Guadalupita MDWCA	131	27	0			Y		4
33	AWR	Ledoux MDWCA	150	80	0	1				13
33	AWR	Mora MDWCA	1,100	80	0	1				99
33	AWR	North Cleveland MDWCA	87	80	0	1				8
33	AWR	Ojo Feliz MDWCA	60	80	0	1				5
33	AWR	Rainsville Water & Sanitation District	250	80	0	1				22
33	AWR	Rancho Valmora	100	80	0	1				9
33	AWR	Rural Self-Supplied Homes	708	80	0					63
33	AWR	San Antonio De Cleveland MDWCA	189	46	0			Y		10
33	AWR	South Holman MDWCA	88	80	0	1				8
33	AWR	Upper Holman	225	30	0			Y		8
33	AWR	Wagon Mound MDWCA	336	196	0			Y		74
		River Basin Subtotals	4,714							438
		County Totals	4,714							438

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
35	P	Cloud Country Estates WUA	276	776	0		Y	Y	192	47
35	P	Cloud Country West Water System	200	52	0			Y		12
35	P	Mayhill Water Supply Company	69	48	0			Y		4
35	p	Pete Ragan Memorial WUA	150	100	0	1				17
35	P	Piñon MDWCA/Piñon WUA	100	100	0	1				11
35	P	Ponderosa Pines Property Owners Assn.	100	100	0	1				11
35	P	Robinhood Park WUA	250	92	0		Y		26	
35	P	Rural Self-Supplied Homes	3,774	100	0					423
35	P	Silver Cloud Water Assn.	100	100	0	1				11
35	P	Silver Spring Water System	40			1			4	
35	p	Twin Forks MDWCA	1,025	100	0	1			115	
35	P	Weed WUA	30	100	0	1				3
		River Basin Subtotals	6,114						337	539
35	RG	Alamo Heights WUA	50	122	0			Y		7
35	RG	Alamogordo Domestic Water System	31,261	145	3		Y	Y	3,601	1,488
35	RG	Boles Acres Water System	900	86	0			Y		86
35	RG	Canyon Hills WUA	52	141	0			Y		8
35	RG	Chippeway Water Users Assn.	109	123	0	2		Y		15
35	RG	Cider Mill Farms MDWCA	40	100	0	1				4
35	RG	Cloudcroft Water System	1,475	153	9		Y	Y	94	158
35	RG	Dog Canyon MDWCA	25	100	0	1				3
35	RG	Dungan MDWCA	49	84	0			Y		5
35	RG	Eileen Acres	190	107	0			Y		23
35	RG	Enchanted Valley Water Users	43	224	0			Y		11
35	RG	Freeman's / Crossroads Mobile Home Park	16	100	0	1				2

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
35	RG	High Rolls Community Water Users Co-op	250	65	0			Y		18
35	RG	Holloman Air Force Base	6,990	47				Y		372
35	RG	Karr Canyon Estates	110	81	0	1	Y		10	
35	RG	La Luz MDWCA	1,750	70	0		Y	Y	47	90
35	RG	Laborcita Water Users Assn.	52	1,867	0		Y	Y	109	
35	RG	Low Mesa WUA	17	420	0			Y		8
35	RG	Mountain Orchard WUA	85	49	0		Y		5	
35	RG	National Solar Observatory	109	123	0	2		Y		15
35	RG	Oasis Mobile Home Park	202	30	0			Y		7
35	RG	Orogrande MDWCA	60	311				Y		21
35	RG	Piney Woods WUA	250	47	0			Y		13
35	RG	Rolling Hills WUA	30	111	0		Y		4	
35	RG	Rural Self-Supplied Homes	10,700	100	0					1,199
35	RG	Timberon Water & Sanitation District	931	127	0		Y	Y	5	128
35	RG	Tularosa Water System	2,684	227	0			Y		682
35	RG	Waterfall Community WUA	112	96	0			Y		12
		River Basin Subtotals	58,542						3,874	4,374
		County Totals	64,656						4,212	4,913
37	AWR	Hills Village Water System	115	35	6			Y		5
37	AWR	Liberty MDWUA	164	114	6			Y		21
37	AWR	Logan Water System	1,350	177	6			Y		268
37	AWR	Nara Visa Water Co-op	58	80	0	1				5
37	AWR	Rad Water Users Co-op	600	84	0			Y		57
37	AWR	Rural Self-Supplied Homes	626	80	0	1				56
37	AWR	San Jon Water Supply	205	219	3			Y		50

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Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
37	AWR	Tucumcari Water System	5,321	168	4			Y		1,003
		River Basin Subtotals	8,439							1,465
37	P	House Water System	65	124	0			Y		9
37	P	Rural Self-Supplied Homes	77	80	0	1				7
		River Basin Subtotals	142							16
		County Totals	8,581							1,481
39	RG	Abiquiu MDWCA	400	80	0	1				36
39	RG	Agua Saña WUA	1,056	80	0	1				95
39	RG	Alcalde MDWCA	737	33	0			Y		28
39	RG	Apodaca MDWCA	95	149	0			Y		16
39	RG	Barranco MDWCA	52	55	0			Y		3
39	RG	Brazos MDWCA	300	41	0			Y		14
39	RG	Canjilon MDWCA	310	54	0			Y		19
39	RG	Cañon Plaza MDWCA	60	80	0	1				5
39	RG	Cañones MDWCA	97	80	0	1				9
39	RG	Capulin MDWCA	450	80	0	1				40
39	RG	Cebolla MDWCA	300	80	0	1				27
39	RG	Chama Water System	1,200	56	0		Y		75	
39	RG	Chamita MDWCA	996	37	0	2				41
39	RG	Christ In The Desert Monastery	30	51	0		Y		2	
39	RG	Cordova MDWCA	325	80	0	1				29
39	RG	Coyote MDWCA	45	53	0			Y		3
39	RG	Dixon MDWCA	500	36	0			Y		20
39	RG	Dulce--BIA, Jicarilla Agency	3,280	80		1			294	
39	RG	Duranes Y Gavilanes MDWCA	220	43	0			Y		11
39	RG	El Llano MDWCA	105	80	0	1				9

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Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
39	RG	El Rito Canyon MDWCA	300	80	0	1				27
39	RG	El Rito Regional Water & Waste Water Assn.	743	80	0	1				67
39	RG	Enchanted Mesa Mobile Home Park	225	58	0			Y		15
39	RG	Ensenada WUA--Los Ojos	202	80	0	1				18
39	RG	Española Water System (part)	8,742	75	0			Y		732
39	RG	Gallina Water System	75	80	0	1				7
39	RG	Greater Chimayo MDWCA	487	55	0			Y		30
39	RG	La Madera MDWCA	90	80	0	1				8
39	RG	Los Brazos MDWCA/La Assn. De Agua De Los Brazos	31	86	0	2		Y		3
39	RG	Los Ojos MDWCA	218	80	0	1				20
39	RG	Ojo Sarco MDWCA	400	24	0			Y		11
39	RG	Rio Embudo MDWCA	120	36	0			Y		5
39	RG	Rural Self-Supplied Homes	14,455	80	0					1,295
39	RG	Rutheron Mutual Water Assn.	253	80	0	1				23
39	RG	Tierra Amarilla MDWCA	470	80	0	1				42
39	RG	Truchas MDWCA	557	80	0	1				50
39	RG	Vallecitos MDWCA	92	49	0			Y		5
39	RG	Valley Estates MDWCA	185	142	0			Y		30
39	RG	Velarde MDWCA	527	59	0			Y		35
		River Basin Subtotals	38,730						371	2,825
39	UC	Lindrith Community Water Co-op	90	113	0			Y		11
39	UC	Lumberton WUA	240	54	0		Y		15	
39	UC	Lybrook WUA	242	80	0	1				22
39	UC	Rural Self-Supplied Homes	450	80	0					40
		River Basin Subtotals	1,022						15	73
		County Totals	39,752						385	2,898

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
41	P	Rural Self-Supplied Homes	174	100	0					19
		River Basin Subtotals	174							19
41	TG	Causey Water Assn.	50	162	0			Y		9
41	TG	Dora Water Assn.	150	179	0	2		Y		30
41	TG	Elida Water System	270	143	0			Y		43
41	TG	Floyd Water Co-op	113	141	0			Y		18
41	TG	Portales Water System	14,097	135	6	4		Y		2,385
41	TG	Roosevelt County Water Co-op	3,625	138	3			Y		560
41	TG	Rural Self-Supplied Homes	1,160	100	0					130
		River Basin Subtotals	19,465							3,176
		County Totals	19,639							3,195
43	RG	Algodones WUA	675	45	0			Y		34
43	RG	Anasazi Trails Water Cooperative	75	80	0	1				7
43	RG	Bernalillo Water System	9,200	114	0			Y		1,172
43	RG	Cañon MDWCA	320	61	0			Y		22
43	RG	Cedar Creek Water Cooperative Inc.	105	69	0			Y		8
43	RG	Cielo Vista Water Cooperative	34	32	0			Y		1
43	RG	Cochiti Lake Water System	450	80	0	1				40
43	RG	Cuba Water System	1,500	80	0	1				134
43	RG	Desert Sky Mountain Water Cooperative	130	94	0			Y		14
43	RG	Hofheins/Marcel Thomas Assn. Co-op Inc	68	115	0		Y	Y	9	
43	RG	Homestead Village	50	80	0	1				4
43	RG	Horseshoe Spring Assn. Inc.	100	79				Y		9
43	RG	Jemez Springs MDWCA	1,500	78	0		Y	Y	65	65
43	RG	La Jara Water Users Assn.	250	65	0		Y		18	
43	RG	La Mesa Water Co-op	750	92	0			Y		77

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
43	RG	La Puerta	25	142	0			Y		4
43	RG	Las Acequias De Placitas	450	80	0	1			40	
43	RG	North Ranchos de Placitas	505	69	0			Y		39
43	RG	Orchard Estates Faculty Lane Water Assn.	36	83	0			Y		3
43	RG	Overlook Water Cooperative/ J & J Utilities	125	95	0			Y		13
43	RG	Peña Blanca MDWCA	414	57	0			Y		26
43	RG	Placitas Trails Water Co-op	355	80	0	1				32
43	RG	Placitas West Water Co-op	110	97	0			Y		12
43	RG	Ponderosa MDWCA	350	86	0			Y		34
43	RG	Pueblo Los Cerros Browood	215	192	0			Y		46
43	RG	Puesta Del Sol	22	75	0			Y		2
43	RG	Ranchos de Placitas Sanitation Dist	264	103	0			Y		30
43	RG	Regina MDWCA	475	37	0			Y		20
43	RG	Rio Rancho - City of	84,664	112		4		Y		10,608
43	RG	Rural Self-Supplied Homes	32,508	80	0					2,913
43	RG	San Ysidro	198	70	0			Y		15
43	RG	Sierra Los Pinos Home Owners Assn.	300	80	0	1				27
43	RG	Sile MDWCA	168	80	0	1				15
43	RG	Vista del Oro de Placitas	90	92	0			Y		9
		River Basin Subtotals	136,481						132	15,439
43	UC	Rural Self-Supplied Homes	2,447	80	0					219
		River Basin Subtotals	2,447							219
		County Totals	138,928						132	15,658
45	UC	Aztec	7,401	170	3		Y		1,409	
45	UC	Blanco Water Assn.	1,017	60	7		Y		69	
45	UC	Bloomfield Water Supply System	8,253	141	0	4	Y		1,308	

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
45	UC	Farmington Water System	45,900	267	3		Y		13,742	
45	UC	Flora Vista WUA	4,300	57	7		Y	Y	22	252
45	UC	Harvest Gold Subdivision	460	70	6	1			36	
45	UC	La Vida Mission Community Water Supply	42	70	0	1			3	
45	UC	Lee Acres WUA	5,138	72	6		Y		413	
45	UC	Lower Valley WUA	8,121	117	3		Y	Y	1,066	
45	UC	Morningstar WUA	6,423	70	3	1			504	
45	UC	Navajo Dam MDWCA	458	67	0		Y		34	
45	UC	North Star WUA	3,750	23	0			Y		96
45	UC	Pine River MDCA	41	91				Y		4
45	UC	Rosa Joint Venture	175	32	0			Y		6
45	UC	Rural Self-Supplied Homes	16,769	70	0					1,315
45	UC	Shiprock--NTUA	8,295	174	6		Y		1,614	
45	UC	Southside WUA	1,593	38	6		Y		67	
45	UC	Upper La Plata WUA	2,265	63	6		Y		161	
45	UC	West Hammond MDWCA	3,578	70	6		Y		279	
		River Basin Subtotals	123,979						20,727	1,673
		County Totals	123,979						20,727	1,673
47	AWR	Big Mesa Water MDWCA	604	41	0		Y		28	
47	AWR	Conchas Dam	450	80	0	1				40
47	AWR	Pendaries Water System	500	80	0	1				45
47	AWR	Rural Self-Supplied Homes	288	80	0					26
		River Basin Subtotals	1,842						28	111
47	P	Benedictine Monastery	40	80	9	1				4
47	P	Chapelle MDWCA	36	80	0	1				3
47	P	Coruco Village	138	33	0			Y		5

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
47	P	East Pecos MDWCA	450	54	0			Y		27
47	P	El Ancon MDWCA	112	26	0			Y		3
47	P	El Cerrito MDWCA	22	40	0			Y		1
47	P	El Coruco MDWCA	138	80	0	1				12
47	P	Gabaldon MDWCA	45	270	0			Y		14
47	P	Gonzales Ranch MDWCA	114	80	0	1				10
47	P	Ilfield MDWCA	400	21	0			Y		10
47	P	La Cueva MDWCA	48	33	0			Y		2
47	P	La Pasada MDWCA	177	20	0			Y		4
47	P	Las Tusas MDWCA	20	80	0	1				2
47	P	Las Vegas Water Supply System	13,756	126	0		Y		1,947	
47	P	Lower Colonias MDWCA	40	9	0			Y		0
47	P	North San Ysidro MDWCA	110	80	0	1				10
47	P	Pecos Water System	2,015	80	0	1				181
47	P	Ribera MDWCA	143	41	0			Y		7
47	P	Rowe MDWCA	150	33	0			Y		5
47	P	Rural Self-Supplied Homes	6,862	80	0					615
47	P	San Jose MDWCA	200	80	0	1				18
47	P	San Juan MDWCA/Soham MDWCA	126	93	0			Y		13
47	P	San Miguel Del Vado MDWCA	79	40	0			Y		4
47	P	Sena Water System	100	58	0			Y		7
47	P	South San Ysidro MDWCA	35	56	0			Y		2
47	P	Tecolote Domestic Water Users Assn.	200	80	0	1				18
47	P	Tecolotito MDWCA	380	81	0			Y		35
47	P	Tres Lagunas Home Owners Assn.	52	80	0	1				5

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CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
47	P	Villanueva MDWCA	312	30	0			Y		10
47	P	Watrous MDWCA	122	92	0			Y		13
		River Basin Subtotals	26,422						1,947	1,038
		County Totals	28,264						1,975	1,149
49	P	Glorieta Camps/Lifeway Glorieta Conference Center	2,060	63	11					145
49	P	Rural Self-Supplied Homes	282	80	0					25
		River Basin Subtotals	2,342							170
49	RG	Agua Fria Community	650	80	0	1				58
49	RG	Asi La Mar Trailer Park	80	80	0	1				7
49	RG	Cañada De Los Alamos MDWCA	70	26	0			Y		2
49	RG	Cañoncito At Apache Canyon	250	80	0	1				22
49	RG	Casitas de Santa Fe	506	80	0	1				45
49	RG	Chupadero MDWCA	160	99	0			Y		18
49	RG	Cielo Lindo Mobile Home Park	26	80	0	1				2
49	RG	City of Santa Fe/Sangre de Cristo Water Company/Public Service of New Mexico	80,280	91	4	4	Y	Y	3,509	4,658
49	RG	Country Club Gardens Mobile Home Park	714	80	0	1				64
49	RG	Cuatro Villas MDWCA/La Puebla MDWCA	299	56	6			Y		19
49	RG	Cundiyo MDWCA	65	80	0	1				6
49	RG	El Rancho Mobile Home Park	40	80	0	1				4
49	RG	El Vadito De Los Cerrillos Water Assn.	450	26	0			Y		13
49	RG	Eldorado de Santa Fe	7,350	59	0			Y		487
49	RG	Entranosa Water and Wastewater Co-op (part)	2,975	136	2					453
49	RG	EPCOR/New Mexico American Water Co. (part)	5,370	41	0			Y		244
49	RG	Española Water System (Part)	1,749	77	0					150
49	RG	Galisteo MDWCA	181	240	0			Y		49
49	RG	Glorieta MDWCA\Glorieta Estates\East Glorieta	397	36	0			Y		16

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
49	RG	Hyde Park Estates	90	71	0			Y		7
49	RG	Juniper Hills Mobile Park	60	80	0	1				5
49	RG	Juniper Hills PT Ranch	65	80	0	1				6
49	RG	La Cienega MDWCA	525	27	0			Y		16
49	RG	La Cienega Owners Assn. Water System	60	410	0			Y		28
49	RG	La Vista Homeowners Assn.	42	100	0			Y		5
49	RG	Lamy Domestic Water User Assn.	99	80	0	1				9
49	RG	Las Campanas	873	243	6		Y	Y	15	223
49	RG	Lone Star Mobile Home Park	100	80	0	1				9
49	RG	Madrid Water Co-op	300	28	0			Y		9
49	RG	Pojoaque Terraces Mobile Home Park	204	128	0			Y		29
49	RG	Ranchitos de Galisteo WUA	90	73	0			Y		7
49	RG	Rio Chiquito MDWCA	130	65	0			Y		10
49	RG	Rio En Medio MDWCA	130	80	0	1				12
49	RG	Rural Self-Supplied Homes	27,915	80	0					2,501
49	RG	Santa Cruz MDWCA	371	80	0	1				33
49	RG	Santa Fe County South Sector	10,958	93	6	4	Y	Y	1,137	
49	RG	Santa Fe West Mobile Home Park	200	19	0			Y		4
49	RG	Shalom Mobile Home Park	50	80	0	1				4
49	RG	Solacito Homeowners Assn.	35	80	0	1				3
49	RG	Sunlit Hills of Santa Fe	978	98	0	2		Y		107
49	RG	Tesuque MDWCA	378	80	0	1		Y		34
49	RG	Trailer Ranch Mobile Home Park	200	60	0			Y		13
49	RG	Village Mobile Home Park	150	80	0	1				13
49	RG	Vista Redonda MDWCA	163	127	0			Y		23

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
49	RG	West Alameda	25	44	0			Y		1
49	RG	Wild And Wooley Trailer Ranch	93	80	0	1				8
		River Basin Subtotals	145,896						4,660	9,439
		County Totals	148,238						4,660	9,609
51	RG	Caballo Estates Water	25	439	0			Y		12
51	RG	Caballo Lake MDWA	147	25	0			Y		4
51	RG	Desertaire Water Company, LLC	46	80	0	1				4
51	RG	Elephant Butte Water System/New Mexico Water Service Company	2,046	115	0			Y		265
51	RG	Hillsboro MDWCA	192	57	6			Y		12
51	RG	Monticello Canyon Domestic Water Cooperative Assn.	86	80	0	1				8
51	RG	Monticello Mutual Domestic Water Users	66	72	0			Y		5
51	RG	Rural Self-Supplied Homes	2,226	80	0					199
51	RG	Truth or Consequences	6,632	189	4			Y		1,407
		River Basin Subtotals	11,466							1,917
		County Totals	11,466							1,917
53	RG	La Joya MDWCA	54	319	0			Y		19
53	RG	Magdalena Water Supply System	938	80	0	1				84
53	RG	New Mexico Boys Ranch	60	80	0	1				5
53	RG	Polvadera MDWCA	1,800	93	0			Y		188
53	RG	Rural Self-Supplied Homes	5,632	80	0	1				505
53	RG	San Acacia MDWCA	80	174	0			Y		16
53	RG	San Antonio MDWCA	950	124	7			Y		132
53	RG	Socorro Water System	7,951	205	0		Y	Y	60	1,763
		River Basin Subtotals	17,465						60	2,712
		County Totals	17,465						60	2,712
55	RG	Arroyo Seco MDWCA	546	38	0	2				23

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
55	RG	Cañon MDWCA	378	80	0	1		Y		34
55	RG	Cerro MDWC & SW /Cerro East MDWCA	280	80	0	1				25
55	RG	Chamisal MDWCA	550	30	0			Y		18
55	RG	Costilla MDWCA	300	80	0	1				27
55	RG	Cuchilla Del Llano MDWCA	400	40	0			Y		18
55	RG	Eagle Rock Village	35	80	0	1				3
55	RG	El Prado Water & Sanitation Dist.	1,118	96	0					121
55	RG	El Rancho Mobile Home Park	72	80	0	1				6
55	RG	El Salto MDWCA	232	41	0			Y		11
55	RG	Enchanted Mobile Home Park	150	80	0	1				13
55	RG	La Lama MDWCA	65	140	0			Y		10
55	RG	La Lomita Mobile Home Park	100	126	0			Y		14
55	RG	Las Colonias Moblie Home Park	85	40	0			Y		4
55	RG	Las Haciendas Homeowners WUA	60	100	0			Y		7
55	RG	Llano Quemado MDWCA	850	38	0			Y		36
55	RG	Llano San Juan MDWCA	84	80	0	1				8
55	RG	Lower Arroyo Hondo MDWCA	180	80	0			Y		16
55	RG	Lower Des Montes MDWCA	400	40	0			Y		18
55	RG	Ojo Caliente MDWCA	415	48	0			Y		22
55	RG	Peñasco MDWCA	700	28	0			Y		22
55	RG	Questa Water System	1,820	112	0			Y		228
55	RG	Ranchos de Taos MDWCA	750	111	0			Y		93
55	RG	Red River Water System	1,524	359	9	4	Y	Y	92	520
55	RG	Rio Lucio MDWCA	500	80	0	1		Y		45
55	RG	Rodarte MDWCA	86	138	0			Y		13

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
55	RG	Rural Self-Supplied Homes	9,136	80	0					819
55	RG	San Cristobal MDWCA	63	44	0			Y		3
55	RG	Sanchez Mobile Home Park	80	80	0	1				7
55	RG	Talpa MDWCA	700	51	0			Y		40
55	RG	Taos Municipal Water System	9,235	84	0	4		Y		872
55	RG	Trampas MDWCA	143	22	0			Y		4
55	RG	Tres Piedras MDWCA	300	28	0			Y		10
55	RG	Upper Arroyo Hondo MDWCA	195	80	0	1				17
55	RG	Upper Des Montes MDWCA	300	80	0	1				27
55	RG	Upper Ojito MDWCA	19	80	0	1				2
55	RG	Upper Ranchitos MDWCA	270	23	0			Y		7
55	RG	Vadito MDWCA	160	80	0	1				14
55	RG	Valdez MDWCA	100	80	0	1				9
55	RG	Valle Escondido Water System	300	46	0			Y		15
55	RG	Vigils Trailer Park	150	56	0			Y		9
55	RG	Village of Taos Ski Valley/Twining Water System	343	94	9			y		36
55	RG	West Rim MDWUA	113	80	0	1				10
		River Basin Subtotals	33,287						92	3,258
		County Totals	33,287						92	3,258
57	P	Clines Corners Water System	58	80	0	1				5
57	P	Duran Water System	90	80		1				8
57	P	Rural Self-Supplied Homes	99	80	0					9
		River Basin Subtotals	247							22
57	RG	Carlos Lucero Subdivision (Gilbert Lucero)	65	80	0	1				6
57	RG	Cassandra Water System	45	80	0	1				4
57	RG	Echo Valley Water Co.	396	64	0			Y		29

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
57	RG	Edgewood Meadows Water Co-op	100	56	0			Y		6
57	RG	Encino Water System	100	88				Y		10
57	RG	EPCOR/New Mexico American Water Co Edgewood District (part)	1,343	41	4	1				61
57	RG	Estancia, Town of	2,600	111	0			Y		325
57	RG	Homestead Estates	195	108	0			Y		24
57	RG	Indian Hills Water Company	434	70	0			Y		34
57	RG	Manzano MDWCA	60	80	0			Y		5
57	RG	Melody Ranch Water Co	208	80	0			Y		19
57	RG	Moriarty Water System	2,653	179	0			Y		531
57	RG	Mountainair	1,258	332	0			Y		468
57	RG	Punta De Agua MDWCA	36	112	0			Y		5
57	RG	Rural Self-Supplied Homes	4,827	80	0					433
57	RG	Squaw Valley Water Supply System	217	38	0			Y		9
57	RG	Sunset Acres Subdivision	247	67	0			Y		18
57	RG	Tajique MDWCA	181	80	0	1				16
57	RG	Torreon MDWCA	253	80	0	1				23
57	RG	Willard Water Supply System	266	64	0			Y		19
		River Basin Subtotals	15,484							2,045
		County Totals	15,731							2,067
59	AWR	Clayton Municipal Supply	2,400	211	0			Y		566
59	AWR	Des Moines Water System	200	80	0	1				18
59	AWR	Grenville Water System	25	51	0	2		Y		1
59	AWR	Rural Self-Supplied Homes	1,745	80	0					156
		River Basin Subtotals	4,370							742
		County Totals	4,370							742
61	RG	Belen Water System	9,780	111	0			Y		1,212

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 7. Public Water Supply and Self-Supplied Domestic. Withdrawals in acre-feet, in New Mexico counties, 2015. Compiled by Julie Valdez and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	USER	POP	GPCD	WEC	WWC	MSW	MGW	WSW	WGW
61	RG	Bosque Farms Water Supply System	4,092	68	0	2		Y		310
61	RG	Bosque Gardens MDWCA	146	129	0			Y		21
61	RG	Correo Water Assn.	129	100	0	1				14
61	RG	Cypress Gardens Water Users Assn.	937	77	0			Y		81
61	RG	D & J Mobile Home Park	52	100	0	1				6
61	RG	El Shaddai Water Co-op/ Mobile Home Park	75	100	0	1				8
61	RG	Hi Mesa Estates Water Co-op	145	68	0			Y		11
61	RG	Highland Meadows Estates MDWCA	43	100	0	1				5
61	RG	JC Mobile Home Park	35	23	0			Y		1
61	RG	Lee Estates Waterworks Assn.	48	67				Y		4
61	RG	Loma Escondida Water Assn.	50	100	0	1				6
61	RG	Los Lunas Water System	17,572	125	0	4		Y		2,451
61	RG	Meadow Lake Water System (operator: NMWSC)	2,310	43	0			Y		111
61	RG	Monterey Water Company, Inc.	1,278	59	0			Y		85
61	RG	New Mexico Water Service Company/Rio Del Oro/Rio Communities	7,335	106	0			Y		874
61	RG	Rural Self-Supplied Homes	31,968	100	0					3,581
61	RG	Santa Socorro Trailer Park	33	100	0	1				4
61	RG	Senior Living Systems, Inc.	50	100	0	1				6
61	RG	Silver Spruce Estates Water Company	60	90	0			Y		6
61	RG	Trails End Mobile Home Park	120	100	0	1				13
61	RG	Trinity Mobile Home Park	54	68	0			Y		4
		River Basin Subtotals	76,312							8,813
		County Totals	76,312							8,813
		State Totals	2,099,856						87,399	224,708

Key: CN=county code; RVB=river basin; GWB=ground water basin; WEC=water exchange code; WWC=water withdrawal code; MSW=measured surface water (y/n); MGW=measured ground water (y/n); WSW=withdrawal, surface water; WGW=withdrawal, ground water

Table 11. Acreage irrigated by drip, flood, and sprinkler application methods and sources of irrigation water in New Mexico counties, 2015. Data reported in acres.

County	SWDA	GWDA	TDA	SWFA	GWFA	TFA	SWSA	GWSA	TSA	TAI
Bernalillo	0	0	0	5,380	541	5,921	0	0	0	5,921
Catron	0	0	0	1,181	0	1,181	0	0	0	1,181
Chaves	0	326	326	984	29,422	30,406	0	23,559	23,559	54,291
Cibola	0	0	0	609	164	773	0	516	516	1,289
Colfax	0	0	0	18,015	0	18,015	3,963	0	3,963	21,978
Curry	0	0	0	0	0	0	0	71,060	71,060	71,060
De Baca	0	0	0	5,214	0	5,214	0	3,528	3,528	8,742
Dona Ana	0	89	89	36,960	34,846	71,806	0	20	20	71,915
Eddy	0	0	0	21,572	12,302	33,874		411	411	34,285
Grant	0	0	0	2,192	640	2,832	38	683	721	3,553
Guadalupe	0	0	0	2,339	272	2,611	0	0	0	2,611
Harding	0	0	0	0	0	0	0	2,347	2,347	2,347
Hidalgo	0	5,016	5,016	1,076	1,799	2,875	0	6,830	6,830	14,721
Lea	0	136	136	0	0	0	0	57,268	57,268	57,404
Lincoln	0	0	0	1,509	504	2,013	0	190	190	2,203
Los Alamos	0	0	0	0	0	0	0	0	0	0
Luna	0	17,378	17,378	800	9,502	10,302	0	2,200	2,200	29,880
McKinley	0	0	0	21	0	21	0	0	0	21
Mora	0	0	0	7,602		7,602	1,425	0	1,425	9,027
Otero	0	369	369	2,328	619	2,947	0	1,144	1,144	4,460
Quay	0	0	0	4,917	3,108	8,025	0	11,083	11,083	19,108
Rio Arriba	0	16	16	27,736	570	28,306	0	0	0	28,322
Roosevelt	0	0	0	0	0	0	0	65,701	65,701	65,701
San Juan	0	0	0	14,927	0	14,927	71,818	0	71,818	86,745
San Miguel	0	0	0	6,388	0	6,388	184	0	184	6,572
Sandoval	0	0	0	6,108	124	6,232	0	0	0	6,232
Santa Fe	0	28	28	1,478	4,323	5,801	0	4,636	4,636	10,465
Sierra	33	35	68	2,754	1,945	4,699	0	0	0	4,767
Socorro	0	0	0	13,340	6,004	19,344	0	110	110	19,454
Taos	0	0	0	16,600	0	16,600	0	535	535	17,135
Torrance	0	40	40	0	6,944	6,944	0	15,487	15,487	22,471
Union	0	0	0	170	2,316	2,486	0	40,787	40,787	43,273
Valencia	0	0	0	20,740	1,895	22,635	0	0	0	22,635
State Totals	33	23,433	23,466	222,940	117,840	340,780	77,428	308,095	385,523	749,769

Key: SWDA=drip irrigated acreage supplied by surface water; GWDA=drip irrigated acreage supplied by ground water; TDA=total drip irrigated acreage; SWFA=flood irrigated acreage supplied by surface water; GWFA=flood irrigated acreage supplied by ground water; TFA=total flood irrigated acreage; SWSA=sprinkler irrigated acreage supplied by surface water; GWSA=sprinkler irrigated acreage supplied by ground water; TSA=total sprinkler irrigated acreage; TAI=total acres irrigated.

Table 12. Irrigated Agriculture. Withdrawals in acre-feet, in New Mexico counties, 2015. Data compiled by Julie Valdez, Chuck Lawler, Matt Nelson, and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EP	TFWSW	CLSW	TPWSW	TPWGW
53	RG	MRGCD	F	2.25	2.25	3,402	0	8,777	5,852	18,031	0.50	0.69	0.35	54,806	24,623	79,428	26,334
53	RG	San Augustin Plains	S		1.64	0	110	0	0	110	0.65			0	0	0	278
			River Basin Subtotals			4,395	150	8,945	5,964	19,454				59,928	26,818	86,746	27,278
			County Totals			4,395	150	8,945	5,964	19,454				59,928	26,818	86,746	27,278
55	RG	Cerro and Questa	F	1.36		3,763	0	0	0	3,763	0.50	0.60	0.30	10,235	6,824	17,059	0
55	RG	Cerro and Questa	S		1.35		413	0	0	413	0.65			0	0	0	858
55	RG	Pexasco and Vicinity	F	1.32	1$	4,304	0	0	0	4,304	0.50	0.70	0.30	11,363	4,870	16,232	0
55	RG	Pexasco and Vicinity	S	1$	1.31	0	8	0	0	8	0.65			0	0	0	16
55	RG	Pilar and Vicinity	F	1.92	1$	46	0	0	0	46	0.50	0.70	0.35	177	76	252	0
55	RG	Rio Costilla	F	1.34	1$	1,130	0	0	0	1,130	0.50	0.60	0.30	3,028	2,019	5,047	0
55	RG	Rio Costilla	S	1$	1.35		85	0	0	85	0.65			0	0	0	177
55	RG	Taos and Vicinity	F	1.28	1$	7,357	0	0	0	7,357	0.50	0.70	0.35	18,834	8,072	26,906	0
55	RG	Taos and Vicinity	S	1$	1.28	0	29	0	0	29	0.65			0	0	0	57
			River Basin Subtotals			16,600	535	0	0	17,135				43,637	21,860	65,496	1,108
			County Totals			16,600	535	0	0	17,135				43,637	21,860	65,496	1,108
57	RG	Estancia GW Basin	D	1$	1.43	0	40	0	0	40	0.85			0	0	0	67
57	RG	Estancia GW Basin	F	1$	1.41	0	6,944	0	0	6,944	0.60			0	0	0	16,318

Key: CN=county number; RVB=river basin; T=type of irrigation system, i.e., drip (D), flood (F), or sprinkler (S); CIRSW=consumptive irrigation requirement for acreage irrigated with surface water; CIRGW=consumptive irrigation requirement for acreage irrigated with ground water; ASWO=acreage irrigated with surface water only; AGWO=acreage irrigated with ground water only; ASWC=surface water component of acreage irrigated with combined water, i.e., both surface and ground water; AGWC=ground water component of acreage irrigated with combined water; TAI=total acreage irrigated; EF=on-farm irrigation efficiency; EC=off-farm conveyance efficiency; Ep=project efficiency; TF:SW=total farm withdrawal, surface water; CLSW=surface water conveyance losses from stream or reservoir to farm headgate; TPWSW=total project withdrawals, surface water; TPWGW=total project withdrawals, ground water; 1=Adjusted CIR in the area please see Chapter 3 for a description; 2=metered and diversion data reported,3=NIIP numbers are as reported by NMISC; N/A=not applicable, no acreage was reported; - - =due to report format efficiency not provided.

Table 12. Irrigated Agriculture. Withdrawals in acre-feet, in New Mexico counties, 2015. Data compiled by Julie Valdez, Chuck Lawler, Matt Nelson, and Molly Magnuson, New Mexico Office of the State Engineer.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EP	TFWSW	CLSW	TPWSW	TPWGW
57	RG	Estancia GW Basin	S	N/A	1.39	0	15,487	0	0	15,487	0.65	- -	- -	0	0	0	33,118
		River Basin Subtotals				0	22,471	0	0	22,471				0	0	0	49,504
		County Totals				0	22,471	0	0	22,471				0	0	0	49,504
59	AWR	Clayton and Scattered	F	N/A	0.75	0	93	0	0	93	0.60	- -	- -	0	0	0	116
59	AWR	Clayton and Scattered	S	N/A	0.79	0	31,269	0	0	31,269	0.65	- -	- -	0	0	0	38,004
59	AWR	Dry Cimarron River	F	1.02	N/A	170	0	0	0	170	0.55	0.70	0.39	315	135	450	0
59	AWR	Dry Cimarron River	S	N/A	1.05	0	728	0	0	728	0.65	- -	- -	0	0	0	1,176
59	AWR	Tramperos Creek	F	N/A	0.75	0	2,223	0	0	2,223	0.55	- -	- -	0	0	0	3,031
59	AWR	Tramperos Creek	S	N/A	0.72	0	8,790	0	0	8,790	0.65	- -	- -	0	0	0	9,737
		River Basin Subtotals				170	43,103	0	0	43,273				315	135	450	52,064
		County Totals				170	43,103	0	0	43,273				315	135	450	52,064
61	RG	MRGCD	F	2.23	2.23	15,055	0	5,685	1,895	22,635	0.50	0.69	0.35	92,500	41,558	134,059	8,452
		River Basin Subtotals				15,055	0	5,685	1,895	22,635				92,500	41,558	134,059	8,452
		County Totals				15,055	0	5,685	1,895	22,635				92,500	41,558	134,059	8,452
		State Totals				225,136	408,628	52,404	63,601	749,769				830,249	425,618	1,255,440	1,120,625

Key: CN=county number; RVB=river basin; T=type of irrigation system, i.e., drip (D), flood (F), or sprinkler (S); CIRSW=consumptive irrigation requirement for acreage irrigated with surface water; CIRGW=consumptive irrigation requirement for acreage irrigated with ground water; ASWO=acreage irrigated with surface water only; AGWO=acreage irrigated with ground water only; ASWC=surface water component of acreage irrigated with combined water, i.e., both surface and ground water; AGWC=ground water component of acreage irrigated with combined water; TAI=total acreage irrigated; EF=on-farm irrigation efficiency; EC=off-farm conveyance efficiency; Ep=project efficiency; TFWSW=total farm withdrawal, surface water; CLSW=surface water conveyance losses from stream or reservoir to farm headgate; TPWSW=total project withdrawals, surface water; TPWGW=total project withdrawals, ground water; 1=Adjusted CIR in the area please see Chapter 3 for a description; 2=metered and diversion data reported,3=NIIP numbers are as reported by NMISC; N/A=not applicable, no acreage was reported; - - =due to report format efficiency not provided.

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7.1 APPENDIX C: GLOSSARY

Acre-foot (AF)

The quantity of water required to cover one acre (43,560 square feet) of land with one foot of water. There are 325,851 gallons in one acre-foot of water.

Aquifer

A saturated underground formation of permeable rock or unconsolidated materials, such as gravel, silt, or clay, capable of storing water and transmitting it to wells, springs, or streams.

Combined water

The combination of groundwater and surface water used on-site for the same purpose, such as crop irrigation.

Consumptive irrigation requirement (CIR)

The quantity of irrigation water expressed as a depth or volume per unit area, exclusive of effective rainfall, that is consumptively used by plants or is evaporated from the soil surface in a specific period of time. It does not include water requirements for leaching, frost protection, wind erosion protection, or plant cooling. Such requirements are accounted for in on-farm efficiency values. The consumptive irrigation requirement may be numerically determined by subtracting effective rainfall from the consumptive use.

Consumptive use (U, u_m) or evapotranspiration (ET)

The unit amount of water consumed on a given area in transpiration, building of plant tissue, and evaporated from adjacent soil, water surface, snow, or intercepted rainfall in a specific period of time. The term includes effective rainfall. Consumptive use may be expressed either in volume per unit area, such as area-inches or acre-feet per acre, or depth, such as in inches or feet.

Crop distribution ratio (CDR)

A ratio computed by dividing the acreage planted in a specific crop by the total acreage for all crops included in the cropping pattern.

Cropping pattern

The distribution of the total irrigated acreage in a specific area according to the acreage planted in each individual crop.

Diversion

The quantity of calculated, metered, or estimated water taken from a surface water or groundwater source.

(See withdrawal)

Drip irrigation

The precise application of water on, above, or beneath the soil by surface drip, subsurface drip, bubbler, spray, mechanical move, and pulse systems. Water is applied as discrete or continuous drops, tiny streams, or miniature spray through emitters or applicators placed along a water delivery line near the plant(s). This may also be referred to as trickle irrigation.

Effective rainfall (R_e, r_e)

Rainfall that occurs during the growing period of a crop that becomes available to meet its consumptive irrigation requirements. It does not include rain that is intercepted by the plant canopy, surface runoff, or deep percolation below the root zone.

Evapotranspiration (ET)

See consumptive use.

Farm delivery requirement (FDR)

The quantity of water exclusive of effective rainfall, that is delivered to the farm headgate or is diverted from a source of water that originates on the farm itself, such as a well or spring, to satisfy the consumptive irrigation requirements of crops grown on a farm in a specific period of time. The farm delivery requirement is computed by dividing the consumptive irrigation requirement, expressed as depth or volume, by the on-farm irrigation efficiency, expressed as a decimal.

Flood irrigation

Includes furrow, border-strip, level-basin, and wild flooding. It is often referred to as "surface irrigation" because the water applied flows over the surface of the irrigated field, or "gravity irrigation" because free water runs downhill.

Gallons per capita per day (GPCD)

The average quantity (gallons) of water used per person, or per head of livestock, per day.

Groundwater

Water stored in the zone of saturation of an aquifer.

Idle and fallow

Acreage plowed and cultivated during the current year but left unseeded, or acreage that is left unused one or more years.

Instream use

Water use that occurs within a stream channel. Instream use is not dependent on withdrawal or diversion from groundwater or surface water sources; it is usually classified as a flow use. Examples of flow uses that depend on water running freely in a channel are hydroelectric power generation, recreation, fish propagation, and water quality improvement.

Irrigable acreage

The sum of irrigated crop acreage and idle and fallow acreage. Such acreage is developed for farming and irrigation works to apply water to the land. It does not include farmstead, feedlots, road areas, ditches, and the like.

Irrigated acreage (net)

Includes agricultural land to which water was artificially applied by controlled means during the calendar year. It includes pre-plant, partial, supplemental, and semi-irrigation applications. Land flooded during high water periods is included as irrigation only if the water was diverted to agricultural land by dams, canals, or other works. It is equal to the sum of all irrigated crop acreage minus the multiple-cropped acreage.

Multiple-cropped acreage

The same acreage used to produce two or more crops in the same year. When conducting inventories of irrigated acreage, each irrigated crop is included as part of the planted acreage, but the multiple-cropped acreage is subtracted from the sum of all crop acreage to obtain the net acreage irrigated.

Off-farm conveyance efficiency (E_c)

The ratio, expressed as a percentage of the quantity of water delivered from an off-farm source to the farm headgate by an open or closed conveyance system, to the quantity of water introduced into the conveyance system at the source or sources of supply.

On-farm distribution system

A system that conveys diverted water to locations on the farm. On-farm distribution systems may consist of a series of ditches or pipes.

On-farm irrigation efficiency (E_f)

The ratio, expressed as a percentage, of the volume of irrigation water infiltrated and stored in the root zone to the depth or volume of water diverted from the farm headgate or a source of water originating on the farm itself, such as a well or spring. The on-farm irrigation efficiency reflects the efficiency of the on-farm distribution and application system, and includes deep percolation losses necessary as a beneficial use for leaching excess salts from the root zone. The on-farm irrigation efficiency is used to calculate the farm delivery requirement.

Pre-plant irrigation

Water applied to fields before seed is sown to provide optimum soil moisture conditions for germination and for storage in the soil profile for later consumptive use by plants during the growing season.

Project diversion requirement or off-farm diversion requirement (PDR)

The project diversion requirement, or off-farm diversion requirement, is defined as the quantity of water, exclusive of effective rainfall, that is diverted from an off-farm source to satisfy the farm delivery requirement in a specific period of time. An additional quantity of water must be diverted from the ultimate source of supply to make up for conveyance losses between the farm headgate and the source of water. Estimated conveyance losses are added to the farm delivery requirement to arrive at the project diversion requirement. The off-farm diversion requirement may also be calculated by dividing the farm delivery requirement by the off-farm conveyance efficiency, expressed as a decimal.

Project or system irrigation efficiency (E_j)

The combined efficiency of the entire irrigation system, from the original diversion point to the crop root zone. It is the product of the on-farm efficiency (E_f) and the off-farm conveyance efficiency (E_c) and is expressed as a percentage. When the irrigation source originates on-farm, such as from a well or spring, the off-farm conveyance efficiency does not apply. In that case, the project or system efficiency is the same as the on-farm irrigation efficiency.

River basin (RVB)

The entire area drained by a stream (or river) or system of connecting streams so that all the streamflow originating in the area is discharged through a single outlet.

Self-supplied

Water users who withdraw water directly from a groundwater or surface water source for individual use.

Sprinkler irrigation

A method of applying irrigation water (similar to rainfall) to farm crops, golf courses, and residential yards and gardens. On a farm, the water is distributed through a system of pipes, by a pump, and is sprayed through the air. Sprinkler irrigation systems can be divided into periodic move systems that remain at a fixed position while irrigating, and continuous move systems that move in either a circular or straight path while irrigating.

Surface water

Water stored in ponds, lakes, rivers, and streams.

Transpiration

The process by which water in plants is converted into water vapor and transferred in the atmosphere.

Weighted consumptive irrigation requirement (WCIR)

The CIR for a crop multiplied by the crop distribution ratio for that crop. Summing the WCIR for all the crops in a cropping pattern equals a WCIR for that cropping pattern.

Withdrawal

The quantity of calculated, metered, or estimated water taken from a surface water or groundwater source.

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