

12.5. A HISTORICAL PERSPECTIVE

12.5.1. History of Water Use and Allocation

The past is a key to the future. Awareness of social conditions that developed over time, influenced by geography, can aid with planning and thus management. When considering water usage today and tomorrow, understanding how the land has been used, the regimes built around the geography, and thus how water has been allocated is crucial to understanding how it is used now, what structures are in place, as well as what modifications may be undertaken to improve management.

Man has lived in the region for hundreds of years, as evidenced by the numerous prehistoric sites dotting the two watersheds.

Archeological site locations can aid in the understanding of population dynamics, settlement pattern analyses, as well as provide clues to landscape and environmental changes. In New Mexico, a composite record of site locations is maintained by the Laboratory of Anthropology in Santa Fe. In the Río Puerco drainage basin, a total of 10,905 known sites are recorded. These sites range in age from paleoindian (9,500 to 9,000 BC) to 19th and 20th century historic settlements. The types of sites in the database range from lithic scatters to masonry and adobe structures. Collecting bias notwithstanding, clear concentrations of sites are present within the upper and middle Río San Jose sub-basin, and the upper and middle Río Puerco valley. The greatest numbers of sites are less than 2000 years old and fall within a puebloan cultural grouping commonly referred to as Anasazi.

Navajo sites make their first appearance in the basin with an apparent depopulation of the area during Pueblo IV phase (1300-1600 AD). These sites tend to cluster in the northern portion of the Puerco basin in the Torreon sub drainage basin. By the time of Spanish contact in the 16th and 17th centuries, site density increased, but had shifted concentration to the upper Río San Jose sub basin in the area of the present Acoma and Laguna Pueblos as well as the Jemez Pueblo area of the upper Río Puerco valley. Although there are few sites in the data base for this period, 18th and early 19th century settlement continued in approximately the same areas as did subsequent Anglo-american and Hispanic occupation during the U.S. Territorial period and the first half of the 20th century. (Larsen and Herzog 2000)

Both Zia and Jemez Pueblos were founded in the 1200's. The Spanish arrived in the 1500's, bringing with them traditions learned from the Moors who had ruled the Iberian Peninsula for 800 years. Irrigated farming, practiced by the Pueblos, was reinforced and boosted to a governing entity. The *mayordomo* parceled water out to *parciantes*, depending on the amount of land to be irrigated rather than a system of sonority. The *repartimiento* of water allowed for all to have some water, even during a drought. First by Spain and then by Mexico, land was granted to individuals and to communities. Indeed, in order to obtain certain legal status, there often had to be an *acequia madre* as well as a church built first.

In 1680, the Pueblos in what is now New Mexico "probably numbered almost 17,000; European diseases, famine, and warfare were the principal causes of this decrease. By 1750 the Pueblo population declined to 12,000, while the nomad population stayed the same. By 1821 the Pueblo population had declined to about 5,000. The Pueblo population in the region was 5,400 in 1860–61 and increased to only 7,124 by 1904. By 1924 the total climbed to 10,565 and by 1964 to 20,822. For the Pueblos in the Middle Basin, the 1964 total was 16,817 (Hewett 1925: 1–2; Simmons 1979b: 221; Table 23).

Table 12.5-1 European Population Growth Prior to Mexican Independence

Year	Population
1680	2,900
1744	2,500
1752	3,402
1789	13,982
1800	8,173
1810	26,926
1817	27,791

Source: Table 35, *From the Rio to the Sierra: An Environmental History of the Middle Rio Grande Basin*, Dan Scurlock, 1998.

Table 12.5-2 Pueblo Population in the Middle Rio Grande, 1904–1968

Pueblo	1904	1924	1932	1942	1950	1968
Cochiti	217	267	295	346	497	707
Santo Domingo	846	1,054	862	1,017	1,106	2,248
San Felipe	489	526	555	697	784	1,542
Santa Ana	224	224	236	273	288	448
Zia	116	154	183	235	267	517
Jemez	498	580	641	767	883	1,707
Sandia	79	92	115	139	139	248
Isleta	979	1,003	1,077	1,304	1,470	2,449
Laguna	1,366	1,901	2,192	2,686	2,894	4,996
Acoma	734	955	1,073	1,322	1,447	2,688
Total	5,548	6,756	7,229	8,786	9,775	17,550

Sources: Dozier 1983: 122; Hewett 1925: 1–2, cited by Scurlock, 1998.

The communal agrarian structure was in place when New Mexico passed into the possession of the United States. The Treaty of Guadalupe Hidalgo (see appendices) was signed at the cessation of hostilities. Not only did it purport to protect the property of Mexicans then living in the territory, but the New Mexico Constitution ratified those protections in Article 2.¹ While much of the lands allocated to Pueblos remained intact, the period between 1848 and 1948 saw many of the land grants losing a great deal of their communal lands.²

¹ Article II, Section 5 of the New Mexico Constitution states that "The rights, privileges and immunities, civil, political and religious guaranteed to the people of New Mexico by the Treaty of Guadalupe Hidalgo shall be preserved inviolate."

² For this reason, the Government Accounting Office is researching claims and issuing a report, expected in 2004. Further information can be found in "Impacts and changes in the Rio Puerco, 1846-1980: A case study" from *From the Rio To the Sierra: An Environmental History of the Middle Rio Grande Basin* by Dan Scurlock, 1998.

Until fairly recently, many land grantees and *acequia parciantes* stayed on the land -- with the acequias playing an important role in their personal and community lives.

Utilizing a different arrangement, Pueblos also irrigated their fields. Sometimes, ditches were shared between Pueblo users and non-Pueblo users, a practice continued today. In northern New Mexico, small plots of alfalfa, vegetables, orchards and pasture were the norm.

After World War II, New Mexico began to rapidly change. Los Alamos brought in new faces, and industries connected with defense sprang up in Albuquerque. Tourism became an ever-increasing economic activity, as did service and government jobs. Many left the small communities and moved to the urban centers. Together with newcomers, cities have grown, adding new job opportunities to attract an ever-larger population. Rio Rancho sprang from a land grant to ranch land to a thriving city of 56,000 by 2002.

This change in economic activity has created stress on the rural communities. In addition to younger generations leaving, the water is leaving, too. Such stresses and changes have been occurring in the Río Jemez and Río Puerco valleys. Newcomers who know nothing of the *acequia* tradition try to build over the "creek." Children leave for education and jobs in Albuquerque, no longer returning for even the annual ditch cleaning. Urban centers, with increasing water demands, search for available water since all of the surface water in the region has been allocated to users. New economic opportunities bring new users and uses, as discussed in Section 10.

12.5.2. Current Land Use

12.5.2.1. Río Jemez

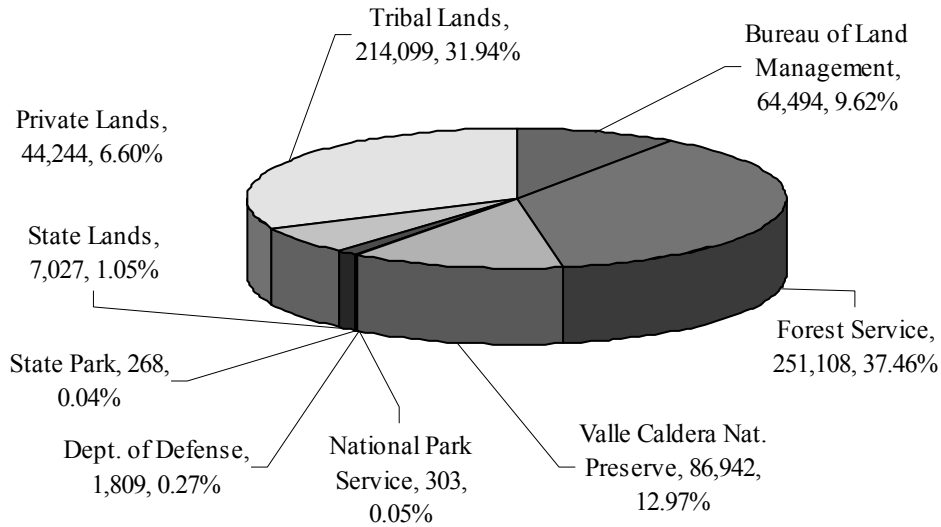
The Río Jemez subregion lies entirely within Sandoval County and includes the watershed area of the Jemez River within Sandoval County down to its confluence with the Rio Grande. The Río Jemez subregion occupies approximately 18% of the total water planning region.

Land status governs water management regimes in place and potential for change. In the Jemez watershed, 32% of the land is tribal, Bureau of Land Management has nearly 10%, the Forest Service manages 37% and the new Valles Caldera National Preserve contains another 13%, all as shown in Figure 12.5-1. Less than 7% is private land.

Figure 12.5-2 maps out the ownership - with the top of the watershed mostly being in the public domain. In the water quality studies, the New Mexico Environment Department (2002) underscores this when reporting that the land uses for the 1,043 mi² watershed above Jemez Pueblo is forest (99%), agriculture (<1%), and urban (<1%).

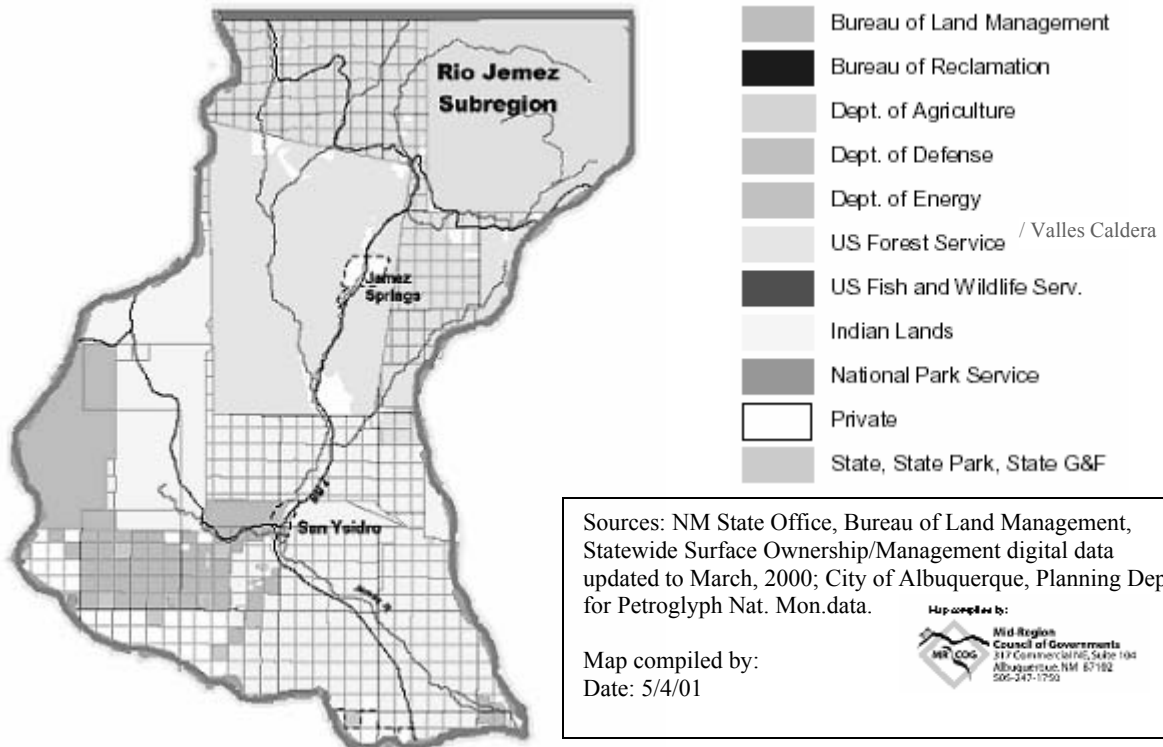
Figure 12.5-1 Río Jemez Land Ownership (acres)

Río Jemez Land Ownership, 670,294 acres



Source: BLM (9/24/03)

Figure 12.5-2 Río Jemez Land Status



Sources: NM State Office, Bureau of Land Management, Statewide Surface Ownership/Management digital data updated to March, 2000; City of Albuquerque, Planning Dept. for Petroglyph Nat. Mon.data.

Map compiled by:
Date: 5/4/01

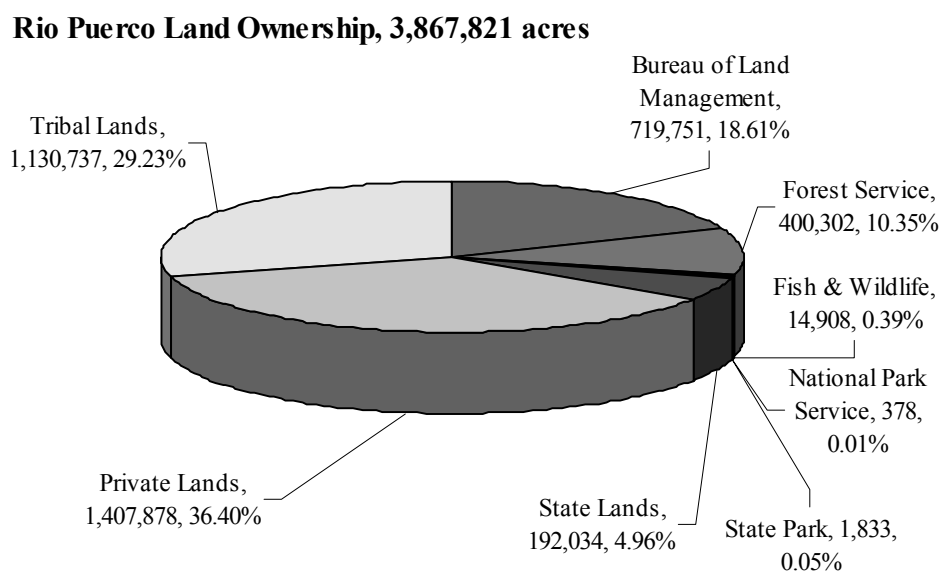
Map compiled by:
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505-247-1752

12.5.2.2. Río Puerco

The Río Puerco subregion extends from Sandoval County through Bernalillo County and into Valencia County. It occupies that portion of the Río Puerco watershed within those three counties, and has an area of approximately 2,119 square miles. The Río Puerco subregion occupies approximately 39% of the total water planning region.

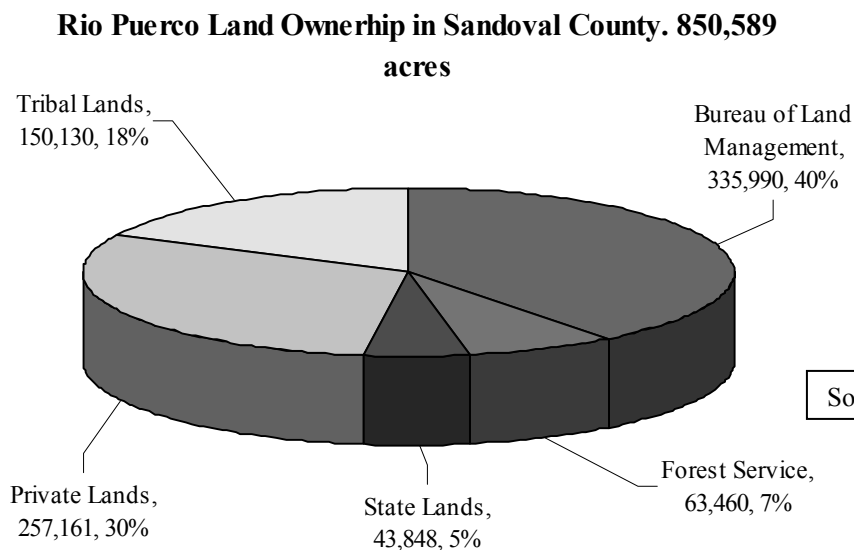
In the Río Puerco watershed, 30% of the land is tribal, Bureau of Land Management manages nearly 19%, and the Forest Service manages 10%, all as shown in Figure 12.5-3. More than 35% is private land.

Figure 12.5-3 Río Puerco Land Status



Source: BLM (9/24/03)










Figure 12.5-4 Río Puerco Land Ownership in Sandoval County

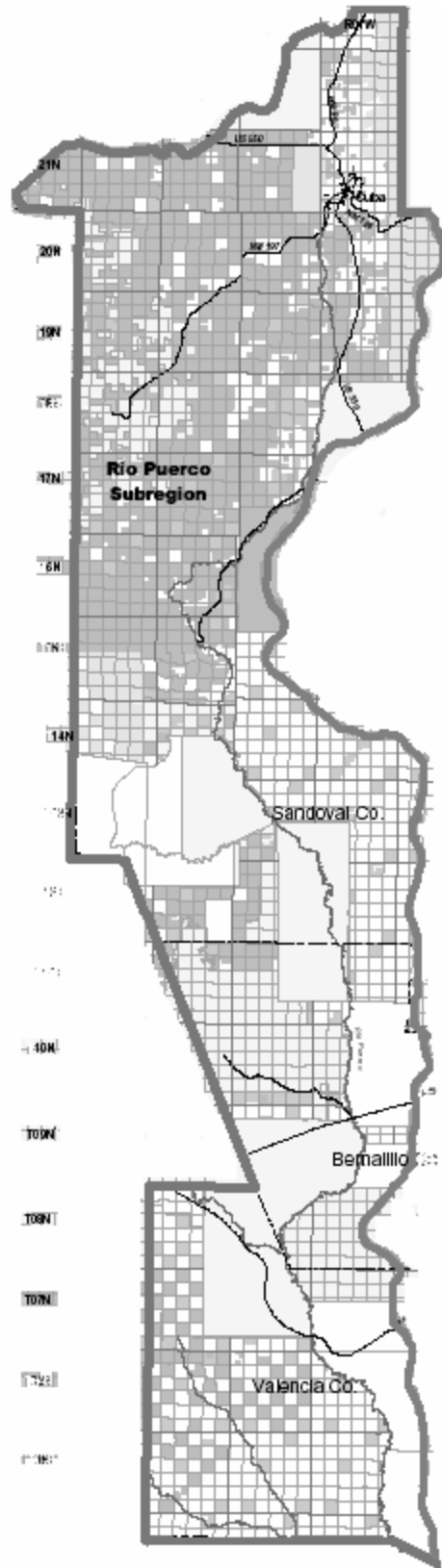


Source: BLM (10/7/03)

These percentages change when only the Sandoval County portion is considered. Tribal lands amount to 18%, while the Bureau of Land Management-managed lands amount to 40%, private land is 30% and the rest is Forest Service lands or State lands, all as shown in Figure 12.5-4. The top of the watershed is mostly in public domain, as shown by the map, Figure 12.5-5.

Figure 12.5-5 Map of Land Status, Río Puerco Subregion

-  Bureau of Land Management
-  Bureau of Reclamation
-  Dept. of Agriculture
-  Dept. of Defense
-  Dept. of Energy
-  US Forest Service
-  US Fish and Wildlife Serv.
-  Indian Lands
-  National Park Service
-  Private
-  State, State Park, State G&F



Sources: NM State Office, Bureau of Land Management, Statewide Surface Ownership/Management digital data updated to March, 2000; City and County of Albuquerque, Dept. for Petroglyph Nat. M

Map Projection:
 Transverse Mercator
 Datum: NAD 83
 Date: 5/4/01
 Map compiled by:



Native American lands within the full planning region are set out in Table 12.5-3. Several entities have land within both watersheds.

**Table 12.5-3 Middle Rio Grande Water Planning Region (MRGWPR)
Indian Lands by Tribe**

Name	Acres within MRGWPR	% of MRGWPR
To'hajiilee Reservation	61,184	1.74
Isleta Pueblo	20,907	0.59
Jemez Pueblo	89,376	2.54
Jicarilla Apache Reservation	16,572	0.47
Laguna Pueblo and Trust Lands	192,312	5.47
Navajo Reservation and Trust Lands	43,713	1.24
Santa Ana Pueblo	63,531	1.81
Zia Pueblo and Trust Lands	121,530	3.46
Total Indian Lands Acreage	609,125	17.32
Total MRGWPR	3,516,845	

Note: No distinction has been made between subregions or between them and lands located in the Río Grande valley. Source: MRCOG 2001.

Within these, land uses run the gamut from forestry to farming, as illustrated by the Natural Resources Conservation Service:

Prominent features [of Jemez Pueblo] include irrigated lands adjacent to the Jemez River and in close proximity to the village of Jemez Pueblo. The Village of Jemez Pueblo is home to nearly 3,000 Jemez Pueblo members. The Tribal Lands consist of 89,000 total acres and the number of producers is 199. The land use consists of 2,100 acres irrigated cropland, 6,500 acres grazing land and 21,900 acres of mountain mixed conifer.

The Jemez River is by far the most important economical and cultural water resource of the Pueblo. The river provides the Pueblos with the water resources for both the production of small family and communal farms and the recharge of the alluvium that provides the Pueblos with its source of drinking water. (U.S. Dept. of Agriculture, Natural Resources Conservation Service 2002).

12.5.3. Water Uses Reflected in Land Uses

One of the regional water planning products is the Future Water Use Projections for the Middle Rio Grande Water Planning Region (FWUP) produced by the Mid-Region Council of Governments (MRCOG) in January 2002. MRCOG prepared a regional land-use map with 18 land-use categories. In 1996, MRCOG produced a future land-use map for the year 2050 reflecting the continuation of existing growth trends and a projected regional population in the

year 2050 of approximately 1.47 million people. Using Shomaker's water use categories, as reported in Historical and Current Water Use in the Middle Río Grande Region (2000), for the year 1995, water withdrawal and depletions coefficients were derived for the land use categories. Projections of future withdrawals and depletion coefficients were calculated by combining withdrawal and depletion coefficients with the map of future land uses. (See Appendices for a summary of Shomaker's report.)

Region-wide, Shomaker et al. reported that 1995 regional withdrawals were approximately 600,000 acre-feet per year (Figure 50, page 88), and that 1995 regional depletions were approximately 340,000 acre-feet per year (Figure 52, page 90). Withdrawal and depletion coefficients relating water use to land uses were adjusted so that calculated existing regional water withdrawals and depletions based on the land-use map prepared by the Middle Rio Grande Council of Governments matched the regional withdrawals and depletions reported by Shomaker.

Of note, the depletions were calculated as a function of the withdrawals, rather than separately, and then further adjusted to match up with Shomaker's figures as reported in Figure 52. Withdrawals alone may provide a skewed picture, since many uses are credited with a return flow. A better gage of water usage would be depletion. Two examples are (1) where water is withdrawn to supply a home and returned via a wastewater system, with the depletion being the amount not returned; and (2) where water is diverted onto an irrigated field with a return flow captured or seepage to the aquifer replenishes the groundwater table, so that the depletion is that water used by the plant or evaporated. Table 12.5-4 summarizes the findings for the Río Jemez Subregion and Table 12.5-5 does likewise for the Río Puerco Subregion.

Table 12.5-4 Land Use Areas, Water Withdrawals and Depletions in Río Jemez Subregion

	Area in Río Jemez in 2000 (acres)	Adjusted Withdrawal Coeff. (gpa/d)*	Calculated Withdrawal in 2000 (ac-ft/year)	Adjusted Depletion Coeff. (gpa/d)	Existing Depletions (ac-ft/year)
Residential - Single Family	1,400	1,026	1,609	559	877
Multi-Family Residential	0	2,372	0	850	0
Major Retail Commercial	0	1,967	0	1,361	0
Mixed and Minor Commercial	131	1,967	289	1,361	200
Office	0	1,967	0	1,361	0
Industrial/Wholesale	80	623	56	431	39
Institutions	109	685	84	474	58
Schools/Universities	10	685	8	474	5
Airports	0	685	0	474	0
Transportation/Utilities	8	685	6	474	4
Agriculture - Irrigated	586	6,709	4,404	2,227	1,462
Rangeland/Dry Agriculture	432,055	0	0	0	0
Major Open Space & Parks (w. water use)	0	685	0	474	0
Major Open Space & Parks (no water use)	207,724	0	0	0	0
Natural Drainage/Riparian	7,012	3,109	24,419	3,109	24,419
Urban Vacant/Abandoned	98	0	0	0	0
Landfills/Sewage Treatment	8	685	6	474	4
Other Urban Non-residential	19	685	15	474	10
	649,240		30,895		27,078

*Adjusted to Shomaker report (ac-ft)
Source: FWUP, Table 3 and Table 8

Table 12.5-5 Land Use Areas, Water Withdrawals and Depletions in Río Puerco Subregion

Category	Area in Río Puerco in 2000 (acres)	Adjusted Withdrawal Coeff. (gpa/d)	Calculated Withdrawal in 2000 (ac-ft/year)	Adjusted Depletion Coeff. (gpa/d)	Existing Depletions (ac-ft/year)
Residential - Single Family	1,502	1,026	1,726	559	940
Multi-Family Residential	0	2,372	0	850	0
Major Retail Commercial	0	1,967	0	1,361	0
Mixed and Minor Commercial	50	1,967	110	1,361	76
Office	0	1,967	0	1,361	0
Industrial/Wholesale	63	623	44	431	30
Institutions	2	685	2	474	1
Schools/Universities	47	685	36	474	25
Airports	29	685	22	474	15
Transportation/Utilities	0	685	0	474	0
Agriculture - Irrigated	553	6,709	4,156	2,227	1,379
Rangeland/Dry Agriculture	1,275,581	0	0	0	0
Major Open Space & Parks (w. water use)	0	685	0	474	0
Major Open Space & Parks (no water use)	69,554	0	0	0	0
Natural Drainage/Riparian	125	3,109	435	3,109	435
Urban Vacant/Abandoned	40	0	0	0	0
Landfills/Sewage Treatment	1,414	685	1,085	474	751
Other Urban Non-residential	28	685	21	474	15
Totals	1,348,988		7,638		3,669

*Adjusted to Shomaker report (ac-ft)
Source: FWUP, Table 3 and Table 8

This information is included here to show land uses; concomitant water uses are discussed in Section 8.

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