PROJECTIONS FOR THE FUTURE

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INTRODUCTION

In this paper, current uses of water in New Mexico, as well as potential future demands, will be presented. The basis of these projections was a study conducted for the Second New Mexico Town Hall on Water held at Angel Fire, New Mexico in mid-May, 1988. These long-range projections will be conjectural in nature and constitute possible water futures for New Mexico. Demand estimates and existing supply figures will be combined to predict future water scarcity.

Water depletion is the foundation for any discussion of water use. The term depletion, means water withdrawn and no longer available for use because it has been evaporated, transpired, incorporated into products or crops, consumed by man or livestock, or otherwise removed.

For this presentation, the state of New Mexico was divided into nine river basins (figure 1). The water use figures on depletion were taken from a 1986 report by the State Engineer Office (SEO) (Wilson 1986). The data presented here combines Wilson's thirteen water use categories into five: agriculture, municipal, industrial, minerals and power, and evaporation.

CURRENT STATE WATER DEPLETIONS

Water depletions in New Mexico from 1970 to 1985 reflected the state's economic health during that period. From 1970 through 1980, there was an increase in water depletions. However, from 1980 to 1985, there was a significant decrease (400,000 acre-feet) in statewide depletions (table 1). The late 1970s and early 1980s represented the era of

Table 1. Water Depletion in New Mexico by Category, 1970-1985.

Water Use Category	1970*	1975**	1980#	1985##
	- - - - -thousands of acre-feet- - - -			
Agriculture	1,760.5	1,820.1	1,910.4	1,482.7
Municipal	84.9	107.5	129.9	137.9
Industrial	12.9	12.1	12.0	12.0
Minerals and Power	61.3	767.0	105.6	87.9
Evaporation	295.8	270.2	416.0	451.3
Total	2,215.4	2,286.9	2,573.9	2,171.8

*Source: Bureau of Reclamation (1976)
**Source: Sorensen (1977)
#Source: Sorensen (1982)
##Source: Wilson (1986)

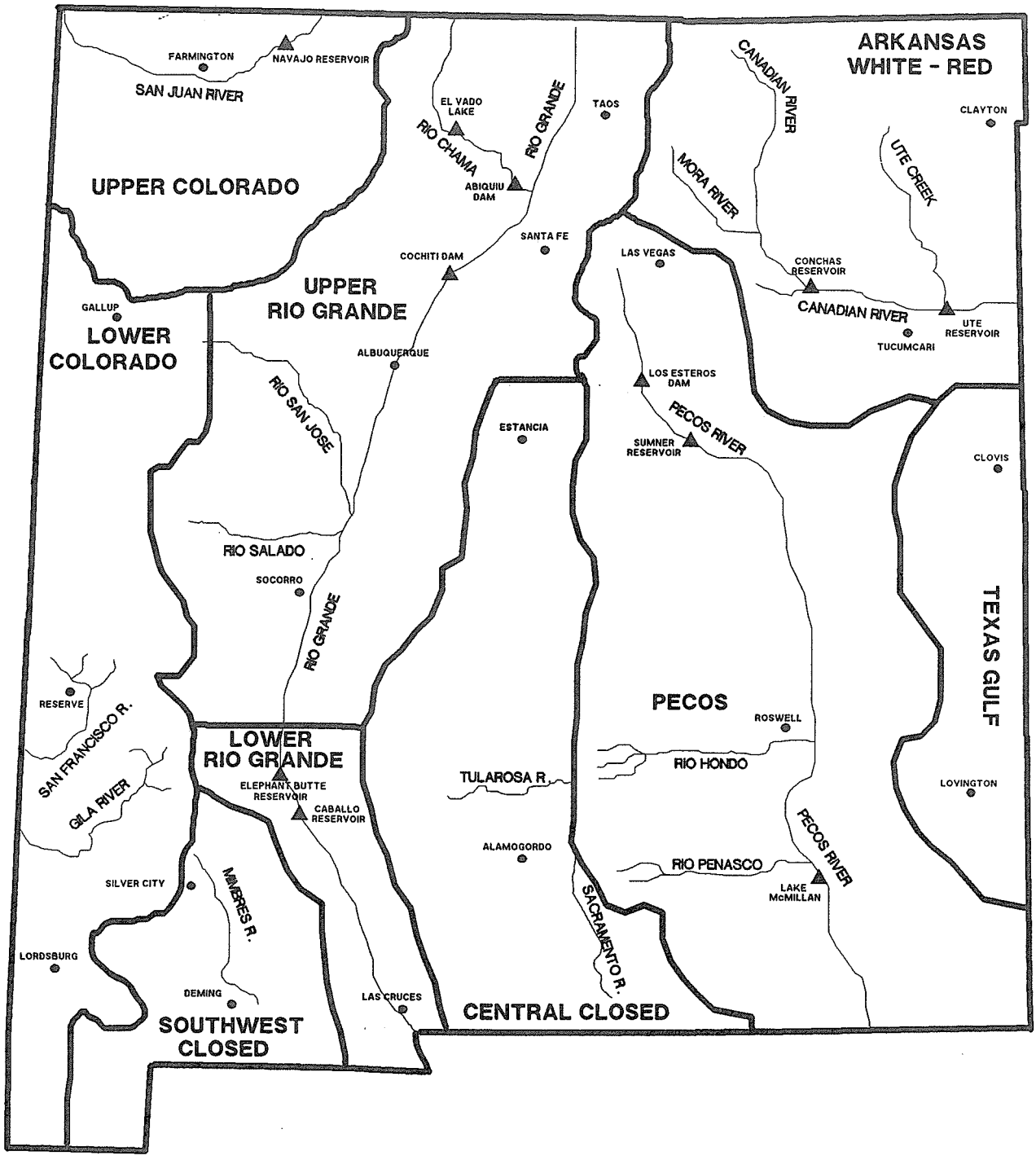

Figure 1. New Mexico's River Basins

greatest economic activity in the history of New Mexico. As indicated by depletions, the agricultural, and minerals and power sectors were at the height of economic activity. Since the early to mid-1980s, these sectors have been in an economic slump and water depletions are down (figure 2). The 1985 statewide depletions by the five water use categories are presented in figure 3. Of total depletions, agriculture accounted for 68%; evaporation, 21%; municipal, 6%; minerals and power, 4%; and industry, less than 1%.

CURRENT DEPLETIONS BY RIVER BASINS

Figure 4 presents depletions by river basin.

Upper Colorado River Basin

Nearly 99 percent of the 1985 depletions for the Upper Colorado River Basin were from surface water sources (Wilson 1986). Small quantities of ground water were used for rural, domestic, livestock, minerals, and recreation purposes. Of total depletions in this basin,

- Agriculture accounted for 72%
- Evaporation accounted for 13%
- Minerals and power accounted for 13%
- Municipal accounted for 2%
- Industry accounted for less than 1%

With the recent development of the Navajo Indian Irrigation Project (NIIP) in San Juan County, this basin has become one of the important irrigated agriculture regions in the state. During 1976, water was delivered to the first 9,200 acres on the project. Since then, water has been delivered to an additional 37,400 acres and eventually, 110,000 acres will be irrigated. The principal crops grown in this basin were alfalfa, corn, pasture, wheat, dry beans, and potatoes.

Lower Colorado River Basin

The Lower Colorado River Basin has the lowest depletions of all the basins in New Mexico. Much of the lower portion of the basin (Gila and San Francisco river basins) is under a federal adjudication decree. In these basins, surface and conjunctive ground water use is monitored closely by the SEO. There are no major reservoirs in this basin. Of total depletions in this basin,

- Agriculture accounted for 52%
- Minerals and power accounted for 28%
- Evaporation accounted for 12%
- Municipal accounted for 7%
- Industry accounted for less than 1%

Nearly all of the irrigated croplands were located in the southern portion of the basin (Catron and Hidalgo counties). Ground water was the most important source for irrigation and nearly all of the ground water depletions were in Hidalgo County. The principal crops were low-value crops such as cotton, grain sorghum, and corn.

Southwest Closed Basin

About 80 percent of the 1985 depletions in the Southwest Closed Basin were from ground water sources. All of the surface water depletions were for agricultural purposes. Of the total depletions in this basin,

- Agriculture accounted for 82%
- Minerals and power accounted for 13%
- Municipal accounted for 4%
- Evaporation accounted for less than 1%
- Industry accounted for less than 1%

Some 10,000 acres of native pasture in the Mimbres Basin in Luna County were irrigated with surface water from the Mimbres River. The Southwest Closed Basin encompassed about 3.3 percent of the state population in 1985, but only 2.8 percent of the state's municipal depletions.

Upper Rio Grande Basin

The Upper Rio Grande Basin had the fifth highest depletions of all the basins in New Mexico. Of total depletions, estimated at about 297,000 acre-feet in 1985,

- Agriculture accounted for 51%
- Municipal accounted for 26%
- Evaporation accounted for 18%
- Minerals and power accounted for 3%
- Industry accounted for 2%

The irrigated cropland was located primarily along the Rio Grande, the Rio Chama, the Jemez, the Rio Puerco, and the Rio San Jose. Surface water was the primary source of water for irrigation accounting for about 85 percent of the irrigation depletions. The lack of supplemental ground water presented a major problem during periods of low flows in the rivers. The cropping plan reflected this problem primarily producing low-value crops such as pasture, alfalfa, native pastures, corn, and small grains. However, some high-value crops were being produced in Rio Arriba, Bernalillo, and Valencia counties.

This basin had the largest municipal depletions of all the basins because of the Albuquerque metropolitan area. This basin accounted for about 56

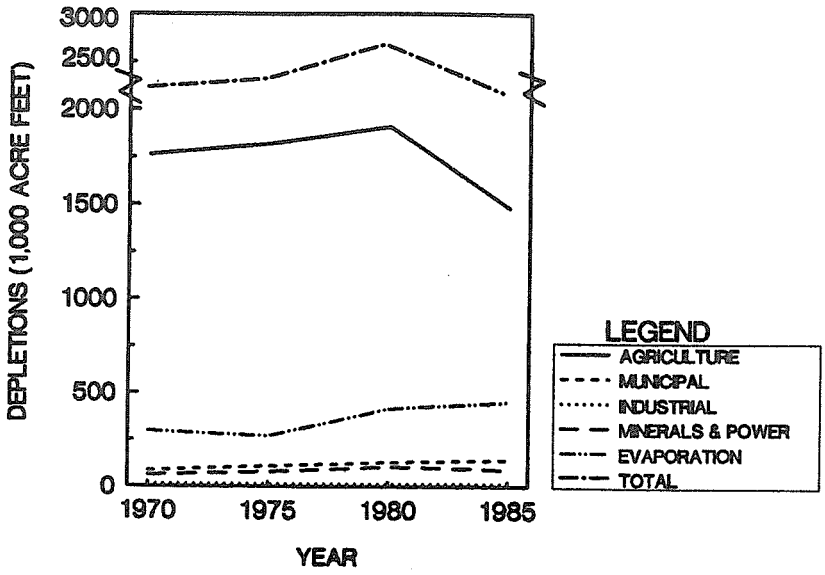

Figure 2. Water Depletion in New Mexico by Category, 1970 - 1985

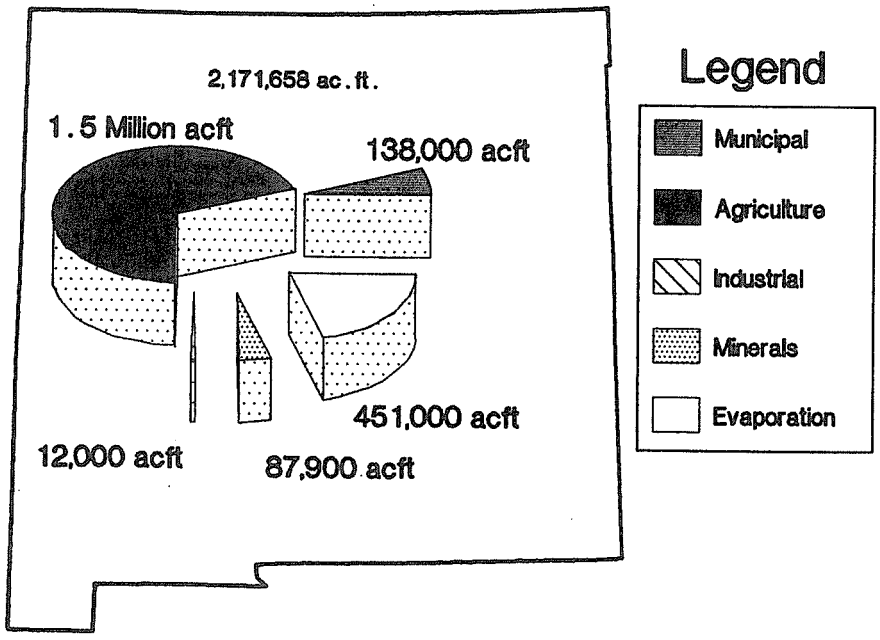

Figure 3. Summary of Water Depletions in New Mexico, 1985

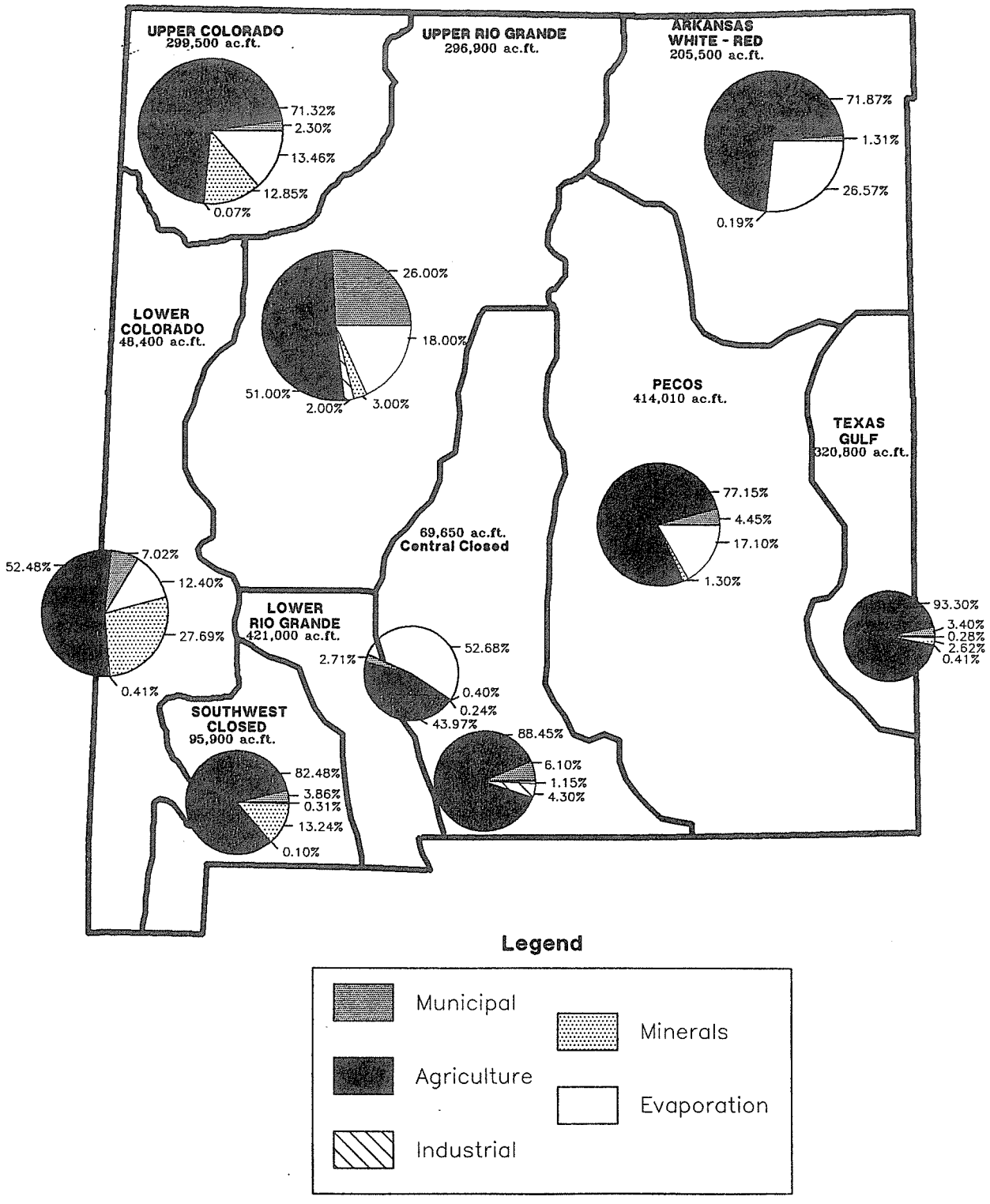

Figure 4. Water Depletions in New Mexico by River Basins, 1985

percent of the total municipal depletions in the state. The population of the basin accounted for about 49 percent of the total state population, and, therefore, the annual municipal depletion of 35,500 gallons per person was well above the state average of 31,000 gallons per person.

Lower Rio Grande Basin

About 88 percent of the depletions for 1985 in the Lower Rio Grande Basin were from surface water sources. Agriculture and municipal were large users of ground water. Small quantities of ground water were used for industrial, minerals, and recreational purposes. Of total depletions,

- Evaporation accounted for 53%
- Agriculture accounted for 44%
- Municipal accounted for 3%
- Minerals and power accounted for less than 1%
- Industry accounted for less than 1%

Because of its southernmost location and the presence of Elephant Butte and Caballo reservoirs, this basin ranked first in terms of evaporation among the state's nine river basins in New Mexico.

This was an important agricultural region in New Mexico producing about 70 percent of the high-value crops in New Mexico. The important irrigated crops in the basin in 1985, which account for about 44 percent of total depletions, were alfalfa, pecans, cotton, chile, lettuce, onions, and wheat.

Central Closed Basin

The Central Closed Basin had the second lowest depletions of all the basins in New Mexico. Of total depletions,

- Agriculture accounted for 88%
- Municipal accounted for 6%
- Industry accounted for 4%
- Evaporation accounted for 1%
- Minerals and power accounted for 0%

The Central Closed Basin includes several small rivers and major streams that feed the ground water basin. The major economic activity was primarily centered in southern Santa Fe County and northern Torrance County around the towns of Moriarty and Estancia in the northern part of the basin, and in Otero County and southeastern Doña Ana County around the cities of Alamogordo, Las Cruces, and El Paso, Texas, in the southern part of the basin.

Pecos River Basin

The Pecos River Basin had the second highest depletions in the state, surpassed only by the Lower Rio Grande Basin. Of total depletions in this basin,

- Agriculture accounted for 77%
- Evaporation accounted for 17%
- Municipal accounted for 4%
- Minerals and power accounted for 1%
- Industry accounted for less than 1%

The Pecos River Basin had the largest agricultural depletions of all the basins. The majority of the irrigated cropland was located primarily along the Pecos River in Chaves and Eddy counties; and the Rio Hondo and Rio Penasco in Lincoln, Chaves, Otero, and Eddy counties.

Arkansas-Red-White Basin

About 56 percent of the depletions in the Arkansas-Red-White (ARW) Basin for 1985 were from surface water sources. Small quantities of ground water were used for municipal and recreational purposes. Of total depletions,

- Agriculture accounted for 72%
- Evaporation accounted for 27%
- Municipal accounted for 1%
- Minerals and power accounted for less than 1%
- Industry accounted for less than 1%

The ARW basin was an important agricultural region in New Mexico with irrigated crops in 1985 of corn, grain sorghum, and wheat.

Texas Gulf Basin

More than 99 percent of the depletions in the Texas Gulf Basin for 1985 were from ground water sources. There are no rivers or major streams in the Texas Gulf Basin. Agriculture, municipal, and minerals were the top three water users in the basin. Small quantities of ground water were used for industrial and recreational purposes. Of total depletions,

- Agriculture accounted for 93%
- Municipal accounted for 3%
- Minerals and power accounted for 3%
- Industry accounted for less than 1%
- Evaporation accounted for less than 1%

POPULATION PROJECTIONS

To determine alternative future water depletions, three population projections were developed: 1) conservative growth, 2) potential growth, and 3) optimistic growth. The population projections for each are presented in figure 5 and table 2.

A detailed analysis of the three alternative population projections (conservative, potential, and optimistic) was completed and presented in a Water Resources Research Institute report by Creel, et al. (1988). There were little differences in depletions among the three population projections because there was little difference among population projections. The major differences were among scenarios. Consequently, in the interest of simplicity and readability, only future depletions for the middle "potential" population projections will be presented in this paper. Two scenarios will be presented for the population projections. The first scenario (A) will hold agricultural depletions constant at the 1985 level over time. The second scenario (B) will permit agricultural depletions to increase at the same rate as the other economic sectors. The second scenario could be representative of the conditions and projections of a high-growth economy that prevailed during the late 1970s and early 1980s. During this period, water depletions were much higher than in 1985. The agricultural, and minerals and power sectors were growing at a fast rate. If these sectors were to recover to growth levels experienced earlier, then Scenario B projections might be more valid.

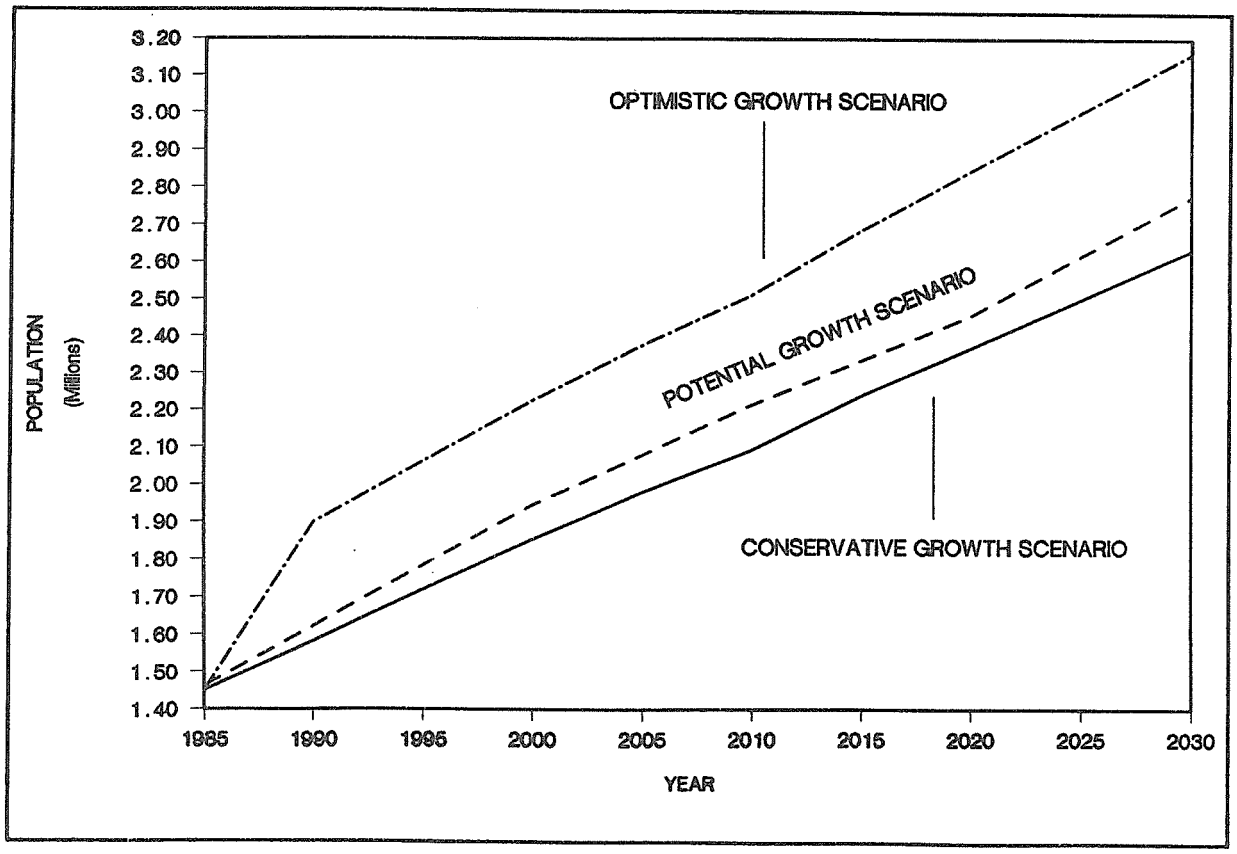

Figure 5. New Mexico Population Projections by Growth Scenarios

Table 2. New Mexico Population Projections by Growth Scenario, 1985-2030.

Basin	1985	2000	2010	2020	2030
			Conservative*		
Upper Colorado	62,028	100,295	121,501	148,337	173,053
Lower Colorado	64,870	89,987	108,363	123,828	140,469
Southwest Closed	47,980	56,807	63,035	68,748	74,672
Upper Rio Grande	706,052	881,119	972,162	1,093,211	1,203,207
Lower Rio Grande	126,803	189,283	219,478	263,490	302,085
Central Closed	59,824	77,191	87,503	99,512	110,846
Pecos	225,667	282,101	326,407	364,536	405,250
Arkansas-Red-White	42,907	46,608	49,558	52,499	55,430
Texas Gulf	115,170	130,709	145,093	156,417	168,781
Total	1,451,300	1,854,100	2,093,100	3,470,579	2,633,793
			Potential**		
Upper Colorado	59,005	91,985	115,181	139,505	161,399
Lower Colorado	65,201	86,378	102,234	120,423	134,082
Southwest Closed	49,359	62,361	70,265	78,312	86,882
Upper Rio Grande	721,175	940,529	1,043,331	1,118,540	1,266,756
Lower Rio Grande	124,091	193,882	236,564	271,712	318,464
Central Closed	57,978	71,789	79,668	87,384	96,548
Pecos	230,534	315,309	367,139	420,753	476,212
Arkansas-Red-White	42,760	50,452	54,840	59,285	64,319
Texas Gulf	112,202	131,967	145,307	160,342	173,208
Total	1,462,303	1,944,652	2,214,529	2,456,256	2,777,870
			Optimistic#		
Upper Colorado	62,028	120,354	145,801	178,004	207,663
Lower Colorado	64,870	107,985	130,035	148,593	168,562
Southwest Closed	47,980	68,168	75,643	82,498	89,607
Upper Rio Grande	706,052	1,057,343	1,166,595	1,311,854	1,443,848
Lower Rio Grande	126,803	227,140	263,374	316,854	1,443,848
Central Closed	59,824	92,629	105,003	119,414	133,015
Pecos	225,667	338,521	391,688	437,444	486,300
Arkansas-Red-White	42,907	55,929	59,470	62,000	66,517
Texas Gulf	115,170	156,851	174,112	187,701	202,538
Total	1,451,300	2,224,920	2,511,720	2,844,694	3,160,551

*Source: Bureau of Business and Economic Research, 1987.
**Source: Peach, J.T. and J.D. Williams, 1987.
#Source: adapted from Bureau of Business and Economic Research, 1987.

PROJECTED DEPLETIONS

Water depletions will be estimated for each of the three population projections based on 1985 depletions. Depletions per person will remain at the 1985 levels for the municipal, industrial, minerals and power, recreation, and fish and wildlife sectors. The per capita depletion coefficients will be used in conjunction with the population projection to estimate future water depletions by water use category. Reservoir evaporation will be held to the average of the past 20 years. The mid-1980s were very wet years and most of the reservoirs were at or near capacity which produced a very high evaporation estimate for 1985. Therefore, in typical years, evaporation would be grossly overestimated.

State-Scenario A

The state's water depletions will not exceed supply by 2030 (table 3). At the rate that depletions are increasing, the state has enough total water supplies to last for an additional 40 to 50 years. However, this large surplus is somewhat misleading because much of this surplus will be located in basins with low economic potential and population projections, such as the Lower Colorado, Southwest Closed, Central Closed, and the ARW basins.

The state depletions were estimated at 2.2 million acre-feet in 1985. Under this scenario, they were estimated to increase to 2.3 million acre-feet in 2030 (table 3). The total supply of water for depletions was estimated to be 3.2 million acre-feet in 1985 and is expected to decrease slowly to 3.1 million in 2030 due to ground water mining in the Texas Gulf Basin (table 3). Of total depletions in 2030,

- Agriculture accounted for 64%
- Evaporation accounted for 16%
- Municipal accounted for 11%
- Minerals and power accounted for 8%
- Industry accounted for less than 1%

State-Scenario B

If depletions had been permitted to grow at about the same rate as occurred in the late 1970s, statewide depletions would exceed supply between 2010 and 2020. The statewide water depletions, in

Table 3. Water Depletions by Water Use Category and Water Supply, New Mexico, Potential Growth Scenario, 1985-2030.

	Depletions				
Water Use Category	1985	2000	2010	2020	2030
	-thousands of acre-feet-				
Scenario A					
Agricultural	1,483.8	1,483.8	1,483.8	1,483.8	1,4838
Municipal	138.6	183.6	208.4	229.9	2601
Industrial	12.4	16.0	17.9	19.6	220
Minerals	88.5	124.3	148.5	173.6	1973
Evaporation	448.5	350.3	355.2	359.7	3654
Total Depletions	2,171.7	2,158.0	2,213.7	2,266.6	2,3285
Supply	3,249.0	3,235.0	3,174.0	3,149.0	3,1240
Scenario B					
Agricultural	1,483.8	1,985.7	2,301.5	2,615.0	2,9472
Municipal	138.6	183.6	208.4	229.9	2601
Industrial	12.4	16.0	17.9	19.6	220
Minerals	88.5	124.3	148.5	173.6	1973
Evaporation	448.5	350.3	355.2	359.7	3654
Total Depletions	2,171.7	2,659.9	3,031.5	3,397.9	3,7919
Supply	3,249.0	3,235.0	3,174.0	3,149.0	3,7919

2030, were estimated at 3.8 million acre-feet (table 3). Of total depletions,

- Agriculture accounted for 78%
- Evaporation accounted for 10%
- Municipal accounted for 6%
- Minerals and power accounted for 5%
- Industry accounted for less than 1%

RIVER BASINS

Upper Colorado River Basin-Scenario A

Based on the projected depletions it appears that in the Upper Colorado River Basin, supply will exceed depletions, in 2030, by 303,000 acre-feet (table 4). Depletions, in 2030, will account for 55 percent of the available supply. This surplus should continue beyond the year 2200. The total supply of water available for depletions in the basin was estimated to be 674,000 acre-feet over the period of this analysis. The depletions in the Upper Colorado River Basin were estimated at about 300,000 acre-feet in 1985 and are expected to increase to 371,000 acre-feet in 2030 (figure 6). The population projection under this scenario is expected to be about 11,600 persons less than under the conservative population projection. The Bureau of Business and Economic Research (BBER) recently revised the population projection upward for northwestern New Mexico because of the potential for a faster than expected recovery in the minerals and energy sector of the economy.

Upper Colorado River Basin-Scenario B

Depletions under this scenario will exceed supplies before 2030 (table 4). Total depletions in 2020 were estimated to be 645,100 acre-feet and are expected to increase to 741,600 acre-feet in 2030 (figure 7). This may be the more likely scenario if the Navajo Indian Irrigation Project (NIIP) is fully developed during the 45-year period of this analysis. Approximately 50,000 acres of irrigated cropland has been developed on NIIP, with approximately 60,000 acres yet to be developed.

Lower Colorado River Basin-Scenario A

Depletions will not exceed water supplies in 2030 (table 4). A surplus of 303,000 acre-feet will continue through the year 2200. Depletions, in 2030, account for about 42 percent of the available water supply. The total supply of water available for depletions in the basin was estimated to be 157,000 acre-feet over the period of this analysis. The depletions in the Lower Colorado River Basin were estimated at about 48,400 acre-feet in 1985 (figure 6) and are expected to increase to 66,400 acre-feet in 2030.

Lower Colorado River Basin-Scenario B

Depletions under this scenario will not exceed supplies in 2030 (table 4). Total depletions, in 2030, were estimated to be 93,200 acre-feet (figure 7). Under this scenario, the break-even point between depletions and supplies is near the year 2100.

Southwest Closed Basin-Scenario A

Depletions will not exceed supplies in 2030, by 78,400 acre-feet (table 4). Depletions, in 2030, account for about 58 percent of the available supply. This surplus should continue through 2200. The total supply of water available for depletions in the basin was estimated to be 187,000 acre-feet over the period of this analysis (figure 6). The depletions in the Southwest Closed Basin were estimated at about 95,900 acre-feet in 1985 and are expected to increase to 108,600 acre-feet in 2030.

Southwest Closed Basin-Scenario B

Depletions under this scenario will not exceed supplies in 2030 (table 4). Total depletions, in 2030, were estimated to be 168,700 acre-feet (figure 7). Under this scenario, the break-even point between depletions and supplies is expected to be between 2040 and 2050.

Upper Rio Grande Basin-Scenario A

Depletions will not exceed supplies in 2030 by 25,800 acre-feet (table 4). However, the basin's depletions will exceed supplies very shortly after 2040. The total supply of water available for depletions in the basin was estimated to be 395,000 acre-feet over the period of this analysis (figure 8). The depletions in the Upper Rio Grande Basin were estimated at about 296,800 acre-feet in 1985 and are expected to increase to 369,200 acre-feet in 2030.

Upper Rio Grande Basin-Scenario B

Depletions under this scenario will exceed supplies in 2030 by about 88,200 feet (table 4). Total depletions in 2010 were estimated to be

Table 4. Water Depletions by Water Use Category by Basin and Water Supply, Potential Population Projection, 1985 and 2030

Water Use Category	Upper Colorado River 1985	Upper Colorado River 2030	Lower Colorado River 1985	Lower Colorado River 2030	Southwest Closed 1985	Southwest Closed 2030
	(depletions in thousands of acre-feet)					
Scenario A						
Agricultural	213.6	213.6	25.4	25.4	79.1	79.1
Municipal	6.9	18.9	3.4	6.9	3.7	6.5
Industrial	0.2	0.6	0.2	0.5	0.1	0.2
Minerals	38.5	105.4	13.4	27.6	12.7	22.4
Evaporation	40.3	32.5	6.0	6.0	0.3	0.5
Total Depletions	299.6	371.0	48.4	66.4	95.9	108.6
Supply	674.0	674.0	157.0	157.0	187.0	187.0
Scenario B						
Agricultural	213.6	584.2	25.4	52.2	79.1	139.2
Municipal	6.9	18.9	3.4	6.9	3.7	6.5
Industrial	0.2	0.6	0.2	0.5	0.1	0.2
Minerals	38.5	105.4	13.4	27.6	12.7	22.4
Evaporation	40.3	32.5	6.0	6.0	0.3	0.5
Total Depletions	299.6	741.6	48.4	93.2	95.9	168.7
Supply	674.0	674.0	157.0	157.0	187.0	187.0

	Upper Rio Grande 1985	Upper Rio Grande 2030	Lower Rio Grande 1985	Lower Rio Grande 2030	Central Closed 1985	Central Closed 2030
	(depletions in thousands of acre-feet)					
Scenario A						
Agricultural	151.8	151.8	185.1	185.1	61.6	61.6
Municipal	77.0	135.3	11.4	29.4	4.5	7.3
Industrial	5.6	9.9	1.0	2.5	3.0	4.7
Minerals	8.5	14.9	1.7	4.4	0.0	0.0
Evaporation	54.0	57.3	221.8	154.7	0.5	0.8
Total Depletions	296.8	369.2	421.0	376.1	69.6	74.4
Supply	395.0	395.0	420.0	420.0	185.0	185.0
Scenario B						
Agricultural	151.8	265.8	185.1	475.1	61.6	124.4
Municipal	77.0	135.3	11.4	29.4	4.5	7.3
Industrial	5.6	9.9	1.0	2.5	3.0	4.7
Minerals	8.5	14.9	1.7	4.4	0.0	0.0
Evaporation	54.0	57.3	221.8	154.7	0.5	0.8
Total Depletions	296.8	483.2	421.0	666.1	69.6	137.2
Supply	395.0	395.0	420.0	420.0	185.0	185.0

	Pecos River 1985	Pecos River 2030	Arkansas-Red-White River 1985	Arkansas-Red-White River 2030	Texas Gulf 1985	Texas Gulf 2030
	(depletions in thousands of acre-feet)					
Scenario A						
Agricultural	320.1	320.1	147.7	147.7	299.3	299.3
Municipal	18.0	34.8	2.7	4.1	10.9	16.8
Industrial	0.8	1.6	0.0	0.0	1.3	2.0
Minerals	4.8	9.1	0.4	0.6	8.4	13.0
Evaporation	70.2	65.5	54.6	46.7	0.9	1.4
Total Depletions	414.0	431.1	205.5	199.2	320.8	332.5
Supply	435.0	435.0	424.0	424.0	342.0	152.0
Scenario B						
Agricultural	320.1	622.0	147.7	222.2	299.3	462.0
Municipal	18.0	34.8	2.7	4.1	10.9	16.8
Industrial	0.8	1.6	0.0	0.0	1.3	2.0
Minerals	4.8	9.1	0.4	0.6	8.4	13.0
Evaporation	70.2	65.5	54.6	46.7	0.9	1.4
Total Depletions	414.0	733.0	205.5	273.7	320.8	495.2
Supply	435.0	435.0	424.0	424.0	342.0	152.0

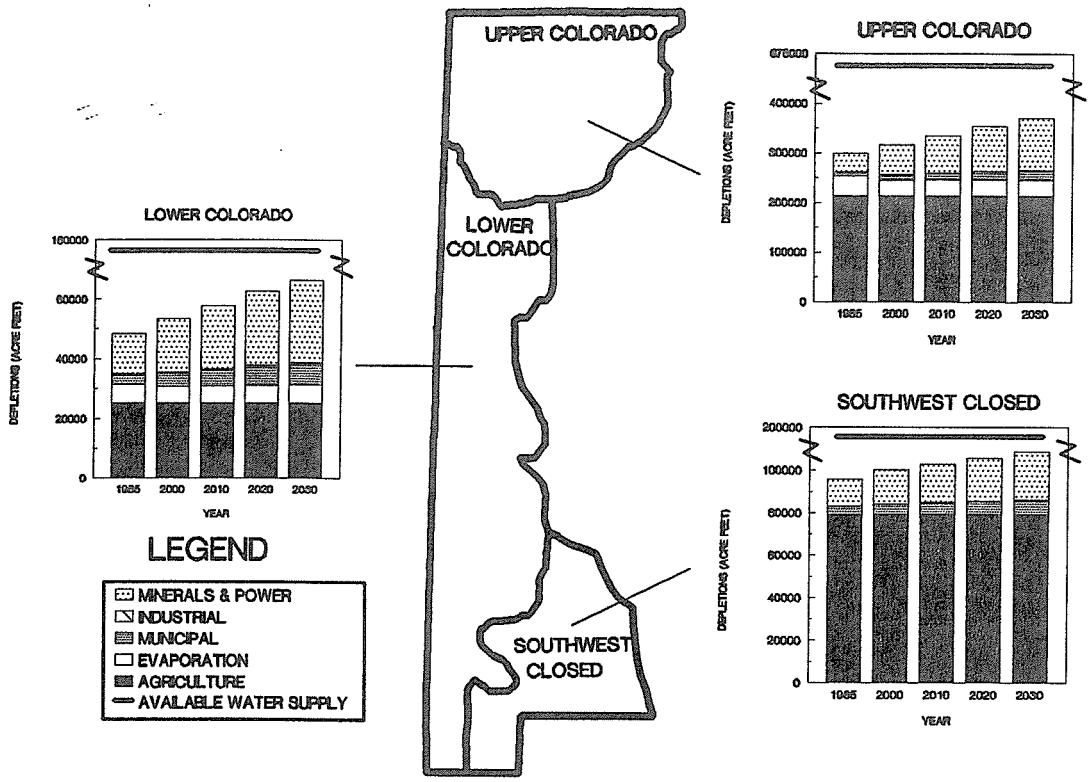

Figure 6. Water Depletion Projections for Upper Colorado, Lower Colorado and Southwest Closed Basins, Potential Growth Projection, Scenario A

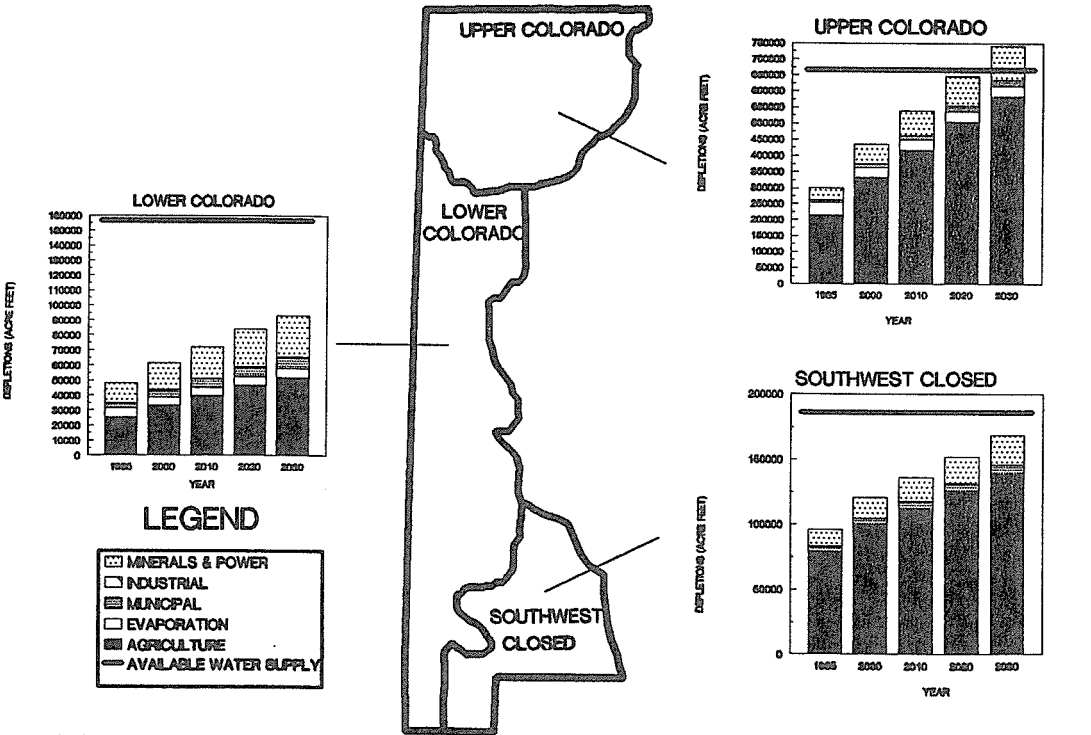

Figure 7. Water Depletion Projections for Upper Colorado, Lower Colorado and Southwest Closed Basins, Potential Growth Projection, Scenario B

404,600 acre-feet, 431,900 acre-feet in 2020, and increase to 483,200 acre-feet in 2030 (figure 9).

Lower Rio Grande Basin-Scenario A

Depletions will not exceed supply in 2030, by 3,900 acre-feet (table 4). However, the basin's depletions will exceed supplies very shortly after 2100. The total supply of water available for depletions in the basin was estimated to be 420,000 acre-feet over the period of this analysis (figure 8). The depletions in the Lower Rio Grande Basin were estimated at about 421,000 acre-feet in 1985 and are expected to decrease to 376,100 acre-feet in 2030. The decrease in depletions is due to the 67,100 acre-feet reduction in evaporation.

Lower Rio Grande Basin-Scenario B

Depletions under this scenario will exceed supplies in 2030 by about 246,100 acre-feet (table 4). Total depletions, in 2030, were estimated to be 666,100 acre-feet (figure 9), which is 246,100 acre-feet above available supplies. Under this scenario, the break-even point between depletions and supplies is about 1995.

Central Closed Basin-Scenario A

Depletions, in 2030, will not exceed supplies by 110,600 acre-feet (table 4). Depletions, in 2030, account for only about one-third of the available supply (figure 8). This surplus should continue through the year 2200. The depletions in the Central Closed Basin were estimated at about 69,600 acre-feet in 1985 and are expected to increase to 74,400 acre-feet in 2030.

Central Closed Basin-Scenario B

Depletions under this scenario will not exceed supplies in 2030 (table 4). Total depletions, in 2030, were estimated to be 137,200 acre-feet (figure 9). Under this scenario, the break-even point between depletions and supplies is more than 50 years beyond 2030.

Pecos River Basin-Scenario A

Depletions, in 2030, will not exceed supplies by 3,900 acre-feet (table 4). However, the basin's depletions will exceed supplies by 2040. The total supply of water available for depletions in the basin was estimated to be 435,000 acre-feet over the period of this analysis (figure 10). The depletions in the Pecos River Basin were estimated at about 414,000 acre-feet in 1985 and are expected to increase to 431,100 acre-feet in 2030.

Pecos River Basin-Scenario B

Depletions under this scenario will exceed supplies in 2030 by about 298,000 acre-feet (table 4). Total depletions, in 2030, were estimated to be 733,000 acre-feet (figure 11), which is 298,000 acre-feet above supplies. Under this scenario, the break-even point between depletions and supplies is between 1990 and 1995.

Arkansas-Red-White River Basin-Scenario A

Depletions, in 2030, will not exceed supplies by 224,800 acre-feet. The total supply of water available for depletions in the basin was estimated to be 424,000 acre-feet over the period of this analysis (figure 10). Depletions account for about 47 percent of the available supply. This surplus should continue beyond the year 2200. The depletions in the ARW Basin were estimated at about 205,500 acre-feet in 1985 and are expected to decrease to 199,200 acre-feet in 2030.

Arkansas-Red-White River Basin-Scenario B

Depletions under this scenario will not exceed supplies in 2030 (table 4). Total depletions, in 2030, were estimated to be 273,700 acre-feet (figure 11). Under this scenario, the break-even point between depletions and supplies is estimated to be beyond the year 2100.

Texas Gulf Basin-Scenario A

The Texas Gulf Basin depletions will exceed supplies prior to the turn of this century. The total supply of water available for depletions in the basin was estimated to be 342,000 acre-feet in 1985, 328,000 in 2000, 217,000 in 2020 and 152,000 in 2030 (figure 10). The depletions in the Texas Gulf Basin were estimated at about 320,800 acre-feet in 1985 and are expected to increase to 332,500 acre-feet in 2030.

Texas Gulf Basin-Scenario B

Depletions under this scenario will exceed supplies well before the turn of the century. Total

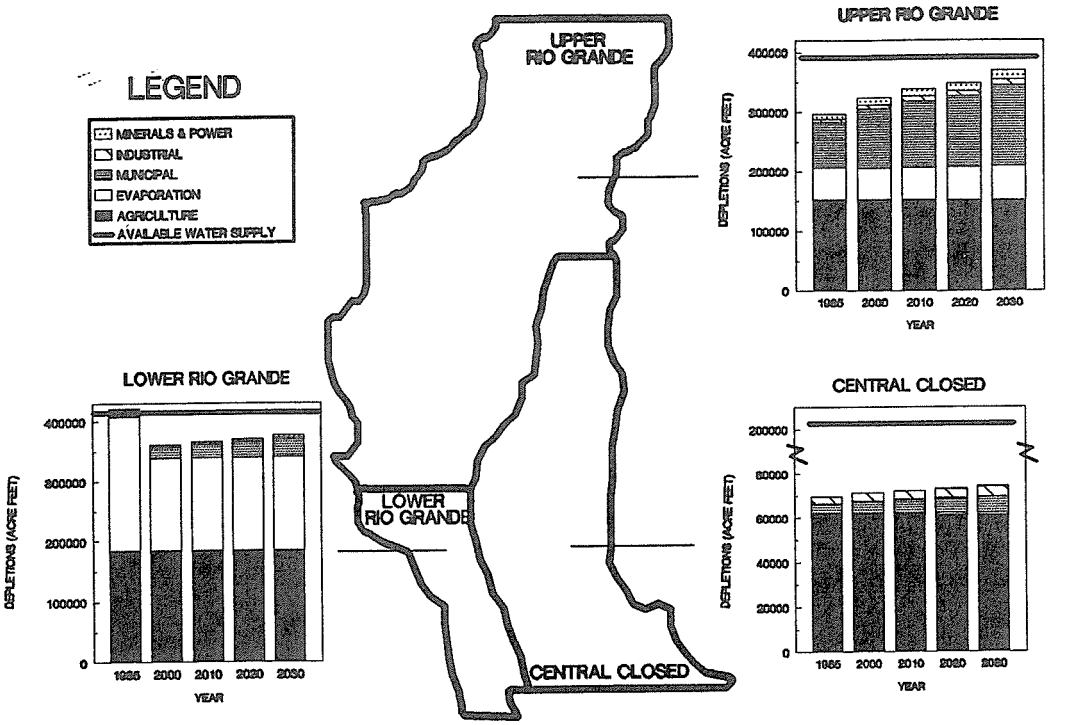

Figure 8. Water Depletion Projections for Lower Rio Grande, Upper Rio Grande, and Central Closed Basins, Potential Growth Projection, Scenario A

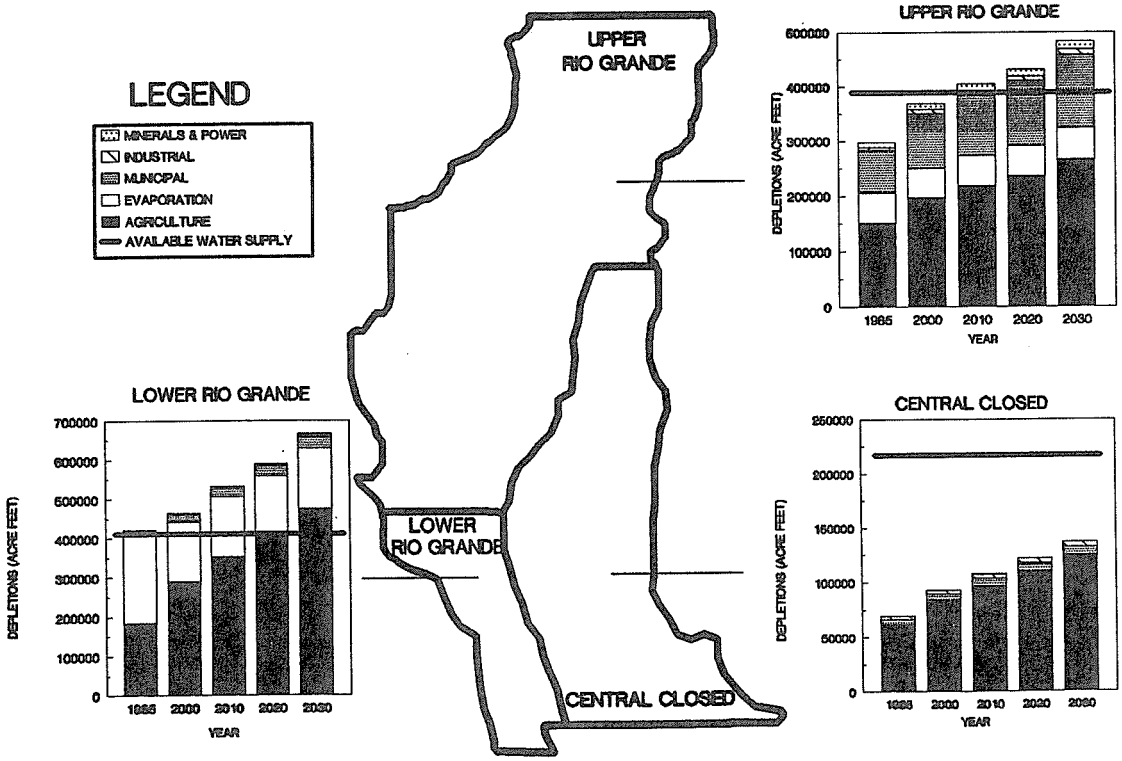

Figure 9. Water Depletion Projections for Lower Rio Grande, Upper Rio Grande, and Central Closed Basins, Potential Growth Projection, Scenario B

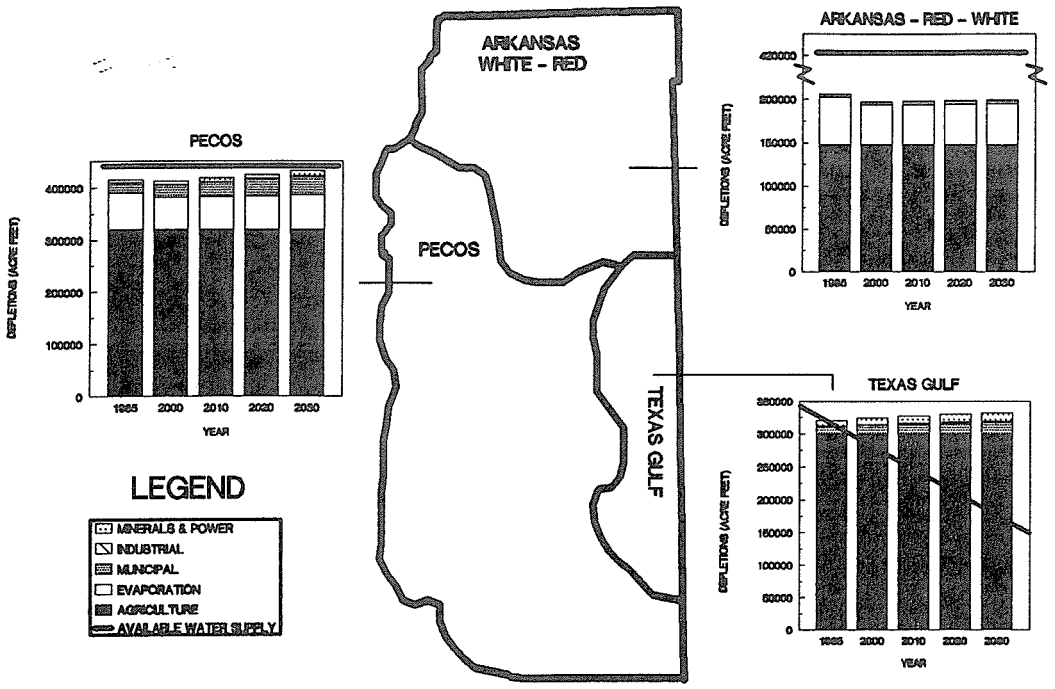

Figure 10. Water Depletion Projections for Pecos, Texas Gulf, and Arkansas-Red-White Basins, Potential Growth Projection, Scenario A

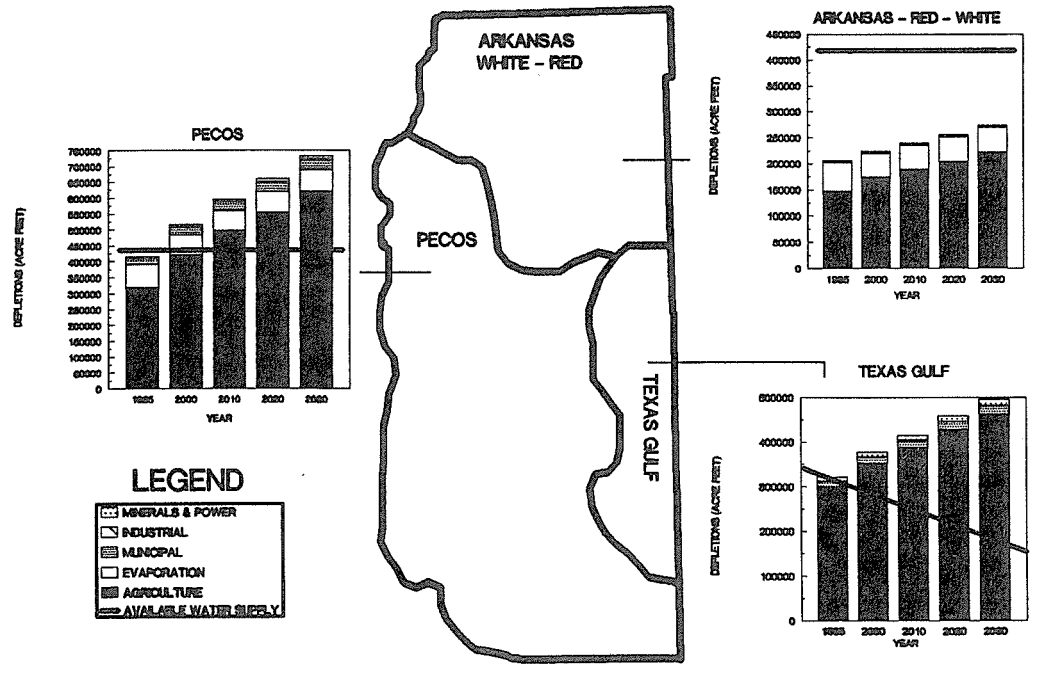

Figure 11. Water Depletion Projections for Pecos, Texas Gulf, and Arkansas-Red-White Basins, Potential Growth Projection, Scenario B

depletions, in the year 2000, were estimated to be 377,300 acre-feet, which is about 49,300 acre-feet above supplies (figure 11). Total depletions in 2030 will increase to nearly 500,000 acre-feet.

CONSERVATION

It is reasonable to expect that a 10 percent reduction in depletions could be brought about either through improved irrigation technology or increased consumer education. To determine the effects of such conservation efforts for each scenario, an estimate of the impact of a 10 percent reduction in depletions was used for each of the population projections and for each of the depletion categories except reservoir evaporation.

In general, the conservation factor had little effect on the depletion percentages of the water use categories. Agricultural depletions continued to rank first, followed by evaporation, municipal, minerals and power, and industrial.

Under Scenario A, where agricultural depletions are held constant, a 10 percent conservation had a corresponding effect on the supply. It was only when agricultural depletions were permitted to increase over time that conservation savings were more evident. In several basins including the Upper and Lower Rio Grande, conservation extended the supply by 10 years. However, 10 years was the maximum recorded for any basin.

IMPLICATIONS

Scenario A

New Mexico's water use outlook as projected to 2030 is promising if agricultural depletions do not increase and if water quality is not substantially decreased. If agricultural depletions remain constant over this period, all of the population projections predict that New Mexico's water depletions will not exceed the supply before 2030 (figure 12).

State depletions were estimated at 2.2 million acre-feet in 1985. Under the potential population projection, total depletions were estimated to increase to 2.3 million acre-feet in 2030. Under the conservative population projection, total depletions were estimated to be about the same as for the potential population projection at 2.3 million acre-feet in 2030. Under the optimistic population projection, total depletions were estimated to increase to 2.4 million acre-feet in 2030, which is well below the water supply of 3.1 million in 2030.

An overall state water surplus can be misleading, since it is equally important as to where these surpluses occur in the state. For example, expected surpluses of water are located in the Upper Colorado, the Lower Colorado, the Southwest Closed, the Central Closed, and the Arkansas-Red-White basins. Most of these basins typically have low population growth expectations.

Figure 13 presents the expected time when water depletions will exceed supply by river basin and population projection for Scenario A. Under the potential population projection, only the Texas Gulf Basin is expected to have a deficit by the year 2030 (table 5). The Pecos and Upper Rio Grande basins are expected to have deficits by the year 2040 under the potential population projection. The rest of the basins will have sufficient supplies to carry them beyond the year 2060.

Under the conservative population projection, only the Texas Gulf Basin is expected to have a deficit by 2020 and the Upper Rio Grande by 2050 (figure 13). Under the optimistic population projection, depletions are expected to exceed supplies by 2030 in the Upper Rio Grande Basin, which is 10 years earlier than under the potential population projection and 20 years earlier than under the conservative population projection (table 5).

Scenario B

If New Mexico's depletions increase over time along the trends of the late 1970s, then water use will exceed the supply by 2030 under all of the population projections (figure 12). The total supply of water for depletions was estimated to be 3.2 million acre-feet in 1985 and then slowly decreases to 3.1 million, in 2030, because of ground water mining in the Texas Gulf Basin. The state's water depletions will exceed supply by 2030 under all of the scenarios: conservative by 2020, potential by 2020, and optimistic by 2010 (figure 14). Under the potential population projection, the Texas Gulf, Lower Rio Grande, and Pecos River basins are expected to have water deficits prior to the year 2000 (table 6). The Upper Colorado and the Upper Rio Grande are expected to have a water deficit between the years 2000 and 2030. The Southwest Closed Basin is expected to have a deficit by the year 2045. The rest of the basins (Lower Colorado,

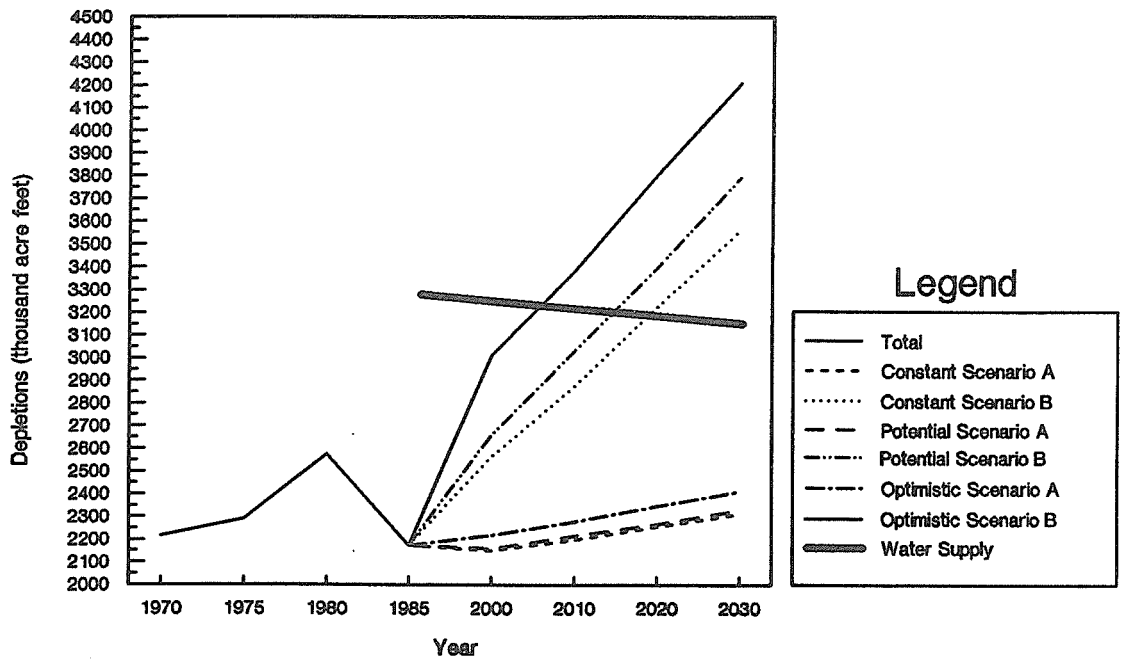

Figure 12. Water Depletions by Population Projection and Scenario for New Mexico, 1970-2030

Central Closed and ARW) will have sufficient supplies to carry them beyond the year 2060.

However, some basins will have surpluses into the 22nd century and beyond. For example, these surpluses of water are located in the Upper Colorado, the Lower Colorado, the Southwest Closed, the Central Closed, and the ARW basins. Most of these basins typically have low economic potential and thus, low population growth expectations.

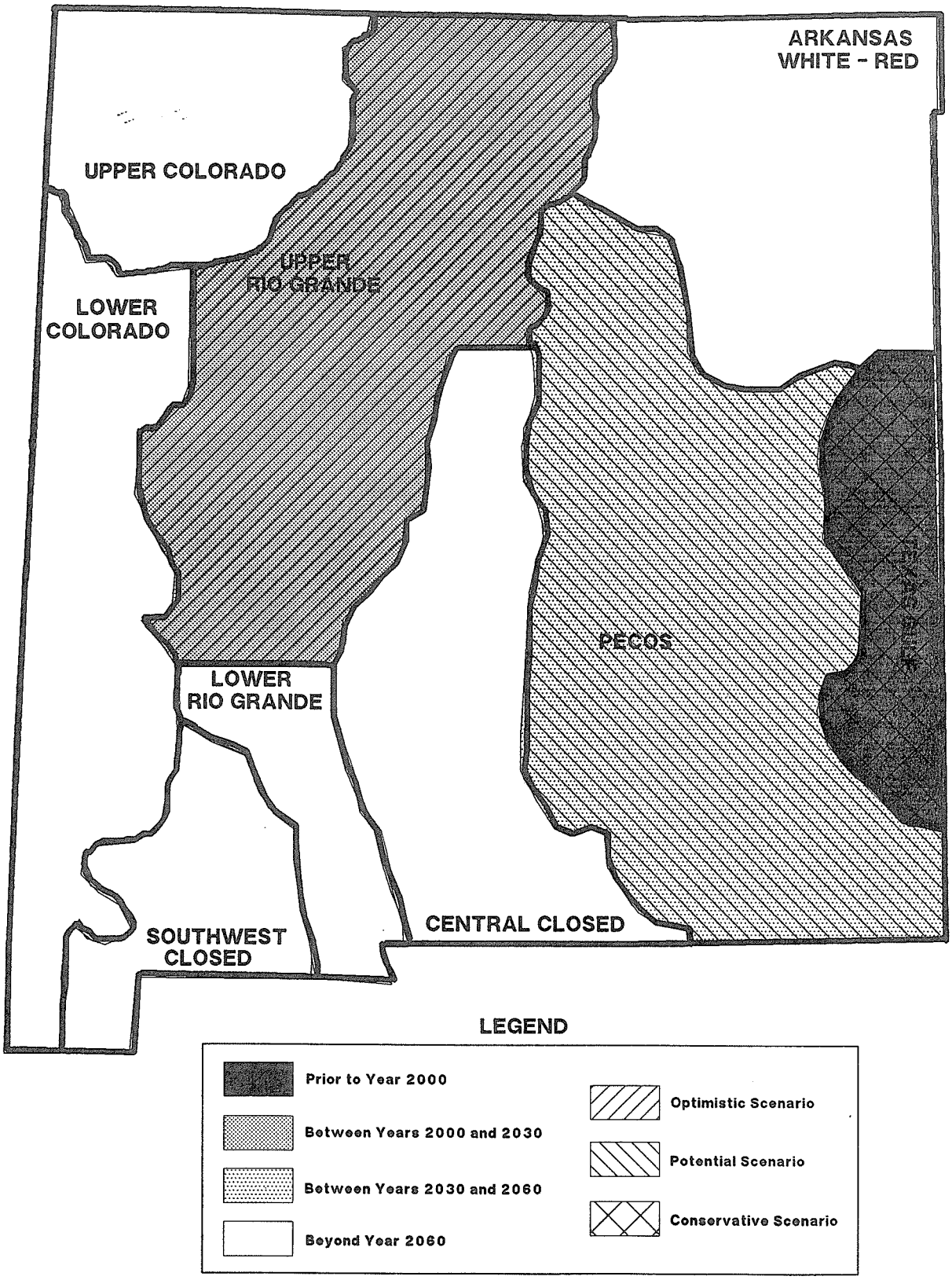

Figure 13. Year Water Depletions Exceed Water Supply by Population Projection and River Basin, Scenario A

Table 5. Year Water Depletions Exceed Water Supply by River Basin and Population Projection, Scenario A.

River Basin	Population Projection		
	Potential	Conservative	Optimistic
Upper Colorado	2060+	2060+	2060+
Lower Colorado	2060+	2060+	2060+
Southwest Closed	2060+	2060+	2060+
Upper Rio Grande	2040	2050	2030
Lower Rio Grande	2060+	2060+	2060+
Central Closed	2060+	2060+	2060+
Pecos	2040	2060+	2040
Arkansas-Red-White	2060+	2060+	2060+
Texas Gulf	1990	1990	1990

Table 6. Year Water Depletions Exceed Water Supply by River Basin and Population Projection, Scenario B.

River Basin	Population Projection		
	Potential	Conservative	Optimistic
Upper Colorado	2025	2025	2025
Lower Colorado	2060+	2060+	2060
Southwest Closed	2045	2060	2040
Upper Rio Grande	2010	2010	2000
Lower Rio Grande	1995	1995	1990
Central Closed	2060+	2060+	2060+
Pecos	1990	1995	1990
Arkansas-Red-White	2060+	2060+	2060+
Texas Gulf	1990	1990	1990

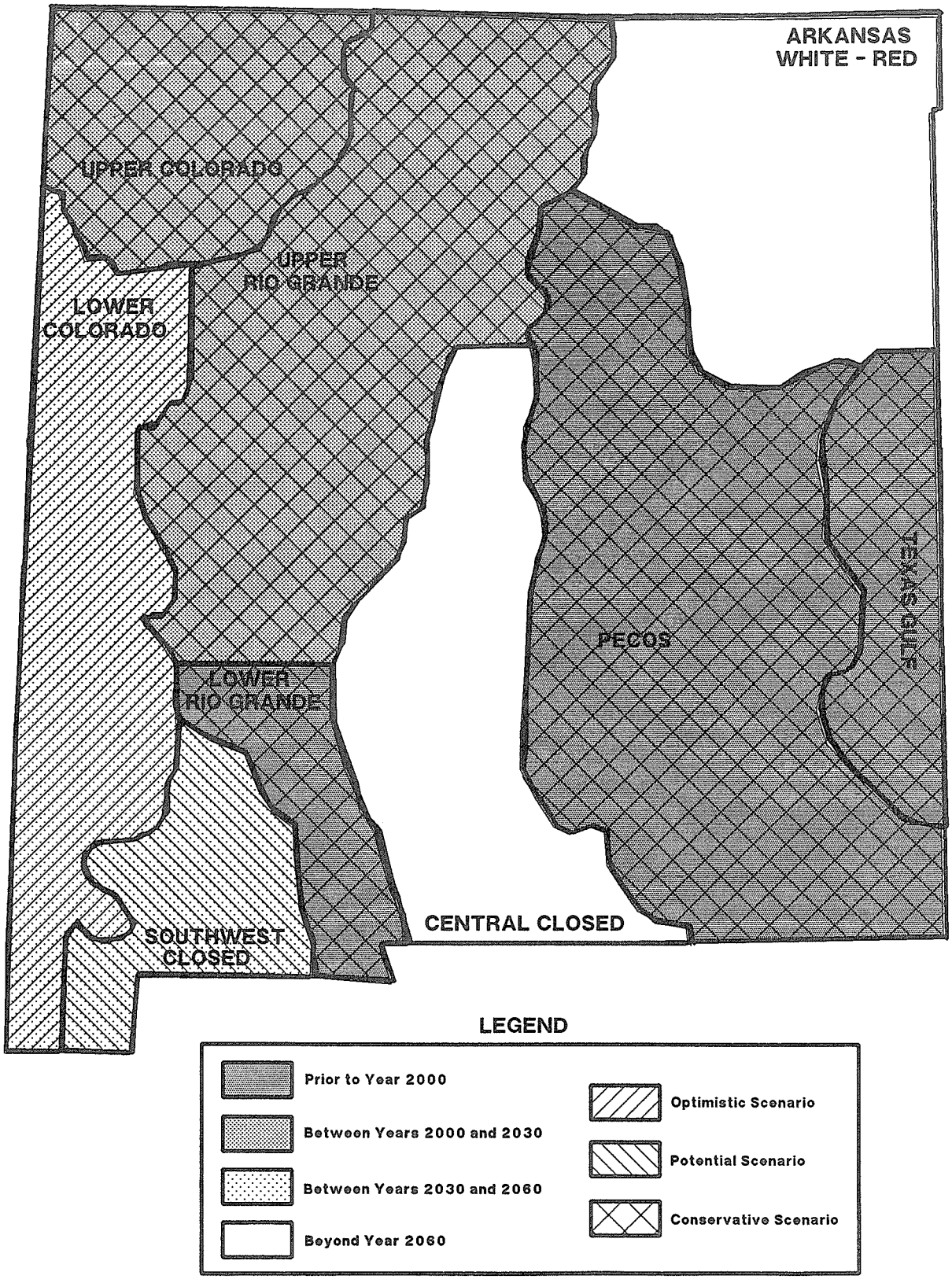

Figure 14. Year Water Depletions Exceed Water Supply by Population Projection and River Basin, Scenario B

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