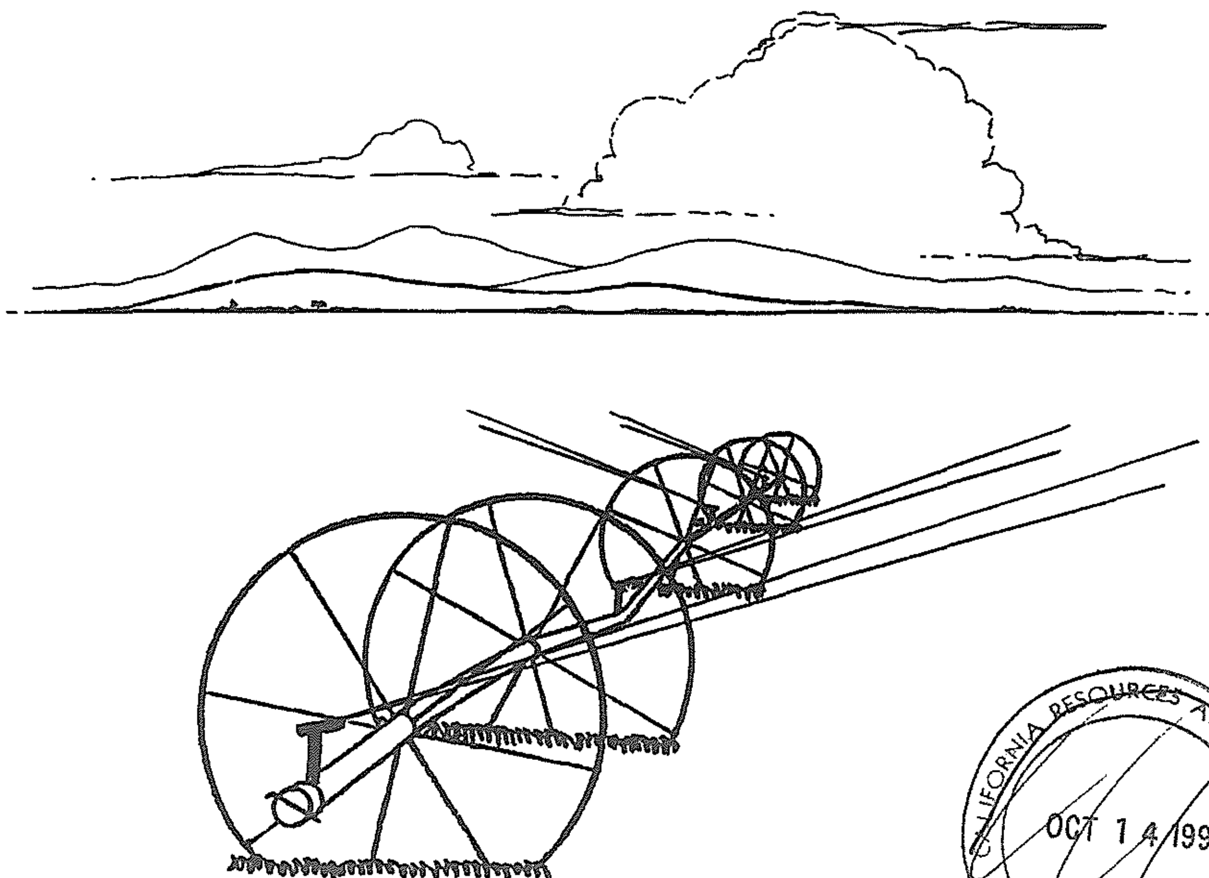
Water Use by Categories in New Mexico Counties and River Basins, and Irrigated Acreage in 1990

By Brian C. Wilson, P.E.



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SECTION 1

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THE STATE

Water withdrawals and depletions in New Mexico counties and river basins in 1990 are tabulated for nine water use categories: Public Water Supply; Self-Supplied Domestic; Irrigated Agriculture; Livestock; Self-Supplied Commercial, Industrial, Mining, and Power; and Reservoir Evaporation. The composition of each of these categories is defined in the text and detailed descriptions of the procedures used to quantify withdrawals and depletions are presented in a step by step format.

In 1990, withdrawals for all categories totaled 4,228,661 acre-feet. Surface water accounted for 2,253,812 acre-feet or 52.30% of the total withdrawal, and ground water for 1,974,849 acre-feet or 47.70%. Depletions totaled 2,637,628 acre-feet or 62.38% of the withdrawals. Surface water accounted for 1,200,735 acre-feet or 45.52% of the total depletion, and ground water for 1,436,893 acre-feet or 54.48%.

Irrigated Agriculture accounted for 3,376,427 acre-feet or 78.85% of the total withdrawals. Surface water accounted for 1,839,325 acre-feet or 54.48% of the irrigation withdrawals, and ground water for 1,537,102 acre-feet or 45.52%. In some areas of the state surface water supplies were not sufficient to meet the irrigation demand. Off-farm conveyance losses in canals and laterals amounted to 661,245 acre-feet or 35.95% of the surface water diverted for irrigation. Irrigation accounted for 1,990,176 acre-feet or 75.45% of the total depletions. Surface water accounted for 809,217 acre-feet or 40.66% of the irrigation depletions, and ground water for 1,180,959 acre-feet or 59.34%

The total acreage irrigated on farms in 1990 was 984,285 acres. Approximately 405,395 acres or 41.19% was irrigated with surface water, and 578,890 acres or 58.81% was irrigated with ground water. Drip irrigation accounted for 5,146 acres or 0.52%, flood for 563,738 acres or 57.28%, and sprinkler for 415,401 acres or 42.20%.

Public Water Supply and Self-Supplied Domestic accounted for 332,611 acre-feet or 7.86% of the total withdrawals. Surface water accounted for 35,827 acre-feet or 10.77% of the withdrawals, and ground water for 296,784 acre-feet or 89.23%. These two categories accounted for 177,878 acre-feet or 6.74% of the total depletions. Surface water accounted for 18,879 acre-feet or 10.62% of the depletions, and ground water for 158,999 acre-feet or 89.38%.

The population of New Mexico increased from 1,302,894 in 1980 to 1,526,318 in 1990, an increase of 223,424 or 17.15%. The population figure used in this report is slightly higher than the figure reported by the U.S. Bureau of the Census (1,515,469) because several municipalities had evidence that the bureau's figures were too low. Approximately 1,110,343 or 72.69% of the state's population live in urban communities.

Together, Public Water Supply, Self-Supplied Domestic, and Irrigated Agriculture accounted for 87.71% of the total withdrawals and 82.19% of the total depletions.

Mining and Power accounted for 145,388 acre-feet or 3.44% of the total withdrawals. Surface water accounted for 47,597 acre-feet or 32.74% of the withdrawals, and ground water for 97,791 acre-feet or 67.26%. These two categories accounted for 104,880 acre-feet or 3.98% of the total depletions. Surface water accounted for 41,927 acre-feet or 39.98% of the depletions, and ground water for 62,953 acre-feet or 60.02%.

Livestock, Commercial, and Industrial accounted for 50,458 acre-feet or 1.19% of the total withdrawals. Surface water accounted for 7,286 acre-feet or 14.44% of these withdrawals, and ground water for 43,172 acre-feet or 85.56%. These categories accounted for 40,916 acre-feet or 1.55% of the total depletions. Surface water accounted for 6,935 or 16.95% of the depletions, and ground water for 96,935 acre-feet or 83.05%.

Evaporation from reservoirs with a storage capacity of 5,000 acre-feet or more amounted to 323,777 acre-feet or 7.66% of the total withdrawals, and 12.28% of the total depletions.

ARKANSAS-WHITE-RED RIVER BASIN

Withdrawals in the basin totaled 368,651 acre-feet or 8.72% of the state total. Surface water accounted for 255,467 acre-feet or 63.30% of the basin withdrawals, and ground water for 113,184 acre-feet or 30.70%. Depletions in the basin totaled 239,122 acre-feet or 9.06% of depletions in the state. Surface water accounted for 145,470 acre-feet or 60.84% of the basin depletions, and ground water for 93,652 acre-feet or 39.16%.

Irrigated Agriculture accounted for 293,779 acre-feet or 79.69% of the basin withdrawals. Surface water accounted for 188,580 acre-feet or 64.19% of the irrigation withdrawals in the basin, and ground water for 105,199 acre-feet or 35.81%. Off-farm conveyance losses in canals and laterals amounted to 73,118 acre-feet or 38.77% of the surface water diverted for irrigation in the basin. Irrigation accounted for 167,767 acre-feet or 70.16% of the basin depletions. Surface water accounted for 79,585 acre-feet or 47.44% of the irrigation depletions, and ground water for 88,182 acre-feet or 52.56%

Acreage irrigated in the basin totaled 125,401 acres or 12.74% of the state total. Approximately 26.75% of the acreage irrigated was planted in pasture, 19.38% in alfalfa, 18.96% in sorghum, 14.86% in small grains, 9.23% in corn, and the remaining 10.82% in miscellaneous crops. Drip irrigation accounted for 40 acres or 0.03%, flood for 68,678 acres or 54.77%, and sprinkler for 56,683 acres or 45.20%. Approximately 70,191 acres or 55.93% were irrigated with surface water, and 55,210 acres or 44.07% were irrigated with ground water.

Public Water Supply and Self-Supplied Domestic accounted for 6,920 acre-feet or 1.88% of the basin withdrawals. Surface water accounted for 2,805 acre-feet or 40.53% of the withdrawals, and ground water for 4,115 acre-feet or 59.47%. These two categories accounted for 3,768 acre-feet or 1.58% of the basin depletions. Surface water accounted for 1,863 acre-feet or 49.44% of the depletions, and ground water for 1,905 acre-feet or 50.56%.

The population in the basin was 34,880 or 2.28% of the state total. Approximately 15,931 or 45.67% of the basin population live in urban communities. The largest city in the basin is Raton (7,372).

Mining accounted for 294 acre-feet or 0.08% of the basin withdrawals, and 146 acre-feet or 0.06% of the basin depletions. All of the withdrawals for mining came from ground water.

There are no self-supplied power generating stations in the basin.

Livestock and Commercial accounted for 4,737 acre-feet or 1.28% of the basin withdrawals. No Industrial water uses were reported. Surface water accounted for 1,161 acre-feet or 24.51% of these withdrawals, and ground water for 3,576 acre-feet or 75.49%. These categories accounted for 4,520 acre-feet or 1.89% of the basin depletions. Surface water accounted for 1,101 acre-feet or 24.36% of the depletions, and ground water for 3,419 acre-feet or 75.64%.

Evaporation from reservoirs with a storage capacity of 5,000 acre-feet or more amounted to 62,921 acre-feet or 17.07% of the basin withdrawals, and 26.31% of the basin depletions.

TEXAS GULF RIVER BASIN

Withdrawals in the basin totaled 678,737 acre-feet or 16.05% of the state total. Surface water accounted for 152 acre-feet or 0.02% of the basin withdrawals, and ground water for 678,585 acre-feet or 99.98%. Depletions in the basin totaled 545,918 acre-feet or 20.70% of the depletions in the state. Surface water accounted for 152 acre-feet or 0.02% of the basin depletions, and ground water for 545,766 acre-feet or 99.08%.

Irrigated Agriculture accounted for 630,437 acre-feet or 92.88% of the basin withdrawals, and 516,067 or 94.53% of the basin depletions. All of the withdrawals came from ground water. Acreage irrigated in the basin totaled 276,640 acres or 28.11% of the state total. Approximately 39.34% of the acreage irrigated was planted in small grains, 13.52% in corn, 11.98% in sorghum, 7.12% in peanuts, 6.06% in alfalfa, and the remaining 21.98% in miscellaneous crops. Drip irrigation accounted for 1,044 acres or 0.38%, flood for 50,011 acres or 18.08%, and sprinkler for 225,585 acres or 81.54%.

Public Water Supply and Self-Supplied Domestic accounted for 25,626 acre-feet or 3.78% of the basin withdrawals, and 13,015 acre-feet or 2.38% of the basin depletions. All of the withdrawals came from ground water.

The population in the basin was 107,595 or 7.05% of the state total. Approximately 87,211 or 81.05% of the basin population live in urban communities. The largest cities in the basin are Clovis (30,954), Hobbs (29,115), Portales (10,690) and Lovington (9,322).

Mining and Power accounted for 17,920 acre-feet or 2.64% of the basin withdrawals, and 12,587 acre-feet or 2.30% of the basin depletions. All of the withdrawals for these two categories came from ground water.

Livestock, Commercial, and Industrial accounted for 4,753 acre-feet or 0.70% of the basin withdrawals. Surface water accounted for 152 acre-feet or 3.20% of these withdrawals, and ground water for 4,601 acre-feet or 96.80%. These categories accounted for 4,249 acre-feet or 0.78% of the basin depletions. Surface water accounted for 152 acre-feet or 3.58% of the depletions, and ground water for 4,097 acre-feet or 96.42%

There are no reservoirs in the basin with a capacity of 5,000 acre-feet or more.

PECOS RIVER BASIN

Withdrawals in the basin totaled 754,835 acre-feet or 17.85% of the state total. Surface water accounted for 255,321 acre-feet or 33.82% of the basin withdrawals, and ground water for 499,514 acre-feet or 66.18%. Depletions in the basin totaled 498,970 acre-feet or 18.92% of the depletions in the state. Surface water accounted for 131,315 acre-feet or 26.32% of the basin depletions, and ground water for 367,655 acre-feet or 73.68%.

Irrigated Agriculture accounted for 658,630 acre-feet or 87.25% of the basin withdrawals. Surface water accounted for 227,009 acre-feet or 34.47% of the irrigation withdrawals in the basin, and ground water for 431,621 acre-feet or 65.53%. Off-farm conveyance losses in canals and laterals amounted to 57,942 acre-feet or 25.52% of the surface water diverted for irrigation in the basin. Irrigation accounted for 436,198 acre-feet or 87.42% of the basin depletions. Surface water accounted for 105,957 acre-feet or 24.29% of the irrigation depletions, and ground water for 330,241 acre-feet or 75.71%

Acreage irrigated in the basin totaled 175,422 acres or 17.82% of the state total. Approximately 54.33% of the acreage irrigated was planted in alfalfa, 14.80% in cotton, 11.46% in pasture, 6.89% in small grains, 3.80% in corn, and the remaining 8.72% in miscellaneous crops. Drip irrigation accounted for 290 acres or 0.17%, flood for 129,602 acres or 73.88%, and sprinkler for 45,530 acres or 25.95%. Approximately 44,619 acres or 25.44% were irrigated with surface water, and 130,803 acres or 74.56% were irrigated with ground water.

Public Water Supply and Self-Supplied Domestic accounted for 41,565 acre-feet or 5.51% of the basin withdrawals. Surface water accounted for 4,563 acre-feet or 10.98% of the withdrawals, and ground water for 37,002 acre-feet or 89.02%. These two categories accounted for 24,376 acre-feet or 4.88% of the basin depletions. Surface water accounted for 1,693 acre-feet or 6.95% of the depletions, and ground water for 22,683 acre-feet or 93.05%.

The population in the basin was 161,399 or 10.57% of the state total. Approximately 114,791 or 70.12% of the basin population live in urban communities. The largest cities in the basin are Roswell (47,500), Carlsbad (24,952), Las Vegas (15,620) and Artesia (10,610).

Mining accounted for 19,454 acre-feet or 2.58% of the basin withdrawals, and 6,328 acre-feet or 1.27% of the basin depletions. Over 99% of the withdrawals for mining came from ground water.

There are no self-supplied power generating stations in the basin.

Livestock, Commercial, and Industrial accounted for 12,906 acre-feet or 1.71% of the basin withdrawals. Surface water accounted for 1,425 acre-feet or 11.04% of these withdrawals, and ground water for 11,481 acre-feet or 88.96%. These categories accounted for 9,789 acre-feet or 1.96% of the basin depletions. Surface water accounted for 1,373 acre-feet or 14.02% of the depletions, and ground water for 8,416 acre-feet or 85.98%

Evaporation from reservoirs with a storage capacity of 5,000 acre-feet or more amounted to 22,280 acre-feet or 2.95% of the basin withdrawals, and 4.47% of the basin depletions.

RIO GRANDE BASIN

Withdrawals in the basin totaled 1,830,628 acre-feet or 43.29% of the state total. Surface water accounted for 1,199,534 acre-feet or 65.53% of the basin withdrawals, and ground water for 631,094 acre-feet or 34.47%. Depletions in the basin totaled 975,823 acre-feet or 37.00% of the depletions in the state. Surface water accounted for 579,482 acre-feet or 59.38% of the basin depletions, and ground water for 396,341 acre-feet or 40.62%.

Irrigated Agriculture accounted for 1,323,593 acre-feet or 72.30% of the basin withdrawals. Surface water accounted for 978,334 acre-feet or 73.92% of the irrigation withdrawals in the basin, and ground water for 345,259 acre-feet or 26.08%. Off-farm conveyance losses in canals and laterals amounted to 419,361 acre-feet or 42.86% of the surface water diverted for irrigation in the basin. Irrigation accounted for 596,864 acre-feet or 61.17% of the depletions in the basin. Surface water accounted for 365,540 acre-feet or 61.24% of the irrigation depletions, and ground water for 231,324 acre-feet or 38.76%

Acreage irrigated in the basin totaled 293,066 acres or 29.77% of the state total. Approximately 27.77% of the acreage irrigated was planted in alfalfa, 24.35% in pasture, 11.50% in cotton, 7.94% in chile, 7.80% in orchards, and the remaining 20.64% in miscellaneous crops. Drip irrigation accounted for 3,742 acres or 1.28%, flood for 264,309 acres or 90.19%, and sprinkler for 25,015 acres or 8.53%. Approximately 184,353 acres or 62.90% were irrigated with surface water, and 108,713 acres or 37.10% were irrigated with ground water.

Public Water Supply and Self-Supplied Domestic accounted for 232,455 acre-feet or 12.70% of the basin withdrawals. Surface water accounted for 12,376 acre-feet or 5.32% of the withdrawals, and ground water for 220,079 acre-feet or 94.68%. These two categories accounted for 123,597 acre-feet or 12.66% of the basin depletions. Surface water accounted for 6,080 acre-feet or 4.92% of the depletions, and ground water for 117,517 acre-feet or 95.08%.

The population in the basin was 1,058,189 or 69.33% of the state total. Approximately 796,168 or 75.24% of the basin population live in urban communities. The largest cities in the basin are Albuquerque (390,000), Las Cruces (62,126) and Santa Fe (59,000).

Mining and Power accounted for 46,578 acre-feet or 2.54% of the basin withdrawals. Surface water accounted for 936 acre-feet or 2.01% of the withdrawals, and ground water for 45,642 acre-feet or 97.99%. These two categories accounted for 32,684 acre-feet or 3.35% of the basin depletions. Surface water accounted for 182 acre-feet or 0.56% of the depletions, and ground water for 32,502 acre-feet or 99.44%.

Livestock, Commercial, and Industrial accounted for 21,919 acre-feet or 1.20% of the basin withdrawals. Surface water accounted for 1,805 acre-feet or 8.23% of the withdrawals, and ground water for 20,114 acre-feet or 91.77%. These categories accounted for 16,594 acre-feet or 1.70% of the basin depletions. Surface water accounted for 1,596 acre-feet or 9.62% of the depletions, and ground water for 14,998 acre-feet or 90.38%.

Evaporation from reservoirs with a storage capacity of 5,000 acre-feet or more amounted to 206,083 acre-feet or 11.26% of basin withdrawals, and 21.12% of basin depletions.

UPPER COLORADO RIVER BASIN

Withdrawals in the basin totaled 497,414 acre-feet or 11.76% of the state total. Surface water accounted for 492,805 acre-feet or 99.07% of the basin withdrawals, and ground water for 4,609 acre-feet or 0.93%. Depletions in the basin totaled 337,760 acre-feet or 12.80% of the depletions in the state. Surface water accounted for 335,405 acre-feet or 99.30% of the basin depletions, and ground water for 2,355 acre-feet or 0.70%.

Irrigated Agriculture accounted for 395,362 acre-feet or 79.48% of the basin withdrawals, and 249,718 or 73.94% of the basin depletions. All of the withdrawals came from surface water. Off-farm conveyance losses in canals and laterals amounted to 75,611 acre-feet or 19.12% of the surface water diverted for irrigation in the basin.

Acreage irrigated in the basin totaled 99,783 acres or 10.14% of the state total. Approximately 34.92% of the acreage irrigated was planted in alfalfa, 23.15% in pasture, 10.50% in corn, 10.06% in small grains, 7.84% in dry beans, and the remaining 13.53% in miscellaneous crops. Flood irrigation accounted for 38,550 acres or 38.63%, and sprinkler for 61,233 acres or 61.37%.

Public Water Supply and Self-Supplied Domestic accounted for 19,013 acre-feet or 3.82% of the basin withdrawals. Surface water accounted for 16,084 acre-feet or 84.59% of the withdrawals, and ground water for 2,929 acre-feet or 15.41%. These two categories accounted for 10,743 acre-feet or 3.18% of the basin depletions. Surface water accounted for 9,242 acre-feet or 86.02% of the depletions, and ground water for 1,501 acre-feet or 13.98%.

The population in the basin was 107,381 or 7.04% of the state total. Approximately 66,732 or 62.14% of the basin population live in urban communities. The largest cities in the basin are Farmington (33,997), Shiprock (7,687), Aztec (5,479) and Bloomfield (5,214).

Mining and Power accounted for 47,468 acre-feet or 9.54% of the basin withdrawals. Surface water accounted for 46,616 acre-feet or 98.20% of the withdrawals, and ground water for 852 acre-feet or 1.80%. These two categories accounted for 41,818 acre-feet or 12.38% of the basin depletions. Surface water accounted for 41,732 acre-feet or 99.79% of the depletions, and ground water for 86 acre-feet or 0.21%.

Livestock, Commercial, and Industrial accounted for 3,077 acre-feet or 0.62% of the basin withdrawals. Surface water accounted for 2,249 acre-feet or 73.10% of these withdrawals, and ground water for 828 acre-feet or 26.90%. These categories accounted for 2,988 acre-feet or 0.88% of the basin depletions. Surface water accounted for 2,220 acre-feet or 74.30% of the depletions, and ground water for 768 acre-feet or 25.70%.

Evaporation from reservoirs with a storage capacity of 5,000 acre-feet or more amounted to 32,493 acre-feet.

LOWER COLORADO RIVER BASIN

Withdrawals in the basin totaled 98,397 acre-feet or 2.33% of the state total. Surface water accounted for 50,534 acre-feet or 51.36% of the basin withdrawals, and ground water for 47,864 acre-feet or 48.64%. Depletions in the basin totaled 40,034 acre-feet or 1.52% of the depletions in the state. Surface water accounted for 8,911 acre-feet or 22.26% of the basin depletions, and ground water for 31,123 acre-feet or 77.74%.

Irrigated Agriculture accounted for 74,626 acre-feet or 75.84% of the basin withdrawals. Surface water accounted for 50,040 acre-feet or 67.05% of the irrigation withdrawals in the basin, and ground water for 24,586 acre-feet or 32.95%. Off-farm conveyance losses in canals and laterals amounted to 35,213 acre-feet or 70.37% of the surface water diverted for irrigation in the basin. Irrigation accounted for 23,562 acre-feet or 58.86% of the depletions in the basin. Surface water accounted for 8,417 acre-feet or 35.72% of the irrigation depletions, and ground water for 15,145 acre-feet or 64.28%

Acreage irrigated in the basin totaled 13,973 acres or 1.42% of the state total. Approximately 28.63% of the acreage irrigated was planted in pasture, 24.69%% in cotton, 13.60% in alfalfa, 11.38% in corn, 10.16% in small grains, and the remaining 11.54% in miscellaneous crops. Drip irrigation accounted for 30 acres or 0.21%, flood for 12,588 acres or 90.09%, and sprinkler for 1,355 acres or 9.70%. Approximately 6,449 acres or 46.15% were irrigated with surface water, and 7,524 acres or 53.85% were irrigated with ground water.

Public Water Supply and Self-Supplied Domestic accounted for 7,032 acre-feet or 7.15% of the basin withdrawals, and 2,379 acre-feet or 5.94% of the basin depletions. All of the withdrawals came from ground water. The population in the basin was 56,874 or 3.73% of the state total. Approximately 29,510 or 51.89% of the basin population live in urban communities. The largest cities in the basin are Silver City (10,683) and Lordsburg (2,951).

Mining and Power accounted for 13,674 acre-feet or 13.90% of the basin withdrawals, and 11,317 acre-feet or 28.27% of the basin depletions. All of the withdrawals for these two categories came from ground water.

Livestock, Commercial, and Industrial accounted for 3,065 acre-feet or 3.12% of the basin withdrawals. Surface water accounted for 494 acre-feet or 16.10% of these withdrawals, and ground water for 2,571 acre-feet or 83.90%. These categories accounted for 2,776 acre-feet or 6.93% of the basin depletions. Surface water accounted for 494 acre-feet or 17.78% of the depletions, and ground water for 2,282 acre-feet or 82.22% of the depletions.

There are no reservoirs in the basin with a capacity of 5,000 acre-feet or more.

SECTION 2

Introduction

PURPOSE

Limited in quantity, and in some areas by its quality, water is a primary factor in determining the future growth of New Mexico. The purpose of this report is to provide decision makers with the most comprehensive, current, and useful water use data available so that informed decisions can be made to insure the conservation and wise use of the state's water resources.

PREVIOUS WATER USE INVENTORIES

The U.S. Bureau of Reclamation (1950) published water withdrawals and depletions in drainage basins and for the state for 1945-49. Reynolds (1959) reported similar data for 1955 to the U.S. Senate Select Committee on National Water Resources. Withdrawals and depletions in 1965 were compiled by the New Mexico State Engineer Office and published by the New Mexico State Planning Office (1967). Data for 1970 were compiled by the New Mexico State Engineer Office and published by the U.S. Bureau of Reclamation and the New Mexico Interstate Stream Commission (1976). Data for 1975, 1980, and 1985 were compiled and published by the New Mexico State Engineer Office (Sorensen, 1977 and 1982; Wilson, 1985).

THE 1990 WATER USE INVENTORY

Content

The results of New Mexico's 1990 water use inventory are presented in this report. Categories inventoried include: Public Water Supply; Self-Supplied Domestic; Irrigated Agriculture; Livestock; Self-Supplied Commercial, Industrial, Mining, and Power; and Reservoir Evaporation. The composition of each water use category is defined in the text and detailed descriptions of the procedures used to quantify withdrawals and depletions are presented in a step by step format. In Section 3, factors which affect water use in communities and results of six benchmark studies on residential water use are reviewed. In Section 4, application of the Blaney-Criddle method for determining consumptive irrigation requirements is explained, a computational aid which lists the equations used to compute irrigation withdrawals and depletions is provided, and causes of poor irrigation efficiency and measures which can be taken to improve farm water management are summarized. In Section 5, the results of a recent study on water requirements for beef cattle are reviewed, and suggested guidelines for estimating water requirements for dairies are presented. Section 6 includes guidelines for estimating water requirements for recreational facilities, notes on the impact of the species of turfgrass on irrigation water requirements for golf courses and measures which can be taken to conserve water, and characteristics of water use in the industrial sector. In Section 7, the importance of quantifying reservoir evaporation is recognized and an overview of methodologies which can be used to estimate evaporation is presented.

In the series of tables presented in the latter part of this report, water withdrawals and depletions in New Mexico counties and river basins in 1990 are tabulated for each of the nine water use categories. A table dedicated to Public Water Supply and Self-Supplied Domestic lists individual water systems by county, population, per capita water use, withdrawals, depletion factors, and depletions. Tables for Irrigated Agriculture are provided which show the consumptive irrigation requirements, incidental depletion factors, acreage irrigated by type of irrigation system and source of water, on-farm irrigation efficiency, off-farm conveyance efficiency, withdrawals, conveyance losses, and depletions for projects and locales in each county.

A glossary of terms and maps showing the state's counties, river basins, declared groundwater basins and location of irrigated cropland are also included.

Changes in Format

Water use categories defined in earlier New Mexico inventories were modified for 1990 to facilitate the assimilation of data into the U.S. Geological Survey National Water Use Information Program. Urban and Rural have been replaced with Public Water Supply and Self-Supplied Domestic and Military is no longer a separate category. Rural community water systems and military installations are now reported in Public Water Supply. Stockpond evaporation is not reported in this inventory. Fish and Wildlife is no longer a separate category. Irrigated crop production for wildlife is now reported in Irrigated Agriculture and off-stream fish hatcheries are reported in Commercial. Recreation is no longer a separate category. Recreational facilities are now reported in Commercial. Golf courses previously reported in Recreation are now included in Public Water Supply if they are owned and operated by a municipality which is a public water supplier. The scope of Reservoir Evaporation has been reduced to include only those reservoirs which have a capacity of approximately 5,000 acre-feet or more.

The data reported in this document reflects many refinements which have been incorporated into the inventory procedures since the last inventory was conducted. The format used to present data in this report has also been improved. A considerable effort has been made to present the irrigation data in a format that will enable others to study the tables and work through the derivation of the withdrawals and depletions.

Due to the changes which have been made in the categories and because more data was captured in 1990 then in previous inventories, a tabular comparison with earlier inventories is not presented.

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SECTION 3

Public Water Supply and Self-Supplied Domestic

INTRODUCTION

The procedures presented in this report for the quantification of withdrawals and depletions for Public Water Supply and Self-Supplied Domestic reflect many refinements which were born out of lessons learned from previous inventories. These procedures emphasize the need to capture information about individual water systems which will provide a more accurate picture of the sources of water—particularly transfers of water between utilities, population served, self-supplied municipal facilities that must be accounted for, and depletion rates. The 1990 census of population is discussed, an overview of factors which affect water use in communities is presented, and the results of six benchmark studies of residential water use are summarized. Notes on individual water systems in New Mexico are also provided.

COMPOSITION OF CATEGORIES

Public Water Supply: Includes all water utilities, publicly or privately owned, which have at least 15 service connections or regularly serve an average of at least 25 individuals daily at least 60 days out of the year. (Safe Water Drinking Act, 1986). Water used for the irrigation of self-supplied playing fields, golf courses and parks or to maintain the water level in ponds and lakes owned and operated by a municipality which is a public water supplier is also included in this category. The purpose of this criteria is to capture all water uses which are debited against the water rights of public water suppliers where such rights have been defined.

Domestic: Includes self-supplied residences which may be single family homes or multiple housing units with less than 25 occupants, where water is used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Also includes water used by that segment of the population which is served by small community water systems for which reliable population and water use data are unavailable.

PROCEDURE FOR QUANTIFYING PUBLIC WATER SUPPLY WITHDRAWALS AND DEPLETIONS

Step 1: Preparation for this category begins with the identification of all the public water suppliers in the state. Regulatory agencies responsible for monitoring the quality of drinking water generally maintain a directory of community water supply systems. Municipal leagues or associations may also publish a directory of municipal offices which list the name and phone number of the city manager, clerk, and water and sewer superintendent.

Step 2: While many water suppliers are required to report their annual withdrawals to State Engineer District Offices, there are many which are under no obligation to do so either because they are not within a declared groundwater basin or because they have prebasin rights. Furthermore, withdrawals are not the only data required for the purpose of the water use inventory. We also need to know: Is the community water system located within the established boundaries of a larger municipality? How many people are served by the water system? How many connections are there? Is the water system metered? If the system is metered do the records reflect water sold or withdrawals measured at the ultimate source of supply? Were there any system malfunctions such as meter breakdowns which would affect the total measured deliveries or withdrawals during the calendar year? Is all or part of the water distributed imported from another municipality? If water is imported, how much and from whom? Is water exported to other communities? If water is exported, how much and to whom? Has the community implemented any water conservation measures?

After compiling a name and address listing of all the public water suppliers, a questionnaire is mailed to each one. This is generally the cheapest way to collect data. Questionnaires must be carefully designed to avoid misinterpretation by the recipient.

In 1990 the State Engineer Office sent questionnaires to 600 public water suppliers. Two-hundred-seventy-five, or approximately 46% of the questionnaires sent out, were completed and returned. Response time generally ranged from two to eight weeks. About 10% of the questionnaires returned for processing were either incomplete or the data proved to be erroneous and could not be used.

Water purveyors that don't respond to questionnaires may have to be contacted by phone. Telephone surveys are more expensive, however, response time is typically one to five days, and they often yield additional information which is very helpful. One of the disadvantages of telephone surveys is that they often turn into a game of tag and there are some people who won't return a call or are reluctant to leave messages.

Step 3: Some water suppliers may report the quantity of water sold rather than the total withdrawal from the source. The difference between a water utility's production and its water sales to consumers is referred to as unaccounted-for water. Unaccounted-for water includes measuring errors caused by inaccurate meters or incorrect meter reading, transmission losses in the distribution system, water used for fire fighting, system flushing, sewer cleaning, construction, and other miscellaneous uses that are not metered. Unaccounted-for water is generally 10% to 20% of the total entering the distribution system in metered systems and is typically 30% in unmetered systems (Tchobanoglous, 1979; Moyer, 1985). A water system is generally considered to be performing well if unaccounted-for water is only 10% to 15% of the total withdrawals, and 20% is considered reasonable.

For the purpose of this inventory, if the withdrawals reported by a water purveyor are for water sold, they are divided by 0.90 to arrive at an estimate of the total withdrawal.

Step 4: In census years, population figures for many of the communities served by water utilities may be extracted from statistics published by the U.S. Bureau of the Census. It is important that these figures be compared with the data reported by water suppliers. If a water supplier reports a population served which is greater than the census population, this may indicate that the water supplier exports water to other communities or it may suggest an error in the census data. In 1990, several municipalities in New Mexico had evidence that the population enumerated by the Bureau of the

Census was too low. If the population reported by a water supplier is less than the census figure, this may indicate that there are other small community water systems located within the defined boundaries of the municipality. It is important that the number of inhabitants in self-supplied residences and subdivisions that are located within a community served by a public water supplier be subtracted from the population of the larger community of which they are a part.

Populations of communities not identified in the census must be obtained from the water system manager, the city clerk, or a regulatory agency, or they may be estimated by some other means. Many water utilities estimate the population they serve with reasonable accuracy on the basis of the total number of connections and the average number of residents served per connection. The number of residents served per connection typically ranges from 2.5 to 3.5.

In non-census years the population must be estimated. Methodologies may range from a simple linear interpolation to complex correlations based on the demographic characteristics of individual communities.

Step 5: Per capita water use in gallons per day (gpcd) is computed using the following equation:

$$GPCD=(W)(892.74)/POP$$

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. If the gpcd appears to be unusually high or low, this indicates a possible error in either the population data or the water use. When data appears to be erroneous, the water supplier is generally contacted by phone to discuss any discrepancies or suspect data.

Nestled in some of the states most popular resort areas are a number of communities which have a very small permanent residential population. In the summertime these communities experience a large influx of vacationers who come to enjoy New Mexico's rarefied air and enchanting landscapes for three or four months while the weather is favorable to leisurely outdoor living. There are also some communities that experience the mirror image of this phenomenon, i.e., there is a large influx of seasonal visitors in the winter months. These are the snowbirds who come to New Mexico to escape harsh winters which are typical of other parts of the nation.

A similar phenomenon occurs on military installations but on a daily basis. While the population of enlisted personnel and their families may be relatively small, each day there is a large influx of civilians who work on the base during the day. In addition, many military installations also have a golf course which increases water requirements.

The withdrawals reported in this inventory for communities which experience a seasonal influx of temporary residents, and military installations which experience a daily influx of civilian workers, reflect the total water use. However, because the population and per capita water requirements reported are based on the number of New Mexico residents who live in the community year-around, these communities will generally exhibit a high rate of per capita water use. Such communities have been flagged in Table 6, which is included in the latter part of this report.

Step 6: Where data is available, depletions for public water supply are estimated by taking the difference between total withdrawals and the effluent discharged from the sewage treatment plant. This approximation assumes that there is no seepage (including deep pecolation from landscape irrigation) or storm-water runoff entering the sewer system; there is no seepage (leakage) out of the sewer system; there are no self-supplied water users discharging water into the sewer system; and water users supplied by public water utilities do not discharge household effluent into septic tanks.

If wastewater is discharged directly into a water body without treatment, or the annual inflow into a wastewater treatment plant is unknown, or the difference between measured diversions from the source of water and inflow into the wastewater treatment plant is an unreliable indicator of depletions due to infiltration, exfiltration, etc., depletions may be estimated by multiplying withdrawals by a depletion factor which typically ranges from 0.45 to 0.55. Depletions rates may be as high as 70% or 80% in communities where front and backyards of residences, boulevards and parks have been planted with grass, or where sewage effluent is used for irrigation.

PROCEDURE FOR QUANTIFYING SELF-SUPPLIED DOMESTIC WITHDRAWALS AND DEPLETIONS

Step 1: The self-supplied domestic population in each county is obtained by subtracting the population served by public water suppliers from the total population in a county. When a county is divided into two or more river basins the total county population must be separated into its basin components. The population served by public water suppliers in each basin is then subtracted from the total population of the respective basins to yield the residual population.

Step 2: The total withdrawal in acre-feet is computed using the following equation:

$$W=(POP)(GPCD)/892.74$$

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

Step 3: Depletions are estimated by multiplying withdrawals by a depletion factor, which is assumed to be 0.45 for the purpose of this inventory.

STATE POPULATION

The total population of the state in 1990 was estimated as 1,526,318. This figure is slightly higher than what the Bureau of the Census reported (1,515,469). The population reported by the bureau was revised upwards in Bernalillo, Chaves and Santa Fe counties because evidence gathered by Albuquerque, Roswell and Santa Fe indicated there was an undercount. (See NOTES ON INDIVIDUAL WATER SYSTEMS at the end of this section). To facilitate the distribution of the 1990 census population in each county by river basin, the U.S. Geological Survey digitized the census block and tract data and overlaid it with hydrologic cataloging units. The populations in individual hydrologic units were then aggregated to yield the river basin populations in each county.

FACTORS WHICH AFFECT WATER USE IN COMMUNITIES

Rural Electrification: While not so much a factor today, historically, rural electrification has had a significant impact on water use. Up until the development of rural electrification, most rural homes lacked not only electrical appliances, but also modern plumbing due to the absence of pressurized water supply. Thus, the rural electrification program initiated the development of modern rural plumbing and greatly increased the demand for water as well as the need for septic tank waste disposal systems.

Type of community: Residential communities will use less water per person than highly commercialized or industrialized communities. The type of housing that is most common will also affect use. Low density residential areas, i.e., those with few housing units per acre, with large gardens and lawns will have a higher water use per person than higher density areas with multiple family dwellings such as townhouses, condominiums, and apartment complexes.

Personal income: The economic level of householder and the market value of homes influences water use because the individual in a higher-valued area is likely to have more water using appliances, ornamental shrubbery and larger lawn areas which must be irrigated.

Climate and season: Water use is normally highest during the warm summer months. More water is used for lawn and garden irrigation, car washing, filling swimming pools; bathing is more frequent; and evaporative coolers (swamp coolers) are more widely used. The amount of rainfall which normally falls in a specific area will affect the amount of water required for lawn and garden irrigation. During winter months in cold climates, water use may be surprisingly high. In some areas residents run water faucets continuously to prevent water from freezing and bursting the pipes. Some water systems follow the same practice to protect water mains above the frost line.

Metering and water pricing: Whether householders are billed according to metered water use or on an unmetered flat-rate basis appears to have little influence on indoor domestic use, but it has considerable influence on landscape irrigation and other outdoor water uses. When a householder can use all the water he wants and does not have to pay any more than other water users, the duration of time on, frequency on, frequency of use, and rate of use when on all tend to increase. Converting a flat-rate, non-metered system to a metered system has been shown to reduce water use by as much as 25% (AWWA, 1986). In Denver, Colorado, metered households use about 20% less water than unmetered households (Bailey, 1984). In Galveston, Texas, the replacement or repair of residential and commercial meters which had been reading low by 11% and 39% respectively, reduced the water demand by more than 10% after customers began paying for the actual amount of water used (Anonymous, 1980). Increasing block-rate structures tend to make consumers more water conscious and discourage wasteful water use practices.

Water pressure: High water pressure at the outlets will generally result in higher water use because the flow rate is higher than under low pressure conditions. Pressure will have an effect on leakage because the rate of flow from a leak is proportional to the square root of the pressure. By increasing a 25 psig service pressure to 45 psig, water use can be expected to increase as much as 30% (AWWA, 1986). In new housing developments where water pressure is maintained at 50 psi instead of 80 psi, a 3% to 6% savings in water use may be expected (Bailey, 1984).

Sewers: Linaweaver (1967) observed that population density is not an important factor in areas with public sewers because of the dominant influence on domestic use of the economic level as reflected by the average market value of the homes. However, in septic tank areas, i.e., in areas where there are no sewers, economic level has little effect on domestic use. Householders apparently use smaller amounts of water for domestic purposes because of concern that their septic tank will require more frequent cleaning, or, if they have their own well, that the pump for their well will break down and require expensive repair service.

Condition of water system: New water mains are generally water tight when they are first installed; however, as the system ages, settling of pipe may partially open joints causing leakage. Leakage will also increase due to pipe corrosion and deterioration of joint compounds.

Conservation measures: Water conservation is any beneficial reduction in water use or water losses (Prasifka, 1988). In addition to the measures already mentioned such as metering, increasing block-rate structures and pressure reduction, water utilities can reduce the demand for water by implementing a public education program, sprinkling restrictions, leak detection and repair programs, and distributing retrofit water-saver kits. Building codes which require the installation of water-saving plumbing fixtures can be very effective in reducing water use. Potential water savings resulting from new plumbing codes are estimated as: low-flow showerhead (3 gpm)—7.2 gpcd, low-flush toilets (3.5 gal/flush)—8.0 gpcd, low-flow aerated faucets (2.75 gpm)—0.1 gpcd, water-efficient dishwasher (10 gal/load)—0.7 gpcd, water-efficient clothes washer (47.5 gal/load)—2.2 gpcd, yielding a total reduction of 18.2 gpcd (Bailey, 1984). Several states have passed legislation mandating the installation of ultra-low-flush toilets in new construction or as replacements of existing toilets. These toilets, which use about 1.6 gal/flush, may save 15.6 gpcd (See: Anderson, 1986; Anonymous, 1990; Fryer, 1990; and Vickers, 1989 and 1990). Homeowners who adopt low-water use landscaping, efficiently irrigated, can also reduce outdoor water use significantly. All of these measures may contribute towards a reduction in average daily water use in a community. In addition, reducing the demand may add years to the life of aquifers that are being mined, reduce the cost of wastewater treatment, save energy, postpone or eliminate the expansion of water treatment and distribution systems, and decrease the volume of wastewater discharged into rivers and streams.

RESIDENTIAL WATER USE

Benchmark Studies of Indoor Water Use

Residential water use is comprised of two components: (1) indoor, i.e., uses inside of the house, and (2) outdoor, i.e., uses outside of the house. The results of several benchmark studies which have been conducted to quantify domestic water use in American homes are summarized in the text which follows.

Bennett (1975). To define the parameters that affect the design of home wastewater systems, six middle class families in Boulder, Colorado were monitored for 15 consecutive days during the month of January when there was no outdoor water use. All of these homes had been constructed since 1950, were equipped with modern appliances, and were connected to the municipal water and sewage system. At each of these residences the male head of household was away at work during the day, the older children were in school, and several of the wives were engaged in part-time employment or community work. Indoor water use for this study group ranged from 32 to 82 gpcd and averaged 45 gpcd. After comparing water use in two different households which were nearly identical in terms of number of family members, age of children, and size of home, it was concluded that water use depended more upon life style than family size or age, as evidenced by the fact that, in the household which had the lower water use, the housewife and her youngest child were away from home in the afternoons. In general, data indicated that small families had a higher per capita water use than larger families. While participants in this study typically used 30 gallons per shower, it was also observed that a teenager may use up to 50 gallons per shower, this amount apparently being limited by the size of the hot water heater.

Brown and Caldwell (1984). In 1980 the U.S. Department of Housing and Urban Development initiated a three-year residential water conservation demonstration program. Homes of upper income families with and without water-saving fixtures were selected nationwide. To compare the effects of different types of water conserving devices on indoor water use, water fixture use data was compiled into three separate groups. Estimated per capita water use resulting from this study was as follows. Group I, homes with no water-conserving devices—78 gpcd. Group II, homes with conventional nonconserving toilets retrofitted with dams, bags, or bottles; showers with moderate flow restrictors; and dishwashers and washing machines with moderate water requirements—68 gpcd. Group III, homes with high efficiency low-flush toilets, low-flow showers, dishwashers and washing machines—60 gpcd. An important discovery in this study was that leakage from conventional as well as low-flush toilets was typically 4 gpcd and as high as 24 gallons per day per toilet.

Table 3.1. Indoor water use in a typical American home without any water conservation devices, in gallons per capita per day (gpcd). (Source: Brown and Caldwell, 1984).

Item and Assumptions	GPCD
Toilets (5.5 gal/flush x 4 flush/capita day)	22.0
Toilet leakage (.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)	7.0
Faucets (Estimated)	9.0
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

Cohen (1974). General Dynamics, under the sponsorship of the U.S. Environmental Protection Agency, monitored water use in eight single family homes with three or more occupants in two New England states and California for a period of one year. Indoor water use for these households without any water saving devices installed ranged from 43 to 94 gpcd and averaged 56 gpcd. The average water use for sewered homes was 67 gpcd as compared with 44 gpcd for those with septic tanks. While the type of waste disposal system showed a definite affect upon per capita use, variations in per capita use between households with the same type of waste disposal system were attributed to differences in family habits and life styles.

Cotter (1974). During the period 1971-73, researchers at New Mexico State University conducted a study of domestic water use at selected subdivisions in Albuquerque and Las Cruces, New Mexico. The residences monitored in this study were predominantly middle income family homes served by municipal water and sewage systems. Indoor water water use for all of the homes included in the study averaged 79 gpcd.

Linaweaver (1967). From 1961 to 1966 the Johns Hopkins University, under the sponsorship of the Federal Housing Administration and in cooperation with 16 water utilities, conducted a study of 41 subdivisions representing the climatic diversity of regions throughout the United States to determine the water use patterns and demand rates imposed on water systems in residential areas. Indoor water use for all 41 study areas, including single-family homes and apartments, averaged 59 gpcd. Indoor per capita use for individual areas ranged from 39 gpcd in a lowered-valued area to 127 gpcd in a high-valued area. Indoor water use for specific categories was as follows: For homes with septic tanks—47 gpcd; for metered areas in the eastern United States with municipal water and sewers—51 gpcd; for apartments—62 gpcd; for flat-rate areas—66 gpcd; and for metered areas in the western

United States with municipal water and sewers—67 gpcd. With the exception of the septic tank areas, variations in per capita use were primarily attributed to differences in the market values of homes and population density.

Siegrist (1976). Indoor water use in 11 rural Wisconsin homes occupied by families of various sizes and economic backgrounds was monitored continuously for 434 days yielding a range of wastewater flow from 25 to 57 gpcd and an average of 43 gpcd. Comparison of winter and summer water use showed no significant seasonal differences. Siegrist observed that water use within the home has changed over the years due to the increasing number of modern appliances, e.g., automatic dishwashers, garbage disposals, and clothes washers which use more water for permanent press fabrics. Changes in the habits of householders have also affected the volume of water and how it is used. On a lighter note, Siegrist also observed that use of in-sink garbage disposals is generally less frequent in homes with big dogs because the dog is given the majority of meal scraps.

Outdoor Water Use

Outdoor water use varies widely depending upon the climate and irrigation requirements of lawns, gardens, trees and ornamental shrubbery; the quantity of water used for washing vehicles, driveways, sidewalks, and the exterior of homes; and filling and maintaining swimming pools, landscape ponds etc. Where outdoor water uses are a factor, they generally account for 50-70% of the total residential water use (indoor plus outdoor). In a study of 20 residences in Las Cruces, New Mexico (Cotter, 1974), annual water use for landscape irrigation ranged from 108,000 gallons to irrigate 3,328 square feet, to 204,000 gallons to irrigate 5,219 square feet. Where desert landscaping has been adopted, outdoor water use may account for only 3% or less of the total residential water use.

PER CAPITA WATER USE FOR SELF-SUPPLIED DOMESTIC

The preceding discussion illustrates that there is a wide range of values for residential water use. For the purpose of estimating withdrawals for the self-supplied domestic population, in most areas it is assumed that indoor residential water use averages 64 gpcd and outdoor water use is zero since desert landscaping is generally the norm for self-supplied residences in New Mexico. For a family of four, 64 gpcd amounts to 93,440 gallons per year, or 0.2868 acre-feet. A higher per capita rate may be used in some areas (e.g., Corrales) where lawn and garden irrigation are common. The approximate breakdown of indoor residential water use based on 64 gpcd is shown in Table 3.2.

Table 3.2. Water use inside the home in gallons per capita per day (gpcd). (Source: Flack, 1977)

Water Use	GPCD
Toilet	25
Bath and shower	20
Bathroom sink	3
Laundry	10
Dishwashing	3
Drinking and cooking	3
Total	64

NOTES ON INDIVIDUAL WATER SYSTEMS

Site-specific data reported in many of the water use categories inventoried is often annotated with a water transfer code (WTC) which is used to flag (1) water imports and exports across a state or county line, or river basin boundary; (2) the transfer of water from one public water supplier to another; (3) the transfer of water from a public water supplier to a facility which is also self-supplied; and (4) to note other facets of a water system which may be of interest. These water transfer codes, many of which appear in Table 6 in the latter part of this report, are defined as follows.

0—No water transfers occurred.

1—Water is imported across a state or county line or river basin boundary.

2—Water is exported across a state or county line, or river basin boundary.

3—Water delivered to customers (e.g., a water utility, commerical 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 of the 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-around.

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 military personnel and their families who live on the installation year-around.

Notes on individual water systems are listed by county in the text which follows. Except where noted otherwise, water transferred from one water utility to another is added to the withdrawal of the receiving organization and is substracted from the withdrawal of the utility from which the water was purchased. The withdrawals reported in Table 6 of this report reflect these adjustments.

Bernalillo County (01)

The census reported the population of Albuquerque as 384,736. However, the city planning office estimated the population as 390,000. The latter figure is assumed to be correct. In addition to serving the population inside the city limits, the Albuquerque water system supplies about 40,000 people outside the city limits. Therefore the total population served by the water system is estimated as 430,000. This figure does not include the residential population at Kirtland Air Force Base which has its own water system. 1990 irrigation withdrawals for Ladera (577 acre-feet) and Los Altos (569 acre-feet) golf courses, which are self-supplied municipal facilities, are included in the total withdrawal reported for the Albuquerque water system.

Paradise Hills exported 18.18 acre-feet of water to Rio Rancho (Albuquerque Utilities) in Sandoval County in 1990. Irrigation withdrawals (not itemized in data reported by the water supplier) for the Double Eagle Golf Course, which is a self-supplied municipal facility, are included in the withdrawal reported for Paradise Hills.

Chaves County (05)

The Berrendo Water Users Association delivered 12.4 acre-feet of water to South Springs Acres, an elite subdivision about one mile south of Roswell.

In addition to 12.4 acre-feet of water purchased from Berrendo, South Springs Acres produced 143.4 acre-feet of water from its own well. This water is used primarily for landscape irrigation in the subdivision.

In addition to producing municipal drinking water, Dexter also pumps ground water (676.60 acre-feet in 1990) to maintain the water level in Lake Van, which is outside the village limits, and to irrigate park areas around the lake.

The census reported the population of Roswell as 44,654. However, the city estimated the population as 47,500. The latter figure is used in this report.

Cibola County (06)

The census reported the population of Milan as 1,911. However, water is delivered to about 600 people in a subdivision outside the village limits. The total population served by the water system is estimated as 2,511.

Colfax County (07)

The census reported the population of Raton as 7,372. However, water is delivered to customers outside the city limits. The total population served by the water system is estimated as 8,500.

The census reported the population of Springer as 1,262. However, water is delivered to subdivisions and the Boys School outside the village limits. The total population served by the water system is estimated as 1,960.

Curry County (09)

1990 irrigation withdrawals (estimated as 272 acre-feet) for Clovis Golf Course, which is a self-supplied municipal facility, are included in the withdrawal reported for Clovis.

De Baca County (11)

Fort Sumner supplies all of the water distributed by the Valley Water Users Association.

Dona Ana County (13)

The census reported the population of Hatch as 1,136. However, water is delivered to Placitas (population 401) and Rodey (population 271). The total population served by the water system is estimated as 1,808.

The census reported the population of Las Cruces as 62,126. Water is delivered to Mesilla but there are also several private water systems within the city of Las Cruces. The city of Las Cruces estimates the total population served by the water system is 55,000.

Picacho Hills owns and operates one self-supplied golf course and delivers water to various satellite subdivisons. The water delivered to these subdivisions and the additional population served are included in the figures reported for Picacho Hills. 1990 irrigation withdrawals (381 acre-feet) for the golf course are also included in the withdrawal reported for Picacho Hills.

Rincon delivers about 60,000 gallons of water per year to the U.S. Border Patrol. This water is included the withdrawal reported for Rincon.

Santa Teresa owns and operates two self-supplied golf courses and delivers water (689.18 acre-feet in 1990) to Sunland Park. 1990 irrigation withdrawals (1,603 acre-feet) for Santa Teresa's golf courses are included in the withdrawal reported for Santa Teresa.

In addition to 689.18 acre-feet of water purchased from Santa Teresa, Sunland Park produced 181.74 acre-feet of water from its own well in 1990.

Eddy County (15)

Artesia supplies all of the water distributed by the Morningside Water Co-Op.

The census reported the population of Carlsbad as 24,952. This figure does not include the population of La Huerta (1,693) which was annexed by the city of Carlsbad before the end of the 1990 calendar year. Water for La Huerta is provided by Carlsbad. Therefore the total population served by the Carlsbad water system is estimated as 26,645. Carlsbad also delivered 26 acre-feet of water to Otis in 1990. This water is included in the withdrawal reported for Otis and not Carlsbad. 1990 irrigation withdrawals (449.70 acre-feet of surface water) for the Lake Carlsbad Golf Course, which is a self-supplied municipal facility, are included in the withdrawals reported for Carlsbad.

In addition to 26 acre-feet of water purchased from Carlsbad, Otis produced 762.3 acre-feet of water from its own wells in 1990.

Loving supplies all of the water distributed in Malaga.

Grant County (17)

Phelps Dodge supplies all of the water distributed in Hurley. The water provided by the mining company is included in the withdrawal reported for Hurley and not Phelps Dodge whose other water uses are tabulated in the Mining category.

Silver City supplies all of the water distributed in Arenas Valley, Pinos Altos, and Tyrone.

Guadalupe County (19)

Santa Rosa supplies all of the water distributed in Rio Pecos Villa (5.18 acre-feet in 1990). 1990 irrigation withdrawals (23 acre-feet of surface water) for Santa Rosa Golf Course, which is a self-supplied municipal facility, are included in the withdrawal reported for Santa Rosa.

Vaughn exports water to Duran and Encino in Torrance County and delivers water to various ranchers. The water exported and the water delivered to the ranchers is not included in the withdrawal reported for Vaughn.

Lea County (25)

Eunice provides part of the water used at Warren Petroleum's Eunice gas processing plant which is located outside of the city limits. This water is included in the withdrawal shown for Euncie.

Lincoln County (27)

Irrigation withdrawals (not itemized in the data reported by the water supplier) for the Links Golf Course, which is a self-supplied municipal facility, is included in the withdrawal reported for Ruidoso.

Los Alamos (28)

The withdrawal reported for Los Alamos includes water delivered to Los Alamos Laboratories and White Rock.

McKinley County (31)

Gallup delivers water to Fort Wingate and several commercial and industrial enterprises outside the city limits. Water delivered to Fort Wingate (6.8 acre-feet in 1990) is included in the withdrawal reported for Fort Wingate but not Gallup. All of the remaining water transferred is included in the withdrawal reported for Gallup.

In addition to 6.8 acre-feet of water it purchased from Gallup, Fort Wingate also produced 0.8 acre-feet of water from its own well in 1990.

Otero County (35)

1990 irrigation withdrawals (estimated as 83.85 acre-feet of ground water) for Alamogordo Golf Course, which is a self-supplied municipal facility, are included in the withdrawals reported for Alamogordo.

Orogrande delivers water (unmetered) to U.S. Army Ranches and the U.S. Forest Service. This water is included in the withdrawal reported for Orogrande.

Quay County (37)

The census reported the population of Tucumcari as 6,831. However, Tucumcari supplies all of the water distributed in Liberty (population 200), RAD and Tuc-Cam (combined population of 400). The total population served by the water system is estimated as 7,431. 1990 irrigation withdrawals (81 acre-feet of surface water) for Tucumcari Golf Course, which is a self-supplied municipal facility, are included in the withdrawals reported for Tucumcari.

Roosevelt County (41)

Portales supplies all of the water distributed by the Roosevelt County Water Co-Op.

Sandoval County (43)

Rio Rancho imported a small amount of water from Paradise Hills in 1990. See Bernalillo County.

San Juan County (45)

Aztec delivers water (a total of 104.10 acre-feet in 1990) to the Southside Water Users Association and Flora Vista Water Users Association. In addition to 73.28 acre-feet of surface water purchased from Aztec, Flora Vista also produced an estimated 200 acre-feet of water from its own wells in 1990.

Bloomfield supplies all of the water (a total of 544.40 acre-feet in 1990) distributed in East and West Hammond, Lee Acres, and North Heights.

Farmington delivers water (a total of 1919.99 acre-feet in 1990) to Lower Valley Water Users Association (Kirtland), Shiprock, and Upper La Plata Water Users Association. 1990 irrigation withdrawals (389 acre-feet of ground water) for the Pinon Hills Golf Course, which is a self-supplied municipal facility, are included in the withdrawals reported for Farmington.

In addition to 714.90 acre-feet of surface water purchased from Farmington, Lower Valley also diverted an estimated 364 acre-feet of surface water in 1990.

Santa Fe County (49)

The census reported the population of Santa Fe as 55,859. However, the city planning office estimated the population as 59,000. The latter figure is assumed to be correct. There are several small community water systems located within the city limits (estimated population 1,600) as well as a number of self-supplied residences (estimated population 1,200). The Sangre de Christo Water Company serves not only the residual population within the city, but it also serves La Tierra-La Mariposa (estimated population 600), and Cottonwood Village Mobile Home Community (estimated population 1,200) which are outside the city limits. The total population served by the Sangre de Christo Water Company is estimated as 58,000.

Sierra County (51)

The census reported the population of Truth or Consequences (T or C) as 6,221. However, T or C also exports water to Williamsburg (population 456). The total population served by the water system is estimated as 6,677. 1990 irrigation withdrawals (218 acre-feet) for the T or C Golf Course, which is a self-supplied municipal facility, are included in the withdrawal reported for T or C.

Torrance County (57)

Duran and Encino both import water from Vaughn in Guadalupe County. See Guadalupe County.

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SECTION 4

Irrigated Agriculture

INTRODUCTION

The procedure presented in this report for quantifying irrigation withdrawals and depletions addresses many facets of irrigation that are often overlooked. It recognizes the need for the separation of irrigation water requirements by type of irrigation system and source of water. Application of the original Blaney-Criddle method for determining the consumptive irrigation requirement of a cropping pattern is described in detail and includes discussion of methods which are used to adjust estimated crop water requirements to account for water supply shortages and other factors. A computational aid which lists the equations used to compute irrigation withdrawals and depletions is provided. Causes of poor irrigation efficiency are identified, and an overview of what can be done to improve irrigation water management is presented. For definitions of terms used in this section, see the glossary included in this report.

COMPOSITION OF CATEGORY

Irrigated Agriculture: Includes all diversions of water for the irrigation of crops grown on farms, ranches, and wildlife refuges

PROCEDURE FOR QUANTIFYING IRRIGATION WITHDRAWALS AND DEPLETIONS

Step 1: Identify irrigated cropping areas and tabulate the gross irrigated acreage for each individual crop in the cropping pattern by type of irrigation system. The gross acreage is the irrigated acreage as defined in the glossary, plus the multiple-cropped acreage.

Sources of irrigated cropland data include the U.S. Bureau of Indian Affairs; the U.S. Bureau of Reclamation; the U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Soil Conservation Service, and National Agricultural Statistics Service; irrigation districts; and county extension agents. Hydrographic surveys, adjudications and court decrees, licenses and permits for water rights, and recent aerial photography may also be helpful in determining the acreage irrigated.

It is important that the irrigated acreage be broken out by type of irrigation system because the incidental depletion factors which are used in the determination of total depletions, and the irrigation efficiencies that are used in the determination of total withdrawals, vary with the type of irrigation system. The methods which farmers use to apply water to irrigated cropland can be separated into four categories: (1) drip irrigation, (2) flood irrigation, (3) sprinkler irrigation, and (4) subsurface irrigation. Each of these categories encompasses a variety of water application methods.

Drip or trickle irrigation can be defined as 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.

Flood irrigation includes furrow, surge-flow, border-strip, basin, wild flooding, and pond irrigation. 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.

Sprinkler irrigation systems can be divided into periodic move systems, which are sprinklers that remain at a fixed position while irrigating, and continuous move systems, which are sprinklers that move in either a circular or straight path while irrigating. The periodic move systems include sprinkler lateral, overlapped hose-fed sprinkler grid, perforated pipe, orchard sprinklers, and gun sprinklers. The dominant continuous move systems are center pivot and side-roll sprinklers.

Subsurface irrigation requires the creation of an artificial water table over a natural barrier that prevents deep percolation. The water table is kept at a fixed depth, usually 12 to 30 inches, below the surface. Moisture is supplied to the plant roots through upward capillary movement. Water may be introduced into the soil profile through open ditches, mole drains, or tile drains. However, in most areas where subsurface irrigation is practiced, water is distributed to the fields by canals, laterals, and field ditches. Subsurface irrigation was used on an experimental basis in New Mexico in the early 1900s, but it is no longer practiced today.

Step 2: The irrigated acreage tabulated for each type of irrigation system is further broken down according to the sources of water. Sources of water include surface, ground, and combined water. When a field is irrigated with both ground and surface water, the source is designated combined. In this case, the primary source is usually surface water which is supplemented by water pumped from a well.

Cropland irrigated by combined water is initially tabulated separately because it is impossible to determine from visual inspection of irrigated cropland in the field or from aerial photography how much of the cropland is irrigated by ground water and how much by surface water. To be meaningful however, the acreage irrigated by combined water must eventually be separated into its ground and surface water components. If records of measured withdrawals are available, the components are computed in Step 12 after the theoretical withdrawal has been computed. When measured withdrawals are not available, the components must be estimated. In this case, a rough approximation of the components may be gleaned by (1) an examination of water rights documentation, if such records exist; (2) comparing recorded streamflows with the estimated demand; or (3) by contacting personnel in the Cooperative Extension Service and the Soil Conservation Service, or individual farmers who know the area well.

Step 3: The average temperature and total recorded rainfall for each month is obtained from the weather station which is most representative for a specific cropping area. When an irrigated cropping area is located between two or more weather stations, the influence of each station should be weighted according to its distance from the centroid of the cropping area. The sum of the weighted values from each station yields the composite data to be used in subsequent calculations.

Step 4: The growing or irrigation season for each crop is defined by the earliest and latest moisture use dates. For annual crops such as corn and spring small grains, the earliest moisture use date is normally assumed to be the planting date, and the latest moisture use date as the day before harvest begins. For some annual crops such as corn, spring small grain, and cotton, farmers may apply a preplant irrigation. So, for example, if a 15-day preplant irrigation is applied, seed is planted on April 1 and the crop reaches maturity in 140 days, the beginning of the growing season would be taken as March 17, and consumptive use would be computed for a 155-day growing season.

For perennial crops such as alfalfa and permanent pasture grasses, the earliest moisture use date correlates with the mean daily air temperature which activates the transpiration process, and the latest moisture use date correlates with the mean daily air temperature that signals the cessation of transpiration on the next day. The earliest and latest moisture use dates may also be established by simply observing when growth begins and ends.

Step 5: The theoretical consumptive use (U) or evapotranspiration (ET) of water by individual crops in the cropping pattern tabulated for each type of irrigation system is calculated using the original Blaney-Criddle method (1950, 1962) and seasonal consumptive use coefficients (K). If, for example, part of the overall cropping pattern is flood irrigated and the remaining portion is sprinkler irrigated, two separate CIRs would be computed.

Step 6: Effective rainfall is computed using the procedure presented in Table 3, page 13 of Technical Bulletin No. 1275 (Blaney, 1962) or Table 5, page 21 of Technical Report 32 (Blaney, 1965).

Step 7: The consumptive irrigation requirement (CIR) for each crop in the cropping pattern is computed by subtracting the effective rainfall (R_e) from the consumptive use (U), i.e., the $CIR=U-R_e$, or $CIR=ET-R_e$

Step 8: The crop distribution ratio (CDR) is computed by dividing the acreage planted in a specific crop by the total acreage for all crops included in the cropping pattern.

Step 9: Multiplying the CIR by the crop distribution ratio yields the weighted CIR for a crop. The sum of all the weighted CIRs is the CIR for the cropping pattern. If the cropping pattern includes multiple-cropped acreage, i.e., acreage on which two or more crops are produced in the same year, the CIR for the cropping pattern is multiplied by the ratio of the gross irrigated acreage to the net irrigated acreage to yield the CIR for the cropping pattern. The net irrigated acreage is the difference between the gross irrigated acreage and the multiple-cropped acreage. The adjusted CIR would be computed as follows:

$$CIR_a=CIR[A_g/(A_g-A_m)]$$

where A_g is the gross irrigated acreage and A_m is the multiple-cropped acreage.

For New Mexico's 1990 water use inventory, CIRs were computed for 169 different cropping patterns using 1990 weather data, irrigated acreages compiled by Robert L. Lansford (1991), Professor of Agricultural Economics and Agricultural Business, New Mexico State University, and computer software developed by the author (Wilson, 1990).

Step 10: The farm delivery requirement (FDR) is computed by dividing the CIR expressed as a depth or volume by the on-farm irrigation efficiency (E_f). For example, if the CIR is 2.0 acre-feet per acre and E_f=60%, FDR=CIR/E_f=2.0/0.60=3.33 acre-feet per acre.

Step 11: The project diversion requirement (PDR) or off-farm diversion requirement is computed by dividing the farm delivery requirement by the off-farm conveyance efficiency (E_c). For example, if the FDR=3.33 acre-feet per acre and E_c=70%, PDR=FDR/E_c=3.33/0.70=4.76 acre-feet per acre.

Step 12: If records of measured withdrawals are available, the ground and surface water components for combined water can be determined by comparing the total theoretical withdrawal with the measured withdrawal. If a shortage occurs, i.e., the measured surface water withdrawal is less than the theoretical withdrawal, it is assumed that the difference is made up with ground water. The acreage irrigated by surface water is then the product of the surface water withdrawal and irrigation efficiency divided by the CIR; and the acreage irrigated by ground water is the difference between the total acreage irrigated and the estimated acreage irrigated by surface water.

It is important that when separating combined water into its ground and surface water components, that the appropriate irrigation efficiencies are used when the source of the surface water is located off-farm while the source of the ground water originates on-farm.

Step 13: Any event or condition imposed by man or nature that affects the robustness of irrigated crops during the growing season will generally reduce the amount of water consumptively used by plants to a level which is below that predicted by the Blaney-Criddle method for a well-watered crop which is free of disease. Thus, it may be necessary to adjust the theoretical CIR and estimated diversion requirements to reflect these conditions. The conditions which should be taken into consideration when estimating crop water requirements can be separated into five categories.

Weather conditions: Excessive rain and flooding that inundates crops and damages diversion structures or ditch conveyance capacity; hail, high winds, and drought.

Soil conditions: Salinity, sodicity, pH excesses or deficiencies, nutritional imbalances, i.e., excesses or deficiencies in nitrogen (N), phosphorous (P), and potassium (K); and waterlogging.

Biological conditions: Crop damage caused by wild animals, birds, and insect infestations; plant diseases; and weeds.

Farm operations: Application of physical, chemical or organic amendments; application of pesticides and herbicides; equipment failure such as the breakdown of a groundwater pumping plant; shortages of farm laborers.

Economic conditions: Cost of water and changes in the market price of crops may affect the farmer's decision to irrigate. If crop prices fall during the irrigation season, a farmer may apply fewer irrigations and actually stress the crop at the expense of lower yield rather than supply the full crop water requirement.

If measured withdrawals are available, they are compared with computed withdrawals and the CIRs are adjusted downward where measured withdrawals are less than the computed withdrawals. Records of measured withdrawals are often available for irrigation projects administered by some of the organizations mentioned in Step 1. When measured withdrawals are not available, water shortages and necessary adjustments to CIRs may be estimated on the basis of field observations made during the irrigation season and comparison of recorded streamflows with the irrigation demand.

Step 14: Coefficients for incidental depletions, referred to as incidental depletion factors from hereon, are assigned to each area according to the type of irrigation system and source of water. Incidental depletions may be expressed as a function of irrigation diversions or the CIR. When expressed as a function of irrigation diversions the total incidental depletion is computed as follows:

$$ID=PDR(F_1)+FDR(F_2+F_3)$$

where PDR is the project diversion requirement; FDR is the farm delivery requirement; and F_1, F_2, and F_3 are the incidental depletion factors above-farm (canals and laterals), on-farm, and below-farm. See glossary for definitions of these terms.

Expressed as a function of the CIR, the total incidental depletion is computed as follows:

$$ID=CIR(G_1+G_2+G_3)$$

where G_1, G_2, and G_3 are the incidental depletion factors above-farm, on-farm, and below-farm.

It is important to remember that G_1, G_2, and G_3 will not have the same value as F_1, F_2, and F_3 because they are based on two different functions. Multiplying G_2 and G_3 by the on-farm irrigation efficiency (E_f) will yield the value of F_2 and F_3, i.e., $F_2=G_2E_f$ and $F_3=G_3E_f$. Multiplying the CIR by G_1 and dividing the product by the project diversion requirement (PDR) will yield the value of F_1, i.e., $F_1=G_1CIR/PDR$.

Incidental depletions associated with canals and laterals are generally estimated by determining (1) the total length of canals and laterals, (2) the top width of the water surface, (3) the fringe width on each side of the canal where phreatophytes consumptively use seepage water, (4) the percent of time during the irrigation season when water is flowing, and (5) the net evaporation rate during the irrigation season. Taking the product of all these elements and dividing by the normal CIR (total acre-feet) for the area under study yields the incidental depletion factor for canals and laterals expressed as a function of the CIR.

Note that because the dimensions, phreatophyte population, and percent of time laterals are flowing will be different from canals, incidental depletions for canals and laterals are generally estimated separately and then aggregated.

In New Mexico, for flood irrigation systems (furrow or basin-border) operating at 55% efficiency, incidental depletions on-farm are generally estimated as 2.75% of the diversions at the farm headgate or well, or 5% (2.75/0.55) of the CIR. For sprinkler irrigation systems operating at 65% efficiency, incidental depletions are estimated as 17% of the farm withdrawals, or 26.2% (17/0.65) of the CIR. In some areas of the state, such as the Roswell Artesian Basin in Chaves and Eddy counties, where sprinklers operate at about 70% efficiency, incidental depletions are estimated as 24.3% (17/0.70) of the CIR. Sternberg (1967) found that sprinkler losses were much greater during the daytime (20% of farm withdrawals) due to higher temperatures and wind movement, than during the nighttime (14% of farm withdrawals). The incidental depletion factors used in this inventory for sprinkler irrigation reflect the average of sprinklers operating day and night. Incidental depletions for sprinkler irrigation in areas where high winds prevail, such as the Northern High Plains of New Mexico, which includes Curry, Harding, Quay, and Union counties, are estimated as 22% of the farm withdrawals, or 33.8% (22/0.65) of the CIR.

Incidental depletions associated with drains below-farm may be estimated using the same technique applied to canals and laterals. Evapotranspiration losses from areas below-farm where runoff and seepage accumulate can be estimated on the basis of the wetted area, percent of time the area is wet, and net evaporation rate or CIR for native vegetation.

In water resources management, it is often assumed that the difference between the total diversion and crop consumptive use is return flow to the stream system or groundwater aquifer. If incidental depletions are ignored, estimates of return flow will be too high. It is important therefore, that incidental depletions be properly accounted for.

Figure 4.1 illustrates how incidental depletions fit into the total water demand on an irrigation project that diverts surface water from a stream or reservoir, and transports it via canals and laterals to farms. In this example, the consumptive irrigation requirement (CIR) is 2.0 acre-feet per acre; the on-farm efficiency (E_f) is 60%; the farm delivery requirement (FDR) is 3.33 acre-feet per acre; the off-farm conveyance efficiency (E_c) is 70%; and the project diversion requirement (PDR) is 4.76 acre-feet per acre. Incidental depletion factors, expressed as a percent of the consumptive irrigation requirement, are 4%, 5%, and 5%, above-farm (canals and laterals), on-farm, and below-farm, respectively.

Step 15: The total quantity of water depleted (D) on a farm or irrigation project is the sum of the CIR and the incidental depletions (ID), i.e., D=CIR+ID. For example, if the CIR=2.0 acre-feet per acre and the total incidental depletion expressed as a function of the CIR is 14% ($G=G_1+G_2+G_3=0.14$) then:

Since ID=CIR(G),

$$D=CIR(1+G)=2.0(1+0.14)=2.28 \text{ acre-feet per acre}$$

THE ORIGINAL BLANEY-CRIDDLE METHOD

Consumptive Use (U)

The original Blaney-Criddle method (1950, 1962) was born out of studies conducted in New Mexico during 1939 and 1940 in the Pecos River Joint Investigation initiated by the National Resources Planning Board. It 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, seasonal consumptive use coefficients (K), and length of growing season to estimate the total consumptive use (U) or evapotranspiration (ET) of water during the growing season for a crop that is well watered and free of disease. The consumptive use in inches for each month is expressed as:

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

Adding the consumptive use computed for each month yields the total consumptive use for a specific crop during the growing season. Note that the monthly values computed using the above expression are not the actual consumptive use that occurs in any one month since the seasonal crop coefficient is used. The monthly values are computed for convenience in determining the seasonal value.

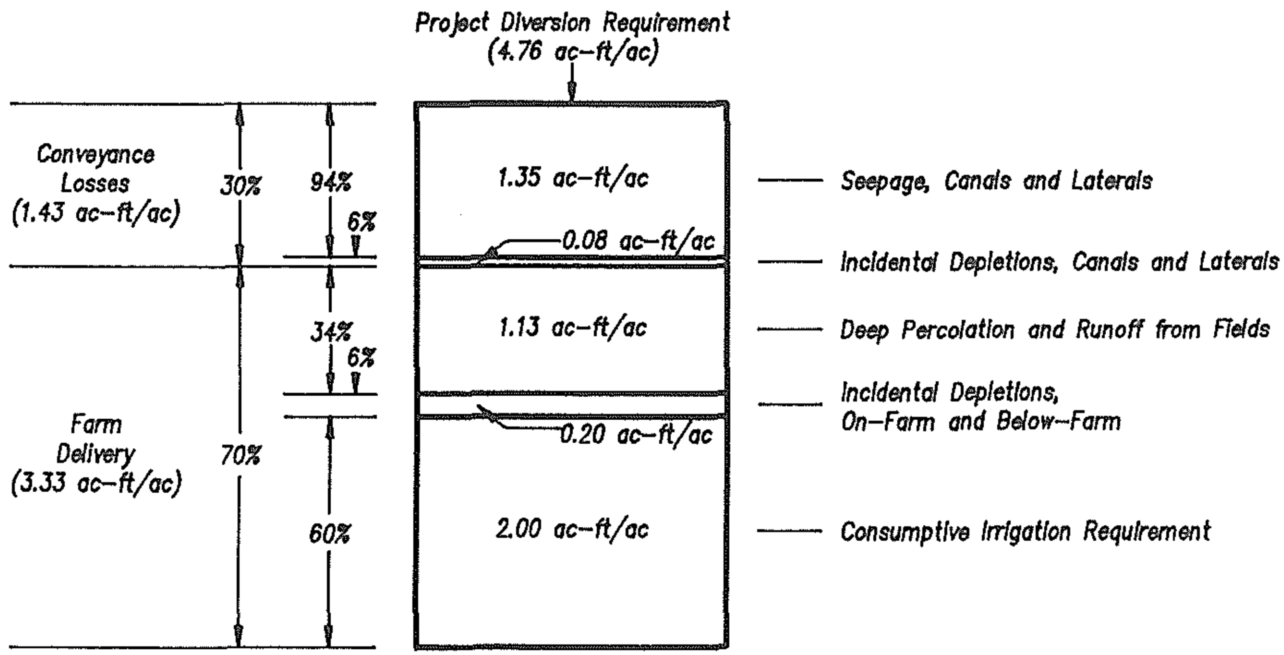

Figure 4.1 Components of the Water Demand on an Irrigation Project

The distinctive feature of the original Blaney-Criddle method is that the consumptive use coefficient (K) remains constant throughout the frost-free period. If the growing season of a crop begins before the last spring frost of 32 degrees Fahrenheit occurs, or extends beyond the occurrence of the first fall frost of 32 degrees Fahrenheit, for this part of the growing season which is outside the frost-free period, another consumptive use coefficient is generally applied which is lower than the value used during the frost-free period. For crops which 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 separated into two different components so that the appropriate consumptive use coefficients can be applied. 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.

USBR Effective Rainfall (R_e)

The amount of rainfall which becomes available to crops is influenced by the following factors: (1) duration and intensity of rainfall; (2) antecedent moisture condition of the soil; (3) infiltration capacity of the soil; (4) presence of surface seals and crusts; (5) slope of fields; (6) root development of the crop; and (7) interception by the plant canopy.

As it was published in 1950, the original Blaney-Criddle method did not include a procedure for estimating effective rainfall. Blaney (1962) later adopted a method which was developed by the U.S. Bureau of Reclamation (USBR). The USBR method expresses effective rainfall as a percentage of the total monthly rainfall and for each one inch increment in rainfall there is a corresponding decrease in the percentage of effective rainfall. The USBR method was originally published as a table of values. However, since the table is often misinterpreted, the effective rainfall is better expressed as a set of equations. Note that the 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 4.1. 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 to symbols: < means less than; ≤ means less than or equal to; and > means greater than.

CALIBRATION OF CONSUMPTIVE USE FOR ALFALFA AND PECANS

Alfalfa

In the late 1970s, researchers at New Mexico State University developed a crop production function for alfalfa which correlates annual evapotranspiration (consumptive use) with annual crop yield (Sammis, 1979). This crop production function is a linear relationship which may be expressed as follows:

$$Y=0.169ET_{in}-1.04$$

where Y is the annual yield in tons per acre at 15% moisture content, which is the normal field-dried condition; and ET_{in} is the annual evapotranspiration in inches. Rearranging this equation to solve for ET_{in}, results in the following expression:

$$ET_{in}=(Y+1.04)/0.169$$

By substituting the annual yield reported for a specific calendar year into the equation, the annual consumptive use can be computed, and the weighted consumptive irrigation requirement for the cropping pattern, adjusted accordingly.

For the purpose of this water use inventory, alfalfa yields reported by the New Mexico Agricultural Statistics Service for 1990 were used in Sammis's crop production function to calibrate ET for alfalfa in several counties. If the ET predicted by Sammis's crop production function was higher than the value computed using the original Blaney-Criddle method and a consumptive use coefficient (K) of 0.85 inside the frost free-period and 0.50 outside the frost-free period, the ET produced by the crop production function was used in determining the consumptive irrigation requirement for alfalfa, provided that the reported yields were accurate and sufficient water was available to satisfy the irrigation demand. Counties in which this adjustment was made include: Bernalillo, Catron (San Augustin Plains), Curry, Dona Ana, Otero (Rio Grande Basin only), Sandoval (MRGCD only), San Juan (NIIP only), Socorro (San Augustin Plains), Torrance, and Union (groundwater irrigation only).

Pecan Orchards

It is generally accepted amongst both producers as well as agricultural researchers that the water requirements for pecan orchards are much higher than for other deciduous orchards. Studies conducted in the Rio Grande Valley near Las Cruces, New Mexico and El Paso, Texas by the Bureau of Reclamation in 1972-73 and by Miyamoto in 1981 (Miyamoto, 1983) indicate that the annual consumptive use of mature pecan trees typically ranges from 39.36 to 51.24 acre-inches per acre and depends on the tree size and planting density.

Historically, the New Mexico State Engineer Office has estimated the water requirements for pecan orchards using the original Blaney-Criddle method and a seasonal consumptive use coefficient of 0.65. The research conducted by the Bureau of Reclamation and Miyamoto indicates that the seasonal coefficient of 0.65 is much to low and needs to be revised. There is also evidence that the threshold temperatures which are normally used to define the growing season for deciduous orchards are inappropriate for pecan orchards. Transpiration of pecan orchards generally begins when the mean daily air temperature reaches 60 degrees Fahrenheit in the spring, and it ends the day after the first fall frost of 28 degrees Fahrenheit or below occurs in the fall (Miyamoto, 1983).

Using this criteria to define the growing season, and assuming the annual consumptive use of water in a pecan orchard is at least 39.36 inches, and that the value of the consumptive use coefficient outside the frost-free period is 0.40, the author 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, and was used to quantify the consumptive irrigation requirements of pecan orchards included in 1990 cropping patterns.

In 1990, pecan production in New Mexico set an alltime record. Dona Ana County accounted for 71.53% of the total production, Chaves for 12.50%, Otero for 3.79%, Luna for 3.90%, Eddy for 3.63%, and Lea for 3.42%; production in several other counties accounted for the remaining 1.23% (New Mexico Agricultural Statistics Service, 1991).

COMPUTATIONAL AID FOR IRRIGATION TABLES

The equations which follow are used to compute the irrigation withdrawals and depletions shown in Tables 8 and 9 in the latter part of this report. They may also be used for other irrigation studies.

Computing Withdrawals (Table 8)

(1) $TFWSW=CIRSW(ASWO+ASWC)/E_f$
(2) $TFWGW=CIRGW(AGWO+AGWC)/E_f$
(2) $TPWSW=TFWSW/E_c$ where $E_c > 0$
(3) TPWGW=TFWGW (assuming the source of water is on-farm)
(4) CLSW=TPWSW-TFWSW

Computing Depletions (Table 9)

(1) TFDSW=CIRSW(1+IDFOF)(ASWO+ASWC)
(2) TFDGW=CIRGW(1+IDFOF)(AGWO+AGWC)
(3) TPDSW=CIRSW(1+IDFSW)(ASWO+ASWC)
(4) TPDGW=CIRGW(1+IDFGWO)(AGWO)+CIRGW(1+IDFGWC)(AGWC)

Key to Acronyms Used in Equations

(a) AGWC=ground water component of acreage irrigated with both surface and ground water (combined water).
(b) AGWO=acreage irrigated with ground water only.
(c) ASWC=surface water component of acreage irrigated with both surface and ground water (combined water).
(d) ASWO=acreage irrigated with surface water only.
(e) CIRGW=consumptive irrigation requirement for acreage irrigated with ground water.
(f) CIRSW=consumptive irrigation requirement for acreage irrigated with surface water.
(g) CLSW=surface water conveyance losses in canals and laterals from stream or reservoir to farm headgate.
(h) E_f=on-farm irrigation efficiency.
(i) E_c=off-farm conveyance efficiency.

(j) IDFBF=incidental depletion factor, below-farm.
(k) IDFCL=incidental depletion factor, canals and laterals, from stream or reservoir to farm headgate.
(l) IDFGWO=sum of incidental depletion factors which apply to withdrawals of ground water only. Note that if the source of water is on-farm (spring or wells), IDFGWO=IFDOF. However, if the source of water is off-farm, IDFGWO=IDFCL+IDFOF.
(m) IDFGWC=sum of incidental depletion factors which apply to the groundwater component of withdrawals where both surface and ground water (combined water) are applied, i.e., IDFGWC=IDFOF+IDFBF when the groundwater source is on-farm.
(n) IDFOF=incidental depletion factor on-farm.
(o) IDFSW=sum of incidental depletion factors which apply to surface water withdrawals, i.e., IDFSW=IDFCL+IDFOF+IDFBF
(p) TFDGW=total farm depletion, ground water.
(q) TFDSW=total farm depletion, surface water.
(r) TFWGW=total farm withdrawal, ground water.
(s) TFWSW=total farm withdrawal, ground water.
(t) TPDGW=total project depletion, ground water.
(u) TPDSW=total project depletion, surface water.
(v) TPWGW=total project withdrawal, ground water.
(w) TPWSW=total project withdrawal, surface water.

IRRIGABLE CROPLAND AND ACREAGE IRRIGATED

In 1990, there were about 1,464,030 acres of irrigable cropland in the state. This includes idle, fallow, and diverted or setaside acreage. Approximately 111,309 acres of irrigable cropland were enrolled in the U.S. Department of Agriculture's Conservation Reserve Program (CRP), and 121,205 acres were enrolled in other government production adjustment programs designed to protect farmer's incomes by taking acreage out of production (Lansford, 1991).

The Conservation Reserve Program was authorized by the Food Security Act of 1985 to conserve and improve soil and water resources on cropland classified as highly erodible (U.S. Department of Agriculture, 1987). Farmers participating in the program sign a 10-year contract with the USDA, agreeing to take eligible land out of production and establish a protective cover of perennial grass, wildlife plants, windbreaks or trees. In return, the USDA provides annual rental payments, in cash or commodities, for the land removed from cultivation and covers half the expense of establishing the permanent cover on the land.

Irrigable cropland enrolled in USDA conservation programs is not normally irrigated, although water may be applied to get a new cover crop started after seeding. Once established, cover crops are generally left to survive on rainfall and snowmelt that infiltrates into the soil.

The total acreage irrigated in 1990 was estimated as 984,285 acres, a decrease of about 6,595 acres from 1989 but slightly greater than the acreage irrigated during the mid-80s as illustrated in Table 4.2. In terms of acreage irrigated in 1990, alfalfa ranked first at 24.4%, pasture second at 15.7%, small grains (wheat, barley, and oats) third at 20.3%, high-value crops such as vegetables, orchards and vineyards fourth at 11.6%, cotton fifth at 8.2%, corn sixth at 8.0%, and sorghum seventh at 7.0%. All other crops accounted for the remaining 4.8% of the acreage irrigated. (Lansford, 1991).

Note that the irrigated acreage shown in Tables 8 and 9 of this report for the Navajo Indian Irrigation Project in San Juan County, includes about 2,873 acres of land enrolled in various USDA conservation programs that was irrigated in 1990.

Drip irrigation accounted for 5,146 acres or 0.52%, flood for 563,738 acres or 57.28%, and sprinkler for 415,401 acres or 42.20%. Counties accounting for the greatest percentage of the total sprinkler irrigated acreage in the state in 1990 were Curry at 120,320 acres or 28.96%; Roosevelt at 86,835 acres or 20.90%; San Juan at 61,233 acres or 14.74%; Union at 38,260 acres or 9.21%; Lea at 26,390 acres or 6.35%; Chaves at 20,490 acres or 4.93%; Eddy at 18,230 acres or 4.39%, Torrance at 12,225 acres or 2.94%; and Quay at 9,548 or 2.30%. Counties accounting for the greatest percentage of the total drip irrigated acreage in the state in 1990 were Otero at 1,695 acres or 32.94%; Lea at 905 acres or 17.59%; Sierra at 790 acres or 15.35%; Luna at 600 acres or 11.66%; Bernalillo at 230 acres or 4.47%; Chaves at 200 acres or 3.89%; Curry at 154 acres or 2.99%; Dona Ana at 150 acres or 2.91%; Santa Fe at 110 acres or 2.14%; and Socorro at 100 acres or 1.94%.

Table 4.2. Acreage irrigated in New Mexico, 1980-90. (Source: Lansford, 1981-91)

Year	Acreage Irrigated
1980	1,045,580
1981	1,053,220
1982	1,004,230
1983	864,980
1984	946,635
1985	941,245
1986	945,229
1987	897,099
1988	879,185
1989	990,880
1990	981,412

SURFACE WATER SHORTAGES

Snowpack during the winter of 1989-90 ranged from 35% to 60% of normal in New Mexico. In the spring of 1990 inflow into reservoirs was generally well below normal. While the water content of small reservoirs was extremely low at the onset of the irrigation season, the content of the states largest reservoirs was generally near normal. Due to inadequate precipitation received the previous summer and fall, soil moisture was well below normal statewide. In June, below normal rainfall and a record breaking heat wave which sent the mercury soaring into the 100s aggravated the situation by increasing the irrigation demand. Irrigators dependent upon surface water were faced with severe shortages in some areas. Hardest hit were Cibola and McKinley counties where streamflows were only sufficient to satisfy 10% or less of the irrigation demand; in Colfax County the Vermejo Conservancy District was short 72%; in Mora County surface water irrigators were about 20% short; in Quay County the Arch Hurley Conservancy District was short 48%; in San Juan County irrigators along the La Plata River were about 60% short; in Santa Fe County the Pojoaque Irrigation District, Santa Cruz Irrigation District (part in Rio Arriba County), and other cropped areas irrigated with surface water were 29%, 60% and 30% short respectively; and in Union County shortages were on the order of 50% on the Dry Cimarron and Tramperos Creek. Surface water shortages also occurred in Eddy County in the Carlsbad Irrigation District and in Dona Ana County in the Elephant Butte Irrigation District; however, these shortages were offset by pumpage from supplemental wells. Conditions improved in most areas of the state during July when much needed rain was received.

CAUSES OF POOR IRRIGATION EFFICIENCY

The main body of the text which follows was adopted from a U.S. Government interagency task force report entitled "Irrigation Water Use and Managment" (U.S Department of Agriculture, 1979). The original text has been edited and updated for inclusion in this report.

In 1990, off-farm conveyance losses in canals and laterals in New Mexico were estimated at 661,245 acre-feet or about 36% of the total surface water withdrawals for irrigation. Off-farm conveyance losses can be attributed to permeable canals, obsolete, inadequate, or improperly maintained facilities, and excessive vegetative growth. Seepage through unlined canals is the main contributor to conveyance losses. Seepage rates are proportionately greater for canals with intermittent flows than for those under continuous operation. Obsolete, inadequate, or improperly maintained facilities result in poor control and management of water throughout the off-farm conveyance system which affects the on-farm management of water. Excessive vegetative growth in and along canals interferes with the delivery of irrigation water, causes seepage and transpiration losses, causes sediment to accumulate and contributes to structural failure and poor operation of the canals.

Physical conditions that contribute to inefficient water use on-farm include unlined farm ditches, lack of measurement structures, poor farm layout, and improper maintenance; and variabilities within fields of soil intake rates, water holding capacities, and erosion resistance. The method of water application, i.e., the type of irrigation system, affects irrigation efficiency, particularly if the method is not suited to soil or topographic conditions. On flood irrigated farms, the relationship between field slope, field length, soil characteristics, and water flow must be balanced to achieve uniform application with minimum deep percolation and surface runoff. For example, the slope and water flow rate may be acceptable, but the length of the field may be too long for the soil conditions. Flood irrigation of steep or nonuniform slopes may result in poor application uniformity, soil erosion, excess surface runoff, and deep percolation. Sprinkler irrigation on fine-textured soils produces surface runoff if the intake rate of the soil is exceeded by the application rate of the sprinkler.

Management factors which contribute to inefficient water use on-farm include lack of soil moisture data and improper timing of irrigation, lack of adequate flow measurements, incorrect application amounts, and lack of adequate facilities to control water. The timing of irrigations and the application amounts may vary because of water availability, other farm activities, or an off-farm job which requires the irrigator's attention, resulting in lower irrigation efficiencies. Farm labor hired for irrigating crops may not have the necessary experience to understand the soil, water, crop, and field relationships needed to achieve good efficiencies.

Institutional and social factors which affect on-farm irrigation efficiency include existing laws and court decrees, water and energy prices, and social attitudes related to land use. Under the doctrine of prior appropriation, an irrigator may use the total amount of water decreed, even if inefficiently, rather than lose the right to divert the water. The rate schedules to assess or charge irrigators in irrigation districts for the cost of water delivered in many cases are constant and do not discourage excessive use of irrigation water.

IMPROVING OFF-FARM CONVEYANCE EFFICIENCY

The off-farm conveyance efficiency can be improved by lining canals and laterals; installing closed pipe systems; consolidating and/or realigning the distribution system; replacing or installing flow-regulating structures; scheduling regular maintenance inspections and performing necessary work; and controlling aquatic and/or ditchbank weeds.

Canal Linings

Materials used for linings include compacted clays, hard-surface materials such as concrete or soil cement, or membranes such as asphalt and flexible plastic. Selection of a lining material is generally based on its availability, cost, and the geographic location or climate where it is intended to be used. A compacted earth lining of silty clay has a seepage rate of about 2.394 gallons per square foot of wetted perimeter per day, while concrete lining has a seepage rate of about 0.598 gallons per square foot per day.

There are other benefits to lining systems in addition to reducing seepage. They include (1) the control of ditchbank weeds and aquatic growth which consume water and require use of herbicides, (2) a reduction of soil erosion, (3) an improvement in water quality, (4) a possible reduction in operation and maintenance costs, (5) reduced drainage requirements, and (6) reclamation of agricultural lands lost to seepage.

Piped conveyance systems provide a means of completely enclosing a system to avoid many of the water losses which occur in an open system. In the past, pipelines to carry irrigation water were used mainly where physical barriers such as steep escarpments and canyons made open systems impractical. In mountain valley situations, consideration should be given to installing pipelines for gravity sprinkler systems.

Relatively few piped systems have been installed to date. Where piped systems have been installed, conveyance efficiencies greater than 95% have been attained. Additional benefits include better utilization of lands along system rights-of-way, elimination of safety hazards common to open systems, reduction of evaporation losses, and better control of water delivered to the farm, thus providing more options for the farmer.

Many conveyance systems were constructed along contours of the land to minimize excavation and fill construction activities which in the past were performed by crude and inefficient machinery. This resulted in the existence of many long and winding systems which have very high losses. Piping of such systems increases the off-farm conveyance efficiency, reduces seepage, and may reduce operation and maintenance costs.

Consolidation and/or Realignment

Consolidation and/or realignment is possible today because of modern construction methods. Better irrigation system features such as improved water control structures and lining and piping materials also make consolidation and/or realignment practical as effective water conservation measures. Benefits include (1) reduced operation and maintenance activities for water users, (2) improved farm unit layout, (3) elimination of weeds along deleted waterways, (4) improved service to water users, (5) improved economic use of the land, and (6) reduction of diversion requirement.

Water Measurement

Water measurement accuracy is important in the operation of any water conveyance system. Measuring devices are essential if an accurate accounting of what happens to the water is to be made. Proper evaluation of losses is necessary to establish the economic advisability of providing canal linings.

Inline Structures

Inline structures include water measurement and regulating structures. Regulating devices are checks, check-drops, turnouts, diversion structures, check inlets, and regulating reservoirs. These structures are used to regulate the flow passing through the conveyance system and/or control the elevation of the upstream water surface. The equitable delivery of water to irrigators is dependent upon the size of the discharge openings, referred to as farm turnouts, and the water level behind the openings. If the structures of the system cannot maintain a constant or uniform water level, proper deliveries cannot be made to the irrigator. This may cause irrigators to use the water supply inefficiently. The use of proper check structures in a system also regulates the water level along the system, thus reducing operational wastes and losses.

Automation of Regulating Structures

The automation of regulating structures is designed to increase the overall efficiency of the system and reduce operational waste. While storage reservoirs and the outlet works of dams, diversion dams and canal headworks are often self-contained and isolated, they can be the focal point for demands of the conveyance system. The proper operation of these facilities through automation can help meet downstream diversion demands in the river (water rights and/or fish and wildlife commitments), and also lessen hydraulic fluctuations to provide smooth operation of the entire system. Automatic controls of check structures can sense deviations of water surfaces on the canal and operate adjacent checks upstream and downstream to provide a nearly constant water level. Automation of turnouts provides uniform deliveries from the distribution system to the farm. Wasteways are the traditional safety valves of the canal operation. They remove excess water and prevent overtopping of the canal. Operational wastes can be eliminated or greatly reduced when a high degree of automation is utilized on other structures within the system.

Benefits that would accrue as a result of automation of facilities would be both tangible and intangible. The tangible benefits could be reduced operation and maintenance costs of the conveyance and distribution system, and a more reliable water supply. Intangible benefits might include safety, and aesthetic values.

Maintenance of Facilities

Proper maintenance of facilities that control and regulate the flow of water is fundamental to good water management practices of the project and the water users. The accuracy of measuring devices, most important for efficient operations, can be assured through inspection and routine maintenance. Facilities designed to maintain water levels in the system need to be under a regular maintenance program to provide optimum service. The regular removal of debris from the system throughout the season and removal of sediment during the off-season will eliminate many operating problems.

Weed and Phreatophyte Control

A weed and phreatophyte control program can effectively minimize excessive vegetation in and along ditchbanks and can be accomplished by mechanical, chemical or biological means. Any method of control will have economic and environmental impacts. Chemical control is generally the most effective and economical but may not be environmentally acceptable. Mechanical control may be less effective and more costly in manpower and equipment. Benefits of a routine weed and phreatophyte control program include increased water delivery capacity, a possible reduction in operation and maintenance costs, and reduced water consumption by ditchbank vegetation.

Conveyance Design

The application of any measure which may improve on-farm efficiency is often limited by the design and management of the conveyance and distribution system. Existing systems have been designed to deliver water by a continuous flow, rotation, or demand method. The continuous flow and rotation methods may discourage efficient on-farm and system water use. The rotation delivery system is designed with a capacity to deliver water for short periods of time at scheduled regular intervals. The demand system of delivery is designed with a capacity to deliver on short notice the flow ordered by an irrigator. The demand method is best suited to promote the efficient use of water. Any improvement measures, either on-farm or in the system, should be interrelated with the delivery capacities of the system. This will provide the type of irrigation delivery system which will allow the irrigator flexibility in choosing on-farm methods to conserve water. However, to change from one method to a more efficient method may require installation of costly structural measures.

Scheduling Water Deliveries

Scheduling water deliveries is an important water management measure. Scheduling deliveries provides for the allocation of water in accordance with actual and projected crop use, rainfall, cultural practices, delivery system carrying capacity, and field irrigation characteristics. Deliveries can be scheduled to make the most effective and efficient use of the total water supply. Use of scheduling might eliminate the need for enlargement of the conveyance system to deliver more efficient flows. Scheduling deliveries on most distribution systems can be accomplished without additional operating personnel.

IMPROVING ON-FARM IRRIGATION EFFICIENCY

The on-farm measures are those that affect the problems causing inefficiency on the farm. These measures deal with the on-farm delivery system, field application system, and water management problems.

Ditch Lining or Piping

An effective method of reducing seepage is to line ditches or replace them with pipelines. These measures are similar to lining or piping off-farm systems. Ditch lining may be less costly to install but is not suitable to all topography and farm layouts. Piping is more effective than ditch lining in managing water because it eliminates evaporation, and when buried, can be farmed over and automated easily. Both lining and piping may reduce labor and maintenance costs of the irrigator.

Land Leveling

Land leveling is reshaping the surface of a field to planned irrigation grades or slopes and is most important in flood irrigation systems. Proper land grades for the field application system being used allow better control and more uniform application of water, which may result in increased efficiency. Where basin-border irrigation is practiced, fields which have not been leveled will require a greater depth of water to cover the high and low spots, and in the low spots, more water will be lost to deep percolation. Thus, the depth or volume of water required to irrigate a laser leveled field will be less than what is needed for a field that has not been leveled because the highs and lows have been removed.

Minimum Tillage

Crop residue left by minimum or no-tillage increases soil tilth, allows more water to penetrate the soil and prevents puddling and runoff. Deep tillage with a chisel plow also increases penetration and breaks up hardpan that can restrict root development. (Anonymous, 1980).

Water Control Structures

Water control structures are those on-farm facilities that control and regulate the flow of water from the farm delivery point to the field. These facilities are similar to the off-farm inline structures, but are designed for smaller flows. Examples of water control and regulating structures are checks, drops, divider boxes, and reservoirs. The control and regulation of water flow on the farm is required to distribute water throughout the on-farm delivery system. Using divider boxes and checks, water can be diverted from one location to another. Checks are used to maintain the constant water level required to achieve efficient application of water on the fields. Drop structures allow the transportation of water along steep slopes, while maintaining a nonerosive slope in each reach of the conveyance system. On-farm reservoirs can accumulate low flow rates from wells or canals until sufficient volume is available for efficient application. Water control structures are most effective in the mountain meadow and intermediate valley irrigation zones where the on-farm delivery systems are relatively old and usually lacking in measuring devices and structures.

Flow Measurement Devices

For the irrigator to apply the specified amount of water at each irrigation, he must have some method of water measurement. Flow measurement devices can be installed in open ditches and in pipelines. Some examples are Parshall flumes, cutthroat flumes, weirs, orifice plates, and flow meters. In addition to telling farmers how much water has been pumped, meters are also useful in determining the efficiency of a pumping plant and detecting potential well and pump problems before they become a serious problem. Installation of flow measuring devices will not in itself conserve water. These devices must be maintained and used by the irrigator to control the amount of water applied. They will be most effective when used in conjunction with an irrigation scheduling program.

Tailwater Recovery Systems

Tailwater recovery systems are used to catch runoff resulting from irrigation and return the water into the original delivery system or onto another irrigated field. The system usually consists of a sump, pit, or collection reservoir located below the irrigated area, a pump, and a pipeline to deliver water back to the delivery system or to the irrigated field. Tailwater pits may lose a third of the inflow because of deep percolation and evaporation (Blair, 1981). They may also become a potential breeding ground for mosquitoes. A better alternative may be to adopt management practices which reduce runoff and eliminate the need for tailwater recovery.

Selection of Application Method

Three methods of irrigation water application—flood, sprinkler, and drip—were described earlier in this section. Switching from one of these methods to another constitutes a change in method of irrigation water application. This is a valid alternative for improving water use and management where the existing irrigation system is poorly suited to the site conditions and the desired degree of efficiency cannot be obtained by improving the system design.

No one irrigation method is consistently more efficient than other methods, and conversion from one method to another should not be based on such a premise. The potential change in method should be based on evaluation of land slope, crops to be irrigated, water supply, water intake and water-holding capacity of the soil, labor, and other factors, including economic and environmental impacts. The method selected should conserve soil as well as water. To do this, it may be necessary or desirable to use more than one method of irrigation on any given farm. For example, crops which are drip irrigated may have to be flood or sprinkler irrigated occasionally to apply a sufficient head of water to leach salts out of the root zone.

A change from flood to sprinkler irrigation may be warranted when soils have high intake rates that cause excessive deep percolation with flood methods; fields are steep or have complex slopes; or light, frequent water applications are required due to crop requirements or soil water-holding characteristics. Efficient flood irrigation is possible, except on steep slopes and coarse-textured soils, when flow rates, time of set, and length of run are properly chosen. Flood systems may be preferred when large water applications are needed for leaching to maintain salt balance; when sprinkling with low quality water would cause damage to crop foliage; when effective use of rainfall and erosion control is feasible by land leveling; or when sprinkler evaporation losses are excessive due to wind and other climatic conditions. Drip irrigation should be considered when (1) the water supply is limited, (2) there is need for a high degree of automation (reduced labor), (3) slopes are excessive, or (4) the cost of water is high.

Improved Application Method

The improved design of an existing application method can be effective in managing irrigation water by facilitating better control of the available water supply. Other purposes may include more effective use of rainfall and labor, reduction of energy requirements, reduction in operation and maintenance costs, and provision for safety features. Reorganization of irrigation systems should be based on analyses of the particular site conditions by personnel who have expertise in irrigation design and water management.

Examples of design changes for sprinkler systems include reorificing sprinkler heads, and changing sprinkler spacings and operating pressures to improve distribution patterns and application rates. Center pivot sprinklers may be fitted with drop down tubes which bring the spray nozzles to within a few inches of the ground. These systems, which are referred to as low energy precision application systems (LEPA), can achieve application efficiencies of up to 95%. Because water is applied at low pressure directly above the furrow, wind drift and evaporation losses are virtually eliminated. To maximize uniform water application with LEPA systems, farmers may use furrow dikes to hold the water in place until it has had time to soak in. Irrigators who have converted their irrigation systems from conventional furrow to LEPA report reduced labor costs of up to 75%, decreases of 35% to 50% in energy costs, water savings of at least 25%, and increases in yields of 25% or more because water previously lost to evaporation is available to the crops. (Anonymous, 1989).

Flood system design may often be improved by adjusting run lengths and furrow streams to prevent excessive deep percolation and runoff; changing dimensions of border strips to obtain proper advance and recession of the irrigation streams; reducing irrigation grades by land leveling; adjusting spacing of field ditches; and adding tailwater recovery facilities, automation, and measuring equipment. A time-controlled surge irrigation valve managed correctly in conjunction with a furrow irrigation system can eliminate irrigation tailwater losses, minimize deep percolation losses and reduce the length of time that water in the furrow is exposed to evaporation. Water savings of 10% to 40% have been measured after the addition of surge valves to conventional irrigation systems (Anonymous, 1989).

On-Farm Irrigation Water Management

On-farm irrigation water management is the determination and control of the rate, amount, and timing of irrigation water application to soils to supply water needs in a planned and efficient manner. Improvements in water management can reduce mining of groundwater supplies, reduce diversion rates from natural streams or reservoirs, reduce tailwater runoff, reduce deep percolation losses, reduce nutrient losses, improve water quality, and improve crop yields. Management improvements can be made by irrigation scheduling and applying water in desired rates and amounts. Many irrigators apply water on a set schedule without regard to the crop needs or moisture-holding capabilities of the soil because of habit or other constraints. Inadequate or ill-timed applications can result in lowered crop yields. Irrigation scheduling involves use of data on soil moisture availability, crop water requirements, and rainfall to achieve a soil moisture balance for the irrigator's fields. The objective is to enable the farmer to determine when he needs to irrigate and how much water to apply. Additional labor can often allow the irrigator to better manage his water.

Scheduling is most effective when irrigation water supplies are adequate, but can be useful in managing a limited supply. If a complete scheduling program is not used, soil moisture determination by itself can improve water management. Whether the determination is made by a shovel, probe, moisture block, or tensiometer, the level of soil moisture is estimated, and irrigation water is applied if moisture is below a specified level. This specified level will vary, depending on the soil, climate, crop, and stage of crop development. Excess water application may cause surface runoff or deep percolation. Inadequate application will not maintain an optimum moisture level and will require more frequent irrigations. The timing and measurement of water are essential to determine how much is being applied.

The potential benefits of irrigation scheduling are illustrated by the following examples.

In 1976, farmers in central Nebraska who were cooperators in an irrigation scheduling program piloted by the University of Nebraska applied an average of 15 inches of water to about 5,000 acres of cropland; farmers who were not in the program applied an average of 24 inches of water. (Ruen, 1977). As a result, farmers in the scheduling program reduced both the amount of ground water pumped and the cost of pumping by about 38%.

The University of Nebraska irrigation scheduling technique used a computerized scheduling program on Nebraska's AGNET computer system. Soil moisture data for the AGNET program was collected from electrical resistance blocks placed in the soil at depths of 0.5, 1.5, 2.5, and 3.5 feet. Irrigations were scheduled when the moisture in the root zone was more than 50% depleted. The irrigation water applied was less than that necessary to fill the soil profile completely, so the soil could absorb rainfall if it should occur.

Since 1984, at the cost of a few dollars per acre, farmers in 16 counties in California have reduced the amount of water they apply to their fields by 15% to 50% using gypsum blocks to signal when its time to irrigate. In Colorado, farmers who have installed gypsum blocks at one or two sites within each circle under center pivot irrigation have reduced their annual diversions by 30% to 40% and their pumping costs by $2,000 or more per field (Richardson, 1992).

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SECTION 5

Self-Supplied Livestock

INTRODUCTION

The procedure presented in this report for quantifying livestock withdrawals and depletions relies primarily upon the number of livestock reported by various state and federal agencies and per capita water requirements for each species of animal determined from agricultural research. A brief overview of factors which affect livestock water use is presented. The results of a recent study of drinking water requirements for beef cattle are reviewed. The current migration of West Coast dairies to New Mexico and the exponential increase in the number of dairy cattle in Chaves County are noted. Water requirements for modern dairies are discussed in detail, and suggested guidelines for quantifying withdrawals and depletions in dairies are included.

COMPOSITION OF CATEGORY

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

PROCEDURE FOR QUANTIFYING LIVESTOCK WITHDRAWALS AND DEPLETIONS

Step 1: Numbers of beef cattle, chickens, hogs, milk cows, and sheep are enumerated by the U.S. Department of Agriculture, National Agricultural Statistics Service, and reported by county and species. Data used in this report was extracted from the New Mexico Agricultural Statistics Service's 1990 edition of "New Mexico Agricultural Statistics." The number of horses and mules in each county is obtained from data reported in property tax valuations filed with county assessors. When a county is divided into two or more river basins, the number of livestock in each basin is estimated based on local knowledge of grazing lands, location of feedlots etc.

Step 2: Livestock water requirements for consumption (drinking) and other uses (e.g. dairy sanitation) exclusive of stockpond evaporation are estimated on the basis of a per capita use where metered withdrawals are unavailable. (Metered withdrawals are available for all dairies in Chaves County.) Withdrawals are computed using the following equation:

$$W=(GPCD)(POP)/892.74$$

where W is the annual withdrawal in acre-feet; POP is the population; and GPCD is gallons per capita per day. Water requirements for chickens, hogs, horses and mules, and milk cows are assumed to come from groundwater sources only. However, drinking water requirements for beef cattle and sheep are generally assumed to come from both surface and groundwater supplies, with the emphasis on groundwater sources where surface water supplies do not provide a reliable source of water year around or where the quality of surface water supplies is unsatisfactory for livestock drinking water.

Step 3: Depletions for beef cattle, chickens, hogs, horses and mules, and sheep are assumed to equal withdrawals. The depletion rate for dairies will vary depending upon the nature of the operation. (See the discussion of dairies later in this section, and in particular, Tables 5.3 and 5.4.)

FACTORS WHICH AFFECT LIVESTOCK WATER USE

Livestock and poultry obtain water from three sources: water that is (1) consumed as free water, (2) contained in the feed, and (3) made available through metabolic processes. Many factors influence the intake of water by livestock and poultry. They include, species, size, age, sex, and production of the animal; amount and content of the feed; accessibility to water; and air temperature.

There are nearly as many different waste disposal systems as there are livestock enterprises. Manure generated by livestock on pasture and range is deposited directly on the land. Manure in lot areas is often dry and easily scraped and handled with loaders and spreaders. Holding ponds are often used to retain feedlot runoff until the waste can be spread. Manure in closely confined areas with slab or slotted floors is often wet, near a fluid state. It may be collected by flushing gutters, hosing or by falling through the slats into a holding tank, lagoon or oxidation ditch. It is applied to the land with slurry or tank spreaders or irrigation equipment, or is recycled. Many waste disposal systems require no additional water. However, over the years, an increasing number of hog and beef-cattle feeders and dairy herdsmen have adopted a partial or total liquid disposal system. Liquid systems may need to have water added to hose floors, flush gutters, start batch oxidation and/or dilute solid concentrations for biotic action or for ease of handling.

Freshwater may also be required for animal washes and dips, quarter washdown and disinfectant sprays, cleaning and sanitizing equipment, washing eggs, and dust control. In addition to water consumed by animals, there are watering losses which include tank and trough evaporation, tank overflows, trough spills, and continuous ripple flow discharge (to prevent freezing). Overflows of watering devices are losses incurred with drinking water; however, these losses are not intake and are in addition to drinking water requirements. Watering losses are generally estimated as 10% of animal drinking water requirements (SCS, 1975).

LIVESTOCK NUMBERS

As of December 31, 1990, the number of beef cattle (exclusive of heifers) in New Mexico was estimated as 571,000. Approximately 646,119 beef cattle were shipped into New Mexico from Arizona, Arkansas, Colorado, Texas, Mississippi, Mexico, and Canada in 1990. About 1,320,267 head were shipped out of the state. The number of milk cows in New Mexico in 1990 was estimated as 89,000; sheep and lambs as 462,000; hogs and pigs as 27,000; and chickens 1,430,000. (New Mexico Agricultural Statistics Service, 1991). The number of horses was estimated as 24,870.

WATER REQUIREMENTS FOR BEEF CATTLE

Sweeten (1990a) studied drinking water requirements of 28,000 beef cattle on a feedlot in Texas over a period of 11 months during 1984 and 1985. Meter records from the municipality which provided water to the feedlot indicated an average consumption of 7 gallons per head per day (gpcd) and a range from 4.2 gpcd in the winter to 10.3 gpcd in the summer. Analysis of the data showed that drinking water requirements can be estimated at 0.48 gallons of water per pound of dry feed consumed. On the basis of this criteria, the data shown in Table 5.1 was developed. Given an 80% dry matter ration, an 800-pound animal will consume 9.6 gallons of water per day. A 10,000 head feedlot would require a continuous pumping rate of 67 gallons per minute (gpm) to meet the average demand and approximately 134 gpm to meet the peak demand. The pumping rate required for an 8-hour day utilizing a storage reservoir would be at least 200 gpm for a 10,000 head feedlot, and 400 gpm to meet the peak demand.

In 1990, the average weight of a steer in New Mexico was about 764 pounds (New Mexico Agricultural Statistics Service, 1991). Using the guidelines developed by Sweeten, the average water requirement per head of beef cattle on an 80% dry matter ration would be 9.2 gallons per day. Allowing for trough water losses would increase the water requirement slightly. For the purpose of this water use inventory, withdrawals for beef cattle are computed on the basis of 10 gpcd and depletions are assumed to equal withdrawals.

Table 5.1. Drinking water requirements for beef cattle in gallons per capita per day (gpcd). (Source: Sweeten, 1990a).

Liveweight (lbs/hd)	Dry Feed Consumption (lbs/hd/day)	Water Required (gpcd) Dry Matter in Ration (%) 70	80	90
600	12	8.2	7.2	6.4
800	16	11.0	9.6	8.5
1000	20	13.7	12.0	10.7
1200	24	16.5	14.4	12.8

Note: To get gpcd, divide dry feed consumption by the percent of dry matter in ration expressed as a decimal and multiply the result by 0.48.

WATER REQUIREMENTS FOR MODERN DAIRY BARNS

In California, where strict air and water quality standards have been enacted, and prolonged drought has dried up the supply of cheap subsidized water farmers count on for the irrigation of pastures, dairymen have fixed their gaze on the land of enchantment in search of greener pastures. Eager to attract new business to give new life to a sagging economy, New Mexico bankers have made an extensive effort to seize this opportunity by enticing dairymen from California and Arizona to relocate in New Mexico. Dairymen have been attracted to New Mexico by inexpensive land, the availability of water, the low price of feed such as alfalfa, and a hospitable climate (McCutcheon, 1991). In Chaves County alone, the number of dairy cattle has tripled in less than two years. In the last two decades Dona Ana County has also experienced a dramatic increase in the number of dairy cattle. Table 5.2 illustrates the historical increase in the number of milk cows in Chaves and Dona Ana counties.

Table 5.2. Number of milk cows in Chaves and Dona Ana counties, New Mexico, 1976-1990. (Source: New Mexico Agricultural Statistics Service, 1976-91)

Year	Chaves	Dona Ana
1976	3000	6500
1977	3500	7000
1978	4000	8500
1979	4000	9200
1980	5000	13100
1981	7200	16000
1982	9700	18300
1983	10800	21000
1984	12000	23800
1985	13200	26000
1986	10500	24400
1987	10500	23400
1988	12000	24000
1989	19000	24000
1990	34000	24500

New dairies today typically operate with 1,000 or more head and maintain high animal concentrations in confined lots or corrals on small acreages relative to the number of cows. Typical animal spacings in open lots are 600 square feet per cow. Large amounts of water are used for manure removal and milk sanitation (Sweeten, 1990b).

Frank Wiersma (1988), Professor of Agricultural Engineering and Cooperative Agricultural Extension Service Dairy Specialist at the University of Arizona, developed the following guidelines for estimating water requirements of dairies.

Total daily water consumption by lactating cows is influenced by ambient climatic conditions and by milk production level. There is a compensating interaction between these two parameters in that high temperatures reduce milk production level. Based on current studies, daily water consumption per lactating cow is given by the following equation:

$$GPCD=26+0.3(MP-40)$$

where GPCD is water consumed in gallons per capita per day and MP is fluid milk production in pounds per day. Since this equation is based on the premise that milk production is not less than 40 pounds per day, at which level the gpcd is 26, water requirements for lactating cows should be 26 gallons per day or the value produced by the above equation, whichever is greater. For a dairy operation to be profitable, cows must generally produce 65 to 75 pounds of milk per day. Substituting 75 pounds per day into the equation yields an average drinking water requirement of 36.5 gpcd.

In addition to lactating cows, dairies also have dry cows, bulls, springer heifers, young calves, and replacement heifers on the premises. One-quarter to a third of the dairy herd is generally retired each year and replaced with younger stock. Most of the water used exclusively by non-lactating animals on the dairy is for drinking. However, water is also used for hospital treatment, foot baths, water trough cleaning, and equipment washing. Total water requirements for non-lactating animals are about 20 gallons per animal per day or the equivalent of 6.6 gallons per lactating cow per day assuming there are three non-lactating animals per lactating cow (i.e., 6.6 gpcd=20 gpcd/3).

Many of the milking center operations requiring water use are dictated by sanitary codes. All milk lines and associated equipment must be washed, rinsed and sanitized after each milking operation. Both hot and cold water are used. Parlor and holding area grates, floors, and walls must also be hosed down to remove all manure after each milking. Hoses with spray nozzles must be available at all milking stalls for teat and udder cleansing prior to attachment of milking equipment.

A small number of dairies in New Mexico prewash the udders of lactating cows prior to entry into the parlor with a grid of jet sprayers at floor level in the holding area. Most dairies in New Mexico however, wash the udders with hand-held hoses before milking. This practice requires much less water than an automated sprinkler wash. For dairies with sprinkler udder washing systems, the total water requirement for the milk room, parlor and holding pen is 35 to 40 gallons per milking per lactating cow. Corresponding water requirements for dairies which employ manual udder washing practices are 23 to 25 gallons per milking per lactating cow.

Other milking center water uses may include coolant for vacuum pumps—2 gallons per milking per cow, cooling towers for precooling milk—0.25 gallons per milking per lactating cow, and cooling towers for refrigeration system condensers—3 gallons per day per lactating cow. Water used for cooling in dairies is generally recycled, however, a small amount of fresh water must be introduced to make up for evaporation losses.

There are many other water uses which may occur in a dairy operation. Water is used as an additive for the feed ration, for washing, for washing the milk truck ramp located forward of the milk room, for separate maternity facilities, for laboratories, for the employees, for occasional flushing of the manure sump, for the cow hospital or treatment area, and for occasional line breaks. Though most of these requirements are rather small, they are cumulatively significant in quantity. Ten gallons per day per lactating cow should be allotted for these water uses.

In some areas of the Southwest where summers are extremely hot (primarily Arizona) it is common practice to use evaporative shades to cool cattle down. Water may also be used to sprinkle traffic lanes and cattle corrals for dust control. However, these practices are not common in New Mexico.

Dairy wastewater from the holding areas, milking parlor, milk storage tank and equipment is routed to lagoons which typically have a surface area ranging from three to five acres. To comply with state regulations to protect groundwater quality, these lagoons are necessarily constructed to prevent seepage. All or part of the water discharged into lagoons may be evaporated. However, after primary treatment in holding ponds, irrigation systems are often used to dispose of the wastewater. Because the salinity of wastewater may cause crop damage, freshwater may be introduced to dilute the wastewater before it is used for irrigation.

Water requirements for dairies are summarized in Tables 5.3 and 5.4. For the purpose of quantifying withdrawals and depletions for dairies in New Mexico's 1990 water use inventory, withdrawals are computed on the basis of 100 gallons per cow per day (gpcd) where metered withdrawals are unavailable, and depletions are estimated as 90% of the withdrawal. This depletion rate reflects the approximate average for the two wastewater disposal schemes shown in Table 5.3. It is based on the assumption that some dairies in a county may use sprinkler systems to dispose of wastewater, while others use flood irrigation systems. All withdrawals are assumed to come from groundwater sources.

Table 5.3. Estimated water requirements in gallons per cow per day (gpcd) for a modern dairy using manual udder washing practices.

Item	Withdrawal (GPCD)	Scenario 1 Depletion Factor	Scenario 1 Depletion (GPCD)	Scenario 2 Depletion Factor	Scenario 2 Depletion (GPCD)
Drinking water for lactating cows	36.5	1.00	36.5	1.00	36.5
Drinking water for other animals	6.6	1.00	6.6	1.00	6.6
Sanitation in milking center	46.0	0.73	33.6	0.87	40.0
Coolant for vacuum pumps	(4.0)	0.00	0.0	0.00	0.0
Refrigeration cooling towers	(3.5)	0.00	0.0	0.00	0.0
Miscellaneous	10.0	0.73	7.3	0.87	8.7
Net Totals	99.1		84.0		91.8

Table 5.4. Estimated water requirements in gallons per cow per day (gpcd) for a modern dairy using sprinkler udder washes.

Item	Withdrawal (GPCD)	Scenario 1 Depletion Factor	Scenario 1 Depletion (GPCD)	Scenario 2 Depletion Factor	Scenario 2 Depletion (GPCD)
Drinking water for lactating cows	36.5	1.00	36.5	1.00	36.5
Drinking water for other animals	6.6	1.00	6.6	1.00	6.6
Sanitation in milking center	70.0	0.73	51.1	0.87	60.9
Coolant for vacuum pumps	(4.0)	0.00	0.0	0.00	0.0
Refrigeration cooling towers	(3.5)	0.00	0.0	0.00	0.0
Miscellaneous	10.0	0.73	7.3	0.87	8.7
Net Totals	123.1		101 .5		112.7

Scenario 1 assumes that wastewater is disposed of by flood irrigation with an on-farm efficiency of 70% and incidental depletions equal to 3% of withdrawals, yielding a total depletion of 73%. Scenario 2 assumes that wastewater is disposed of by sprinkler irrigation with an on-farm efficiency of 70% and incidental depletions equal to 17% of withdrawals, yielding a total depletion of 87%. See glossary for definition of incidental depletions. Depletions for each line item are computed by multiplying the withdrawal by the depletion factor. Numbers in parenthesis indicate water that is recycled. Water requirements for employee residences which are located on the dairy premises would be in addition to the water requirements shown in these tables.

SUMMARY OF PER CAPITA WATER REQUIREMENTS FOR LIVESTOCK

Per capita water requirements used to quantify livestock withdrawals in New Mexico are summarized in Table 5.5

Table 5.5. Drinking and miscellaneous water requirements for livestock in gallons per capita per day (gpcd). (Sources: Beef cattle—Sweeten, 1990a; horses—Van der Leeden, 1990; milk cows—Wiersma, 1988; all other—SCS, 1975 and USDA, 1955)

Species	Drinking	Miscellaneous	Total
Beef Cattle	9.00	1.00	10.00
Chickens	0.06	0.02	0.08
Hogs	2.00	1.00	3.00
Horses and Mules	12.00	1.00	13.00
Milk Cows	36.50	63.50	100.00
Sheep	2.00	0.20	2.20

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SECTION 6

Self-Supplied Commercial, Industrial, Mining, and Power

INTRODUCTION

The procedure presented in this report for quantifying withdrawals and depletions for Commercial, Industrial, Mining, and Power emphasizes the importance of metering to monitor water use. Guidelines for estimating water requirements for recreational facilities such as campgrounds are presented. Criteria used to categorize golf courses, the impact of the species of turfgrass on irrigation water requirements, and measures which may be taken to conserve water are discussed in detail. The nature of water use in the industrial sector is summarized, and the factors which affect the amount of water recirculated are identified. New Mexico's importance as one of the nation's leading mineral producers is noted.

COMPOSITION OF CATEGORIES

Commercial: Includes self-supplied businesses (e.g., motels, restaurants, recreational resorts and campgrounds) and institutions (e.g., schools and hospitals), public or private, involved in the trade of goods or provision of services. Self-supplied golf courses which are not otherwise included in the Public Water Supply category are included as well as greenhouses and nurseries primarily engaged in selling products to the general public which are produced on the same premises from which they are sold. Off-stream fish hatcheries engaged in the production of fish for release are also included.

Industrial: Includes self-supplied enterprises engaged in the processing of raw materials (organic or inorganic—solids, liquids, or gases) or the manufacturing of durable or nondurable goods. Water used for the construction of highways, subdivisions and other construction projects is also included.

Mining: Includes self-supplied enterprises engaged in the extraction of minerals occurring naturally in the earth's crust: solids, such as coal and smelting ores; liquids, such as crude petroleum; and gases, such as natural gas. Water used for oil and gas well drilling, 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 is included as well as water removed from underground excavations and stored in, and evaporated from, tailings ponds. Mining also includes water used to irrigate new vegetative covers at former mine sites which are being reclaimed. It does not include the processing of raw materials such as smelting ores unless this activity occurs as an integral part of, and is physically contiguous with, a mining operation.

Power: Includes all self-supplied power generating facilities.

GENERAL PROCEDURE FOR QUANTIFYING WITHDRAWALS AND DEPLETIONS

The procedure for quantifying withdrawals and depletions for self-supplied commercial, industrial, mining, and power generating facilities is generally the same for each of these individual categories. This procedure is outlined in detail in the text which follows.

Step 1: Metered diversions for those enterprises that report to the New Mexico State Engineer Office are culled from the records.

Step 2: While most self-supplied commercial, industrial, mining, and power generating facilities are required to report their annual water use to the State Engineer Office, there are many that are continually delinquent in keeping their water use records up to date. When metered records for the water use inventory year are not complete, water use may be estimated by examining earlier records or prorating the water right.

Step 3: In some areas there may be establishments that are unmetered. These entities may be very difficult to identify, particularly where no declaration is required or no declaration has been filed with the State Engineer Office. It is acknowledged that many of these establishments are not captured in the water use inventory. However, whenever possible, directories maintained by various business associations and regulatory agencies are available and can be used to identify those entities that might otherwise be missed. It then becomes a matter of contacting these entities by phone or mail to get an estimate of the annual water use from the executive director or operator.

Step 4: Depletions for self-supplied commercial, industrial, mining, and power generating facilities vary from zero to 100% of withdrawals. Some water users such as refineries and power plants measure discharges and can thus determine depletions by taking the difference between measured withdrawals and discharges. Others have developed complex formulas for estimating depletions. Where depletions are not measured or computed using an empirical formula, they are estimated as a percentage of the withdrawals.

SELF-SUPPLIED COMMERCIAL

Campgrounds, Picnic Areas, and Visitor Centers

In the absence of metered data, water use at campgrounds, picnic areas, and visitors centers is estimated by multiplying visitor day counts by water use coefficients. Visitor day counts are obtained from the Bureau of Land Management, the National Park Service, New Mexico Parks and Recreation Department, and the U.S. Forest Service. When possible, visitor day statistics are separated into two distinct groups, i.e., overnight campers, and daytime visitors and picnickers. Over the years several studies have been conducted to develop guidelines for per capita water requirements in recreational areas. In chronological order these include: U.S. Public Health Service, 1962; Pacific Southwest Inter-Agency Committee, 1963; American Society of Civil Engineers, 1969; U.S. Environmental Protection Agency, 1980; U.S. Environmental Protection Agency, 1982.

The per capita water requirements presented in Table 6.1 represent the results of the most current studies available and were used to quantify water use in unmetered recreational areas in New Mexico's 1990 water use inventory.

Table 6.1. Water requirements in gallons per capita per day (gpcd) for recreational areas. (Source: U.S. Environmental Protection Agency, 1980)

Type of Facility	GPCD	Percent Depleted
Campground with showers and flush toilets	35	45
Campground with flush toilets	15	45
Campground with drinking water only	5	100
Picnic area with flush toilets	5	45
Visitor center	5	45

Golf Courses

In many communities, self-supplied golf courses represent the largest water users in the Commercial category. There are approximately 68 golf courses in New Mexico (Sun Country Amateur Golf Association, 1991) and they range from 9-hole par-three courses which cover as little as 40 acres to sprawling 18-hole courses which cover 200 acres or more. The amount of water used at golf courses is as varied as the golf courses themselves. Water requirements range from less than 100, to more than 800 acre-feet per year depending upon the local climate, species of turfgrass, irrigation management practices, number of ponds, and clubhouse facilities.

In the major urban areas there is generally a mix of both public and private golf courses. There are also several military installations which have their own golf course. Many of the well-established 18-hole private courses have clubhouse facilities which include snack bar and restaurant, locker rooms with shower facilities, and swimming pools. Golf courses are often the focal point of new subdivision developments which use the rich green turf as a means of creating an oasis in the desert to attract new home buyers.

There are some golf courses which divert water for irrigation directly from their own wells or a surface water source while also using treated municipal water in their clubhouse facilities as well as for irrigation in some months of the year. There are also several golf courses which irrigate with sewage effluent, however, these are not included in the Commercial category as the water used is already accounted for in the Public Water Supply category. There is a need to make a distinction in regard to how municipal golf courses which have their own wells are categorized. For the purpose of this water use inventory, self-supplied golf courses which are owned and operated by a municipality that is a public water supplier are included in the Public Water Supply category. Water used for the irrigation of self-supplied golf courses located within military installations is accounted for in the Public Water Supply category and is thus a transparent component of the total water use on a military installation. The intent here is to treat military installations as a distinct unit. Many universities also own and operate their own golf course; the water used to irrigate these golf courses is generally included with the water use reported for the university, in the Commercial category. All other self-supplied golf courses are included in Commercial. Private golf courses which irrigate from their own wells but also use municipal water for irrigation are also included in Commercial, however, the municipal water which is used for irrigation is included in Public Water Supply.

Many of the golf courses in the state are metered and report their annual diversions to the State Engineer Office. For those self-supplied golf courses which are not metered, withdrawals are estimated using the procedure outlined in Irrigated Agriculture for the quantification of crop water requirements. This necessarily requires that the acreage irrigated, as well as the species of turfgrass in the fairways, be obtained from the golf course superintendent. It is important that the species of turfgrass is identified because the irrigation water requirements for turfgrass will vary depending on the species of grass which is grown and climatic conditions. From a practical perspective, turfgrasses can be separated into two categories.

Cool-season grasses: These grasses have a temperature optimum of 60-70 degrees Fahrenheit and are best suited to the cooler regions of New Mexico. They include Kentucky bluegrass, tall fescue, perennial ryegrass, and creeping bentgrass.

Warm-season grasses: These grasses have a temperature optimum of 80-95 degrees Fahrenheit or above and are best suited to southern New Mexico and elevations below 4,500 feet. They include bermudagrass, Tifgreen, Santa Ana, zoysiagrass, St. Augustinegrass, and buffalograss. Warm-season grasses are generally susceptible to injury by cold weather.

During the warmest months of the year, cool-season grasses normally exhibit evapotranspiration rates which are typically 30% to 40% higher than warm-season grasses (Borrelli, 1981; Texas Agricultural Experiment Station, 1986). Thus, warm-season grasses will consume less water than cool-season grasses. For the purpose of this inventory, consumptive irrigation requirements for golf courses were computed using the original Blaney-Criddle method and the following consumptive use coefficients (K): For cool-season turfgrasses, 1.05 inside the frost-free period, and 0.50 outside the frost-free period; for warm-season turfgrasses, 0.80 and 0.50, respectively.

Where measured withdrawals are available, the irrigation efficiency on sprinkler irrigated golf courses is taken to be either the consumptive irrigation requirement (acre-feet) multiplied by 100 and divided by the withdrawal, or 80%, whichever value is lower. An irrigation efficiency of 70% is generally assumed when withrawals are estimated. Incidental depletion factors (See glossary for definition of incidental depletions.) for sprinkler irrigated golf courses are generally assumed to be slightly less than for farm crops because the sprinkler heads discharge at a low angle and close to the ground, there is no interception by a plant canopy such as occurs when irrigating alfalfa or corn, there is no bare ground—runoff is zero, and the turf is generally irrigated during the night when temperatures are lower and winds are calm. For the purpose of this inventory, incidental depletions for sprinkler irrigated golf courses are estimated as 12% of the withdrawals. Thus, if the irrigation efficiency is assumed to be 70%, the total depletion would be 82% (70%+12%) of the withdrawal.

In 1990, self-supplied golf courses exclusive of those owned and operated by municipalities which are public water suppliers in New Mexico, accounted for approximately 30% of the withdrawals and 40% of the depletions in the Commercial category.

To keep irrigation water requirements to a minimum, developers who are planning the construction of a new golf course should explore the research which has been conducted on turfgrasses and adopt a species of grass which has low water requirements and is well adapted to the local climate. The importance of carefully selecting a turfgrass cannot be overemphasized. In southern New Mexico, there are several golf courses planted in cool season grasses which are not suited to the climate. During the hot summer months, large volumes of water are required to prevent these grasses from wilting. The annual water demand and stress on the aquifer would be much less had these golf courses been seeded with warm season grasses. To prevent new developments from planting turfgrasses which have high water requirements where an alternative species of grass with low water requirements is viable, local governments and regulatory agencies can formulate guidelines which would discourage the use of certain species of turfgrass.

On a golf course with an irrigation system which has been carefully designed to conserve water, water is applied strictly according to plant needs. A vast array of electronic equipment is available to help maintenance personnel apply the right amount of water at the right time. Sprinklers can be turned on automatically by a system that measures soil moisture using tensiometers and applies water only when it is needed. Greens, fairways, and rough areas may be irrigated on different schedules to satisfy the water demands of each species of vegetation. To minimize evaporation, an anemometer may be installed to monitor wind speed and postpone irrigation until winds are calm.

These efforts may sound extreme, but the financial benefit to a business maintaining a large area of turfgrass can be substantial. A golf course in California that adopted the irrigation scheduling practices just described reduced its irrigation withdrawals by 70% and saved $32,000 per year in pumping costs. (California Department of Water Resources, 1984). An additional benefit resulting from the implementation of water conservation measures on a golf course is that when less water is applied, turf disease is minimized and fertilizer requirements are reduced because a smaller percentage of the nutrients percolate below the root zone.

SELF-SUPPLIED INDUSTRIAL

Water is used in the manufacturing industry for heating, cooling, conveying materials, washing, pollution control, and includes water sold as a part of the product (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. The quantity of intake water recirculated is affected by: the availability and cost of water delivered to the plant; quality of the raw water; plant processes and technology; recovery of materials, by-products, and energy; consumptive loss; air and water pollution control regulations; cost avoidance; and age of plant (Kollar and Brewer, 1980).

In 1990, self-supplied gas processing plants and oil refineries accounted for approximately 80% of the withdrawals and 90% of the depletions in the Industrial category. Water introduced into these facilities for cooling is generally recirculated. However, water used for other purposes, and water separated from petroleum during processing is generally discharged into lagoons where it is evaporated or it is injected into deep aquifers.

SELF-SUPPLIED MINING

New Mexico continues to be one of the leading mineral resource producing states in the nation, ranking first in the production of potash and perlite; second in copper and carbon dioxide; third in pumice and mica; fourth in natural gas; fifth in uranium; seventh in crude oil; and thirteenth in coal and gold. (New Mexico Energy, Minerals and Natural Resources Department, 1990b)

New Mexico's uranium industry continued its struggle to survive a severly depressed market in 1990. Chevron Resources ceased production at Mount Taylor in January of 1990, and Homestake closed its milling operation at Milan in June. Quivira continues to recover uranium at Ambrosia Lake in McKinley County, using stope leaching. It is the only uranium production operation still active in New Mexico.

Before the start of any mining operations, 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 the mines and mills registered in the state is updated annually. This directory is used to identify those mines and mills which are not required to report their annual withdrawals directly to the State Engineer Office. These mines and mills are then contacted by mail or phone.

Measured withdrawals for water used in the secondary recovery of oil may be obtained from the New Mexico Energy and Minerals Department, Oil and Gas Commission and State Engineer District Offices. Brine water pumped from a depth of 4,000 to 5,000 feet, which is returned by injection into deep brine aquifers, is not quantified in this inventory since its impact on the net supply of freshwater 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 is spread on the land surface where it evaporates, is treated as a 100% depletion.

The Oil and Gas Commission also maintains records of oil and gas well drilling. The total footage drilled is multiplied by 0.00045 gallons to arrive at an estimate of the water used for this purpose. Depletions are estimated as 10% of withdrawals.

SELF-SUPPLIED POWER

The New Mexico Public Service Commission maintains a directory of all power generating facilities in the state. This directory is used to identify electric utility companies which are not required to report their annual withdrawals directly to the State Engineer Office. These companies are then contacted by mail or phone.

There are currently 17 power generating facilities in New Mexico. Over 70% of the states generating capacity is located at the two largest coal-fired generating stations—Four Corners and San Juan, in San Juan County. Approximately 47% of the electricity generated in New Mexico is consumed in the state, while 53% is exported to other states, primarily Arizona, California, and Texas. (New Mexico Energy, Minerals and Natural Resources Department, 1990a)

Due to the complexity of the water budget for BHP-Utah International in San Juan County, evaporation from Morgan Lake, which is filled by water pumped from the San Juan River to supply the Four Corners Generating Station, is included in the depletions in the Power category.

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SECTION 7

Reservoir Evaporation

INTRODUCTION

The quantity of water discharged by a stream is continuously changing throughout the year, from rainy season to dry, and the quantity of flow during any one season varies from year to year. Variability is characteristic of streamflow, as it is of weather. Streams and rivers that originate in the interior mountain areas are characterized by a high rate of discharge during the period of snowmelt, usually in May and June. The rate of flow both before and after the snowmelt period is usually low. The time of peak flow varies somewhat, depending on the time of snowmelt.

Because of the high variability in the flow of most streams, full utilization of surface water is possible only through regulation and control. Storage is necessary to provide for fuller utilization of annual flows. Dams and reservoirs which impound precious runoff from upstream areas capture and conserve water for irrigation, hydroelectric power, municipal and industrial demands, outdoor recreation, fish and wildlife enhancement, and improved water quality as well as providing flood control.

While reservoirs provide many benefits, evaporation from exposed water surfaces of reservoirs consumes a significant part of available surface water supplies. Average annual gross evaporation from reservoirs ranges from 30 inches in the mountains of northern New Mexico to 80 inches in the valleys near the southern border of the state. Because water is a scarce and expensive commodity in New Mexico, evaporation losses attain special importance. Evaporation forecasts are needed for a variety of hydrologic problems such as forecasting water supplies and regulation of reservoirs. Where the management of streams and reservoirs is governed by interstate stream compacts, reservoir evaporation plays an important role in the accounting of inflows and outflows in the annual water budget.

In the text which follows, a general overview of the methods used to estimate reservoir evaporation is presented. Since evaporation from large reservoirs is most often estimated by using an evaporation rate determined from a Class A land pan, the pan approach is discussed in detail. An empirical method for estimating evaporation from small reservoirs where there is a paucity of data is also discussed as well as factors which affect reservoir evaporation.

COMPOSITION OF CATEGORY

Reservoir Evaporation: Net evaporation from man-made reservoirs which have a storage capacity of approximately 5,000 acre-feet or more.

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 which is diverted from the Rio Grande and ultimately evaporated from the wetlands.

OVERVIEW OF METHODS USED TO ESTIMATE RESERVOIR EVAPORATION

There are four generally accepted methods for computing lake or reservoir evaporation: (1) water budget, (2) energy budget, (3) mass transfer, and (4) coefficient applied to pan evaporation.

The water budget method consists of solving the mass balance contained in the hydrologic cycle, a perpetual sequence of events governing the depletion and replenishment of water in a basin, for the unknown evaporation component. It is an accounting of all incoming and outgoing water, such as inflow and outflow by rivers and streams, supply from storage in the ground, variation of water storage in the lake, overwater precipitation, and evaporation.

The energy budget method is based on the exchange of thermal energy between a body of water and the atmosphere. Disregarding minor energy sources (chemical, biological, conduction through the bottom, transformation of kinetic energy), there are six basic heating or cooling processes constituting the energy budget of a lake. These energy processes include heat gains or losses produced by shortwave and longwave radiation, heat transfer to the atmosphere through sensible and latent heat, heat advection caused by exchange of water masses, and heat storage within the lake. Data required includes solar radiation, daily maximum and minimum air temperatures and relative humidity, wind run, and water surface temperature.

The mass transfer method of computing evaporation is based on the removal of vapor from the water surface by turbulent diffusion. It consists of a modified application of Dalton's law, where evaporation is considered to be a function of the wind speed and the difference between the vapor pressure of saturated air at the water surface and the vapor pressure of the air above. While many equations have been developed for mass transfer analysis, the equation which was born out of the Lake Hefner study (U.S. Geological Survey, 1954) and later applied and verified by the Lake Mead study (U.S. Geological Survey, 1958) is most often used when the required data is available.

It is generally accepted that the most practical method of estimating reservoir evaporation is the pan approach, because the hydrologic and meteorlogical data required for the other procedures is generally not available. A description of the U.S. Weather Bureau Class A land pan and a procedure for application of the pan approach is outlined in detail in the sections which follow.

THE U.S. WEATHER BUREAU CLASS A LAND PAN

The U.S. Weather Bureau Class A land pan is four feet in diameter and 10 inches deep. It is made of 22-gauge galvanized iron, is unpainted, and is supported on a wooden pallet so that the bottom of the pan is raised six inches above the ground surface to permit air circulation underneath the pan. 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 two inches of the top and is refilled as soon as the water level drops one inch. The depth of water is measured with a micrometer hook gauge that is located in a stilling well which acts as a support for the gauge. Wind movement is measured by an anemometer which is mounted on the wooden pallet so that the cups are 24 inches above the pan. A rain gauge, and maximum and minimum thermometers which are kept in an instrument shelter, are also installed at the site. The entire installation is normally enclosed by a five foot high wire-mesh fence to protect the equipment. A reading is generally taken daily, usually in the morning.

Unlike a lake, the Class A pan permits considerable transfer of heat to and from its sides and bottom due to radiation exchange and to 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, effects of pan rims on air turbulence, and the convection of heat within the water in the pan, produce an evaporation rate from the pan which is greater than that from a lake or reservoir surface. The ratio of lake evaporation to the pan evaporation is referred to as the pan coefficient.

Studies conducted by the U.S. Department of Agriculture 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 (Subcommitte on Evaporation, 1934). A coefficient of 0.78 is used in the Pecos River Basin in New Mexico.

While the pan approach has wide application, when it is used in cold climates consideration should be given to the fact that in winter months the pan may be frozen while the reservoir still remains open.

ESTIMATING RESERVOIR EVAPORATION USING THE PAN APPROACH

Step 1: Compute the average gage height of the water surface level or the average reservoir content for each month from daily observations reported by the agency responsible for the management of the reservoir. Sources of data include the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, U.S. Geological Survey, National Oceanic and Atmospheric Administration (NOAA), irrigation districts and other organizations.

Step 2: Determine the average water surface area in acres for each month from a curve or equation which 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: 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 exposed water surface area in the presence of ice. For large reservoirs, daily observations of ice cover may be available. Tables showing the percent ice cover by month have been developed by some agencies on the basis of historical records and may be used when no other data is available.

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

Step 5: 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. To address those situations where the evaporation pan is iced over but the water surface of a nearby reservoir remains open, agencies such as the Bureau of Reclamation have developed empirical equations based on temperature to estimate gross evaporation under these conditions.

Step 6: Obtain the total rainfall recorded for each month. This data is published monthly for most weather stations operated by NOAA. When a reservoir is completely covered with ice for part of a month, recorded rainfall should be adjusted to reflect only those days when there was an exposed water surface.

Step 7: The net evaporation rate for each month, expressed as a depth of water in feet, is computed by subtracting the measured rainfall, in feet, from the gross evaporation rate computed in Step 4.

Step 8: The net volume of water evaporated in each month, expressed in acre-feet, is computed by multiplying the exposed surface area, expressed in acres, by the net evaporation rate, expressed in feet.

Step 9: Adding the net evaporation for each month yields the net evaporation for the calendar year.

ESTIMATING EVAPORATION FROM SMALL RESERVOIRS USING EMPIRICAL DATA

In some areas there are small reservoirs which are not monitored on a regular basis. Many of these reservoirs are not equipped with a gage to measure the water level, and area capacity curves are not available. Because these reservoirs are small and hydrologic and meteorlogic data is typically scant, large expenditures of time and effort are generally not warranted to estimate annual evaporation. To estimate the evaporation from these reservoirs the following procedure may be used.

Step 1: Obtain the reservoir surface area at spillway elevation from the original design specifications and the normal surface area from historical records if they are available.

Step 2: If only the maximum surface area is known, multiply this area by a fullness factor which is based on the observations of someone who is familiar with the reservoir. If observations are unavailable, choose a fullness factor which in your best judgment reflects the runoff conditions for the time period under study. Water supply forecasts published by the U.S. Soil Conservation Service may be helpful in choosing a fullness factor. If the average or normal water surface area of the reservoir is known, use this value in years when precipitation and runoff are considered normal. In drought years it may be necessary to multiply the normal water surface area by a fullness factor to account for low runoff.

Step 3: The annual gross evaporation is estimated by reading values from isopleths drawn on maps prepared by the U.S. Soil Conservation Service and other agencies. The isopleths should represent annual evaporation from a natural water body such as a lake or stream. If they only reflect pan evaporation, multiply the value read from the isopleth by an appropriate pan coefficient, usually 0.70.

Step 4: The normal annual rainfall is estimated by reading values from isopleths on maps which are similar to those described in Step 3. Rainfall read from the isopleths may be reduced by some percentage to reflect drought conditions.

Step 5: Subtract the rainfall from the gross evaporation rate to get the net evaporation rate.

Step 6: Multiply the exposed 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.

FACTORS WHICH AFFECT THE EVAPORATION RATE

The body of water from which evaporation takes place may be small or large, exposed or protected from the wind, shallow or deep, high or low. It may have a high or low plant population or concentration of salts. If exposed to wind movements, or if small, shallow, or densely populated with plant growth, evaporation will be increased. In the summer, when evaporation is at a maximum, more water will evaporate from small and shallow bodies of water than from deep and large bodies due to the increased temperature in the small bodies of water. The presence of aquatic plants will also add to the amount of water loss as evaporation will be augmented by the transpiration of the plants. Dissolved salts in saline bodies of water reduce the vapor pressure of the water surface, tending to promote condensation while inhibiting evaporation to a slight degree. Because air temperature decreases with altitude, evaporation from water bodies at high elevations will generally be less than from a body of water at the same latitude but at a lower elevation.

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GLOSSARY

Acre-foot: The quantity of water required to cover one acre (43,560 square feet) of land with one foot of water. There are 325,841 gallons in an acre-foot of water.

Aquifer: A saturated underground formation of permeable materials capable of storing water and transmitting it to wells, springs, or streams.

Combined water: When both ground and surface water are used on-site for the same purpose, such as the irrigation of a crop, the water supplied is referred to as combined water.

Consumptive irrigation requirement (CIR): The quantity of irrigation water expressed as a depth or volume, exclusive of effective precipitation, that is consumptively used by plants or is evaporated from the soil surface in a specific period of time. It does not include incidental depletions (See definition of incidental depletions) nor does it include water requirements for leaching, frost protection, wind erosion protection or plant cooling. Such requirements are accounted for in the on-farm efficiency values. The consumptive irrigation requirement may be numerically determined by subtracting effective rainfall from consumptive use.

Consumptive use (U) 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 precipitation in a specific period of time. The term includes effective rainfall. Consumptive use may be expressed either in volume per unit area such as acre-inches or acre-feet per acre, or depth, such as in inches or feet. Note however, that consumptive use of water by a crop does not include incidental depletions. (See definition of incidental depletions.)

County: The largest administrative division of a U.S. state. Counties may be identified by a two or three-digit code. These numerical codes are presented in "Counties and County Equivalents of the United States, Federal Information Processing Standards Publication 6-2," issued by the National Bureau of Standards (1973)

Cropping pattern: Distribution of the total irrigated acreage in a specific area according to the acreage planted in each individual crop.

Depletion: That part of a withdrawal that has been evaporated, transpired, incorporated into crops or products, consumed by man or livestock, or otherwise removed from the water environment. It includes that portion of ground water recharge resulting from seepage or deep percolation (in connection with a water use) that is not economically recoverable in a reasonable number of years, or is not usable.

Diversion: See withdrawal.

Diverted-setaside acreage: All of the acreage in the production adjustment programs administered by the Agricultural Stabilization and Conservation Service.

Effective rainfall (R_e): Rainfall occurring during the growing period of a crop that becomes available to meet the consumptive water requirements of the crop. It does not include rain which is intercepted by the plant canopy and evaporates, 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 which 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 a depth or volume, by the on-farm irrigation efficiency, expressed as a decimal.

Field application efficiency: The ratio of the low-quarter depth or volume of irrigation water added to the root zone to the depth or volume of water applied to the soil. The application efficiency does not account for the conveyance losses which may occur between the farm headgate and the fields which are irrigated. (See definition of on-farm irrigation efficiency.)

Ground water: Water stored underground, beneath the earth's surface. It is stored in cracks and crevices of rocks and in the pores of geologic materials that make up the earth's crust.

Hydrologic unit: A surface water drainage basin identified by an eight digit code such as 13020101. Starting from the left, there are 4 pairs of digits. The first pair specifies the region; the second pair, the subregion; the third pair, the accounting unit; and the last pair, the cataloging unit. These hydrologic units were established by the U.S. Water Resources Council in 1970 for use in the Second (1975) National Assessment of Water and Related Land Resources.

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

Incidental depletions, above-farm: Evaporation from canals and laterals that convey water from stream or reservoir to the farm headgate; transpiration by phreatophytes along canals and laterals; and evaporation of leakage from off-farm water supply pipelines.

Incidental depletions, on-farm: Evaporation from on-farm reservoirs used to store water for irrigation; evaporation from farm ditches and irrigated fields during surface application; transpiration by phreatohphytes along farm ditches, evaporation of leakage from irrigation water pipes; sprinkler spray evaporation and drift losses; and evaporation from wetted crop canopies (interception).

Incidental depletions, below-farm: Evaporation of runoff and seepage from irrigated fields; evaporation from open drains and tailwater recovery pits; and transpiration by phreatophytes along drains and below irrigated fields.

Instream use: Water use taking place within a stream channel. The term "nonwithdrawal use" is frequently used interchangeably with instream use. Instream use is a water use not dependent on a withdrawal or diversion from ground or surface water sources and it usually is classified as flow uses. Examples of flow uses which depend on water running freely in a channel are hydroelectric power generation, navigation, recreation, fish propagation, and water quality improvement.

Irrecoverable water losses: See depletion and incidental depletions.

Irrigable acreage: The sum of irrigated crop acreage, diverted-setaside acreage, and idle and fallow acreage. The term implies that such acreage is developed and that irrigation works exist to apply water to the land. It does not include farmstead, feedlots, area in roads, ditches and the like.

Irrigated acreage (net): Includes agricultural land to which water was artificially applied by controlled means to include preplant, partial, supplemental, and semi-irrigation, during the calendar year. 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 crop acreage irrigated 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 irrigated to obtain the net acreage irrigated.

Off-farm conveyance efficiency (Ec): The ratio, expressed as a percentage of the quantity of water delivered 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: An on-farm distribution system may consist of a series of ditches or pipes, and related appurtenances, which convey the water delivered to the farm, to the appropriate field.

On-farm irrigation efficiency (Ef): The ratio, expressed as a percentage, of the average low-quarter depth or 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. So that the reader may clearly understand what the low quarter means, let's assume that we have measured the change in soil moisture content in the root zone after an irrigation at sampling sites on a field. The low quarter, would be the average of the three lowest values recorded. The on-farm efficiency reflects the efficiency of the on-farm distribution system and application system and includes deep percolation losses necessary as a beneficial use for leaching excess salts from the root zone. In the design and operation of an irrigation system and in the administration of water rights, it is the on-farm irrigation efficiency which is used in the determination of the farm delivery requirement.

Per capita use: The average quantity of water used per person or per head of livestock, per day.

Preplant irrigation: Water applied to fields before seed is sown to provide optimum soil moisture conditions for germination and to store water in the soil profile for consumptive use by plants during the growing season.

Project diversion requirement or off-farm diversion requirement (PDR): When the source of irrigation water does not originate on the farm, the project diversion requirement or off-farm diversion requirement is defined as the quantity of water exclusive of effective rainfall, which 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 computed by dividing the farm delivery requirement by the off-farm conveyance efficiency, expressed as a decimal.

Project or system irrigation efficiency (Ej): The combined efficiency of the entire irrigation system, from the ultimate diversion point to the crop root zone. In mathematical terms it is the product expressed as a percentage of the on-farm efficiency (Ef) and the off-farm conveyance efficiency (Ec). When the irrigation water originates on the farm itself, such as from a well or spring, the off-farm conveyance efficiency does not apply and thus the project or system efficiency is the same as the on-farm irrigation efficiency.

River basin: 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.

Rural: Any community, incorporated or unincorporated with a population of less than 2,500 inhabitants and not within a larger community that is classified as urban, is classified as rural by the U.S. Bureau of the Census.

Self-supplied: Water users who withdraw water directly from a ground or surface water source.

Surface water: An open body of water such as a river, stream, or lake.

Transpiration: The process by which water in plants is transferred into water vapor in the atmosphere.

Urban: Any community, incorporated or unincorporated with a population of 2,500 inhabitants or more is classified as urban by the U.S. Bureau of the Census. A self-supplied subdivision or residence (single family home or multiple housing unit) with a population of less than 2,500 inhabitants is classified as urban if it is within the established boundaries of a larger community or metropolitan area which is classified as urban by the Bureau of the Census.

Withdrawal: The quantify of water taken from a ground or surface water source. A diversion is the same as a withdrawal.

TERMS OF CONFUSION

There are three terms which are frequently used in discussions pertaining to water which open the door to confusion and misunderstanding. They are (1) consumed, (2) consumption, and (3) consumptive use.

Water consumed and water consumption are often taken as meaning water delivered to a water user whether the user be a water utility, and individual household, or a commercial or industrial enterprise. When used in this sense, these terms do not mean the same thing as depletion as defined in this glossary. Furthermore, 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 a depletion of water and consumptive use.

1990 WATER USE DATA

Table A-1. County code numbers established by the National Bureau of Standards and whole or part counties included in each river basin.

Table A-2. Acronyms for river basins.

Table 1. Summary of water use (acre-feet) in New Mexico, 1990.

Table 2. Water use by category expressed as a percent of state totals in New Mexico, 1990

Table 3. Percent of withdrawals measured in each water use category in New Mexico, 1990.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

Table 5. Summary of water use (acre-feet) in New Mexico river basins, 1990.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, populations, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

Table 7. Populations in New Mexico River Basins, 1990.

Table 8. Irrigated Agriculture. Withdrawals (acre-feet) in New Mexico counties, 1990.

Table 9. Irrigated Agriculture. Depletions (acre-feet) in New Mexico counties, 1990.

Table 10. Irrigated Agriculture. Summary of acreage irrigated, withdrawals, conveyance losses, and depletions (acre-feet) in New Mexico river basins, 1990.

Table 11. Irrigated acreage and sources of irrigation water in New Mexico counties, 1990.

Table 12. Acreage irrigated by drip, flood, and sprinkler application methods and sources of irrigation water in New Mexico counties, 1990.

Table 13. Acreage irrigated by drip, flood, and sprinkler application methods and sources of irrigation water in New Mexico river basins, 1990.

Table A-1. County code numbers (CN) established by the National Bureau of Standards and whole or part counties included in each river basin. See Table A-2 for river basin acronyms.

		---- RIVER BASINS ----					
CN	COUNTY	AWR	TG	P	RG	UC	LC
1	Bernalillo	-	-	-	X	-	-
3	Catron	-	-	-	X	-	X
5	Chaves	-	-	X	-	-	-
6	Cibola	-	-	-	X	-	X
7	Colfax	X	-	-	-	-	-
9	Curry	X	X	-	-	-	-
11	De Baca	-	-	X	-	-	-
13	Dona 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	-	-	-	-	-	-
29	Luna	-	-	-	X	-	X
31	McKinley	-	-	-	X	X	X
33	Mora	X	-	-	-	-	-
35	Otero	-	-	X	X	-	-
37	Quay	X	-	X	-	-	-
39	Rio Arriba	-	-	-	X	X	-
41	Roosevelt	-	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	-	-

Table A-2. Acronyms (RVB) for river basins.

RVB	RIVER BASIN
AWR	Arkansas-White-Red
LC	Lower Colorado
P	Pecos
RG	Rio Grande
TG	Texas Gulf
UC	Upper Colorado

Table 1. Summary of water use (acre-feet) in New Mexico, 1990.

CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
Public Water Supply	35827.08	270208.92	306036.00	18878.85	145782.85	164661.70	16948.23	124426.07	141374.30
Domestic (self-supplied)	0.00	26575.15	26575.15	0.00	13216.59	13216.59	0.00	13358.56	13358.56
Irrigated Agriculture	1839325.00	1537102.00	3376427.00	809217.00	1180959.00	1990176.00	1030108.00	356143.00	1386251.00
Livestock (self-supplied)	3993.86	20183.82	24177.68	3993.86	19403.97	23397.83	0.00	779.85	779.85
Commercial (self-supplied)	1358.34	17931.67	19290.01	1015.21	10823.14	11838.35	343.13	7108.53	7451.66
Industrial (self-supplied)	1934.11	5055.96	6990.07	1926.12	3753.81	5679.93	7.99	1302.15	1310.14
Mining (self-supplied)	2694.67	86020.07	88714.74	1381.30	51740.07	53121.37	1313.37	34280.00	35593.37
Power (self-supplied)	44902.22	11771.21	56673.43	40546.04	11213.14	51759.18	4356.18	558.07	4914.25
Reservoir Evaporation	323777.02	0.00	323777.02	323777.02	0.00	323777.02	0.00	0.00	0.00
State Totals	2253812.30	1974848.80	4228661.10	1200735.40	1436892.57	2637627.97	1053076.90	537956.23	1591033.13

Key: WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 2. Water use by category expressed as a percent of state totals in New Mexico, 1990.

CATEGORY	WITHDRAWALS % OF TOTAL	DEPLETIONS % OF TOTAL
Public Water Supply	7.24	6.24
Domestic (self-supplied)	0.63	0.50
Irrigated Agriculture	79.85	75.45
Livestock (self-supplied)	0.57	0.89
Commercial (self-supplied)	0.45	0.45
Industrial (self-supplied)	0.16	0.22
Mining (self-supplied)	2.10	2.01
Power (self-supplied)	1.34	1.96
Reservoir Evaporation	7.66	12.28
Totals	100.00	100.00

Table 3. Percent of withdrawals measured in each water use category in New Mexico, 1990.

CATEGORY	MSW	MGW	MTW
Public Water Supply	98.53	99.10	99.03
Domestic (self-supplied)	0.00	0.00	0.00
Irrigated Agriculture	63.03	25.60	45.99
Livestock (self-supplied)	0.00	10.61	8.86
Commercial (self-supplied)	34.72	77.37	74.39
Industrial (self-supplied)	97.73	74.55	80.96
Mining (self-supplied)	64.88	83.96	83.38
Power (self-supplied)	100.00	99.94	99.99
Reservoir Evaporation	94.79	0.00	94.79

Key: MSW=percent of surface water withdrawals measured; MGW=percent of groundwater withdrawals measured; MTW=per -cent of total withdrawals that were measured.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
1	Bernalillo	Public Water Supply	0.00	125483.16	125483.16	0.00	64918.84	64918.84	0.00	60564.32	60564.32
1	Bernalillo	Domestic (self-supplied)	0.00	3561.90	3561.90	0.00	2141.64	2141.64	0.00	1420.26	1420.26
1	Bernalillo	Irrigated Agriculture	73727.00	4037.00	77764.00	18769.00	2223.00	20992.00	54958.00	1814.00	56772.00
1	Bernalillo	Livestock (self-supplied)	36.33	753.20	789.53	36.33	697.19	733.52	0.00	56.01	56.01
1	Bernalillo	Commercial (self-supplied)	0.00	3711.30	3711.30	0.00	2358.96	2358.96	0.00	1352.34	1352.34
1	Bernalillo	Industrial (self-supplied)	0.00	485.05	485.05	0.00	144.79	144.79	0.00	340.26	340.26
1	Bernalillo	Mining (self-supplied)	0.00	324.74	324.74	0.00	86.81	86.81	0.00	237.93	237.93
1	Bernalillo	Power (self-supplied)	0.00	179.36	179.36	0.00	103.16	103.16	0.00	76.20	76.20
1	Bernalillo	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	73763.33	138535.71	212299.04	18805.33	72674.39	91479.72	54958.00	65861.32	120819.32
3	Catron	Public Water Supply	0.00	125.44	125.44	0.00	51.74	51.74	0.00	73.70	73.70
3	Catron	Domestic (self-supplied)	0.00	136.79	136.79	0.00	61.56	61.56	0.00	75.23	75.23
3	Catron	Irrigated Agriculture	18153.00	1869.00	20022.00	1592.00	1441.00	3033.00	16561.00	428.00	16989.00
3	Catron	Livestock (self-supplied)	308.14	332.46	640.60	308.14	331.90	640.04	0.00	0.56	0.56
3	Catron	Commercial (self-supplied)	8.00	16.35	24.35	8.00	7.49	15.49	0.00	8.86	8.86
3	Catron	Industrial (self-supplied)	0.00	11.13	11.13	0.00	5.97	5.97	0.00	5.16	5.16
3	Catron	Mining (self-supplied)	0.00	3.51	3.51	0.00	0.35	0.35	0.00	3.16	3.16
3	Catron	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Catron	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	18469.14	2494.68	20963.82	1908.14	1900.01	3808.15	16561.00	594.67	17155.67

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
5	Chaves	Public Water Supply	0.00	16273.45	16273.45	0.00	10702.39	10702.39	0.00	5571.06	5571.06
5	Chaves	Domestic (self-supplied)	0.00	586.41	586.41	0.00	319.88	319.88	0.00	266.53	266.53
5	Chaves	Irrigated Agriculture	39382.00	266461.00	305843.00	19577.00	206505.00	226082.00	19805.00	59956.00	79761.00
5	Chaves	Livestock (self-supplied)	235.81	2889.30	3125.11	235.81	2696.41	2932.22	0.00	192.89	192.89
5	Chaves	Commercial (self-supplied)	0.00	2801.66	2801.66	0.00	758.52	758.52	0.00	2043.14	2043.14
5	Chaves	Industrial (self-supplied)	0.00	157.39	157.39	0.00	35.65	35.65	0.00	121.74	121.74
5	Chaves	Mining (self-supplied)	0.00	148.54	148.54	0.00	14.85	14.85	0.00	133.69	133.69
5	Chaves	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Chaves	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	39617.81	289317.75	328935.56	19812.81	221032.70	240845.51	19805.00	68285.05	88090.05
6	Cibola	Public Water Supply	0.00	2854.10	2854.10	0.00	1069.56	1069.56	0.00	1784.54	1784.54
6	Cibola	Domestic (self-supplied)	0.00	842.85	842.85	0.00	379.28	379.28	0.00	463.57	463.57
6	Cibola	Irrigated Agriculture	305.00	1354.00	1659.00	137.00	798.00	935.00	168.00	556.00	724.00
6	Cibola	Livestock (self-supplied)	50.36	211.19	261.55	50.36	210.63	260.99	0.00	0.56	0.56
6	Cibola	Commercial (self-supplied)	0.00	53.78	53.78	0.00	24.21	24.21	0.00	29.57	29.57
6	Cibola	Industrial (self-supplied)	0.00	9.93	9.93	0.00	8.08	8.08	0.00	1.85	1.85
6	Cibola	Mining (self-supplied)	0.00	3859.32	3859.32	0.00	2662.69	2662.69	0.00	1196.63	1196.63
6	Cibola	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Cibola	Reservoir Evaporation	1080.00	0.00	1080.00	1080.00	0.00	1080.00	0.00	0.00	0.00
		County Totals	1435.36	9185.17	10620.53	1267.36	5152.45	6419.81	168.00	4032.72	4200.72

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
7	Colfax	Public Water Supply	2675.02	107.88	2782.90	1771.62	48.55	1820.17	903.40	59.33	962.73
7	Colfax	Domestic (self-supplied)	0.00	58.43	58.43	0.00	26.29	26.29	0.00	32.14	32.14
7	Colfax	Irrigated Agriculture	57898.00	91.00	57989.00	23662.00	74.00	23736.00	34236.00	17.00	34253.00
7	Colfax	Livestock (self-supplied)	336.71	354.90	691.61	336.71	353.78	690.49	0.00	1.12	1.12
7	Colfax	Commercial (self-supplied)	104.56	362.65	467.21	52.69	220.96	273.65	51.87	141.69	193.56
7	Colfax	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Colfax	Mining (self-supplied)	0.00	277.77	277.77	0.00	143.53	143.53	0.00	134.24	134.24
7	Colfax	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Colfax	Reservoir Evaporation	6829.20	0.00	6829.20	6829.20	0.00	6829.20	0.00	0.00	0.00
		County Totals	67843.49	1252.63	69096.12	32652.22	867.11	33519.33	35191.27	385.52	35576.79
9	Curry	Public Water Supply	0.00	8678.35	8678.35	0.00	4481.88	4481.88	0.00	4196.47	4196.47
9	Curry	Domestic (self-supplied)	0.00	357.23	357.23	0.00	160.76	160.76	0.00	196.47	196.47
9	Curry	Irrigated Agriculture	0.00	329831.00	329831.00	0.00	272656.00	272656.00	0.00	57175.00	57175.00
9	Curry	Livestock (self-supplied)	115.63	1169.62	1285.25	115.63	1157.30	1272.93	0.00	12.32	12.32
9	Curry	Commercial (self-supplied)	0.00	216.88	216.88	0.00	190.13	190.13	0.00	26.75	26.75
9	Curry	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Curry	Mining (self-supplied)	0.00	10.00	10.00	0.00	2.00	2.00	0.00	8.00	8.00
9	Curry	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Curry	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	115.63	340263.08	340378.71	115.63	278648.07	278763.70	0.00	61615.01	61615.01

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
11	De Baca	Public Water Supply	0.00	429.65	429.65	0.00	285.12	285.12	0.00	144.53	144.53
11	De Baca	Domestic (self-supplied)	0.00	38.78	38.78	0.00	17.45	17.45	0.00	21.33	21.33
11	De Baca	Irrigated Agriculture	38873.00	8596.00	47469.00	14659.00	7051.00	21710.00	24214.00	1545.00	25759.00
11	De Baca	Livestock (self-supplied)	79.24	329.57	408.81	79.24	329.01	408.25	0.00	0.56	0.56
11	De Baca	Commercial (self-supplied)	0.00	2.56	2.56	0.00	1.15	1.15	0.00	1.41	1.41
11	De Baca	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	De Baca	Mining (self-supplied)	0.00	10.00	10.00	0.00	2.00	2.00	0.00	8.00	8.00
11	De Baca	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	De Baca	Reservoir Evaporation	6616.00	0.00	6616.00	6616.00	0.00	6616.00	0.00	0.00	0.00
		County Totals	45568.24	9406.56	54974.80	21354.24	7685.73	29039.97	24214.00	1720.83	25934.83
13	Dona Ana	Public Water Supply	0.00	28955.98	28955.98	0.00	17409.69	17409.69	0.00	11546.29	11546.29
13	Dona Ana	Domestic (self-supplied)	0.00	2311.64	2311.64	0.00	1386.98	1386.98	0.00	924.66	924.66
13	Dona Ana	Irrigated Agriculture	368042.00	104989.00	473031.00	149254.00	70900.00	220154.00	218788.00	34089.00	252877.00
13	Dona Ana	Livestock (self-supplied)	48.04	2977.30	3025.34	48.04	2708.47	2756.51	0.00	268.83	268.83
13	Dona Ana	Commercial (self-supplied)	88.80	4547.25	4636.05	81.70	3077.55	3159.25	7.10	1469.70	1476.80
13	Dona Ana	Industrial (self-supplied)	0.00	129.49	129.49	0.00	69.54	69.54	0.00	59.95	59.95
13	Dona Ana	Mining (self-supplied)	0.00	44.80	44.80	0.00	11.15	11.15	0.00	33.65	33.65
13	Dona Ana	Power (self-supplied)	0.00	1707.09	1707.09	0.00	1331.53	1331.53	0.00	375.56	375.56
13	Dona Ana	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	368178.84	145662.55	513841.39	149383.74	96894.91	246278.65	218795.10	48767.64	267562.74

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
15	Eddy	Public Water Supply	449.70	14216.89	14666.59	413.72	9182.05	9595.77	35.98	5034.84	5070.82
15	Eddy	Domestic (self-supplied)	0.00	161.16	161.16	0.00	72.52	72.52	0.00	88.64	88.64
15	Eddy	Irrigated Agriculture	82345.00	141684.00	224029.00	42164.00	106383.00	148547.00	40181.00	35301.00	75482.00
15	Eddy	Livestock (self-supplied)	142.42	591.89	734.31	142.42	591.33	733.75	0.00	0.56	0.56
15	Eddy	Commercial (self-supplied)	9.90	228.35	238.25	7.92	178.22	186.14	1.98	50.13	52.11
15	Eddy	Industrial (self-supplied)	0.00	464.19	464.19	0.00	458.35	458.35	0.00	5.84	5.84
15	Eddy	Mining (self-supplied)	37.90	13692.50	13730.40	11.37	4049.37	4060.74	26.53	9643.13	9669.66
15	Eddy	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Eddy	Reservoir Evaporation	8781.00	0.00	8781.00	8781.00	0.00	8781.00	0.00	0.00	0.00
		County Totals	91765.92	171038.98	262804.90	51520.43	120914.84	172435.27	40245.49	50124.14	90369.63
17	Grant	Public Water Supply	126.02	3290.22	3416.24	63.01	1974.98	2037.99	63.01	1315.24	1378.25
17	Grant	Domestic (self-supplied)	0.00	666.29	666.29	0.00	299.83	299.83	0.00	366.46	366.46
17	Grant	Irrigated Agriculture	25241.00	3997.00	29238.00	3429.00	2384.00	5813.00	21812.00	1613.00	23425.00
17	Grant	Livestock (self-supplied)	302.28	324.47	626.75	302.28	323.91	626.19	0.00	0.56	0.56
17	Grant	Commercial (self-supplied)	0.00	200.35	200.35	0.00	90.18	90.18	0.00	110.17	110.17
17	Grant	Industrial (self-supplied)	0.00	1.72	1.72	0.00	1.72	1.72	0.00	0.00	0.00
17	Grant	Mining (self-supplied)	0.00	30465.58	30465.58	0.00	24680.89	24680.89	0.00	5784.69	5784.69
17	Grant	Power (self-supplied)	0.00	645.36	645.36	0.00	645.36	645.36	0.00	0.00	0.00
17	Grant	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	25669.30	39590.99	65260.29	3794.29	30400.87	34195.16	21875.01	9190.12	31065.13

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
19	Guadalupe	Public Water Supply	23.00	605.17	628.17	21.16	239.09	260.25	1.84	366.08	367.92
19	Guadalupe	Domestic (self-supplied)	0.00	87.31	87.31	0.00	39.29	39.29	0.00	48.02	48.02
19	Guadalupe	Irrigated Agriculture	14196.00	943.00	15139.00	7016.00	545.00	7561.00	7180.00	398.00	7578.00
19	Guadalupe	Livestock (self-supplied)	98.33	415.15	513.48	98.33	414.59	512.92	0.00	0.56	0.56
19	Guadalupe	Commercial (self-supplied)	0.00	15.24	15.24	0.00	6.86	6.86	0.00	8.38	8.38
19	Guadalupe	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Guadalupe	Mining (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Guadalupe	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Guadalupe	Reservoir Evaporation	4470.00	0.00	4470.00	4470.00	0.00	4470.00	0.00	0.00	0.00
		County Totals	18787.33	2065.87	20853.20	11605.49	1244.83	12850.32	7181.84	821.04	8002.88
21	Harding	Public Water Supply	0.00	106.07	106.07	0.00	47.73	47.73	0.00	58.34	58.34
21	Harding	Domestic (self-supplied)	0.00	30.68	30.68	0.00	13.81	13.81	0.00	16.87	16.87
21	Harding	Irrigated Agriculture	0.00	3697.00	3697.00	0.00	2714.00	2714.00	0.00	983.00	983.00
21	Harding	Livestock (self-supplied)	107.86	441.62	549.48	107.86	441.06	548.92	0.00	0.56	0.56
21	Harding	Commercial (self-supplied)	0.00	0.06	0.06	0.00	0.03	0.03	0.00	0.03	0.03
21	Harding	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Harding	Mining (self-supplied)	0.00	1.38	1.38	0.00	0.14	0.14	0.00	1.24	1.24
21	Harding	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Harding	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	107.86	4276.81	4384.67	107.86	3216.77	3324.63	0.00	1060.04	1060.04

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
23	Hidalgo	Public Water Supply	0.00	1333.97	1333.97	0.00	666.99	666.99	0.00	666.98	666.98
23	Hidalgo	Domestic (self-supplied)	0.00	135.28	135.28	0.00	60.88	60.88	0.00	74.40	74.40
23	Hidalgo	Irrigated Agriculture	8611.00	23355.00	31966.00	4425.00	14419.00	18844.00	4186.00	8936.00	13122.00
23	Hidalgo	Livestock (self-supplied)	102.99	454.00	556.99	102.99	453.44	556.43	0.00	0.56	0.56
23	Hidalgo	Commercial (self-supplied)	0.00	349.14	349.14	0.00	231.54	231.54	0.00	117.60	117.60
23	Hidalgo	Industrial (self-supplied)	0.00	1.83	1.83	0.00	0.96	0.96	0.00	0.87	0.87
23	Hidalgo	Mining (self-supplied)	0.00	4169.70	4169.70	0.00	3961.22	3961.22	0.00	208.48	208.48
23	Hidalgo	Power (self-supplied)	0.00	477.81	477.81	0.00	477.81	477.81	0.00	0.00	0.00
23	Hidalgo	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	8713.99	30276.73	38990.72	4527.99	20271.84	24799.83	4186.00	10004.89	14190.89
25	Lea	Public Water Supply	0.00	13766.20	13766.20	0.00	6210.41	6210.41	0.00	7555.79	7555.79
25	Lea	Domestic (self-supplied)	0.00	829.31	829.31	0.00	373.19	373.19	0.00	456.12	456.12
25	Lea	Irrigated Agriculture	0.00	92049.00	92049.00	0.00	72124.00	72124.00	0.00	19925.00	19925.00
25	Lea	Livestock (self-supplied)	55.54	737.75	793.29	55.54	715.35	770.89	0.00	22.40	22.40
25	Lea	Commercial (self-supplied)	0.00	1279.47	1279.47	0.00	997.06	997.06	0.00	282.41	282.41
25	Lea	Industrial (self-supplied)	0.00	1943.52	1943.52	0.00	1586.33	1586.33	0.00	357.19	357.19
25	Lea	Mining (self-supplied)	0.00	17976.82	17976.82	0.00	9430.01	9430.01	0.00	8546.81	8546.81
25	Lea	Power (self-supplied)	0.00	5376.47	5376.47	0.00	5376.47	5376.47	0.00	0.00	0.00
25	Lea	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	55.54	133958.54	134014.08	55.54	96812.82	96868.36	0.00	37145.72	37145.72

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Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
27	Lincoln	Public Water Supply	1294.86	1246.61	2541.47	284.19	312.34	596.53	1010.67	934.27	1944.94
27	Lincoln	Domestic (self-supplied)	0.00	264.47	264.47	0.00	119.01	119.01	0.00	145.46	145.46
27	Lincoln	Irrigated Agriculture	19599.00	6810.00	26409.00	7754.00	3816.00	11570.00	11845.00	2994.00	14839.00
27	Lincoln	Livestock (self-supplied)	268.05	294.69	562.74	268.05	293.57	561.62	0.00	1.12	1.12
27	Lincoln	Commercial (self-supplied)	0.00	822.36	822.36	0.00	646.97	646.97	0.00	175.39	175.39
27	Lincoln	Industrial (self-supplied)	0.00	57.38	57.38	0.00	46.24	46.24	0.00	11.14	11.14
27	Lincoln	Mining (self-supplied)	6.18	28.50	34.68	1.24	5.70	6.94	4.94	22.80	27.74
27	Lincoln	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	Lincoln	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	21168.09	9524.01	30692.10	8307.48	5239.83	13547.31	12860.61	4284.18	17144.79
28	Los Alamos	Public Water Supply	0.00	5267.22	5267.22	0.00	3687.05	3687.05	0.00	1580.17	1580.17
28	Los Alamos	Domestic (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Los Alamos	Irrigated Agriculture	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Los Alamos	Livestock (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Los Alamos	Commercial (self-supplied)	0.00	5.51	5.51	0.00	2.48	2.48	0.00	3.03	3.03
28	Los Alamos	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Los Alamos	Mining (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	Los Alamos	Power (self-supplied)	28.04	138.17	166.21	28.04	31.86	59.90	0.00	106.31	106.31
28	Los Alamos	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	28.04	5410.90	5438.94	28.04	3721.39	3749.43	0.00	1689.51	1689.51

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Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
29	Luna	Public Water Supply	0.00	3509.91	3509.91	0.00	1754.96	1754.96	0.00	1754.95	1754.95
29	Luna	Domestic (self-supplied)	0.00	284.54	284.54	0.00	128.04	128.04	0.00	156.50	156.50
29	Luna	Irrigated Agriculture	5280.00	98527.00	103807.00	2295.00	58691.00	60986.00	2985.00	39836.00	42821.00
29	Luna	Livestock (self-supplied)	96.21	422.63	518.84	96.21	421.51	517.72	0.00	1.12	1.12
29	Luna	Commercial (self-supplied)	0.00	144.02	144.02	0.00	118.26	118.26	0.00	25.76	25.76
29	Luna	Industrial (self-supplied)	0.00	157.10	157.10	0.00	125.15	125.15	0.00	31.95	31.95
29	Luna	Mining (self-supplied)	0.00	374.55	374.55	0.00	110.86	110.86	0.00	263.69	263.69
29	Luna	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	Luna	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	5376.21	103419.75	108795.96	2391.21	61349.78	63740.99	2985.00	42069.97	45054.97
31	McKinley	Public Water Supply	0.00	4007.16	4007.16	0.00	968.29	968.29	0.00	3038.87	3038.87
31	McKinley	Domestic (self-supplied)	0.00	2411.84	2411.84	0.00	1085.32	1085.32	0.00	1326.52	1326.52
31	McKinley	Irrigated Agriculture	1283.00	0.00	1283.00	641.00	0.00	641.00	642.00	0.00	642.00
31	McKinley	Livestock (self-supplied)	99.26	408.92	508.18	99.26	408.36	507.62	0.00	0.56	0.56
31	McKinley	Commercial (self-supplied)	0.00	24.98	24.98	0.00	11.25	11.25	0.00	13.73	13.73
31	McKinley	Industrial (self-supplied)	0.00	1028.51	1028.51	0.00	984.15	984.15	0.00	44.36	44.36
31	McKinley	Mining (self-supplied)	0.00	9988.35	9988.35	0.00	5722.13	5722.13	0.00	4266.22	4266.22
31	McKinley	Power (self-supplied)	0.00	3237.00	3237.00	0.00	3237.00	3237.00	0.00	0.00	0.00
31	McKinley	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	1382.26	21106.76	22489.02	740.26	12416.50	13156.76	642.00	8690.26	9332.26

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Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
33	Mora	Public Water Supply	0.00	263.25	263.25	0.00	89.76	89.76	0.00	173.49	173.49
33	Mora	Domestic (self-supplied)	0.00	149.76	149.76	0.00	67.39	67.39	0.00	82.37	82.37
33	Mora	Irrigated Agriculture	38128.00	46.00	38174.00	17676.00	39.00	17715.00	20452.00	7.00	20459.00
33	Mora	Livestock (self-supplied)	129.77	146.29	276.06	129.77	145.73	275.50	0.00	0.56	0.56
33	Mora	Commercial (self-supplied)	0.00	0.41	0.41	0.00	0.19	0.19	0.00	0.22	0.22
33	Mora	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Mora	Mining (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Mora	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Mora	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	38257.77	605.71	38863.48	17805.77	342.07	18147.84	20452.00	263.64	20715.64
35	Otero	Public Water Supply	8616.82	2678.20	11295.02	4379.34	1466.66	5846.00	4237.48	1211.54	5449.02
35	Otero	Domestic (self-supplied)	0.00	799.91	799.91	0.00	359.96	359.96	0.00	439.95	439.95
35	Otero	Irrigated Agriculture	5968.00	21685.00	27653.00	2822.00	17397.00	20219.00	3146.00	4288.00	7434.00
35	Otero	Livestock (self-supplied)	94.89	227.36	322.25	94.89	226.24	321.13	0.00	1.12	1.12
35	Otero	Commercial (self-supplied)	735.51	160.16	895.67	578.42	94.70	673.12	157.09	65.46	222.55
35	Otero	Industrial (self-supplied)	0.00	4.85	4.85	0.00	2.91	2.91	0.00	1.94	1.94
35	Otero	Mining (self-supplied)	0.00	21.37	21.37	0.00	4.69	4.69	0.00	16.68	16.68
35	Otero	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	Otero	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	15415.22	25576.85	40992.07	7874.65	19552.16	27426.81	7540.57	6024.69	13565.26

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Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
37	Quay	Public Water Supply	81.00	1971.38	2052.38	69.66	968.27	1037.93	11.34	1003.11	1014.45
37	Quay	Domestic (self-supplied)	0.00	154.84	154.84	0.00	69.68	69.68	0.00	85.16	85.16
37	Quay	Irrigated Agriculture	78484.00	18586.00	97070.00	31161.00	14721.00	45882.00	47323.00	3865.00	51188.00
37	Quay	Livestock (self-supplied)	68.35	652.00	720.35	68.35	649.76	718.11	0.00	2.24	2.24
37	Quay	Commercial (self-supplied)	0.00	6.54	6.54	0.00	2.94	2.94	0.00	3.60	3.60
37	Quay	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	Quay	Mining (self-supplied)	0.00	2.19	2.19	0.00	0.22	0.22	0.00	1.97	1.97
37	Quay	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	Quay	Reservoir Evaporation	34055.00	0.00	34055.00	34055.00	0.00	34055.00	0.00	0.00	0.00
		County Totals	112688.35	21372.95	134061.30	65354.01	16411.87	81765.88	47334.34	4961.08	52295.42
39	Rio Arriba	Public Water Supply	432.86	1212.37	1645.23	194.79	392.72	587.51	238.07	819.65	1057.72
39	Rio Arriba	Domestic (self-supplied)	0.00	1473.57	1473.57	0.00	663.10	663.10	0.00	810.47	810.47
39	Rio Arriba	Irrigated Agriculture	92613.00	1065.00	93678.00	34970.00	570.00	35540.00	57643.00	495.00	58138.00
39	Rio Arriba	Livestock (self-supplied)	188.52	211.13	399.65	188.52	210.01	398.53	0.00	1.12	1.12
39	Rio Arriba	Commercial (self-supplied)	105.67	143.03	248.70	46.05	78.36	124.41	59.62	64.67	124.29
39	Rio Arriba	Industrial (self-supplied)	0.00	73.79	73.79	0.00	56.19	56.19	0.00	17.60	17.60
39	Rio Arriba	Mining (self-supplied)	0.00	539.40	539.40	0.00	79.70	79.70	0.00	459.70	459.70
39	Rio Arriba	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	Rio Arriba	Reservoir Evaporation	22862.50	0.00	22862.50	22862.50	0.00	22862.50	0.00	0.00	0.00
		County Totals	116202.55	4718.29	120920.84	58261.86	2050.08	60311.94	57940.69	2668.21	60608.90

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Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
41	Roosevelt	Public Water Supply	0.00	4002.19	4002.19	0.00	2695.52	2695.52	0.00	1306.67	1306.67
41	Roosevelt	Domestic (self-supplied)	0.00	205.39	205.39	0.00	92.43	92.43	0.00	112.96	112.96
41	Roosevelt	Irrigated Agriculture	0.00	224603.00	224603.00	0.00	184947.00	184947.00	0.00	39656.00	39656.00
41	Roosevelt	Livestock (self-supplied)	45.43	1429.67	1475.10	45.43	1328.86	1374.29	0.00	100.81	100.81
41	Roosevelt	Commercial (self-supplied)	0.00	146.33	146.33	0.00	134.00	134.00	0.00	12.33	12.33
41	Roosevelt	Industrial (self-supplied)	0.00	52.02	52.02	0.00	52.02	52.02	0.00	0.00	0.00
41	Roosevelt	Mining (self-supplied)	0.00	62.16	62.16	0.00	17.58	17.58	0.00	44.58	44.58
41	Roosevelt	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	Roosevelt	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	45.43	230500.76	230546.19	45.43	189267.41	189312.84	0.00	41233.35	41233.35
43	Sandoval	Public Water Supply	89.21	9561.34	9650.55	43.32	6753.63	6796.95	45.89	2807.71	2853.60
43	Sandoval	Domestic (self-supplied)	0.00	1998.81	1998.81	0.00	1064.72	1064.72	0.00	934.09	934.09
43	Sandoval	Irrigated Agriculture	49505.00	684.00	50189.00	17426.00	453.00	17879.00	32079.00	231.00	32310.00
43	Sandoval	Livestock (self-supplied)	97.95	322.82	420.77	97.95	301.52	399.47	0.00	21.30	21.30
43	Sandoval	Commercial (self-supplied)	10.00	393.99	403.99	10.00	195.85	205.85	0.00	198.14	198.14
43	Sandoval	Industrial (self-supplied)	0.00	193.76	193.76	0.00	45.98	45.98	0.00	147.78	147.78
43	Sandoval	Mining (self-supplied)	0.00	297.81	297.81	0.00	127.57	127.57	0.00	170.24	170.24
43	Sandoval	Power (self-supplied)	0.00	7.95	7.95	0.00	7.95	7.95	0.00	0.00	0.00
43	Sandoval	Reservoir Evaporation	9472.00	0.00	9472.00	9472.00	0.00	9472.00	0.00	0.00	0.00
		County Totals	59174.16	13460.48	72634.64	27049.27	8950.22	35999.49	32124.89	4510.26	36635.15

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Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
45	San Juan	Public Water Supply	15746.91	603.29	16350.20	9090.19	454.31	9544.50	6656.72	148.98	6805.70
45	San Juan	Domestic (self-supplied)	0.00	1403.03	1403.03	0.00	631.36	631.36	0.00	771.67	771.67
45	San Juan	Irrigated Agriculture	394375.00	0.00	394375.00	249237.00	0.00	249237.00	145138.00	0.00	145138.00
45	San Juan	Livestock (self-supplied)	97.63	463.50	561.13	97.63	457.90	555.53	0.00	5.60	5.60
45	San Juan	Commercial (self-supplied)	145.90	66.83	212.73	124.83	31.48	156.31	21.07	35.35	56.42
45	San Juan	Industrial (self-supplied)	1909.11	33.16	1942.27	1901.12	25.76	1926.88	7.99	7.40	15.39
45	San Juan	Mining (self-supplied)	1742.20	445.29	2187.49	1214.26	44.53	1258.79	527.94	400.76	928.70
45	San Juan	Power (self-supplied)	44874.18	0.00	44874.18	40518.00	0.00	40518.00	4356.18	0.00	4356.18
45	San Juan	Reservoir Evaporation	32434.50	0.00	32434.50	32434.50	0.00	32434.50	0.00	0.00	0.00
		County Totals	491325.43	3015.10	494340.53	334617.53	1645.34	336262.87	156707.90	1369.76	158077.66
47	San Miguel	Public Water Supply	2882.74	120.28	3003.02	1013.83	52.88	1066.71	1868.91	67.40	1936.31
47	San Miguel	Domestic (self-supplied)	0.00	570.36	570.36	0.00	256.66	256.66	0.00	313.70	313.70
47	San Miguel	Irrigated Agriculture	37362.00	432.00	37794.00	17176.00	354.00	17530.00	20186.00	78.00	20264.00
47	San Miguel	Livestock (self-supplied)	276.00	327.85	603.85	276.00	327.29	603.29	0.00	0.56	0.56
47	San Miguel	Commercial (self-supplied)	105.00	262.46	367.46	96.60	128.47	225.07	8.40	133.99	142.39
47	San Miguel	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47	San Miguel	Mining (self-supplied)	0.00	24.52	24.52	0.00	4.45	4.45	0.00	20.07	20.07
47	San Miguel	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47	San Miguel	Reservoir Evaporation	23971.02	0.00	23971.02	23971.02	0.00	23971.02	0.00	0.00	0.00
		County Totals	64596.76	1737.47	66334.23	42533.45	1123.75	43657.20	22063.31	613.72	22677.03

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
49	Santa Fe	Public Water Supply	3408.94	8759.33	12168.27	1534.02	3910.96	5444.98	1874.92	4848.37	6723.29
49	Santa Fe	Domestic (self-supplied)	0.00	2610.91	2610.91	0.00	1325.91	1325.91	0.00	1285.00	1285.00
49	Santa Fe	Irrigated Agriculture	19185.00	13496.00	32681.00	9120.00	10515.00	19635.00	10065.00	2981.00	13046.00
49	Santa Fe	Livestock (self-supplied)	134.57	160.20	294.77	134.57	158.52	293.09	0.00	1.68	1.68
49	Santa Fe	Commercial (self-supplied)	0.00	287.01	287.01	0.00	172.74	172.74	0.00	114.27	114.27
49	Santa Fe	Industrial (self-supplied)	0.00	31.09	31.09	0.00	24.42	24.42	0.00	6.67	6.67
49	Santa Fe	Mining (self-supplied)	0.00	25.33	25.33	0.00	18.88	18.88	0.00	6.45	6.45
49	Santa Fe	Power (self-supplied)	0.00	2.00	2.00	0.00	2.00	2.00	0.00	0.00	0.00
49	Santa Fe	Reservoir Evaporation	120.00	0.00	120.00	120.00	0.00	120.00	0.00	0.00	0.00
		County Totals	22848.51	25371.87	48220.38	10908.59	16128.43	27037.02	11939.92	9243.44	21183.36
51	Sierra	Public Water Supply	0.00	2053.97	2053.97	0.00	1220.07	1220.07	0.00	833.90	833.90
51	Sierra	Domestic (self-supplied)	0.00	158.86	158.86	0.00	71.49	71.49	0.00	87.37	87.37
51	Sierra	Irrigated Agriculture	25470.00	11316.00	36786.00	11940.00	7081.00	19021.00	13530.00	4235.00	17765.00
51	Sierra	Livestock (self-supplied)	66.86	409.43	476.29	66.86	395.99	462.85	0.00	13.44	13.44
51	Sierra	Commercial (self-supplied)	0.00	330.59	330.59	0.00	242.78	242.78	0.00	87.81	87.81
51	Sierra	Industrial (self-supplied)	25.00	24.84	49.84	25.00	24.84	49.84	0.00	0.00	0.00
51	Sierra	Mining (self-supplied)	0.00	166.27	166.27	0.00	33.25	33.25	0.00	133.02	133.02
51	Sierra	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	Sierra	Reservoir Evaporation	164974.00	0.00	164974.00	164974.00	0.00	164974.00	0.00	0.00	0.00
		County Totals	190535.86	14459.96	204995.82	177005.86	9069.42	186075.28	13530.00	5390.54	18920.54

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
53	Socorro	Public Water Supply	0.00	1995.55	1995.55	0.00	997.78	997.78	0.00	997.77	997.77
53	Socorro	Domestic (self-supplied)	0.00	318.59	318.59	0.00	143.37	143.37	0.00	175.22	175.22
53	Socorro	Irrigated Agriculture	103356.00	30962.00	134318.00	35442.00	20759.00	56201.00	67914.00	10203.00	78117.00
53	Socorro	Livestock (self-supplied)	71.68	635.55	707.23	71.68	613.15	684.83	0.00	22.40	22.40
53	Socorro	Commercial (self-supplied)	0.00	144.34	144.34	0.00	64.96	64.96	0.00	79.38	79.38
53	Socorro	Industrial (self-supplied)	0.00	2.20	2.20	0.00	2.20	2.20	0.00	0.00	0.00
53	Socorro	Mining (self-supplied)	0.00	14.68	14.68	0.00	6.44	6.44	0.00	8.24	8.24
53	Socorro	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
53	Socorro	Reservoir Evaporation	7570.00	0.00	7570.00	7570.00	0.00	7570.00	0.00	0.00	0.00
		County Totals	110997.68	34072.91	145070.59	43083.68	22586.90	65670.58	67914.00	11486.01	79400.01
55	Taos	Public Water Supply	0.00	1676.26	1676.26	0.00	621.38	621.38	0.00	1054.88	1054.88
55	Taos	Domestic (self-supplied)	0.00	1066.16	1066.16	0.00	479.77	479.77	0.00	586.39	586.39
55	Taos	Irrigated Agriculture	103253.00	1211.00	104464.00	40037.00	926.00	40963.00	63216.00	285.00	63501.00
55	Taos	Livestock (self-supplied)	57.52	83.17	140.69	57.52	82.61	140.13	0.00	0.56	0.56
55	Taos	Commercial (self-supplied)	45.00	133.36	178.36	9.00	59.79	68.79	36.00	73.57	109.57
55	Taos	Industrial (self-supplied)	0.00	91.64	91.64	0.00	27.40	27.40	0.00	64.24	64.24
55	Taos	Mining (self-supplied)	908.39	3029.04	3937.43	154.43	515.02	669.45	753.96	2514.02	3267.98
55	Taos	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
55	Taos	Reservoir Evaporation	63.00	0.00	63.00	63.00	0.00	63.00	0.00	0.00	0.00
		County Totals	104326.91	7290.63	111617.54	40320.95	2711.97	43032.92	64005.96	4578.66	68584.62

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
57	Torrance	Public Water Supply	0.00	781.11	781.11	0.00	351.50	351.50	0.00	429.61	429.61
57	Torrance	Domestic (self-supplied)	0.00	477.16	477.16	0.00	214.72	214.72	0.00	262.44	262.44
57	Torrance	Irrigated Agriculture	0.00	41820.00	41820.00	0.00	31288.00	31288.00	0.00	10532.00	10532.00
57	Torrance	Livestock (self-supplied)	29.16	279.91	309.07	29.16	279.35	308.51	0.00	0.56	0.56
57	Torrance	Commercial (self-supplied)	0.00	46.83	46.83	0.00	23.33	23.33	0.00	23.50	23.50
57	Torrance	Industrial (self-supplied)	0.00	16.57	16.57	0.00	16.57	16.57	0.00	0.00	0.00
57	Torrance	Mining (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57	Torrance	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57	Torrance	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	29.16	43421.58	43450.74	29.16	32173.47	32202.63	0.00	11248.11	11248.11
59	Union	Public Water Supply	0.00	1050.15	1050.15	0.00	472.57	472.57	0.00	577.58	577.58
59	Union	Domestic (self-supplied)	0.00	109.11	109.11	0.00	49.10	49.10	0.00	60.01	60.01
59	Union	Irrigated Agriculture	6958.00	73817.00	80775.00	3623.00	62791.00	66414.00	3335.00	11026.00	14361.00
59	Union	Livestock (self-supplied)	125.72	1163.76	1289.48	125.72	1161.52	1287.24	0.00	2.24	2.24
59	Union	Commercial (self-supplied)	0.00	2.19	2.19	0.00	0.98	0.98	0.00	1.21	1.21
59	Union	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
59	Union	Mining (self-supplied)	0.00	12.35	12.35	0.00	2.24	2.24	0.00	10.11	10.11
59	Union	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
59	Union	Reservoir Evaporation	478.80	0.00	478.80	478.80	0.00	478.80	0.00	0.00	0.00
		County Totals	7562.52	76154.56	83717.08	4227.52	64477.41	68704.93	3335.00	11677.15	15012.15

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 4. Summary of water use (acre-feet) in New Mexico counties, 1990.

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
61	Valencia	Public Water Supply	0.00	3222.82	3222.82	0.00	1323.18	1323.18	0.00	1899.64	1899.64
61	Valencia	Domestic (self-supplied)	0.00	2313.78	2313.78	0.00	1041.20	1041.20	0.00	1272.58	1272.58
61	Valencia	Irrigated Agriculture	131733.00	9089.00	140822.00	43213.00	6394.00	49607.00	88520.00	2695.00	91215.00
61	Valencia	Livestock (self-supplied)	26.61	562.52	589.13	26.61	517.71	544.32	0.00	44.81	44.81
61	Valencia	Commercial (self-supplied)	0.00	1025.69	1025.69	0.00	670.75	670.75	0.00	354.94	354.94
61	Valencia	Industrial (self-supplied)	0.00	84.80	84.80	0.00	8.59	8.59	0.00	76.21	76.21
61	Valencia	Mining (self-supplied)	0.00	3.60	3.60	0.00	1.80	1.80	0.00	1.80	1.80
61	Valencia	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61	Valencia	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	131759.61	16302.21	148061.82	43239.61	9957.23	53196.84	88520.00	6344.98	94864.98
		State Totals	2253812.30	1974848.80	4228661.10	1200735.40	1436892.57	2637627.97	1053076.90	537956.23	1591033.13

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow.

Table 5. Summary of water use (acre-feet) in New Mexico river basins, 1990.

RVB	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
AWR	Public Water Supply	2804.76	3503.84	6308.60	1863.21	1630.02	3493.23	941.55	1873.82	2815.37
AWR	Domestic (self-supplied)	0.00	611.15	611.15	0.00	275.02	275.02	0.00	336.13	336.13
AWR	Irrigated Agriculture	188580.00	105199.00	293779.00	79585.00	88182.00	167767.00	108995.00	17017.00	126012.00
AWR	Livestock (self-supplied)	951.49	3197.64	4149.13	951.49	3190.92	4142.41	0.00	6.72	6.72
AWR	Commercial (self-supplied)	209.56	378.15	587.71	149.29	227.94	377.23	60.27	150.21	210.48
AWR	Industrial (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AWR	Mining (self-supplied)	0.00	293.69	293.69	0.00	146.13	146.13	0.00	147.56	147.56
AWR	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AWR	Reservoir Evaporation	62921.40	0.00	62921.40	62921.40	0.00	62921.40	0.00	0.00	0.00
	River Basin Totals	255467.21	113183.47	368650.68	145470.39	93652.03	239122.42	109996.82	19531.44	129528.26
TG	Public Water Supply	0.00	24374.76	24374.76	0.00	12451.46	12451.46	0.00	11923.30	11923.30
TG	Domestic (self-supplied)	0.00	1251.70	1251.70	0.00	563.27	563.27	0.00	688.43	688.43
TG	Irrigated Agriculture	0.00	630437.00	630437.00	0.00	516067.00	516067.00	0.00	114370.00	114370.00
TG	Livestock (self-supplied)	152.13	2753.66	2905.79	152.13	2618.13	2770.26	0.00	135.53	135.53
TG	Commercial (self-supplied)	0.00	1416.06	1416.06	0.00	1112.70	1112.70	0.00	303.36	303.36
TG	Industrial (self-supplied)	0.00	431.60	431.60	0.00	366.31	366.31	0.00	65.29	65.29
TG	Mining (self-supplied)	0.00	12543.26	12543.26	0.00	7210.93	7210.93	0.00	5332.33	5332.33
TG	Power (self-supplied)	0.00	5376.47	5376.47	0.00	5376.47	5376.47	0.00	0.00	0.00
TG	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	River Basin Totals	152.13	678584.51	678736.64	152.13	545766.27	545918.40	0.00	132818.24	132818.24

Key: RVB=river basin; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow. See Table A-2 for river basin acronyms.

Table 5. Summary of water use (acre-feet) in New Mexico river basins, 1990.

RVB	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
P	Public Water Supply	4562.62	35046.24	39608.86	1693.45	21746.67	23440.12	2869.17	13299.57	16168.74
P	Domestic (self-supplied)	0.00	1956.24	1956.24	0.00	936.31	936.31	0.00	1019.93	1019.93
P	Irrigated Agriculture	227009.00	431621.00	658630.00	105957.00	330241.00	436198.00	121052.00	101380.00	222432.00
P	Livestock (self-supplied)	941.55	5045.18	5986.73	941.55	4848.93	5790.48	0.00	196.25	196.25
P	Commercial (self-supplied)	483.90	4192.67	4676.57	430.92	1755.04	2185.96	52.98	2437.63	2490.61
P	Industrial (self-supplied)	0.00	2242.90	2242.90	0.00	1812.28	1812.28	0.00	430.62	430.62
P	Mining (self-supplied)	44.08	19409.78	19453.86	12.61	6315.03	6327.64	31.47	13094.75	13126.22
P	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P	Reservoir Evaporation	22279.62	0.00	22279.62	22279.62	0.00	22279.62	0.00	0.00	0.00
	River Basin Totals	255320.77	499514.01	754834.78	131315.15	367655.26	498970.41	124005.62	131858.75	255864.37
RG	Public Water Supply	12375.79	201462.44	213838.23	6080.35	107937.68	114018.03	6295.44	93524.76	99820.20
RG	Domestic (self-supplied)	0.00	18616.58	18616.58	0.00	9579.24	9579.24	0.00	9037.34	9037.34
RG	Irrigated Agriculture	978334.00	345259.00	1323593.00	365540.00	231324.00	596864.00	612794.00	113935.00	726729.00
RG	Livestock (self-supplied)	1268.82	7535.25	8804.07	1268.82	7100.51	8369.33	0.00	434.74	434.74
RG	Commercial (self-supplied)	510.98	11309.48	11820.46	302.17	7365.58	7667.75	208.81	3943.90	4152.71
RG	Industrial (self-supplied)	25.00	1269.46	1294.46	25.00	532.39	557.39	0.00	737.07	737.07
RG	Mining (self-supplied)	908.39	39725.08	40633.47	154.43	27142.66	27297.09	753.96	12582.42	13336.38
RG	Power (self-supplied)	28.04	5916.93	5944.97	28.04	5358.86	5386.90	0.00	558.07	558.07
RG	Reservoir Evaporation	206083.00	0.00	206083.00	206083.00	0.00	206083.00	0.00	0.00	0.00
	River Basin Totals	1199534.02	631094.22	1830628.24	579481.81	396340.92	975822.73	620052.21	234753.30	854805.51

Key: RVB=river basin; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow. See Table A-2 for river basin acronyms.

Table 5. Summary of water use (acre-feet) in New Mexico river basins, 1990.

RVB	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
UC	Public Water Supply	16083.91	607.30	16691.21	9241.84	456.11	9697.95	6842.07	151.19	6993.26
UC	Domestic (self-supplied)	0.00	2321.79	2321.79	0.00	1044.79	1044.79	0.00	1277.00	1277.00
UC	Irrigated Agriculture	395362.00	0.00	395362.00	249718.00	0.00	249718.00	145644.00	0.00	145644.00
UC	Livestock (self-supplied)	194.30	666.30	860.60	194.30	660.70	855.00	0.00	5.60	5.60
UC	Commercial (self-supplied)	145.90	67.06	212.96	124.83	31.58	156.41	21.07	35.48	56.55
UC	Industrial (self-supplied)	1909.11	94.50	2003.61	1901.12	75.72	1976.84	7.99	18.78	26.77
UC	Mining (self-supplied)	1742.20	852.06	2594.26	1214.26	85.93	1300.19	527.94	766.13	1294.07
UC	Power (self-supplied)	44874.18	0.00	44874.18	40518.00	0.00	40518.00	4356.18	0.00	4356.18
UC	Reservoir Evaporation	32493.00	0.00	32493.00	32493.00	0.00	32493.00	0.00	0.00	0.00
	River Basin Totals	492804.60	4609.01	497413.61	335405.35	2354.83	337760.18	157399.25	2254.18	159653.43
LC	Public Water Supply	0.00	5214.34	5214.34	0.00	1560.91	1560.91	0.00	3653.43	3653.43
LC	Domestic (self-supplied)	0.00	1817.69	1817.69	0.00	817.96	817.96	0.00	999.73	999.73
LC	Irrigated Agriculture	50040.00	24586.00	74626.00	8417.00	15145.00	23562.00	41623.00	9441.00	51064.00
LC	Livestock (self-supplied)	485.57	985.79	1471.36	485.57	984.78	1470.35	0.00	1.01	1.01
LC	Commercial (self-supplied)	8.00	568.25	576.25	8.00	330.30	338.30	0.00	237.95	237.95
LC	Industrial (self-supplied)	0.00	1017.50	1017.50	0.00	967.11	967.11	0.00	50.39	50.39
LC	Mining (self-supplied)	0.00	13196.20	13196.20	0.00	10839.39	10839.39	0.00	2356.81	2356.81
LC	Power (self-supplied)	0.00	477.81	477.81	0.00	477.81	477.81	0.00	0.00	0.00
LC	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	River Basin Totals	50533.57	47863.58	98397.15	8910.57	31123.26	40033.83	41623.00	16740.32	58363.32

Key: RVB=river basin; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow. See Table A-2 for river basin acronyms.

Table 5. Summary of water use (acre-feet) in New Mexico river basins, 1990.

RVB	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
	State Totals	2253812.30	1974848.80	4228661.10	1200735.40	1436892.57	2637627.97	1053076.90	537956.23	1591033.13

Key: RVB=river basin; WSW=withdrawal, surface water; WGW=withdrawal, ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=return flow, ground water; TRF=total return flow. See Table A-2 for river basin acronyms.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
1	RG	Alamo Acres MHP	R	150	63	0	-	Y	0.00	10.55	0.00	0.50	0.00	5.28
1	RG	Albuquerque Water System	U	430000	243	4	-	Y	0.00	117012.85	0.00	0.51	0.00	59676.55
1	RG	Barcelona MHP	R	300	92	0	-	Y	0.00	31.05	0.00	0.50	0.00	15.52
1	RG	Corrales--self-supplied homes (prt)	U	535	150	0	-	N	0.00	89.89	0.00	0.65	0.00	58.43
1	RG	Desert Palms MHP	R	175	127	0	-	Y	0.00	24.96	0.00	0.50	0.00	12.48
1	RG	Forest Park Property Owners Co-Op	R	200	66	0	-	Y	0.00	14.71	0.00	0.50	0.00	7.36
1	RG	Green Acres MHP	R	100	153	0	-	Y	0.00	17.16	0.00	0.50	0.00	8.58
1	RG	Green Valley MHP	R	300	69	0	-	Y	0.00	23.22	0.00	0.50	0.00	11.61
1	RG	Hamilton MHP	R	85	297	0	-	Y	0.00	28.24	0.00	0.50	0.00	14.12
1	RG	Homestead Mobile Home Community	R	150	113	0	-	Y	0.00	19.00	0.00	0.50	0.00	9.50
1	RG	Kirtland Air Force Base	U	7667	549	10	-	Y	0.00	4713.00	0.00	0.60	0.00	2827.80
1	RG	Paradise Hills--NM Utilities	U	8700	275	2,3	-	Y	0.00	2679.08	0.00	0.70	0.00	1875.36
1	RG	Rural self-supplied homes	R	30996	100	0	-	N	0.00	3472.01	0.00	0.60	0.00	2083.21
1	RG	Sandia Peak Utility Company	U	4908	123	0	-	Y	0.00	674.26	0.00	0.50	0.00	337.13
1	RG	Sierra Vista South Water Co-Op	R	125	78	0	-	Y	0.00	10.94	0.00	0.50	0.00	5.47
1	RG	Tierra West MHP	R	500	252	0	-	Y	0.00	141.16	0.00	0.50	0.00	70.58
1	RG	Tranquillo Pines Water System	R	850	54	0	-	Y	0.00	51.35	0.00	0.50	0.00	25.68
1	RG	Valle Grande MHP	R	100	282	0	-	Y	0.00	31.63	0.00	0.50	0.00	15.82
		River Basin Subtotals		485841					0.00	129045.06			0.00	67060.48
		County Totals		485841					0.00	129045.06			0.00	67060.48
3	LC	Quemado Water Works	R	150	66	0	-	Y	0.00	11.13	0.00	0.45	0.00	5.01
3	LC	Rancho Grande Water Assn.	R	125	144	0	-	Y	0.00	20.13	0.00	0.45	0.00	9.06

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
3	LC	Reserve Water Works	R	500	168	0	-	Y	0.00	94.18	0.00	0.40	0.00	37.67
3	LC	Rural self-supplied homes	R	1561	64	0	-	N	0.00	111.91	0.00	0.45	0.00	50.36
		River Basin Subtotals		2336					0.00	237.35			0.00	102.10
3	RG	Rural self-supplied homes	R	347	64	0	-	N	0.00	24.88	0.00	0.45	0.00	11.20
		River Basin Subtotals		347					0.00	24.88			0.00	11.20
		County Totals		2683					0.00	262.23			0.00	113.30
5	P	Berrendo Water Users Assn.	U	3940	194	3	-	Y	0.00	854.50	0.00	0.50	0.00	433.45
5	P	Dexter Municipal Water System	R	1700	524	0	-	Y	0.00	997.10	0.00	0.40	0.00	398.84
5	P	Greenfield MDWCA	R	250	167	0	-	Y	0.00	46.84	0.00	0.50	0.00	23.42
5	P	Hagerman Water System	R	961	405	0	-	Y	0.00	435.50	0.00	0.50	0.00	217.75
5	P	Lake Arthur Water Co-Op	R	336	134	0	-	Y	0.00	50.51	0.00	0.50	0.00	25.26
5	P	Roswell Municipal Water System	U	47500	258	0	-	Y	0.00	13733.20	0.00	0.69	0.00	9475.91
5	P	Roswell--domestic irrigation wells	U	0	0	0	-	N	0.00	160.00	0.00	0.80	0.00	128.00
5	P	South Springs Acres	R	60	2318	7	-	Y	0.00	155.80	0.00	0.82	0.00	127.76
5	P	Rural self-supplied homes	R	5948	64	0	-	N	0.00	426.41	0.00	0.45	0.00	191.88
		River Basin Subtotals		60695					0.00	16859.86			0.00	11022.27
		County Totals		60695					0.00	16859.86			0.00	11022.27
6	LC	Rural self-supplied homes	R	3167	64	0	-	N	0.00	227.04	0.00	0.45	0.00	102.17
		River Basin Subtotals		3167					0.00	227.04			0.00	102.17
6	RG	Grants Domestic Water System	U	8626	222	0	-	Y	0.00	2147.89	0.00	0.35	0.00	751.76
6	RG	Milan Community Water System	U	2511	215	4	-	Y	0.00	604.57	0.00	0.45	0.00	272.06
6	RG	Rural self-supplied homes	R	8590	64	0	-	N	0.00	615.81	0.00	0.45	0.00	277.11
6	RG	San Rafael Water & Sanitation	R	900	101	0	-	Y	0.00	101.64	0.00	0.45	0.00	45.74

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
		Dist.												
		River Basin Subtotals		20627					0.00	3469.91			0.00	1346.67
		County Totals		23794					0.00	3696.95			0.00	1448.84
7	AWR	Cimarron Water System	R	774	224	0	Y	-	194.50	0.00	0.45	0.00	87.53	0.00
7	AWR	Eagle Nest Water & Sanitation Dist.	R	189	210	0	-	Y	0.00	44.46	0.00	0.45	0.00	20.01
7	AWR	Maxwell Cooperative W.U.A.	R	400	88	0	-	Y	0.00	39.31	0.00	0.45	0.00	17.69
7	AWR	Maxwell Water System	R	287	75	0	-	Y	0.00	24.11	0.00	0.45	0.00	10.85
7	AWR	Raton Domestic Water System	U	8500	239	4	Y	-	2271.41	0.00	0.70	0.00	1589.99	0.00
7	AWR	Rural self-supplied homes	R	815	64	0	-	N	0.00	58.43	0.00	0.45	0.00	26.29
7	AWR	Springer Water System	R	1960	95	4	Y	-	209.11	0.00	0.45	0.00	94.10	0.00
		River Basin Subtotals		12925					2675.02	166.31			1771.62	74.84
		County Totals		12925					2675.02	166.31			1771.62	74.84
9	AWR	Grady Water System	R	131	114	0	-	Y	0.00	16.78	0.00	0.50	0.00	8.39
9	AWR	Rural self-supplied homes	R	489	64	0	-	N	0.00	35.06	0.00	0.45	0.00	15.78
		River Basin Subtotals		620					0.00	51.84			0.00	24.17
9	TG	Cannon Air Force Base	U	3312	385	10	-	Y	0.00	1427.03	0.00	0.60	0.00	856.22
9	TG	Clovis--NM American Water	U	32000	189	0	-	Y	0.00	6787.00	0.00	0.50	0.00	3393.50
9	TG	Desert Ranch Water System	R	99	133	0	-	Y	0.00	14.74	0.00	0.50	0.00	7.37
9	TG	Melrose Water System	R	662	197	0	-	Y	0.00	146.00	0.00	0.50	0.00	73.00
9	TG	Rural self-supplied homes	R	4494	64	0	-	N	0.00	322.17	0.00	0.45	0.00	144.98
9	TG	Texico Water System	R	1020	251	0	-	Y	0.00	286.80	0.00	0.50	0.00	143.40
		River Basin Subtotals		41587					0.00	8983.74			0.00	4618.47
		County Totals		42207					0.00	9035.58			0.00	4642.64

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
11	P	Fort Sumner Municipal Water System	R	1269	247	3	-	Y	0.00	351.45	0.00	0.70	0.00	246.02
11	P	Rural self-supplied homes	R	541	64	0	-	N	0.00	38.78	0.00	0.45	0.00	17.45
11	P	Valley Water Users Assn.	R	442	158	6	-	Y	0.00	78.20	0.00	0.50	0.00	39.10
		River Basin Subtotals		2252					0.00	468.43			0.00	302.57
		County Totals		2252					0.00	468.43			0.00	302.57
13	RG	Anthony Water Works	U	5160	94	0	-	Y	0.00	542.60	0.00	0.64	0.00	347.26
13	RG	Berino Water Users Assn.	R	1560	112	0	-	Y	0.00	196.00	0.00	0.50	0.00	98.00
13	RG	Butterfield Park MDWCA	R	1200	63	0	-	Y	0.00	84.88	0.00	0.50	0.00	42.44
13	RG	Chaparral Water System	U	5400	145	0	-	Y	0.00	879.64	0.00	0.50	0.00	439.82
13	RG	Delara Estates MDWCA	R	500	158	0	-	Y	0.00	88.33	0.00	0.50	0.00	44.17
13	RG	Desert Sands MDWCA	R	840	82	0	-	Y	0.00	77.54	0.00	0.50	0.00	38.77
13	RG	Dona Ana MDWCA	U	7360	129	0	-	Y	0.00	1063.06	0.00	0.50	0.00	531.53
13	RG	Ft. Seldon Subdivision	R	500	157	0	-	Y	0.00	88.10	0.00	0.50	0.00	44.05
13	RG	Garfield MDWCA	R	1740	104	0	-	Y	0.00	202.15	0.00	0.50	0.00	101.08
13	RG	Green Valley MHP	R	205	83	0	-	Y	0.00	19.00	0.00	0.50	0.00	9.50
13	RG	Hacienda Acres Water System	U	2152	119	0	-	Y	0.00	286.51	0.00	0.50	0.00	143.26
13	RG	Hatch Water Supply System	R	1808	141	4	-	Y	0.00	285.44	0.00	0.64	0.00	182.68
13	RG	Holly Gardens MHP	U	205	107	0	-	Y	0.00	24.59	0.00	0.50	0.00	12.30
13	RG	Las Alturas Estates	R	804	193	0	-	Y	0.00	173.51	0.00	0.50	0.00	86.76
13	RG	Las Cruces Municipal Water System	U	55000	274	3	-	Y	0.00	16904.92	0.00	0.60	0.00	10142.95
13	RG	Mesa Development Ctr., Inc.	U	1750	45	0	-	Y	0.00	89.00	0.00	0.50	0.00	44.50
13	RG	Mesilla Park Manor Water	R	1148	157	0	-	Y	0.00	202.27	0.00	0.50	0.00	101.14

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
		System												
13	RG	Mesilla Water System	U	1975	95	6	-	Y	0.00	209.46	0.00	0.50	0.00	104.73
13	RG	Mesquite MDWCA	U	2750	167	0	-	Y	0.00	513.15	0.00	0.50	0.00	256.58
13	RG	Moongate Water System	U	4480	112	0	-	Y	0.00	563.00	0.00	0.50	0.00	281.50
13	RG	Mountain View MDWCA	R	600	125	0	-	Y	0.00	83.69	0.00	0.50	0.00	41.85
13	RG	Picacho Hills Water System	R	650	766	4	-	N	0.00	557.98	0.00	0.82	0.00	457.54
13	RG	Raasaf Hills Water System	R	75	194	0	-	Y	0.00	16.32	0.00	0.50	0.00	8.16
13	RG	Rincon Water Consumers Co-Op	R	285	150	4	-	N	0.00	47.77	0.00	0.50	0.00	23.89
13	RG	Rural self-supplied homes	R	20637	100	0	-	N	0.00	2311.64	0.00	0.60	0.00	1386.98
13	RG	San Andres Estates Water System	R	940	121	0	-	Y	0.00	127.61	0.00	0.50	0.00	63.81
13	RG	Santa Teresa Water System	U	2512	838	3	-	Y	0.00	2356.80	0.00	0.82	0.00	1932.58
13	RG	Skoshi Mobile Home Park	R	151	109	0	-	Y	0.00	18.38	0.00	0.50	0.00	9.19
13	RG	Sunland Park Water System	U	8179	95	0	-	Y	0.00	870.92	0.00	0.50	0.00	435.46
13	RG	Talavera Water Co-Op	R	70	114	0	-	Y	0.00	8.95	0.00	0.50	0.00	4.48
13	RG	University Estates	U	2188	173	0	-	Y	0.00	424.13	0.00	0.50	0.00	212.07
13	RG	Vista Real MHP	R	70	322	0	-	Y	0.00	25.28	0.00	0.50	0.00	12.64
13	RG	White Sands Missile Range	U	2616	657	10	-	Y	0.00	1925.00	0.00	0.60	0.00	1155.00
		River Basin Subtotals		135510					0.00	31267.62			0.00	18796.67
		County Totals		135510					0.00	31267.62			0.00	18796.67
15	P	Artesia Domestic Water System	U	10610	285	3	-	Y	0.00	3391.54	0.00	0.70	0.00	2374.08
15	P	Artesia Rural Water Cooperative	R	1450	211	0	-	Y	0.00	343.42	0.00	0.50	0.00	171.71
15	P	Carlsbad Municipal Water System	U	26645	307	4	Y	Y	449.70	8720.50	0.92	0.66	413.72	5755.53

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
15	P	Cottonwood Water Co-Operative	R	1328	126	0	-	Y	0.00	188.00	0.00	0.50	0.00	94.00
15	P	Happy Valley Water Co-Op	R	800	119	0	-	Y	0.00	107.00	0.00	0.50	0.00	53.50
15	P	Hope Water System	R	101	475	0	-	Y	0.00	53.70	0.00	0.50	0.00	26.85
15	P	Loving Water System	R	1243	328	3	-	Y	0.00	456.25	0.00	0.50	0.00	228.13
15	P	Malaga Water Users Co-Op	R	605	182	6	-	Y	0.00	123.19	0.00	0.50	0.00	61.60
15	P	Morningside Water Cooperative	R	200	199	6	-	Y	0.00	44.56	0.00	0.50	0.00	22.28
15	P	Otis Water Co-Op	U	3200	220	7	-	Y	0.00	788.73	0.00	0.50	0.00	394.37
15	P	Rural self-supplied homes	R	2248	64	0	-	N	0.00	161.16	0.00	0.45	0.00	72.52
		River Basin Subtotals		48430					449.70	14378.05			413.72	9254.57
		County Totals		48430					449.70	14378.05			413.72	9254.57
17	LC	Pinos Altos MDWCA	R	150	92	6	-	Y	0.00	15.51	0.00	0.50	0.00	7.76
17	LC	Rural self-supplied homes	R	1773	64	0	-	N	0.00	127.11	0.00	0.45	0.00	57.20
17	LC	Tyrone Water System	R	480	426	6	-	Y	0.00	229.26	0.00	0.50	0.00	114.63
		River Basin Subtotals		2403					0.00	371.88			0.00	179.59
17	RG	Arenas Valley MDWCA	R	500	65	6	-	Y	0.00	36.49	0.00	0.50	0.00	18.25
17	RG	Bayard Municipal Water System	U	2598	117	0	-	Y	0.00	339.88	0.00	0.50	0.00	169.94
17	RG	Casas Adobes Water Company	R	50	144	0	-	Y	0.00	8.07	0.00	0.50	0.00	4.04
17	RG	Central Water System	R	1835	118	0	-	Y	0.00	242.50	0.50	0.50	0.00	121.25
17	RG	Ft. Bayard Medical Center	R	450	250	0	N	-	126.02	0.00	0.50	0.00	63.01	0.00
17	RG	Hurley Water Supply System	R	1534	121	6	-	Y	0.00	207.52	0.00	0.50	0.00	103.76
17	RG	Rural self-supplied homes	R	7521	64	0	-	N	0.00	539.18	0.00	0.45	0.00	242.63
17	RG	Silver City Water System	U	10683	184	3	-	Y	0.00	2199.01	0.00	0.65	0.00	1429.36
17	RG	Whiskey Creek Mobile Ranch	R	102	105	0	-	Y	0.00	11.98	0.00	0.50	0.00	5.99
		River Basin Subtotals		25273					126.02	3584.63			63.01	2095.22
		County Totals		27676					126.02	3956.51			63.01	2274.81

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
19	AWR	Rural self-supplied homes	R	97	64	0	-	N	0.00	6.95	0.00	0.45	0.00	3.13
		River Basin Subtotals		97					0.00	6.95			0.00	3.13
19	P	Rio Pecos Villa W.U.A.	R	42	110	6	-	Y	0.00	5.18	0.00	0.50	0.00	2.59
19	P	Rural self-supplied homes	R	1121	64	0	-	N	0.00	80.36	0.00	0.45	0.00	36.16
19	P	Santa Rosa Water Supply	R	2263	188	3	Y	Y	23.00	453.54	0.92	0.36	21.16	163.27
19	P	Vaughn Water System	R	633	207	2,3	-	Y	0.00	146.45	0.00	0.50	0.00	73.23
		River Basin Subtotals		4059					23.00	685.53			21.16	275.25
		County Totals		4156					23.00	692.48			21.16	278.38
21	AWR	Mosquero Water System	R	197	181	0	-	N	0.00	40.00	0.00	0.45	0.00	18.00
21	AWR	Roy Water Works	R	362	163	0	-	Y	0.00	66.07	0.00	0.45	0.00	29.73
21	AWR	Rural self-supplied homes	R	428	64	0	-	N	0.00	30.68	0.00	0.45	0.00	13.81
		River Basin Subtotals		987					0.00	136.75			0.00	61.54
		County Totals		987					0.00	136.75			0.00	61.54
23	LC	Lordsburg Water Supply System	U	2951	250	0	-	Y	0.00	824.80	0.00	0.50	0.00	412.40
23	LC	Rodeo Water Users Assn.	R	120	91	0	-	Y	0.00	12.17	0.00	0.50	0.00	6.09
23	LC	Rural self-supplied homes	R	823	64	0	-	N	0.00	59.00	0.00	0.45	0.00	26.55
		River Basin Subtotals		3894					0.00	895.97			0.00	445.04
23	RG	Playas Townsite Water System	R	1000	444	0	-	Y	0.00	497.00	0.00	0.50	0.00	248.50
23	RG	Rural self-supplied homes	R	1064	64	0	-	N	0.00	76.28	0.00	0.45	0.00	34.33
		River Basin Subtotals		2064					0.00	573.28			0.00	282.83
		County Totals		5958					0.00	1469.25			0.00	727.87
25	P	Eunice Water Supply System	U	2676	460	5	-	Y	0.00	1379.00	0.00	0.45	0.00	620.55

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
25	P	Jal Water Supply System	R	2156	254	0	-	Y	0.00	613.80	0.00	0.45	0.00	276.21
25	P	Monument Water Users Assn.	R	160	348	0	-	Y	0.00	62.40	0.00	0.50	0.00	31.20
25	P	Rural self-supplied homes	R	1181	64	0	-	N	0.00	84.67	0.00	0.45	0.00	38.10
		River Basin Subtotals		6173					0.00	2139.87			0.00	966.06
25	TG	Hobbs Municipal Water Supply	U	29115	267	0	-	Y	0.00	8707.00	0.00	0.45	0.00	3918.15
25	TG	Lovington Municipal Water Supply	U	9322	264	0	-	Y	0.00	2754.00	0.00	0.45	0.00	1239.30
25	TG	Rural self-supplied homes	R	10387	64	0	-	N	0.00	744.64	0.00	0.45	0.00	335.09
25	TG	Tatum Water System	R	768	291	0	-	Y	0.00	250.00	0.00	0.50	0.00	125.00
		River Basin Subtotals		49592					0.00	12455.64			0.00	5617.54
		County Totals		55765					0.00	14595.51			0.00	6583.60
27	P	Agua Fria Water Company	R	200	78	0	Y	-	17.50	0.00	0.45	0.00	7.88	0.00
27	P	Capitan Water System	R	842	166	0	Y	Y	1.62	154.50	0.45	0.45	0.73	69.53
27	P	Corona Water System	R	215	114	0	-	Y	0.00	27.43	0.00	0.45	0.00	12.34
27	P	Ft. Stanton Medical Center	R	450	260	0	Y	-	131.22	0.00	0.45	0.00	59.05	0.00
27	P	Lincoln MDWCA	R	60	199	0	-	Y	0.00	13.35	0.00	0.45	0.00	6.01
27	P	Rancho Ruidoso Village	R	70	193	0	-	Y	0.00	15.14	0.00	0.45	0.00	6.81
27	P	Ruidoso Downs Water System	R	920	83	0	Y	Y	61.43	24.44	0.18	0.18	11.06	4.40
27	P	Ruidoso Water System	U	4600	377	0	Y	Y	1044.15	896.45	0.18	0.18	187.95	161.36
27	P	Rural self-supplied homes	R	3247	64	0	-	N	0.00	232.78	0.00	0.45	0.00	104.75
27	P	Sun Valley Sanitation Dist.	R	60	287	9	-	Y	0.00	19.30	0.00	0.45	0.00	8.69
		River Basin Subtotals		10664					1255.92	1383.39			266.67	373.89
27	RG	Carizozo Water System	R	1075	110	0	Y	Y	36.00	96.00	0.45	0.45	16.20	43.20
27	RG	Nogal Water Consumers Assn.	R	42	62	0	Y	-	2.94	0.00	0.45	0.00	1.32	0.00
27	RG	Rural self-supplied homes	R	442	64	0	-	N	0.00	31.69	0.00	0.45	0.00	14.26

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
		River Basin Subtotals		1559					38.94	127.69			17.52	57.46
		County Totals		12223					1294.86	1511.08			284.19	431.35
28	RG	Los Alamos Municipal Water System	U	18115	260	4	-	Y	0.00	5267.22	0.00	0.70	0.00	3687.05
		River Basin Subtotals		18115					0.00	5267.22			0.00	3687.05
		County Totals		18115					0.00	5267.22			0.00	3687.05
29	RG	Columbus Water System	R	641	150	0	-	Y	0.00	107.41	0.00	0.50	0.00	53.71
29	RG	Deming Municipal Water System	U	13500	225	0	-	Y	0.00	3402.50	0.00	0.50	0.00	1701.25
29	RG	Rural self-supplied homes	R	3969	64	0	-	N	0.00	284.54	0.00	0.45	0.00	128.04
		River Basin Subtotals		18110					0.00	3794.45			0.00	1883.00
		County Totals		18110					0.00	3794.45			0.00	1883.00
31	LC	Coal Basin Water Assn.	R	65	103	0	-	Y	0.00	7.49	0.00	0.45	0.00	3.37
31	LC	Ft. Wingate Army Depot	R	100	68	7	-	Y	0.00	7.60	0.00	0.45	0.00	3.42
31	LC	Gallup Water System	U	19154	156	5	-	Y	0.00	3339.74	0.00	0.20	0.00	667.95
31	LC	Ramah Water & Sanitation Dist.	R	319	132	0	-	Y	0.00	47.33	0.00	0.45	0.00	21.30
31	LC	Rural self-supplied homes	R	18031	64	0	-	N	0.00	1292.63	0.00	0.45	0.00	581.68
31	LC	Zuni Pueblo Water Works	U	7405	73	0	-	N	0.00	605.00	0.00	0.45	0.00	272.25
		River Basin Subtotals		45074					0.00	5299.79			0.00	1549.97
31	RG	Rural self-supplied homes	R	4624	64	0	-	N	0.00	331.49	0.00	0.45	0.00	149.17
		River Basin Subtotals		4624					0.00	331.49			0.00	149.17
31	UC	Rural self-supplied homes	R	10988	64	0	-	N	0.00	787.72	0.00	0.45	0.00	354.47
		River Basin Subtotals		10988					0.00	787.72			0.00	354.47
		County Totals		60686					0.00	6419.00			0.00	2053.61

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
33	AWR	Mora MDWCA	R	1750	56	0	-	Y	0.00	110.40	0.00	0.19	0.00	20.98
33	AWR	Rural self-supplied homes	R	2089	64	0	-	N	0.00	149.76	0.00	0.45	0.00	67.39
33	AWR	Wagon Mound MDWCA	R	425	321	0	-	Y	0.00	152.85	0.00	0.45	0.00	68.78
		River Basin Subtotals		4264					0.00	413.01			0.00	157.15
		County Totals		4264					0.00	413.01			0.00	157.15
35	P	Mayhill Water Supply Company	R	120	45	0	-	Y	0.00	6.00	0.00	0.50	0.00	3.00
35	P	Rural self-supplied homes	R	3255	64	0	-	N	0.00	233.35	0.00	0.45	0.00	105.01
		River Basin Subtotals		3375					0.00	239.35			0.00	108.01
35	RG	Alamogordo Domestic Water System	U	27596	252	0	Y	Y	7155.33	633.91	0.50	0.50	3577.67	316.96
35	RG	Boles Acres Water System	R	1095	96	0	-	Y	0.00	117.48	0.00	0.50	0.00	58.74
35	RG	Canyon Hills Water User's Assn.	R	50	146	0	-	Y	0.00	8.20	0.00	0.50	0.00	4.10
35	RG	Cider Mill Farms W.U.A.	R	30	169	0	-	Y	0.00	5.67	0.00	0.50	0.00	2.84
35	RG	Cloudcroft Water System	R	636	269	9	-	Y	0.00	191.77	0.00	0.42	0.00	80.54
35	RG	High Rolls	R	375	90	0	-	Y	0.00	37.88	0.00	0.50	0.00	18.94
35	RG	Holloman Air Force Base	U	5891	324	10	Y	Y	709.25	1428.90	0.60	0.60	425.55	857.34
35	RG	La Luz MDWCA	R	2000	88	0	Y	Y	42.24	156.00	0.50	0.50	21.12	78.00
35	RG	Mountain Orchard W.U.A.	R	90	105	0	-	Y	0.00	10.57	0.00	0.50	0.00	5.29
35	RG	Orogrande MDWCA	R	72	465	5	-	Y	0.00	37.50	0.00	0.50	0.00	18.75
35	RG	Pinon Water Users Assn.	R	200	198	0	-	Y	0.00	44.32	0.00	0.50	0.00	22.16
35	RG	Rural self-supplied homes	R	7903	64	0	-	N	0.00	566.56	0.00	0.45	0.00	254.95
35	RG	Tularosa Water System	U	2615	242	0	Y	-	710.00	0.00	0.50	0.50	355.00	0.00
		River Basin Subtotals		48553					8616.82	3238.76			4379.34	1718.61

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
		County Totals		51928					8616.82	3478.11			4379.34	1826.62
37	AWR	Logan Water System	R	870	297	9	-	Y	0.00	289.43	0.00	0.45	0.00	130.24
37	AWR	Rural self-supplied homes	R	1956	64	0	-	N	0.00	140.22	0.00	0.45	0.00	63.10
37	AWR	San Jon Water Supply	R	277	152	0	-	Y	0.00	47.28	0.00	0.45	0.00	21.28
37	AWR	Tucumcari Water System	U	7431	205	4	Y	Y	81.00	1623.00	0.86	0.50	69.66	811.50
		River Basin Subtotals		10534					81.00	2099.93			69.66	1026.12
37	P	House Water System	R	85	123	0	-	Y	0.00	11.67	0.00	0.45	0.00	5.25
37	P	Rural self-supplied homes	R	204	64	0	-	N	0.00	14.62	0.00	0.45	0.00	6.58
		River Basin Subtotals		289					0.00	26.29			0.00	11.83
		County Totals		10823					81.00	2126.22			69.66	1037.95
39	RG	Alcalde MDWCA	R	860	50	0	-	Y	0.00	48.13	0.00	0.45	0.00	21.66
39	RG	Barranco MDWCA	R	46	149	0	-	N	0.00	7.67	0.00	0.45	0.00	3.45
39	RG	Chama Water System	R	1048	82	0	Y	-	95.86	0.00	0.45	0.00	43.14	0.00
39	RG	Cordova MDWCA	R	300	51	0	-	Y	0.00	17.00	0.00	0.45	0.00	7.65
39	RG	Dixon MDWCA	R	500	96	0	-	Y	0.00	53.50	0.00	0.45	0.00	24.08
39	RG	Espanola Water System (part)	U	6986	130	0	-	Y	0.00	1019.00	0.00	0.30	0.00	305.70
39	RG	Rural self-supplied homes	R	20044	64	0	-	N	0.00	1436.94	0.00	0.45	0.00	646.62
39	RG	Tierra Amarilla MDWCA	R	650	47	0	-	Y	0.00	34.18	0.00	0.45	0.00	15.38
39	RG	Truchas MDWCA	R	460	56	0	-	Y	0.00	28.88	0.00	0.45	0.00	13.00
		River Basin Subtotals		30894					95.86	2645.30			43.14	1037.54
39	UC	Dulce--BIA, Jicarilla Agency	U	2870	105	0	N	-	337.00	0.00	0.45	0.00	151.65	0.00
39	UC	Lindrith--Community Water Co-Op	R	90	40	0	-	Y	0.00	4.01	0.00	0.45	0.00	1.80
39	UC	Rural self-supplied homes	R	511	64	0	-	N	0.00	36.63	0.00	0.45	0.00	16.48

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
		River Basin Subtotals		3471					337.00	40.64			151.65	18.28
		County Totals		34365					432.86	2685.94			194.79	1055.82
41	P	Rural self-supplied homes	R	286	64	0	-	N	0.00	20.50	0.00	0.45	0.00	9.23
		River Basin Subtotals		286					0.00	20.50			0.00	9.23
41	TG	Causey Water Association	R	57	100	0	-	N	0.00	6.38	0.00	0.50	0.00	3.19
41	TG	Elida Water System	R	201	168	0	-	Y	0.00	37.91	0.00	0.50	0.00	18.96
41	TG	Floyd Water Co-Op	R	117	140	0	-	Y	0.00	18.40	0.00	0.50	0.00	9.20
41	TG	Portales Water System	U	10690	290	3	-	Y	0.00	3472.10	0.00	0.70	0.00	2430.47
41	TG	Roosevelt County Water Co-Op	U	2772	151	6	-	Y	0.00	467.40	0.00	0.50	0.00	233.70
41	TG	Rural self-supplied homes	R	2579	64	0	-	N	0.00	184.89	0.00	0.45	0.00	83.20
		River Basin Subtotals		16416					0.00	4187.08			0.00	2778.72
		County Totals		16702					0.00	4207.58			0.00	2787.95
43	RG	Algodones W.U.A.	R	500	61	0	-	Y	0.00	34.10	0.00	0.50	0.00	17.05
43	RG	Bernalillo Water System	U	5960	135	0	-	Y	0.00	900.91	0.00	0.51	0.00	459.46
43	RG	Browood Unit Owners Assn.	R	250	210	0	-	Y	0.00	58.70	0.00	0.50	0.00	29.35
43	RG	Cochiti Lake Water System	R	434	166	0	-	Y	0.00	80.89	0.00	0.50	0.00	40.45
43	RG	Corrales--self-supplied homes (prt)	U	4918	150	0	-	N	0.00	826.33	0.00	0.65	0.00	537.11
43	RG	Cuba Water System	R	760	260	0	-	N	0.00	221.24	0.00	0.50	0.00	110.62
43	RG	Jemez Springs Water Co-Op	R	413	139	0	N	-	64.16	0.00	0.48	0.00	30.80	0.00
43	RG	Placitas MDWCA	R	264	74	0	-	Y	0.00	22.00	0.00	0.50	0.00	11.00
43	RG	Ponderosa MDWCA	R	500	45	0	Y	-	25.05	0.00	0.50	0.00	12.52	0.00
43	RG	Ranchos de Placitas Sanitation Dist	R	160	224	0	-	Y	0.00	40.09	0.00	0.50	0.00	20.05

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
43	RG	Regina MDWCA	R	300	60	0	-	Y	0.00	20.32	0.00	0.50	0.00	10.16
43	RG	Rio Rancho--Albuquerque Utilities	U	32505	225	1,7	-	Y	0.00	8183.09	0.00	0.74	0.00	6055.49
43	RG	Rural self-supplied homes	R	15038	64	0	-	N	0.00	1078.07	0.00	0.45	0.00	485.13
		River Basin Subtotals		62002					89.21	11465.74			43.32	7775.87
43	UC	Rural self-supplied homes	R	1317	64	0	-	N	0.00	94.41	0.00	0.45	0.00	42.48
		River Basin Subtotals		1317					0.00	94.41			0.00	42.48
		County Totals		63319					89.21	11560.15			43.32	7818.35
45	UC	Aztec Domestic Water System	U	5479	208	3	Y	-	1275.90	0.00	0.60	0.00	765.54	0.00
45	UC	Bloomfield Water Supply System	U	5214	118	3	Y	-	689.90	0.00	0.40	0.00	275.96	0.00
45	UC	East and West Hammond MDWCA	R	2400	65	6	Y	-	173.80	0.00	0.40	0.00	69.52	0.00
45	UC	Farmington Water System	U	33997	291	3	Y	Y	10680.02	389.00	0.64	0.92	6835.21	357.88
45	UC	Flora Vista Water Users Assn.	R	2062	118	7	Y	N	73.28	200.00	0.45	0.45	32.98	90.00
45	UC	Lee Acres Water Users Assn.	U	3622	80	6	Y	-	325.20	0.00	0.40	0.00	130.08	0.00
45	UC	Lower Valley W.U.A.	U	6700	144	7	Y	-	1078.99	0.00	0.45	0.00	485.55	0.00
45	UC	Morningstar W.U.A.	R	522	181	0	Y	-	106.10	0.00	0.45	0.00	47.75	0.00
45	UC	Navajo Dam MDWCA	R	150	85	0	-	Y	0.00	14.29	0.00	0.45	0.00	6.43
45	UC	North Heights W.U.A.	R	1050	39	6	Y	-	45.40	0.00	0.40	0.00	18.16	0.00
45	UC	North Star Water Users Assn.	U	1163	48	0	Y	-	62.41	0.00	0.45	0.00	28.08	0.00
45	UC	Rural self-supplied homes	R	19571	64	0	-	N	0.00	1403.03	0.00	0.45	0.00	631.36
45	UC	Shiprock--NTUA	U	7687	120	6	Y	-	1032.00	0.00	0.30	0.00	309.60	0.00
45	UC	Southside Water Users Assn.	R	980	28	6	Y	-	30.82	0.00	0.45	0.00	13.87	0.00
45	UC	Upper La Plata W.U.A.	R	1008	153	6	Y	-	173.09	0.00	0.45	0.00	77.89	0.00
		River Basin Subtotals		91605					15746.91	2006.32			9090.19	1085.67
		County Totals		91605					15746.91	2006.32			9090.19	1085.67

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
47	AWR	Big Mesa Water Co-Op	R	150	290	9	Y	-	48.74	0.00	0.45	0.00	21.93	0.00
47	AWR	Rural self-supplied homes	R	1129	64	0	-	N	0.00	80.94	0.00	0.45	0.00	36.42
		River Basin Subtotals		1279					48.74	80.94			21.93	36.42
47	P	East Pecos MDWCA	R	700	43	0	-	Y	0.00	33.60	0.00	0.45	0.00	15.12
47	P	Las Vegas Water Supply System	U	15620	162	0	Y	-	2834.00	0.00	0.35	0.00	991.90	0.00
47	P	Pecos Water System	R	1012	55	0	-	N	0.00	62.41	0.00	0.43	0.00	26.84
47	P	Ribera MDWCA	R	180	50	0	-	N	0.00	10.00	0.00	0.45	0.00	4.50
47	P	Rural self-supplied homes	R	6827	64	0	-	N	0.00	489.42	0.00	0.45	0.00	220.24
47	P	Sena Water System	R	125	102	0	-	N	0.00	14.27	0.00	0.45	0.00	6.42
		River Basin Subtotals		24464					2834.00	609.70			991.90	273.12
		County Totals		25743					2882.74	690.64			1013.83	309.54
49	P	Glorieta Baptist Conference Center	R	300	443	9	-	Y	0.00	148.90	0.00	0.45	0.00	67.01
49	P	Glorieta Estates Water Co-Op	R	54	86	0	-	Y	0.00	5.23	0.00	0.45	0.00	2.35
49	P	Rural self-supplied homes	R	136	64	0	-	N	0.00	9.75	0.00	0.45	0.00	4.39
		River Basin Subtotals		490					0.00	163.88			0.00	73.75
49	RG	Agua Fria MHP	U	100	91	0	-	Y	0.00	10.15	0.00	0.45	0.00	4.57
49	RG	Canoncito MDWCA	R	120	100	0	-	Y	0.00	13.43	0.00	0.45	0.00	6.04
49	RG	Chimayo MDWCA	R	75	184	0	-	Y	0.00	15.43	0.00	0.45	0.00	6.94
49	RG	Country Club Estates	R	85	162	0	-	Y	0.00	15.41	0.00	0.45	0.00	6.93
49	RG	Country Club Gardens MHP	U	1364	64	0	-	Y	0.00	97.69	0.00	0.45	0.00	43.96
49	RG	Edgewood--Entranosa Water Co-Op	R	2000	89	0	-	Y	0.00	199.98	0.00	0.45	0.00	89.99
49	RG	El Rancho MHP	R	50	52	0	-	Y	0.00	2.94	0.00	0.45	0.00	1.32

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
49	RG	Eldorado de Santa Fe	R	2260	77	0	-	Y	0.00	194.24	0.00	0.45	0.00	87.41
49	RG	Espanola Water System (part)	U	1403	130	0	-	Y	0.00	205.00	0.00	0.30	0.00	61.50
49	RG	Galisteo Water Users Assn.	R	125	184	0	-	Y	0.00	25.76	0.00	0.45	0.00	11.59
49	RG	Hyde Park Estates	R	200	51	0	-	Y	0.00	11.36	0.00	0.45	0.00	5.11
49	RG	Jemez Road MHP	R	200	107	0	-	Y	0.00	24.02	0.00	0.45	0.00	10.81
49	RG	Juniper Hills MHP	R	78	48	0	-	Y	0.00	4.22	0.00	0.45	0.00	1.90
49	RG	Juniper Hills PT Ranch	R	35	78	0	-	Y	0.00	3.07	0.00	0.45	0.00	1.38
49	RG	La Cienega Lakeside MHP	R	50	91	0	-	Y	0.00	5.10	0.00	0.45	0.00	2.30
49	RG	La Cienega MDWCA	R	130	116	0	-	Y	0.00	16.87	0.00	0.45	0.00	7.59
49	RG	La Puebla MDWCA	R	120	265	0	-	Y	0.00	35.57	0.00	0.45	0.00	16.01
49	RG	Penitentiary of New Mexico	R	1315	237	0	-	Y	0.00	349.35	0.00	0.45	0.00	157.21
49	RG	Pojoaque Terraces MHP	R	225	55	0	-	Y	0.00	13.98	0.00	0.45	0.00	6.29
49	RG	Rio En Medio MDWCA	R	110	51	0	-	Y	0.00	6.23	0.00	0.45	0.00	2.80
49	RG	Road Runner MHP	U	425	94	0	-	Y	0.00	44.77	0.00	0.45	0.00	20.15
49	RG	Rufina Apartments	U	50	91	0	-	Y	0.00	5.10	0.00	0.45	0.00	2.30
49	RG	Rural self-supplied homes	R	27077	80	0	-	N	0.00	2426.42	0.00	0.50	0.00	1213.21
49	RG	Sangre de Cristo Water Company	U	58000	159	4	Y	Y	3408.94	6902.11	0.45	0.45	1534.02	3105.95
49	RG	Santa Cruz MDWCA	R	430	43	0	-	Y	0.00	20.80	0.00	0.45	0.00	9.36
49	RG	Santa Fe Country Club Apartments	R	130	134	0	-	Y	0.00	19.51	0.00	0.45	0.00	8.78
49	RG	Santa Fe Mobile Home Hacienda	R	400	54	0	-	Y	0.00	24.24	0.00	0.45	0.00	10.91
49	RG	Santa Fe West MHP	R	250	51	0	-	Y	0.00	14.30	0.00	0.45	0.00	6.44
49	RG	Santa Fe--urban self-supplied homes	U	1200	130	0	-	N	0.00	174.74	0.00	0.62	0.00	108.31
49	RG	Sunlit Hills of Santa Fe	R	990	103	0	-	Y	0.00	114.62	0.00	0.45	0.00	51.58
49	RG	Sunset Mobile Home Park	R	133	121	0	-	Y	0.00	17.99	0.00	0.45	0.00	8.10

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
49	RG	Tesuque MDWCA	R	300	61	0	-	Y	0.00	20.65	0.00	0.45	0.00	9.29
49	RG	Trailer Ranch MHP	U	140	101	0	-	Y	0.00	15.77	0.00	0.45	0.00	7.10
49	RG	Valle Vista MHP	R	950	63	0	-	Y	0.00	66.98	0.00	0.45	0.00	30.14
49	RG	Valley Cove MHP	R	75	135	0	-	Y	0.00	11.34	0.00	0.45	0.00	5.10
49	RG	Villitas de Santa Fe MHP	U	984	70	0	-	Y	0.00	77.22	0.00	0.45	0.00	34.75
		River Basin Subtotals		101579					3408.94	11206.36			1534.02	5163.12
		County Totals		102069					3408.94	11370.24			1534.02	5236.87
51	RG	Elephant Butte--National Utilities	R	868	110	0	-	Y	0.00	106.66	0.00	0.50	0.00	53.33
51	RG	Hillsboro MDWCA	R	150	98	0	-	Y	0.00	16.50	0.00	0.50	0.00	8.25
51	RG	Rural self-supplied homes	R	2216	64	0	-	N	0.00	158.86	0.00	0.45	0.00	71.49
51	RG	Truth or Consequences	U	6677	258	4	-	Y	0.00	1930.81	0.00	0.60	0.00	1158.49
		River Basin Subtotals		9911					0.00	2212.83			0.00	1291.56
		County Totals		9911					0.00	2212.83			0.00	1291.56
53	RG	Magdalena Water Supply System	R	861	150	0	-	N	0.00	144.66	0.00	0.50	0.00	72.33
53	RG	New Mexico Boys Ranch	R	82	298	0	-	Y	0.00	27.35	0.00	0.50	0.00	13.68
53	RG	Polvadera MDWCA	R	1038	103	0	-	Y	0.00	119.22	0.00	0.50	0.00	59.61
53	RG	Rural self-supplied homes	R	4444	64	0	-	N	0.00	318.59	0.00	0.45	0.00	143.37
53	RG	San Acacia MDWCA	R	180	79	0	-	Y	0.00	15.98	0.00	0.50	0.00	7.99
53	RG	Socorro Water System	U	8159	185	0	-	Y	0.00	1688.34	0.00	0.50	0.00	844.17
		River Basin Subtotals		14764					0.00	2314.14			0.00	1141.15
		County Totals		14764					0.00	2314.14			0.00	1141.15
55	RG	El Prado Water & Sanitation	R	745	44	0	-	Y	0.00	37.00	0.00	0.45	0.00	16.65

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
		Dist.												
55	RG	Ojo Caliente MDWCA	R	242	104	0	-	Y	0.00	28.11	0.00	0.45	0.00	12.65
55	RG	Questa Water System	R	1707	82	0	-	N	0.00	156.67	0.00	0.45	0.00	70.50
55	RG	Ranchos de Taos MDWCA	R	700	86	0	-	Y	0.00	67.24	0.00	0.45	0.00	30.26
55	RG	Red River Water System	R	387	1179	9	-	Y	0.00	511.30	0.00	0.19	0.00	97.15
55	RG	Rural self-supplied homes	R	14872	64	0	-	N	0.00	1066.16	0.00	0.45	0.00	479.77
55	RG	Taos Municipal Water System	U	4065	186	0	-	Y	0.00	848.43	0.00	0.45	0.00	381.79
55	RG	Tres Piedras MDWCA	R	150	76	0	-	Y	0.00	12.83	0.00	0.45	0.00	5.77
55	RG	Valle Escondido Water System	R	250	52	0	-	Y	0.00	14.68	0.00	0.45	0.00	6.61
		River Basin Subtotals		23118					0.00	2742.42			0.00	1101.15
		County Totals		23118					0.00	2742.42			0.00	1101.15
57	P	Clines Corners Water System	R	90	177	0	-	Y	0.00	17.83	0.00	0.45	0.00	8.02
57	P	Duran Water System	R	70	68	1,6	-	Y	0.00	5.36	0.00	0.45	0.00	2.41
57	P	Rural self-supplied homes	R	62	64	0	-	N	0.00	4.44	0.00	0.45	0.00	2.00
		River Basin Subtotals		222					0.00	27.63			0.00	12.43
57	RG	Encino Water System	R	131	117	1,6	-	Y	0.00	17.10	0.00	0.45	0.00	7.70
57	RG	Estancia Water System	R	830	238	0	-	Y	0.00	221.00	0.00	0.45	0.00	99.45
57	RG	Moriarty Water System	R	1399	207	0	-	N	0.00	325.16	0.00	0.45	0.00	146.32
57	RG	Mountainaire	R	926	173	0	-	Y	0.00	179.86	0.00	0.45	0.00	80.94
57	RG	Rural self-supplied homes	R	6594	64	0	-	N	0.00	472.72	0.00	0.45	0.00	212.72
57	RG	Willard Water Supply System	R	183	72	0	-	Y	0.00	14.80	0.00	0.45	0.00	6.66
		River Basin Subtotals		10063					0.00	1230.64			0.00	553.79
		County Totals		10285					0.00	1258.27			0.00	566.22
59	AWR	Clayton Municipal Supply	R	2484	367	0	-	Y	0.00	1021.93	0.00	0.45	0.00	459.87

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Table 6. Public Water Supply and Self-Supplied Domestic. Water systems, population, per capita use, and withdrawals and depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	WATER SUPPLIER	C	POP	GPCD	WTC	MSW	MGW	WSW	WGW	DFSW	DFGW	DSW	DGW
59	AWR	Des Moines Water System	R	168	150	0	-	N	0.00	28.22	0.00	0.45	0.00	12.70
59	AWR	Rural self-supplied homes	R	1522	64	0	-	N	0.00	109.11	0.00	0.45	0.00	49.10
		River Basin Subtotals		4174					0.00	1159.26			0.00	521.67
		County Totals		4174					0.00	1159.26			0.00	521.67
61	RG	Belen Water System	U	6547	189	0	-	Y	0.00	1384.00	0.00	0.28	0.00	387.52
61	RG	Bosque Farms Water Supply System	R	1500	60	0	-	Y	0.00	101.30	0.00	0.45	0.00	45.59
61	RG	Cyprus Gardens Water System	R	55	137	0	-	Y	0.00	8.43	0.00	0.45	0.00	3.79
61	RG	Los Lunas Water System	U	6013	161	0	-	Y	0.00	1081.95	0.00	0.55	0.00	595.07
61	RG	Monterey Mobile Home Estates	R	300	97	0	-	Y	0.00	32.60	0.00	0.45	0.00	14.67
61	RG	Rio Grande Utilities	U	5000	110	0	-	Y	0.00	614.54	0.00	0.45	0.00	276.54
61	RG	Rural self-supplied homes	R	25820	80	0	-	N	0.00	2313.78	0.00	0.45	0.00	1041.20
		River Basin Subtotals		45235					0.00	5536.60			0.00	2364.38
		County Totals		45235					0.00	5536.60			0.00	2364.38
		State Totals		1526318					35827.08	296784.07			18878.85	158999.44

Key: CN=county number; RVB=river basin; C=census classification (urban/rural); POP=population; GPCD=gallons per capita per day; WTC=water transfer code; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); WSW=withdrawals, surface water; WGW=withdrawals, ground water; DFSW=depletion factor, surface water; DFGW=depletion factor, ground water; DSW=depletion, surface water; DGW=depletion, ground water; See Table A-1 for county numbers, Table A-2 for river basin acronyms, and "Notes on Individual Water Systems" in Section 3 of text for water transfer codes.

Table 7. Populations in New Mexico river basins, 1990.

RIVER BASIN	CATEGORY	POPULATION	URBAN POPULATION	RURAL POPULATION
Arkansas-White-Red	Public Water Supply	26355	15931	10424
Arkansas-White-Red	Domestic (self-supplied)	8525	0	8525
	River Basin Totals	34880	15931	18949
Texas Gulf	Public Water Supply	90135	87211	2924
Texas Gulf	Domestic (self-supplied)	17460	0	17460
	River Basin Totals	107595	87211	20384
Pecos	Public Water Supply	136343	114791	21552
Pecos	Domestic (self-supplied)	25056	0	25056
	River Basin Totals	161399	114791	46608
Rio Grande	Public Water Supply	849338	789515	59823
Rio Grande	Domestic (self-supplied)	208851	6653	202198
	River Basin Totals	1058189	796168	262021
Upper Colorado	Public Water Supply	74994	66732	8262
Upper Colorado	Domestic (self-supplied)	32387	0	32387
	River Basin Totals	107381	66732	40649
Lower Colorado	Public Water Supply	31519	29510	2009
Lower Colorado	Domestic (self-supplied)	25355	0	25355
	River Basin Totals	56874	29510	27364
	State Totals	1526318	1110343	415975

Table 8. Irrigated Agriculture. Withdrawals (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
1	RG	Estancia Basin	F	0.000	1.640	0	50	0	0	50	0.6000	0.0000	0.0000	-	N	0	0	0	137
1	RG	Inside MRGCD but exclusive of CD	D	0.000	1.350	0	100	0	0	100	0.8500	0.0000	0.0000	-	N	0	0	0	159
1	RG	MRGCD only	F	2.030	2.030	5616	0	2403	801	8820	0.4600	0.4800	0.2208	Y	N	35389	38338	73727	3535
1	RG	Outside MRGCD	D	0.000	1.350	0	130	0	0	130	0.8500	0.0000	0.0000	-	N	0	0	0	206
		River Basin Subtotals				5616	280	2403	801	9100						35389	38338	73727	4037
		County Totals				5616	280	2403	801	9100						35389	38338	73727	4037
3	LC	Quemado & Vicinity	F	1.150	0.000	181	0	0	0	181	0.5500	0.9000	0.5225	N	-	378	42	420	0
3	LC	San Francisco River--Apache-Aragon	F	1.080	0.000	155	0	0	0	155	0.4000	0.5173	0.2069	Y	-	419	391	810	0
3	LC	San Francisco River--Glenwood	F	1.840	0.000	428	0	0	0	428	0.4000	0.1639	0.0656	Y	-	1969	10044	12013	0
3	LC	San Francisco River--Luna	F	0.700	0.000	68	0	0	0	68	0.4000	0.0902	0.0361	Y	-	119	1200	1319	0
3	LC	San Francisco River--Reserve	F	1.230	0.000	148	0	0	0	148	0.4000	0.1267	0.0507	Y	-	455	3136	3591	0
		River Basin Subtotals				980	0	0	0	980						3340	14813	18153	0
3	RG	San Augustin Plains	F	0.000	1.890	0	111	0	0	111	0.5500	0.0000	0.0000	-	N	0	0	0	381
3	RG	San Augustin Plains	S	0.000	2.150	0	450	0	0	450	0.6500	0.0000	0.0000	-	N	0	0	0	1488
		River Basin Subtotals				0	561	0	0	561						0	0	0	1869
		County Totals				980	561	0	0	1541						3340	14813	18153	1869
5	P	Rio Hondo	F	2.210	0.000	300	0	0	0	300	0.5500	0.7000	0.3850	N	-	1205	516	1721	0
5	P	Rio Penasco	F	2.310	2.310	605	0	732	183	1520	0.5500	0.7000	0.3850	N	N	5615	2406	8021	769
5	P	Roswell Basin North	D	0.000	2.550	0	200	0	0	200	0.8500	0.0000	0.0000	-	Y	0	0	0	600
5	P	Roswell Basin North (part)	F	1.922	0.000	1885	0	4790	0	6675	0.6000	0.7500	0.4500	Y	-	21382	7128	28510	0
5	P	Roswell Basin North (part)	F	0.000	2.234	0	51651	0	7184	58835	0.7000	0.0000	0.0000	-	Y	0	0	0	187767
5	P	Roswell Basin North	S	0.000	2.548	0	20490	0	0	20490	0.7000	0.0000	0.0000	-	Y	0	0	0	74584
5	P	Scattered	F	2.440	2.990	0	50	250	500	800	0.6000	0.9000	0.5400	N	N	1017	113	1130	2741
		River Basin Subtotals				2790	72391	5772	7867	88820						29219	10163	39382	266461
		County Totals				2790	72391	5772	7867	88820						29219	10163	39382	266461
6	RG	Scattered	F	0.140	1.390	564	420	270	116	1370	0.5500	0.7000	0.3850	N	N	213	92	305	1354
		River Basin Subtotals				564	420	270	116	1370						213	92	305	1354
		County Totals				564	420	270	116	1370						213	92	305	1354
7	AWR	Canadian River	F	1.220	0.000	4815	0	0	0	4815	0.5500	0.6000	0.3300	N	-	10681	7121	17802	0

Key: CN=county number; RVB=river basin; T=type of irrigation system, i.e., drip (D), flood (F), or sprinkler (S); CIRSW=consumptive irrigation requirement for acreage irrigated with surface water; CIRGW=consumptive irrigation 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; EJ=project efficiency; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); 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. See Table A-1 for county numbers and Table A-2 for river basin acronyms.

Table 8. Irrigated Agriculture. Withdrawals (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
7	AWR	Canadian River	S	1.070	0.000	200	0	0	0	200	0.6500	0.6000	0.3900	N	-	329	219	548	0
7	AWR	Cimarron River	F	1.230	0.000	8270	0	0	0	8270	0.5500	0.6000	0.3300	N	-	18495	12330	30825	0
7	AWR	Cimarron River	S	1.320	0.000	530	0	0	0	530	0.6500	0.6000	0.3900	N	-	1076	717	1793	0
7	AWR	Dry Cimarron	F	0.470	0.000	380	0	0	0	380	0.5500	0.8000	0.4400	N	-	325	81	406	0
7	AWR	Dry Cimarron	S	0.000	1.180	0	50	0	0	50	0.6500	0.0000	0.0000	-	N	0	0	0	91
7	AWR	Near Capulin	F	1.140	0.000	380	0	0	0	380	0.5500	0.8000	0.4400	N	-	788	197	985	0
7	AWR	Purgatoire	F	0.940	0.000	160	0	0	0	160	0.5500	0.8000	0.4400	N	-	273	68	341	0
7	AWR	Vermejo Conservancy District	F	0.396	0.000	5145	0	0	0	5145	0.5500	0.7153	0.3934	Y	-	3704	1474	5178	0
7	AWR	Vermejo Conservancy District	S	0.396	0.000	20	0	0	0	20	0.5500	0.7153	0.3934	Y	-	14	6	20	0
		River Basin Subtotals				19900	50	0	0	19950						35685	22213	57898	91
		County Totals				19900	50	0	0	19950						35685	22213	57898	91
9	AWR	Scattered	F	0.000	1.340	0	320	0	0	320	0.6000	0.0000	0.0000	-	N	0	0	0	715
9	AWR	Scattered	S	0.000	1.160	0	7000	0	0	7000	0.6500	0.0000	0.0000	-	N	0	0	0	12492
		River Basin Subtotals				0	7320	0	0	7320						0	0	0	13207
9	P	Scattered	F	0.000	1.220	0	120	0	0	120	0.6000	0.0000	0.0000	-	N	0	0	0	244
9	P	Scattered	S	0.000	1.190	0	380	0	0	380	0.6500	0.0000	0.0000	-	N	0	0	0	696
		River Basin Subtotals				0	500	0	0	500						0	0	0	940
9	TG	Scattered	D	0.000	1.560	0	154	0	0	154	0.8500	0.0000	0.0000	-	N	0	0	0	283
9	TG	Scattered	F	0.000	1.330	0	26276	0	0	26276	0.6000	0.0000	0.0000	-	N	0	0	0	58245
9	TG	Scattered	S	0.000	1.480	0	112940	0	0	112940	0.6500	0.0000	0.0000	-	N	0	0	0	257156
		River Basin Subtotals				0	139370	0	0	139370						0	0	0	315684
		County Totals				0	147190	0	0	147190						0	0	0	329831
11	P	Fort Sumner & Vicinity	S	0.000	1.380	0	2210	0	0	2210	0.6500	0.0000	0.0000	-	N	0	0	0	4692
11	P	Fort Sumner Irrigation District	F	2.140	0.000	5000	0	0	0	5000	0.3815	0.7215	0.2752	Y	-	28047	10826	38873	0
11	P	Scattered	S	0.000	2.080	0	1220	0	0	1220	0.6500	0.0000	0.0000	-	N	0	0	0	3904
		River Basin Subtotals				5000	3430	0	0	8430						28047	10826	38873	8596
		County Totals				5000	3430	0	0	8430						28047	10826	38873	8596
13	RG	EBID only	F	2.420	2.420	0	0	52624	20410	73034	0.6000	0.5767	0.3460	Y	N	212250	155792	368042	82320
13	RG	Hueco Basin	F	0.000	2.970	0	100	0	0	100	0.6000	0.0000	0.0000	-	N	0	0	0	495
13	RG	Inside EBID but exclusive of EBID	D	0.000	2.260	0	110	0	0	110	0.8500	0.0000	0.0000	-	N	0	0	0	292

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Table 8. Irrigated Agriculture. Withdrawals (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
13	RG	Inside EBID but exclusive of EBID	F	0.000	2.420	0	3155	0	0	3155	0.6000	0.0000	0.0000	-	N	0	0	0	12725
13	RG	Nutt-Hockett	F	0.000	1.570	0	145	0	0	145	0.6000	0.0000	0.0000	-	N	0	0	0	379
13	RG	Outside EBID	D	0.000	2.260	0	40	0	0	40	0.8500	0.0000	0.0000	-	N	0	0	0	106
13	RG	Outside EBID	F	0.000	2.420	0	1346	0	0	1346	0.6000	0.0000	0.0000	-	N	0	0	0	5429
13	RG	Outside EBID	S	0.000	2.540	0	830	0	0	830	0.6500	0.0000	0.0000	-	N	0	0	0	3243
		River Basin Subtotals				0	5726	52624	20410	78760						212250	155792	368042	104989
		County Totals				0	5726	52624	20410	78760						212250	155792	368042	104989
15	P	Black River	F	2.730	2.730	390	735	62	62	1249	0.5500	0.8000	0.4400	Y	N	2244	561	2805	3956
15	P	Carlsbad Basin--Scattered	F	2.660	2.660	406	1115	1104	317	2942	0.5500	0.9000	0.4950	Y	N	7303	811	8114	6926
15	P	Carlsbad Irrigation District (part)	F	2.656	0.000	2503	0	7660	0	10163	0.6000	0.7573	0.4544	Y	-	44988	14418	59406	0
15	P	Carlsbad Irrigation District (part)	F	0.000	2.656	0	0	0	8240	8240	0.6045	0.0000	0.0000	-	Y	0	0	0	36204
15	P	Rio Penasco	F	2.610	2.610	0	0	1773	197	1970	0.5500	0.7000	0.3850	N	N	8414	3606	12020	935
15	P	Roswell Basin South	F	0.000	2.005	0	12970	0	0	12970	0.7000	0.0000	0.0000	-	Y	0	0	0	37150
15	P	Roswell Basin South	S	0.000	2.170	0	18230	0	0	18230	0.7000	0.0000	0.0000	-	Y	0	0	0	56513
		River Basin Subtotals				3299	33050	10599	8816	55764						62949	19396	82345	141684
		County Totals				3299	33050	10599	8816	55764						62949	19396	82345	141684
17	LC	Gila River--Cliff Gila (part)	F	1.590	0.000	693	0	0	0	693	0.4000	0.1384	0.0554	Y	-	2755	17151	19906	0
17	LC	Gila River--Cliff Gila (part)	F	0.000	1.590	0	7	0	0	7	0.5500	0.0000	0.0000	-	N	0	0	0	20
17	LC	Gila River--Red Rock	F	1.810	1.810	400	190	0	0	590	0.5500	0.7331	0.4032	Y	N	1316	479	1795	625
17	LC	Gila River--Upper Gila	F	1.350	0.000	53	0	0	0	53	0.4000	0.1570	0.0628	Y	-	179	961	1140	0
17	LC	Lordsburg Valley	D	0.000	1.450	0	30	0	0	30	0.8500	0.0000	0.0000	-	N	0	0	0	51
17	LC	Lordsburg Valley	F	0.000	2.100	0	140	0	0	140	0.5500	0.0000	0.0000	-	N	0	0	0	535
		River Basin Subtotals				1146	367	0	0	1513						4250	18591	22841	1231
17	RG	Mimbres River	F	1.320	1.320	380	820	420	280	1900	0.5500	0.8000	0.4400	N	N	1920	480	2400	2640
17	RG	Mimbres River	S	0.000	1.020	0	80	0	0	80	0.6500	0.0000	0.0000	-	N	0	0	0	126
		River Basin Subtotals				380	900	420	280	1980						1920	480	2400	2766
		County Totals				1526	1267	420	280	3493						6170	19071	25241	3997
19	P	Anton Chico	F	1.820	0.000	2888	0	0	0	2888	0.5500	0.7500	0.4125	N	-	9557	3186	12743	0
19	P	Colonias	F	0.000	1.970	0	142	0	0	142	0.5500	0.0000	0.0000	-	N	0	0	0	509

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CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
19	P	Puerto de Luna	F	2.380	0.000	252	0	0	0	252	0.5500	0.7500	0.4125	N	-	1090	363	1453	0
19	P	Scattered	F	0.000	2.320	0	103	0	0	103	0.5500	0.0000	0.0000	-	N	0	0	0	434
		River Basin Subtotals				3140	245	0	0	3385						10647	3549	14196	943
		County Totals				3140	245	0	0	3385						10647	3549	14196	943
21	AWR	Scattered	F	0.000	1.060	0	890	0	0	890	0.5500	0.0000	0.0000	-	N	0	0	0	1715
21	AWR	Scattered	S	0.000	0.920	0	1400	0	0	1400	0.6500	0.0000	0.0000	-	N	0	0	0	1982
		River Basin Subtotals				0	2290	0	0	2290						0	0	0	3697
		County Totals				0	2290	0	0	2290						0	0	0	3697
23	LC	Animas Valley	F	0.000	1.840	0	4381	0	0	4381	0.5500	0.0000	0.0000	-	N	0	0	0	14656
23	LC	Animas Valley	S	0.000	1.730	0	1355	0	0	1355	0.6500	0.0000	0.0000	-	N	0	0	0	3606
23	LC	Gila River--Virden Valley	F	1.960	2.550	0	0	1933	277	2210	0.5500	0.8000	0.4675	N	N	6889	1722	8611	1284
23	LC	Lordsburg Valley	F	0.000	1.970	0	850	0	0	850	0.5500	0.0000	0.0000	-	N	0	0	0	3045
23	LC	San Simon Valley	F	0.000	1.430	0	294	0	0	294	0.5500	0.0000	0.0000	-	Y	0	0	0	764
		River Basin Subtotals				0	6880	1933	277	9090						6889	1722	8611	23355
		County Totals				0	6880	1933	277	9090						6889	1722	8611	23355
25	P	Scattered	D	0.000	2.550	0	30	0	0	30	0.8500	0.0000	0.0000	-	N	0	0	0	90
25	P	Scattered	S	0.000	2.640	0	320	0	0	320	0.6500	0.0000	0.0000	-	N	0	0	0	1300
		River Basin Subtotals				0	350	0	0	350						0	0	0	1390
25	TG	Scattered	D	0.000	2.520	0	875	0	0	875	0.8500	0.0000	0.0000	-	N	0	0	0	2594
25	TG	Scattered	F	0.000	2.660	0	2950	0	0	2950	0.5500	0.0000	0.0000	-	N	0	0	0	14267
25	TG	Scattered	S	0.000	1.840	0	26070	0	0	26070	0.6500	0.0000	0.0000	-	N	0	0	0	73798
		River Basin Subtotals				0	29895	0	0	29895						0	0	0	90659
		County Totals				0	30245	0	0	30245						0	0	0	92049
27	P	Rio Hondo & Tributaries	D	0.000	1.500	0	60	0	0	60	0.8500	0.0000	0.0000	-	N	0	0	0	106
27	P	Rio Hondo & Tributaries	F	2.070	2.070	1793	590	1372	588	4343	0.5000	0.7000	0.3500	N	N	13103	5615	18718	4877
27	P	Rio Hondo & Tributaries	S	0.000	1.970	0	170	0	0	170	0.6500	0.0000	0.0000	-	N	0	0	0	515
27	P	Scattered	F	2.120	2.120	131	196	0	0	327	0.4500	0.7000	0.3150	N	N	617	264	881	923
		River Basin Subtotals				1924	1016	1372	588	4900						13720	5879	19599	6421
27	RG	Carrizozo & Vicinity	D	0.000	1.400	0	10	0	0	10	0.8500	0.0000	0.0000	-	N	0	0	0	16
27	RG	Carrizozo & Vicinity	F	0.000	1.580	0	130	0	0	130	0.5500	0.0000	0.0000	-	N	0	0	0	373
		River Basin Subtotals				0	140	0	0	140						0	0	0	389

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CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
		County Totals				1924	1156	1372	588	5040						13720	5879	19599	6810
29	RG	Mimbres River	D	0.000	1.250	0	600	0	0	600	0.8500	0.0000	0.0000	-	N	0	0	0	882
29	RG	Mimbres River	F	1.620	1.620	200	25430	600	600	26830	0.5500	0.6500	0.3575	N	N	2356	1268	3624	76670
29	RG	Mimbres River	S	0.000	2.630	0	80	0	0	80	0.6500	0.0000	0.0000	-	N	0	0	0	324
29	RG	Mimbres River--Floodwater Area	F	0.072	0.000	10350	0	0	0	10350	0.4500	0.0000	0.4500	N	-	1656	0	1656	0
29	RG	Nutt-Hockett	F	0.000	1.900	0	6005	0	0	6005	0.6000	0.0000	0.0000	-	N	0	0	0	19016
29	RG	Nutt-Hockett	S	0.000	2.760	0	385	0	0	385	0.6500	0.0000	0.0000	-	N	0	0	0	1635.
		River Basin Subtotals				10550	32500	600	600	44250						4012	1268	5280	98527
		County Totals				10550	32500	600	600	44250						4012	1268	5280	98527
31	LC	Scattered	F	0.080	0.000	2390	0	0	0	2390	0.5500	0.8000	0.4400	N	-	348	87	435	0
		River Basin Subtotals				2390	0	0	0	2390						348	87	435	0
31	RG	Scattered	F	0.840	0.000	160	0	0	0	160	0.5500	0.8000	0.4400	N	-	244	61	305	0
		River Basin Subtotals				160	0	0	0	160						244	61	305	0
31	UC	Scattered	F	0.180	0.000	1325	0	0	0	1325	0.5500	0.8000	0.4400	N	-	434	109	543	0
		River Basin Subtotals				1325	0	0	0	1325						434	109	543	0
		County Totals				3875	0	0	0	3875						1026	257	1283	0
33	AWR	Scattered	D	0.000	0.970	0	40	0	0	40	0.8500	0.0000	0.0000	-	N	0	0	0	46
33	AWR	Scattered	F	1.070	0.000	12925	0	0	0	12925	0.5500	0.7000	0.3850	N	-	25145	10776	35921	0
33	AWR	Scattered	S	0.980	0.000	1025	0	0	0	1025	0.6500	0.7000	0.4550	N	-	1545	662	2207	0
		River Basin Subtotals				13950	40	0	0	13990						26690	11438	38128	46
		County Totals				13950	40	0	0	13990						26690	11438	38128	46
35	P	Rio Penasco	F	1.480	0.000	615	0	0	0	615	0.5500	0.7000	0.3850	N	-	1655	709	2364	0
		River Basin Subtotals				615	0	0	0	615						1655	709	2364	0
35	RG	Salt Basin	D	0.000	1.370	0	5	0	0	5	0.8500	0.0000	0.0000	-	N	0	0	0	8
35	RG	Salt Basin	F	0.000	1.620	0	895	0	0	895	0.6000	0.0000	0.0000	-	N	0	0	0	2417
35	RG	Salt Basin	S	0.000	2.810	0	1470	0	0	1470	0.6500	0.0000	0.0000	-	N	0	0	0	6355
35	RG	Tularosa Basin	D	0.000	2.440	0	1690	0	0	1690	0.8500	0.0000	0.0000	-	N	0	0	0	4851
35	RG	Tularosa Basin	F	2.380	2.380	250	0	386	129	765	0.6000	0.7000	0.4200	N	N	2523	1081	3604	512
35	RG	Tularosa Basin	S	0.000	2.580	0	1900	0	0	1900	0.6500	0.0000	0.0000	-	N	0	0	0	7542
		River Basin Subtotals				250	5960	386	129	6725						2523	1081	3604	21685
		County Totals				865	5960	386	129	7340						4178	1790	5968	21685

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; EJ=project efficiency; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); 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. See Table A-1 for county numbers and Table A-2 for river basin acronyms.

Table 8. Irrigated Agriculture. Withdrawals (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
37	AWR	Arch Hurley Conservancy District	F	0.850	0.000	25081	0	0	0	25081	0.6000	0.5330	0.3198	Y	-	35531	31131	66662	0
37	AWR	Arch Hurley Conservancy District	S	0.850	0.000	4448	0	0	0	4448	0.6000	0.5330	0.3198	Y	-	6301	5521	11822	0
37	AWR	Scattered	F	0.000	2.110	0	1450	0	0	1450	0.6000	0.0000	0.0000	-	N	0	0	0	5099
37	AWR	Scattered	S	0.000	1.890	0	1680	0	0	1680	0.6500	0.0000	0.0000	-	N	0	0	0	4885
37	AWR	Tucumcari & Vicinity	S	0.000	1.600	0	1770	0	0	1770	0.6500	0.0000	0.0000	-	N	0	0	0	4357
		River Basin Subtotals				29529	4900	0	0	34429						41832	36652	78484	14341
37	P	Scattered	F	0.000	1.380	0	400	0	0	400	0.6000	0.0000	0.0000	-	N	0	0	0	920
37	P	Scattered	S	0.000	1.310	0	1650	0	0	1650	0.6500	0.0000	0.0000	-	N	0	0	0	3325
		River Basin Subtotals				0	2050	0	0	2050						0	0	0	4245
		County Totals				29529	6950	0	0	36479						41832	36652	78484	18586
39	RG	Rio Chama	F	0.920	0.920	20735	500	210	70	21515	0.5000	0.6000	0.3000	N	N	38538	25692	64230	1049
39	RG	Santa Cruz & Vicinity	F	0.720	0.000	4235	0	0	0	4235	0.5500	0.7500	0.4125	N	-	5544	1848	7392	0
39	RG	Truchas & Vicinity	F	1.120	0.000	2960	0	0	0	2960	0.4000	0.8000	0.3200	N	-	8288	2072	10360	0
39	RG	Velarde & Vicinity	D	0.000	0.880	0	15	0	0	15	0.8500	0.0000	0.0000	-	N	0	0	0	16
39	RG	Velarde & Vicinity	F	1.540	0.000	2580	0	0	0	2580	0.5000	0.7800	0.3900	N	-	7946	2241	10187	0
		River Basin Subtotals				30510	515	210	70	31305						60316	31853	92169	1065
39	UC	Dulce & Vicinity	F	0.740	0.000	240	0	0	0	240	0.5000	0.8000	0.4000	N	-	355	89	444	0
		River Basin Subtotals				240	0	0	0	240						355	89	444	0
		County Totals				30750	515	210	70	31545						60671	31942	92613	1065
41	P	Scattered	S	0.000	1.370	0	260	0	0	260	0.7000	0.0000	0.0000	-	N	0	0	0	509
		River Basin Subtotals				0	260	0	0	260						0	0	0	509
41	TG	Causey-Lingo	S	0.000	1.430	0	3609	0	0	3609	0.7000	0.0000	0.0000	-	N	0	0	0	7373
41	TG	Portales Basin	D	0.000	1.640	0	15	0	0	15	0.8500	0.0000	0.0000	-	N	0	0	0	29
41	TG	Portales Basin	F	0.000	1.260	0	20785	0	0	20785	0.6000	0.0000	0.0000	-	N	0	0	0	43649
41	TG	Portales Basin	S	0.000	1.460	0	82966	0	0	82966	0.7000	0.0000	0.0000	-	N	0	0	0	173043
		River Basin Subtotals				0	107375	0	0	107375						0	0	0	224094
		County Totals				0	107635	0	0	107635						0	0	0	224603
43	RG	Cuba & Vicinity	F	0.980	0.980	1520	70	0	0	1590	0.5000	0.7000	0.3500	N	N	2979	1277	4256	137
43	RG	Jemez Basin	F	1.300	0.000	1700	0	0	0	1700	0.5000	0.7000	0.3500	N	-	4420	1894	6314	0

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Table 8. Irrigated Agriculture. Withdrawals (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
43	RG	MRGCD only	F	1.990	1.990	5163	0	472	158	5793	0.6000	0.4800	0.2880	Y	N	18689	20246	38935	524
43	RG	Outside MRGCD	D	0.000	1.170	0	17	0	0	17	0.8500	0.0000	0.0000	-	N	0	0	0	23
		River Basin Subtotals				8383	87	472	158	9100						26088	23417	49505	684
		County Totals				8383	87	472	158	9100						26088	23417	49505	684
45	UC	Animas River	F	1.980	0.000	11030	0	0	0	11030	0.5500	0.8000	0.4400	N	-	39708	9927	49635	0
45	UC	Animas River	S	2.090	0.000	2620	0	0	0	2620	0.6500	0.8000	0.5200	N	-	8424	2106	10530	0
45	UC	Hammond Irrigation District	F	2.180	0.000	862	0	0	0	862	0.4683	0.7628	0.3572	Y	-	4013	1248	5261	0
45	UC	Hammond Irrigation District	S	2.230	0.000	2474	0	0	0	2474	0.4683	0.7628	0.3572	Y	-	11781	3663	15444	0
45	UC	La Plata River	F	0.710	0.000	4097	0	0	0	4097	0.5500	0.7500	0.4125	N	-	5289	1763	7052	0
45	UC	La Plata River	S	0.740	0.000	320	0	0	0	320	0.6500	0.7500	0.4875	N	-	364	121	485	0
45	UC	Navajo Indian Irrigation Project	S	1.569	0.000	44498	0	0	0	44498	0.5491	0.8892	0.4882	Y	-	127152	15836	142988	0
45	UC	Navajo--Colorado River Storage Prj.	F	0.620	0.000	121	0	0	0	121	0.5000	0.7500	0.3750	Y	-	150	50	200	0
45	UC	Pine River Irrigation District	F	0.450	0.000	380	0	0	0	380	0.5000	0.7419	0.3710	Y	-	342	119	461	0
45	UC	Scattered	F	2.220	0.000	20495	0	0	0	20495	0.5500	0.7500	0.4125	N	-	82725	27575	110300	0
45	UC	Scattered	S	2.240	0.000	11321	0	0	0	11321	0.6500	0.7500	0.4875	N	-	39014	13005	52019	0
		River Basin Subtotals				98218	0	0	0	98218						318962	75413	394375	0
		County Totals				98218	0	0	0	98218						318962	75413	394375	0
47	AWR	Sabinosa & Bell Ranch	F	1.880	0.000	812	0	0	0	812	0.5500	0.8000	0.4400	N	-	2776	694	3470	0
47	AWR	Sabinosa & Bell Ranch	S	1.350	0.000	300	0	0	0	300	0.6500	0.8000	0.5200	N	-	623	156	779	0
47	AWR	Sapello River	F	1.120	0.000	920	0	0	0	920	0.4500	0.8000	0.3600	N	-	2290	573	2863	0
		River Basin Subtotals				2032	0	0	0	2032						5689	1423	7112	0
47	P	Scattered	F	1.100	0.000	6358	0	0	0	6358	0.5000	0.7500	0.3750	N	-	13988	4663	18651	0
47	P	Scattered	S	0.000	1.170	0	240	0	0	240	0.6500	0.0000	0.0000	-	N	0	0	0	432
47	P	Storrie Irrigation Project	F	1.220	0.000	3390	0	0	0	3390	0.5000	0.7500	0.3750	N	-	8272	2757	11029	0
47	P	Storrie Irrigation Project	S	1.030	0.000	360	0	0	0	360	0.6500	1.0000	0.6500	N	-	570	0	570	0
		River Basin Subtotals				10108	240	0	0	10348						22830	7420	30250	432
		County Totals				12140	240	0	0	12380						28519	8843	37362	432
49	RG	Estancia Basin	D	0.000	1.080	0	110	0	0	110	0.8500	0.0000	0.0000	-	N	0	0	0	140
49	RG	Estancia Basin	F	0.000	1.030	0	1265	0	0	1265	0.6000	0.0000	0.0000	-	N	0	0	0	2172
49	RG	Estancia Basin	S	0.000	1.280	0	5165	0	0	5165	0.6500	0.0000	0.0000	-	N	0	0	0	10171

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Table 8. Irrigated Agriculture. Withdrawals (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
49	RG	Pojoaque Valley Irrigation District	F	1.290	1.800	2145	0	280	115	2540	0.5500	0.7550	0.4152	Y	N	5688	1846	7534	376
49	RG	Pojoaque Valley Irrigation District	S	0.000	1.370	0	5	0	0	5	0.6500	0.0000	0.0000	-	N	0	0	0	11
49	RG	Santa Cruz & Vicinity	F	0.720	0.000	5220	0	0	0	5220	0.5500	0.7500	0.4125	N	-	6833	2278	9111	0
49	RG	Santa Cruz & Vicinity	S	0.000	1.370	0	50	0	0	50	0.6500	0.0000	0.0000	-	N	0	0	0	105
49	RG	Santa Fe & Vicinity	F	0.870	1.250	985	0	110	110	1205	0.5000	0.7500	0.3750	N	N	1905	635	2540	275
49	RG	Santa Fe & Vicinity	S	0.000	0.800	0	200	0	0	200	0.6500	0.0000	0.0000	-	N	0	0	0	246
		River Basin Subtotals				8350	6795	390	225	15760						14426	4759	19185	13496
		County Totals				8350	6795	390	225	15760						14426	4759	19185	13496
51	RG	Above Elephant Butte	D	1.440	0.000	790	0	0	0	790	0.8500	1.0000	0.8500	N	-	1338	0	1338	0
51	RG	Above Elephant Butte	F	2.500	0.000	710	205	150	50	1115	0.6000	0.9000	0.5400	N	N	3583	398	3981	0
51	RG	EBID only	F	2.140	2.140	0	0	2872	958	3830	0.6000	0.5767	0.3460	Y	N	10243	7518	17761	3417
51	RG	Los Animas Creek and others	F	2.140	2.140	200	615	230	80	1125	0.5500	0.7000	0.3850	N	N	1673	717	2390	2704
51	RG	Nutt-Hockett	F	0.000	2.210	0	130	0	0	130	0.6000	0.0000	0.0000	-	N	0	0	0	479
51	RG	Scattered	F	0.000	2.340	0	400	0	0	400	0.5500	0.0000	0.0000	-	N	0	0	0	1702
51	RG	Truth or Consequences	F	0.000	2.140	0	845	0	0	845	0.6000	0.0000	0.0000	-	N	0	0	0	3014
		River Basin Subtotals				1700	2195	3252	1088	8235						16837	8633	25470	11316
		County Totals				1700	2195	3252	1088	8235						16837	8633	25470	11316
53	RG	MRGCD only	F	2.660	2.660	2570	0	7740	5160	15470	0.6000	0.4800	0.2880	Y	N	45708	49518	95226	22876
53	RG	Outside MRGCD	D	0.000	1.480	0	100	0	0	100	0.8500	0.0000	0.0000	-	N	0	0	0	174
53	RG	Outside MRGCD	S	0.000	2.490	0	200	0	0	200	0.6500	0.0000	0.0000	-	N	0	0	0	766
53	RG	San Augustin Plains	F	0.000	1.510	0	550	0	0	550	0.5500	0.0000	0.0000	-	N	0	0	0	1510
53	RG	San Augustin Plains	S	0.000	2.150	0	450	0	0	450	0.6500	0.0000	0.0000	-	N	0	0	0	1488
53	RG	Scattered	F	2.300	2.300	30	40	1428	952	2450	0.5500	0.7500	0.4125	N	N	6097	2033	8130	4148
		River Basin Subtotals				2600	1340	9168	6112	19220						51805	51551	103356	30962
		County Totals				2600	1340	9168	6112	19220						51805	51551	103356	30962
55	RG	Cerro-Questa	F	1.110	0.000	4570	0	0	0	4570	0.5000	0.6000	0.3000	N	-	10145	6763	16908	0
55	RG	Cerro-Questa	S	0.000	1.020	0	330	0	0	330	0.6500	0.0000	0.0000	-	N	0	0	0	518
55	RG	Costilla	F	1.140	0.000	4425	0	0	0	4425	0.5000	0.6000	0.3000	N	-	10089	6726	16815	0
55	RG	Costilla	S	0.000	1.260	0	230	0	0	230	0.6500	0.0000	0.0000	-	N	0	0	0	446
55	RG	Embudo & Vicinity	F	1.160	0.000	5145	0	0	0	5145	0.5000	0.7500	0.3750	N	-	11936	3979	15915	0

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CN	RVB	LOCALE	T	CIRSW	CIRGW	ASWO	AGWO	ASWC	AGWC	TAI	EF	EC	EJ	MSW	MGW	TFWSW	CLSW	TPWSW	TPWGW
55	RG	Pilar & Ojo Caliente	F	1.120	0.000	35	0	0	0	35	0.5000	0.9000	0.4500	N	-	78	9	87	0
55	RG	Taos & Vicinity	F	1.370	1.370	13525	40	150	50	13765	0.5000	0.7000	0.3500	N	N	37470	16058	53528	247
		River Basin Subtotals				27700	600	150	50	28500						69718	33535	103253	1211
		County Totals				27700	600	150	50	28500						69718	33535	103253	1211
57	RG	Estancia Basin	D	0.000	0.900	0	10	0	0	10	0.8500	0.0000	0.0000	-	N	0	0	0	11
57	RG	Estancia Basin	F	0.000	1.650	0	5765	0	0	5765	0.6000	0.0000	0.0000	-	N	0	0	0	15854
57	RG	Estancia Basin	S	0.000	1.380	0	12225	0	0	12225	0.6500	0.0000	0.0000	-	N	0	0	0	25955
		River Basin Subtotals				0	18000	0	0	18000						0	0	0	41820
		County Totals				0	18000	0	0	18000						0	0	0	41820
59	AWR	Clayton & Vicinity	F	0.000	1.430	0	1480	0	0	1480	0.6000	0.0000	0.0000	-	N	0	0	0	3527
59	AWR	Clayton & Vicinity	S	0.000	1.160	0	38260	0	0	38260	0.6500	0.0000	0.0000	-	N	0	0	0	68279
59	AWR	Dry Cimarron	F	0.610	1.220	4070	600	190	190	5050	0.5500	0.8000	0.4400	N	N	4725	1182	5907	1752
59	AWR	Tramperos Creek	F	0.890	1.780	520	80	0	0	600	0.5500	0.8000	0.4400	N	N	841	210	1051	259
		River Basin Subtotals				4590	40420	190	190	45390						5566	1392	6958	73817
		County Totals				4590	40420	190	190	45390						5566	1392	6958	73817
61	RG	Inside MRGCD but exclusive of CD	D	0.000	1.270	0	15	0	0	15	0.8500	0.0000	0.0000	-	N	0	0	0	22
61	RG	MRGCD only	F	2.200	2.200	12220	0	5025	1675	18920	0.6000	0.4800	0.2880	Y	N	63232	68501	131733	6142
61	RG	Outside MRGCD	S	0.000	1.970	0	965	0	0	965	0.6500	0.0000	0.0000	-	N	0	0	0	2925
		River Basin Subtotals				12220	980	5025	1675	19900						63232	68501	131733	9089
		County Totals				12220	980	5025	1675	19900						63232	68501	131733	9089
		State Totals				310159	529438	95236	49452	984285						1178080	661245	1839325	1537102

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; EJ=project efficiency; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); 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. See Table A-1 for county numbers and Table A-2 for river basin acronyms.

Table 9. Irrigated Agriculture. Depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
1	RG	Estancia Basin	F	0.000	1.640	0.000	0.050	0.000	0.000	0.050	0.000	0	50	0	0	50	0	86
1	RG	Inside MRGCD but exclusive of CD	D	0.000	1.350	0.000	0.000	0.000	0.000	0.000	0.000	0	100	0	0	100	0	135
1	RG	MRGCD only	F	2.030	2.030	0.030	0.050	0.073	0.153	0.000	0.123	5616	0	2403	801	8820	18769	1826
1	RG	Outside MRGCD	D	0.000	1.350	0.000	0.000	0.000	0.000	0.000	0.000	0	130	0	0	130	0	176
									River Basin Subtotals			5616	280	2403	801	9100	18769	2223
										County Totals		5616	280	2403	801	9100	18769	2223
3	LC	Quemado & Vicinity	F	1.150	0.000	0.020	0.050	0.030	0.100	0.000	0.000	181	0	0	0	181	229	0
3	LC	San Francisco River--Apache-Aragon	F	1.080	0.000	0.020	0.050	0.080	0.150	0.000	0.000	155	0	0	0	155	193	0
3	LC	San Francisco River--Glenwood	F	1.840	0.000	0.020	0.050	0.080	0.150	0.000	0.000	428	0	0	0	428	906	0
3	LC	San Francisco River--Luna	F	0.700	0.000	0.020	0.050	0.080	0.150	0.000	0.000	68	0	0	0	68	55	0
3	LC	San Francisco River--Reserve	F	1.230	0.000	0.020	0.050	0.080	0.150	0.000	0.000	148	0	0	0	148	209	0
									River Basin Subtotals			980	0	0	0	980	1592	0
3	RG	San Augustin Plains	F	0.000	1.890	0.000	0.050	0.000	0.000	0.050	0.000	0	111	0	0	111	0	220
3	RG	San Augustin Plains	S	0.000	2.150	0.000	0.262	0.000	0.000	0.262	0.000	0	450	0	0	450	0	1221
									River Basin Subtotals			0	561	0	0	561	0	1441
										County Totals		980	561	0	0	10641	1592	1441
5	P	Rio Hondo	F	2.210	0.000	0.010	0.050	0.024	0.084	0.000	0.000	300	0	0	0	300	719	0
5	P	Rio Penasco	F	2.310	2.310	0.030	0.050	0.100	0.180	0.000	0.150	605	0	732	183	1520	3644	486
5	P	Roswell Basin North	D	0.000	2.550	0.000	0.000	0.000	0.000	0.000	0.000	0	200	0	0	200	0	510
5	P	Roswell Basin North (part)	F	1.922	0.000	0.032	0.050	0.050	0.132	0.000	0.000	1885	0	4790	0	6675	14523	0
5	P	Roswell Basin North (part)	F	0.000	2.234	0.000	0.050	0.050	0.000	0.050	0.100	0	51651	0	7184	58835	0	138812
5	P	Roswell Basin North	S	0.000	2.548	0.000	0.243	0.000	0.000	0.243	0.000	0	20490	0	0	20490	0	64895
5	P	Scattered	F	2.440	2.990	0.032	0.050	0.050	0.132	0.050	0.100	0	50	250	500	800	691	1802
									River Basin Subtotals			2790	72391	5772	7867	88820	19577	206505
										County Totals		2790	72391	5772	7867	99461	19577	206505
6	RG	Scattered	F	0.140	1.390	0.025	0.050	0.100	0.175	0.050	0.150	564	420	270	116	1370	137	798
									River Basin Subtotals			564	420	270	116	1370	137	798
										County Totals		564	420	270	116	100831	137	798
7	AWR	Canadian River	F	1.220	0.000	0.030	0.050	0.120	0.200	0.000	0.000	4815	0	0	0	4815	7049	0

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Table 9. Irrigated Agriculture. Depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
7	AWR	Canadian River	S	1.070	0.000	0.030	0.262	0.000	0.292	0.000	0.000	200	0	0	0	200	276	0
7	AWR	Cimarron River	F	1.230	0.000	0.030	0.050	0.120	0.200	0.000	0.000	8270	0	0	0	8270	12207	0
7	AWR	Cimarron River	S	1.320	0.000	0.030	0.262	0.000	0.292	0.000	0.000	530	0	0	0	530	904	0
7	AWR	Dry Cimarron	F	0.470	0.000	0.043	0.050	0.100	0.193	0.000	0.000	380	0	0	0	380	213	0
7	AWR	Dry Cimarron	S	0.000	1.180	0.000	0.262	0.000	0.000	0.262	0.000	0	50	0	0	50	0	74
7	AWR	Near Capulin	F	1.140	0.000	0.030	0.050	0.120	0.200	0.000	0.000	380	0	0	0	380	520	0
7	AWR	Purgatoire	F	0.940	0.000	0.030	0.050	0.120	0.200	0.000	0.000	160	0	0	0	160	180	0
7	AWR	Vermejo Conservancy District	F	0.396	0.000	0.030	0.050	0.050	0.130	0.000	0.000	5145	0	0	0	5145	2302	0
7	AWR	Vermejo Conservancy District	S	0.396	0.000	0.030	0.309	0.000	0.339	0.000	0.000	20	0	0	0	20	11	0
									River Basin Subtotals			19900	50	0	0	19950	23662	74
										County Totals		19900	50	0	0	120781	23662	74
9	AWR	Scattered	F	0.000	1.340	0.000	0.050	0.000	0.000	0.050	0.000	0	320	0	0	320	0	450
9	AWR	Scattered	S	0.000	1.160	0.000	0.338	0.000	0.000	0.338	0.000	0	7000	0	0	7000	0	10865
									River Basin Subtotals			0	7320	0	0	7320	0	11315
9	P	Scattered	F	0.000	1.220	0.000	0.050	0.000	0.000	0.050	0.000	0	120	0	0	120	0	154
9	P	Scattered	S	0.000	1.190	0.000	0.338	0.000	0.000	0.338	0.000	0	380	0	0	380	0	605
									River Basin Subtotals			0	500	0	0	500	0	759
9	TG	Scattered	D	0.000	1.560	0.000	0.000	0.000	0.000	0.000	0.000	0	154	0	0	154	0	240
9	TG	Scattered	F	0.000	1.330	0.000	0.050	0.000	0.000	0.050	0.000	0	26276	0	0	26276	0	36694
9	TG	Scattered	S	0.000	1.480	0.000	0.338	0.000	0.000	0.338	0.000	0	112940	0	0	112940	0	223648
									River Basin Subtotals			0	139370	0	0	139370	0	260582
										County Totals		0	147190	0	0	267971	0	272656
11	P	Fort Sumner & Vicinity	S	0.000	1.380	0.000	0.262	0.000	0.000	0.262	0.000	0	2210	0	0	2210	0	3849
11	P	Fort Sumner Irrigation District	F	2.140	0.000	0.030	0.050	0.290	0.370	0.000	0.000	5000	0	0	0	5000	14659	0
11	P	Scattered	S	0.000	2.080	0.000	0.262	0.000	0.000	0.262	0.000	0	1220	0	0	1220	0	3202
									River Basin Subtotals			5000	3430	0	0	8430	14659	7051
										County Totals		5000	3430	0	0	276401	14659	7051
13	RG	EBID only	F	2.420	2.420	0.040	0.050	0.082	0.172	0.000	0.132	0	0	52624	20410	73034	149254	55912
13	RG	Hueco Basin	F	0.000	2.970	0.000	0.050	0.000	0.000	0.050	0.000	0	100	0	0	100	0	312
13	RG	Inside EBID but exclusive of EBID	D	0.000	2.260	0.000	0.000	0.000	0.000	0.000	0.000	0	110	0	0	110	0	249

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; IDFCL=incidental depletion factor, canals and laterals, from stream or reservoir to farm headgate; IDFOF=incidental depletion factor, on-farm; IDFBF=incidental depletion factor, below farm; IDFSW=sum of incidental depletion factors which apply to surface water withdrawals; IDFGWO=incidental depletion factor which applies to withdrawals of ground water only; IDFGWC=sum of incidental depletion factors which apply to the groundwater component of withdrawals where both surface and ground water are applied (combined 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; AGWC=groundwater component of acreage irrigated with combined water; TAI=total acreage irrigated; TPDSW=total project depletion, surface water; TPDGW=total project depletion, ground water. Note that incidental depletion factors are expressed as a function of the CIR. See Table A-1 for county numbers and Table A-2 for river basin acronyms.

Table 9. Irrigated Agriculture. Depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
13	RG	Inside EBID but exclusive of EBID	F	0.000	2.420	0.000	0.050	0.000	0.000	0.050	0.000	0	3155	0	0	3155	0	8017
13	RG	Nutt-Hockett	F	0.000	1.570	0.000	0.050	0.000	0.000	0.050	0.000	0	145	0	0	145	0	239
13	RG	Outside EBID	D	0.000	2.260	0.000	0.000	0.000	0.000	0.000	0.000	0	40	0	0	40	0	90
13	RG	Outside EBID	F	0.000	2.420	0.000	0.050	0.000	0.000	0.050	0.000	0	1346	0	0	1346	0	3420
13	RG	Outside EBID	S	0.000	2.540	0.000	0.262	0.000	0.000	0.262	0.000	0	830	0	0	830	0	2661
		River Basin Subtotals										0	5726	52624	20410	78760	149254	70900
		County Totals										0	5726	52624	20410	355161	149254	70900
15	P	Black River	F	2.730	2.730	0.030	0.050	0.050	0.130	0.050	0.100	390	735	62	62	1249	1394	2293
15	P	Carlsbad Basin--Scattered	F	2.660	2.660	0.030	0.050	0.050	0.130	0.050	0.100	406	1115	1104	317	2942	4538	4042
15	P	Carlsbad Irrigation District (part)	F	2.656	0.000	0.040	0.050	0.050	0.140	0.000	0.000	2503	0	7660	0	10163	30772	0
15	P	Carlsbad Irrigation District (part)	F	0.000	2.656	0.000	0.050	0.000	0.000	0.000	0.050	0	0	0	8240	8240	0	22980
15	P	Rio Penasco	F	2.610	2.610	0.030	0.050	0.100	0.180	0.000	0.150	0	0	1773	197	1970	5460	591
15	P	Roswell Basin South	F	0.000	2.005	0.000	0.050	0.000	0.000	0.050	0.000	0	12970	0	0	12970	0	27305
15	P	Roswell Basin South	S	0.000	2.170	0.000	0.243	0.000	0.000	0.243	0.000	0	18230	0	0	18230	0	49172
		River Basin Subtotals										3299	33050	10599	8816	55764	42164	106383
		County Totals										3299	33050	10599	8816	410925	42164	106383
17	LC	Gila River--Cliff Gila (part)	F	1.590	0.000	0.020	0.050	0.080	0.150	0.000	0.000	693	0	0	0	693	1267	0
17	LC	Gila River--Cliff Gila (part)	F	0.000	1.590	0.000	0.050	0.000	0.000	0.050	0.000	0	7	0	0	7	0	12
17	LC	Gila River--Red Rock	F	1.810	1.810	0.020	0.050	0.080	0.150	0.050	0.000	400	190	0	0	590	833	361
17	LC	Gila River--Upper Gila	F	1.350	0.000	0.020	0.050	0.080	0.150	0.000	0.000	53	0	0	0	53	82	0
17	LC	Lordsburg Valley	D	0.000	1.450	0.000	0.000	0.000	0.000	0.000	0.000	0	30	0	0	30	0	44
17	LC	Lordsburg Valley	F	0.000	2.100	0.000	0.050	0.000	0.000	0.050	0.000	0	140	0	0	140	0	309
		River Basin Subtotals										1146	367	0	0	1513	2182	726
17	RG	Mimbres River	F	1.320	1.320	0.051	0.050	0.080	0.181	0.050	0.130	380	820	420	280	1900	1247	1555
17	RG	Mimbres River	S	0.000	1.020	0.000	0.262	0.000	0.000	0.262	0.000	0	80	0	0	80	0	103
		River Basin Subtotals										380	900	420	280	1980	1247	1658
		County Totals										1526	1267	420	280	414418	3429	2384
19	P	Anton Chico	F	1.820	0.000	0.030	0.050	0.118	0.198	0.000	0.000	2888	0	0	0	2888	6297	0
19	P	Colonias	F	0.000	1.970	0.000	0.050	0.000	0.000	0.050	0.000	0	142	0	0	142	0	294

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CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
19	P	Puerto de Luna	F	2.380	0.000	0.030	0.050	0.118	0.198	0.000	0.000	252	0	0	0	252	719	0
19	P	Scattered	F	0.000	2.320	0.000	0.050	0.000	0.000	0.050	0.000	0	103	0	0	103	0	251
											River Basin Subtotals	3140	245	0	0	3385	7016	545
											County Totals	3140	245	0	0	417803	7016	545
21	AWR	Scattered	F	0.000	1.060	0.000	0.050	0.000	0.000	0.050	0.000	0	890	0	0	890	0	991
21	AWR	Scattered	S	0.000	0.920	0.000	0.338	0.000	0.000	0.338	0.000	0	1400	0	0	1400	0	1723
											River Basin Subtotals	0	2290	0	0	2290	0	2714
											County Totals	0	2290	0	0	420093	0	2714
23	LC	Animas Valley	F	0.000	1.840	0.000	0.050	0.000	0.000	0.050	0.000	0	4381	0	0	4381	0	8464
23	LC	Animas Valley	S	0.000	1.730	0.000	0.262	0.000	0.000	0.262	0.000	0	1355	0	0	1355	0	2958
23	LC	Gila River--Virden Valley	F	1.960	2.550	0.038	0.050	0.080	0.168	0.000	0.130	0	0	1933	277	2210	4425	798
23	LC	Lordsburg Valley	F	0.000	1.970	0.000	0.050	0.000	0.000	0.050	0.000	0	850	0	0	850	0	1758
23	LC	San Simon Valley	F	0.000	1.430	0.000	0.050	0.000	0.000	0.050	0.000	0	294	0	0	294	0	441
											River Basin Subtotals	0	6880	1933	277	9090	4425	14419
											County Totals	0	6880	1933	277	429183	4425	14419
25	P	Scattered	D	0.000	2.550	0.000	0.000	0.000	0.000	0.000	0.000	0	30	0	0	30	0	77
25	P	Scattered	S	0.000	2.640	0.000	0.262	0.000	0.000	0.262	0.000	0	320	0	0	320	0	1066
											River Basin Subtotals	0	350	0	0	350	0	1143
25	TG	Scattered	D	0.000	2.520	0.000	0.000	0.000	0.000	0.000	0.000	0	875	0	0	875	0	2205
25	TG	Scattered	F	0.000	2.660	0.000	0.050	0.000	0.000	0.050	0.000	0	2950	0	0	2950	0	8239
25	TG	Scattered	S	0.000	1.840	0.000	0.262	0.000	0.000	0.262	0.000	0	26070	0	0	26070	0	60537
											River Basin Subtotals	0	29895	0	0	29895	0	70981
											County Totals	0	30245	0	0	459428	0	72124
27	P	Rio Hondo & Tributaries	D	0.000	1.500	0.000	0.000	0.000	0.000	0.000	0.000	0	60	0	0	60	0	90
27	P	Rio Hondo & Tributaries	F	2.070	2.070	0.023	0.050	0.063	0.136	0.050	0.113	1793	590	1372	588	4343	7442	2637
27	P	Rio Hondo & Tributaries	S	0.000	1.970	0.000	0.262	0.000	0.000	0.262	0.000	0	170	0	0	170	0	423
27	P	Scattered	F	2.120	2.120	0.023	0.050	0.050	0.123	0.050	0.000	131	196	0	0	327	312	436
											River Basin Subtotals	1924	1016	1372	588	4900	7754	3586
27	RG	Carrizozo & Vicinity	D	0.000	1.400	0.000	0.000	0.000	0.000	0.000	0.000	0	10	0	0	10	0	14
27	RG	Carrizozo & Vicinity	F	0.000	1.580	0.000	0.050	0.000	0.000	0.050	0.000	0	130	0	0	130	0	216
											River Basin Subtotals	0	140	0	0	140	0	230

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; IDFCL=incidental depletion factor, canals and laterals, from stream or reservoir to farm headgate; IDFOF=incidental depletion factor, on-farm; IDFBF=incidental depletion factor, below farm; IDFSW=sum of incidental depletion factors which apply to surface water withdrawals; IDFGWO=incidental depletion factor which applies to withdrawals of ground water only; IDFGWC=sum of incidental depletion factors which apply to the groundwater component of withdrawals where both surface and ground water are applied (combined 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; AGWC=groundwater component of acreage irrigated with combined water; TAI=total acreage irrigated; TPDSW=total project depletion, surface water; TPDGW=total project depletion, ground water. Note that incidental depletion factors are expressed as a function of the CIR. See Table A-1 for county numbers and Table A-2 for river basin acronyms.

Table 9. Irrigated Agriculture. Depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
		County Totals										1924	1156	1372	588	464468	7754	3816
29	RG	Mimbres River	D	0.000	1.250	0.000	0.000	0.000	0.000	0.000	0.000	0	600	0	0	600	0	750
29	RG	Mimbres River	F	1.620	1.620	0.038	0.050	0.080	0.168	0.050	0.130	200	25430	600	600	26830	1513	44354
29	RG	Mimbres River	S	0.000	2.630	0.000	0.262	0.000	0.000	0.262	0.000	0	80	0	0	80	0	266
29	RG	Mimbres River--Floodwater Area	F	0.072	0.000	0.000	0.050	0.000	0.050	0.000	0.000	10350	0	0	0	10350	782	0
29	RG	Nutt-Hockett	F	0.000	1.900	0.000	0.050	0.000	0.000	0.050	0.000	0	6005	0	0	6005	0	11980
29	RG	Nutt-Hockett	S	0.000	2.760	0.000	0.262	0.000	0.000	0.262	0.000	0	385	0	0	385	0	1341
		River Basin Subtotals										10550	32500	600	600	44250	2295	58691
		County Totals										10550	32500	600	600	508718	2295	58691
31	LC	Scattered	F	0.080	0.000	0.030	0.050	0.060	0.140	0.000	0.000	2390	0	0	0	2390	218	0
		River Basin Subtotals										2390	0	0	0	2390	218	0
31	RG	Scattered	F	0.840	0.000	0.030	0.050	0.050	0.130	0.000	0.000	160	0	0	0	160	152	0
		River Basin Subtotals										160	0	0	0	160	152	0
31	UC	Scattered	F	0.180	0.000	0.025	0.050	0.060	0.135	0.000	0.000	1325	0	0	0	1325	271	0
		River Basin Subtotals										1325	0	0	0	1325	271	0
		County Totals										3875	0	0	0	512593	641	0
33	AWR	Scattered	D	0.000	0.970	0.000	0.000	0.000	0.000	0.000	0.000	0	40	0	0	40	0	39
33	AWR	Scattered	F	1.070	0.000	0.034	0.050	0.100	0.184	0.000	0.000	12925	0	0	0	12925	16374	0
33	AWR	Scattered	S	0.980	0.000	0.034	0.262	0.000	0.296	0.000	0.000	1025	0	0	0	1025	1302	0
		River Basin Subtotals										13950	40	0	0	13990	17676	39
		County Totals										13950	40	0	0	526583	17676	39
35	P	Rio Penasco	F	1.480	0.000	0.030	0.050	0.100	0.180	0.000	0.000	615	0	0	0	615	1074	0
		River Basin Subtotals										615	0	0	0	615	1074	0
35	RG	Salt Basin	D	0.000	1.370	0.000	0.000	0.000	0.000	0.000	0.000	0	5	0	0	5	0	7
35	RG	Salt Basin	F	0.000	1.620	0.000	0.050	0.000	0.000	0.050	0.000	0	895	0	0	895	0	1522
35	RG	Salt Basin	S	0.000	2.810	0.000	0.262	0.000	0.000	0.262	0.000	0	1470	0	0	1470	0	5213
35	RG	Tularosa Basin	D	0.000	2.440	0.000	0.000	0.000	0.000	0.000	0.000	0	1690	0	0	1690	0	4124
35	RG	Tularosa Basin	F	2.380	2.380	0.030	0.050	0.075	0.155	0.000	0.125	250	0	386	129	765	1748	345
35	RG	Tularosa Basin	S	0.000	2.580	0.000	0.262	0.000	0.000	0.262	0.000	0	1900	0	0	1900	0	6186
		River Basin Subtotals										250	5960	386	129	6725	1748	17397
		County Totals										865	5960	386	129	533923	2822	17397

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Table 9. Irrigated Agriculture. Depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
37	AWR	Arch Hurley Conservancy	F	0.850	0.000	0.064	0.050	0.099	0.213	0.000	0.000	25081	0	0	0	25081		
		District															25860	0
37	AWR	Arch Hurley Conservancy	S	0.850	0.000	0.064	0.338	0.000	0.402	0.000	0.000	4448	0	0	0	4448		
		District															5301	0
37	AWR	Scattered	F	0.000	2.110	0.000	0.050	0.000	0.000	0.050	0.000	0	1450	0	0	1450	0	3212
37	AWR	Scattered	S	0.000	1.890	0.000	0.338	0.000	0.000	0.338	0.000	0	1680	0	0	1680	0	4248
37	AWR	Tucumcari & Vicinity	S	0.000	1.600	0.000	0.338	0.000	0.000	0.338	0.000	0	1770	0	0	1770	0	3789
											River Basin Subtotals	29529	4900	0	0	34429	31161	11249
37	P	Scattered	F	0.000	1.380	0.000	0.050	0.000	0.000	0.050	0.000	0	400	0	0	400	0	580
37	P	Scattered	S	0.000	1.310	0.000	0.338	0.000	0.000	0.338	0.000	0	1650	0	0	1650	0	2892
											River Basin Subtotals	0	2050	0	0	2050	0	3472
											County Totals	29529	6950	0	0	570402	31161	14721
39	RG	Rio Chama	F	0.920	0.920	0.038	0.050	0.097	0.185	0.050	0.147	20735	500	210	70	21515	22834	557
39	RG	Santa Cruz & Vicinity	F	0.720	0.000	0.029	0.050	0.100	0.179	0.000	0.000	4235	0	0	0	4235	3595	0
39	RG	Truchas & Vicinity	F	1.120	0.000	0.013	0.050	0.050	0.113	0.000	0.000	2960	0	0	0	2960	3690	0
39	RG	Velarde & Vicinity	D	0.000	0.880	0.000	0.000	0.000	0.000	0.000	0.000	0	15	0	0	15	0	13
39	RG	Velarde & Vicinity	F	1.540	0.000	0.038	0.050	0.080	0.168	0.000	0.000	2580	0	0	0	2580	4641	0
											River Basin Subtotals	30510	515	210	70	31305	34760	570
39	UC	Dulce & Vicinity	F	0.740	0.000	0.038	0.050	0.097	0.185	0.000	0.000	240	0	0	0	240	210	0
											River Basin Subtotals	240	0	0	0	240	210	0
											County Totals	30750	515	210	70	601947	34970	570
41	P	Scattered	S	0.000	1.370	0.000	0.243	0.000	0.000	0.243	0.000	0	260	0	0	260	0	443
											River Basin Subtotals	0	260	0	0	260	0	443
41	TG	Causey-Lingo	S	0.000	1.430	0.000	0.243	0.000	0.000	0.243	0.000	0	3609	0	0	3609	0	6415
41	TG	Portales Basin	D	0.000	1.640	0.000	0.000	0.000	0.000	0.000	0.000	0	15	0	0	15	0	25
41	TG	Portales Basin	F	0.000	1.260	0.000	0.050	0.000	0.000	0.050	0.000	0	20785	0	0	20785	0	27499
41	TG	Portales Basin	S	0.000	1.460	0.000	0.243	0.000	0.000	0.243	0.000	0	82966	0	0	82966	0	150565
											River Basin Subtotals	0	107375	0	0	107375	0	184504
											County Totals	0	107635	0	0	709582	0	184947
43	RG	Cuba & Vicinity	F	0.980	0.980	0.018	0.050	0.060	0.128	0.050	0.000	1520	70	0	0	1590	1680	72
43	RG	Jemez Basin	F	1.300	0.000	0.038	0.050	0.060	0.148	0.000	0.000	1700	0	0	0	1700	2537	0

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Table 9. Irrigated Agriculture. Depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
43	RG	MRGCD only	F	1.990	1.990	0.030	0.050	0.098	0.178	0.000	0.148	5163	0	472	158	5793	13209	361
43	RG	Outside MRGCD	D	0.000	1.170	0.000	0.000	0.000	0.000	0.000	0.000	0	17	0	0	17	0	20
									River Basin Subtotals			8383	87	472	158	9100	17426	453
										County Totals		8383	87	472	158	718682	17426	453
45	UC	Animas River	F	1.980	0.000	0.044	0.050	0.090	0.184	0.000	0.000	11030	0	0	0	11030	25858	0
45	UC	Animas River	S	2.090	0.000	0.044	0.262	0.000	0.306	0.000	0.000	2620	0	0	0	2620	7151	0
45	UC	Hammond Irrigation District	F	2.180	0.000	0.044	0.050	0.100	0.194	0.000	0.000	862	0	0	0	862	2244	0
45	UC	Hammond Irrigation District	S	2.230	0.000	0.044	0.362	0.000	0.406	0.000	0.000	2474	0	0	0	2474	7757	0
45	UC	La Plata River	F	0.710	0.000	0.044	0.050	0.060	0.154	0.000	0.000	4097	0	0	0	4097	3357	0
45	UC	La Plata River	S	0.740	0.000	0.044	0.262	0.000	0.306	0.000	0.000	320	0	0	0	320	309	0
45	UC	Navajo Indian Irrigation Project	S	1.569	0.000	0.020	0.320	0.000	0.340	0.000	0.000	44498	0	0	0	44498	114825	0
45	UC	Navajo--Colorado River Storage Prj.	F	0.620	0.000	0.044	0.050	0.090	0.184	0.000	0.000	121	0	0	0	121	89	0
45	UC	Pine River Irrigation District	F	0.450	0.000	0.044	0.050	0.090	0.184	0.000	0.000	380	0	0	0	380	202	0
45	UC	Scattered	F	2.220	0.000	0.044	0.050	0.100	0.194	0.000	0.000	20495	0	0	0	20495	54326	0
45	UC	Scattered	S	2.240	0.000	0.044	0.262	0.000	0.306	0.000	0.000	11321	0	0	0	11321	33119	0
									River Basin Subtotals			98218	0	0	0	98218	249237	0
										County Totals		98218	0	0	0	816900	249237	0
47	AWR	Sabinosa & Bell Ranch	F	1.880	0.000	0.020	0.050	0.065	0.135	0.000	0.000	812	0	0	0	812	1733	0
47	AWR	Sabinosa & Bell Ranch	S	1.350	0.000	0.020	0.262	0.000	0.282	0.000	0.000	300	0	0	0	300	519	0
47	AWR	Sapello River	F	1.120	0.000	0.025	0.050	0.100	0.175	0.000	0.000	920	0	0	0	920	1211	0
									River Basin Subtotals			2032	0	0	0	2032	3463	0
47	P	Scattered	F	1.100	0.000	0.034	0.050	0.106	0.190	0.000	0.000	6358	0	0	0	6358	8323	0
47	P	Scattered	S	0.000	1.170	0.000	0.262	0.000	0.000	0.262	0.000	0	240	0	0	240	0	354
47	P	Storrie Irrigation Project	F	1.220	0.000	0.034	0.050	0.106	0.190	0.000	0.000	3390	0	0	0	3390	4922	0
47	P	Storrie Irrigation Project	S	1.030	0.000	0.000	0.262	0.000	0.262	0.000	0.000	360	0	0	0	360	468	0
									River Basin Subtotals			10108	240	0	0	10348	13713	354
										County Totals		12140	240	0	0	829280	17176	354
49	RG	Estancia Basin	D	0.000	1.080	0.000	0.000	0.000	0.000	0.000	0.000	0	110	0	0	110	0	119
49	RG	Estancia Basin	F	0.000	1.030	0.000	0.050	0.000	0.000	0.050	0.000	0	1265	0	0	1265	0	1368
49	RG	Estancia Basin	S	0.000	1.280	0.000	0.262	0.000	0.000	0.262	0.000	0	5165	0	0	5165	0	8343

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CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
49	RG	Pojoaque Valley Irrigation District	F	1.290	1.800	0.030	0.050	0.060	0.140	0.000	0.110	2145	0	280	115	2540	3566	230
49	RG	Pojoaque Valley Irrigation District	S	0.000	1.370	0.000	0.262	0.000	0.000	0.262	0.000	0	5	0	0	5	0	9
49	RG	Santa Cruz & Vicinity	F	0.720	0.000	0.029	0.050	0.100	0.179	0.000	0.000	5220	0	0	0	5220	4431	0
49	RG	Santa Cruz & Vicinity	S	0.000	1.370	0.000	0.262	0.000	0.000	0.262	0.000	0	50	0	0	50	0	86
49	RG	Santa Fe & Vicinity	F	0.870	1.250	0.029	0.050	0.100	0.179	0.000	0.150	985	0	110	110	1205	1123	158
49	RG	Santa Fe & Vicinity	S	0.000	0.800	0.000	0.262	0.000	0.000	0.262	0.000	0	200	0	0	200	0	202
									River Basin Subtotals			8350	6795	390	225	15760	9120	10515
										County Totals		8350	6795	390	225	845040	9120	10515
51	RG	Above Elephant Butte	D	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	790	0	0	0	790	1138	0
51	RG	Above Elephant Butte	F	2.500	0.000	0.040	0.050	0.082	0.172	0.050	0.132	710	205	150	50	1115	2520	0
51	RG	EBID only	F	2.140	2.140	0.040	0.050	0.082	0.172	0.000	0.132	0	0	2872	958	3830	7203	2321
51	RG	Los Animas Creek and others	F	2.140	2.140	0.040	0.050	0.082	0.172	0.050	0.132	200	615	230	80	1125	1079	1576
51	RG	Nutt-Hockett	F	0.000	2.210	0.000	0.050	0.000	0.000	0.050	0.000	0	130	0	0	130	0	302
51	RG	Scattered	F	0.000	2.340	0.000	0.050	0.000	0.000	0.050	0.000	0	400	0	0	400	0	983
51	RG	Truth or Consequences	F	0.000	2.140	0.000	0.050	0.000	0.000	0.050	0.000	0	845	0	0	845	0	1899
									River Basin Subtotals			1700	2195	3252	1088	8235	11940	7081
										County Totals		1700	2195	3252	1088	853275	11940	7081
53	RG	MRGCD only	F	2.660	2.660	0.034	0.050	0.068	0.152	0.000	0.118	2570	0	7740	5160	15470	31593	15345
53	RG	Outside MRGCD	D	0.000	1.480	0.000	0.000	0.000	0.000	0.000	0.000	0	100	0	0	100	0	148
53	RG	Outside MRGCD	S	0.000	2.490	0.000	0.262	0.000	0.000	0.262	0.000	0	200	0	0	200	0	628
53	RG	San Augustin Plains	F	0.000	1.510	0.000	0.050	0.000	0.000	0.050	0.000	0	550	0	0	550	0	872
53	RG	San Augustin Plains	S	0.000	-2.150	0.000	0.262	0.000	0.000	0.262	0.000	0	450	0	0	450	0	1221
53	RG	Scattered	F	2.300	2.300	0.030	0.050	0.068	0.148	0.050	0.118	30	40	1428	952	2450	3849	2545
									River Basin Subtotals			2600	1340	9168	6112	19220	35442	20759
										County Totals		2600	1340	9168	6112	872495	35442	20759
55	RG	Cerro-Questa	F	1.110	0.000	0.040	0.050	0.050	0.140	0.000	0.000	4570	0	0	0	4570	5783	0
55	RG	Cerro-Questa	S	0.000	1.020	0.000	0.262	0.000	0.000	0.262	0.000	0	330	0	0	330	0	425
55	RG	Costilla	F	1.140	0.000	0.040	0.050	0.050	0.140	0.000	0.000	4425	0	0	0	4425	5751	0
55	RG	Costilla	S	0.000	1.260	0.000	0.262	0.000	0.000	0.262	0.000	0	230	0	0	230	0	366
55	RG	Embudo & Vicinity	F	1.160	0.000	0.022	0.050	0.080	0.152	0.000	0.000	5145	0	0	0	5145	6875	0

Key: CN=county number; RVB=river basin; T=type of irrigation system, i.e., drip (D), flood (F), or sprinkler (S); CIRSW=consumptive irrigation requirement for acreage irrigated with surface water; CIRGW=consumptive irrigation requirement for acreage irrigated with ground water; IDFCL=incidental depletion factor, canals and laterals, from stream or reservoir to farm headgate; IDFOF=incidental depletion factor, on-farm; IDFBF=incidental depletion factor, below farm; IDFSW=sum of incidental depletion factors which apply to surface water withdrawals; IDFGWO=incidental depletion factor which applies to withdrawals of ground water only; IDFGWC=sum of incidental depletion factors which apply to the groundwater component of withdrawals where both surface and ground water are applied (combined 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; AGWC=groundwater component of acreage irrigated with combined water; TAI=total acreage irrigated; TPDSW=total project depletion, surface water; TPDGW=total project depletion, ground water. Note that incidental depletion factors are expressed as a function of the CIR. See Table A-1 for county numbers and Table A-2 for river basin acronyms.

Table 9. Irrigated Agriculture. Depletions (acre-feet) in New Mexico counties, 1990.

CN	RVB	LOCALE	T	CIRSW	CIRGW	IDFCL	IDFOF	IDFBF	IDFSW	IDFGWO	IDFGWC	ASWO	AGWO	ASWC	AGWC	TAI	TPDSW	TPDGW
55	RG	Pilar & Ojo Caliente	F	1.120	0.000	0.038	0.050	0.050	0.138	0.000	0.000	35	0	0	0	35	45	0
55	RG	Taos & Vicinity	F	1.370	1.370	0.022	0.050	0.080	0.152	0.050	0.130	13525	40	150	50	13765	21583	135
											River Basin Subtotals	27700	600	150	50	28500	40037	926
											County Totals	27700	600	150	50	900995	40037	926
57	RG	Estancia Basin	D	0.000	0.900	0.000	0.000	0.000	0.000	0.000	0.000	0	10	0	0	10	0	9
57	RG	Estancia Basin	F	0.000	1.650	0.000	0.050	0.000	0.000	0.050	0.000	0	5765	0	0	5765	0	9988
57	RG	Estancia Basin	S	0.000	1.380	0.000	0.262	0.000	0.000	0.262	0.000	0	12225	0	0	12225	0	21291
											River Basin Subtotals	0	18000	0	0	18000	0	31288
											County Totals	0	18000	0	0	918995	0	31288
59	AWR	Clayton & Vicinity	F	0.000	1.430	0.000	0.050	0.000	0.000	0.050	0.000	0	1480	0	0	1480	0	2222
59	AWR	Clayton & Vicinity	S	0.000	1.160	0.000	0.338	0.000	0.000	0.338	0.000	0	38260	0	0	38260	0	59383
59	AWR	Dry Cimarron	F	0.610	1.220	0.043	0.050	0.100	0.193	0.050	0.150	4070	600	190	190	5050	3100	1036
59	AWR	Tramperos Creek	F	0.890	1.780	0.040	0.050	0.040	0.130	0.050	0.000	520	80	0	0	600	523	150
											River Basin Subtotals	4590	40420	190	190	45390	3623	62791
											County Totals	4590	40420	190	190	964385	3623	62791
61	RG	Inside MRGCD but exclusive of CD	D	0.000	1.270	0.000	0.000	0.000	0.000	0.000	0.000	0	15	0	0	15	0	19
61	RG	MRGCD only	F	2.200	2.200	0.060	0.050	0.029	0.139	0.000	0.079	12220	0	5025	1675	18920	43213	3976
61	RG	Outside MRGCD	S	0.000	1.970	0.000	0.262	0.000	0.000	0.262	0.000	0	965	0	0	965	0	2399
											River Basin Subtotals	12220	980	5025	1675	19900	43213	6394
											County Totals	12220	980	5025	1675	984285	43213	6394
											State Totals	310159	529438	95236	49452	984285	809217	1180959

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; IDFCL=incidental depletion factor, canals and laterals, from stream or reservoir to farm headgate; IDFOF=incidental depletion factor, on-farm; IDFBF=incidental depletion factor, below farm; IDFSW=sum of incidental depletion factors which apply to surface water withdrawals; IDFGWO=incidental depletion factor which applies to withdrawals of ground water only; IDFGWC=sum of incidental depletion factors which apply to the groundwater component of withdrawals where both surface and ground water are applied (combined 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; AGWC=groundwater component of acreage irrigated with combined water; TAI=total acreage irrigated; TPDSW=total project depletion, surface water; TPDGW=total project depletion, ground water. Note that incidental depletion factors are expressed as a function of the CIR. See Table A-1 for county numbers and Table A-2 for river basin acronyms.

Table 10. Irrigated Agriculture. Summary of acreage irrigated, withdrawals, conveyance losses, and depletions (acre-feet) in New Mexico river basins, 1990.

RIVER BASIN	T	ASWO	AGWO	ASWC	AGWC	TASW	TAGW	TAI	TFWSW	CLSW	TPWSW	TPWGW	TPDSW	TPDGW
Arkansas-White-Red	D	0	40	0	0	0	40	40	0	0	0	46	0	39
Arkansas-White-Red	F	63478	4820	190	190	63668	5010	68678	105574	65837	171411	13067	71272	8061
Arkansas-White-Red	S	6523	50160	0	0	6523	50160	56683	9888	7281	17169	92086	8313	80082
Basin Totals		70001	55020	190	190	70191	55210	125401	115462	73118	188580	105199	79585	88182
Texas Gulf	D	0	1044	0	0	0	1044	1044	0	0	0	2906	0	2470
Texas Gulf	F	0	50011	0	0	0	50011	50011	0	0	0	116161	0	72432
Texas Gulf	S	0	225585	0	0	0	225585	225585	0	0	0	511370	0	441165
Basin Totals		0	276640	0	0	0	276640	276640	0	0	0	630437	0	516067
Pecos	D	0	290	0	0	0	290	290	0	0	0	796	0	677
Pecos	F	26516	68072	17743	17271	44259	85343	129602	168497	57942	226439	284355	105489	202663
Pecos	S	360	45170	0	0	360	45170	45530	570	0	570	146470	468	126901
Basin Totals		26876	113532	17743	17271	44619	130803	175422	169067	57942	227009	431621	105957	330241
Rio Grande	D	790	2952	0	0	790	2952	3742	1338	0	1338	6906	1138	5873
Rio Grande	F	108193	49032	75370	31714	183563	80746	264309	557635	419361	976996	275009	364402	173490
Rio Grande	S	0	25015	0	0	0	25015	25015	0	0	0	63344	0	51961
Basin Totals		108983	76999	75370	31714	184353	108713	293066	558973	419361	978334	345259	365540	231324
Upper Colorado	D	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Colorado	F	38550	0	0	0	38550	0	38550	133016	40880	173896	0	86557	0
Upper Colorado	S	61233	0	0	0	61233	0	61233	186735	34731	221466	0	163161	0
Basin Totals		99783	0	0	0	99783	0	99783	319751	75611	395362	0	249718	0
Lower Colorado	D	0	30	0	0	0	30	30	0	0	0	51	0	44
Lower Colorado	F	4516	5862	1933	277	6449	6139	12588	14827	35213	50040	20929	8417	12143
Lower Colorado	S	0	1355	0	0	0	1355	1355	0	0	0	3606	0	2958
Basin Totals		4516	7247	1933	277	6449	7524	13973	14827	35213	50040	24586	8417	15145
State Totals		310159	529438	95236	49452	405395	578890	984285	1178080	661245	1839325	1537102	809217	1180959

Key: T=type of irrigation system, i.e., drip (D), flood (F), or sprinkler (S); 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=groundwater component of acreage irrigated with combined water; TASW=total acreage irrigated with surface water; TAGW=total acreage irrigated with ground water; TAI=total acreage irrigated; TFWSW=total farm withdrawal, surface water; CLSW=surface water conveyance losses from stream or reservoir to farm headgate; TPWSW=total project withdrawal, surface water; TPWGW=total project withdrawal, ground water; TPDSW=total project depletion, surface water; TPDGW=total project depletion, ground water.

Table 11. Irrigated acreage and sources of irrigation water in New Mexico counties, 1990.

COUNTY	TASWO	TAGWO	TACW	TAI	TAIF	TIC
Bernalillo	5616	280	3204	9100	1530	10630
Catron	980	561	0	1541	1079	2620
Chaves	2790	72391	13639	88820	9000	97820
Cibola	564	420	386	1370	7690	9060
Colfax	19900	50	0	19950	9950	29900
Curry	0	147190	0	147190	75010	222200
De Baca	5000	3430	0	8430	4790	13220
Dona Ana	0	5726	73034	78760	17270	96030
Eddy	3299	33050	19415	55764	19926	75690
Grant	1526	1267	700	3493	3457	6950
Guadalupe	3140	245	0	3385	795	4180
Harding	0	2290	0	2290	2380	4670
Hidalgo	0	6880	2210	9090	31330	40420
Lea	0	30245	0	30245	88995	119240
Lincoln	1924	1156	1960	5040	1270	6310
Los Alamos	0	0	0	0	0	0
Luna	10550	32500	1200	44250	29700	73950
McKinley	3875	0	0	3875	2565	6440
Mora	13950	40	0	13990	1470	15460
Otero	865	5960	515	7340	11950	19290
Quay	29529	6950	0	36479	19011	55490
Rio Arriba	30750	515	280	31545	9565	41110
Roosevelt	0	107635	0	107635	36035	143670
Sandoval	8383	87	630	9100	8170	17270
San Juan	98218	0	0	98218	21382	119600
San Miguel	12140	240	0	12380	1140	13520
Santa Fe	8350	6795	615	15760	2310	18070
Sierra	1700	2195	4340	8235	3165	11400
Socorro	2600	1340	15280	19220	2020	21240
Taos	27700	600	200	28500	13400	41900
Torrance	0	18000	0	18000	20110	38110
Union	4590	40420	380	45390	14610	60000
Valencia	12220	980	6700	19900	8670	28570
State Totals	310159	529438	144688	984285	479745	1464030

Key: TASWO=total acreage irrigated with surface water only; TAGWO=total acreage irrigated with ground water only; TACW=total acreage irrigated with combined water, i.e., both surface and ground water; TAI=total acreage irrigated; TAIF=total irrigable acreage which is idle and fallow or planted but not irrigated; TIC=total irrigable acreage.

Table 12. Acreage irrigated by drip, flood, and sprinkler application methods and sources of irrigation water in New Mexico counties, 1990.

COUNTY	DASW	DAGW	TDA	FASW	FAGW	TFA	SASW	SAGW	TSA	TAI
Bernalillo	0	230	230	8019	851	8870	0	0	0	9100
Catron	0	0	0	980	111	1091	0	450	450	1541
Chaves	0	200	200	8562	59568	68130	0	20490	20490	88820
Cibola	0	0	0	834	536	1370	0	0	0	1370
Colfax	0	0	0	19150	0	19150	750	50	800	19950
Curry	0	154	154	0	26716	26716	0	120320	120320	147190
De Baca	0	0	0	5000	0	5000	0	3430	3430	8430
Dona Ana	0	150	150	52624	25156	77780	0	830	830	78760
Eddy	0	0	0	13898	23636	37534	0	18230	18230	55764
Grant	0	30	30	1946	1437	3383	0	80	80	3493
Guadalupe	0	0	0	3140	245	3385	0	0	0	3385
Harding	0	0	0	0	890	890	0	1400	1400	2290
Hidalgo	0	0	0	1933	5802	7735	0	1355	1355	9090
Lea	0	905	905	0	2950	2950	0	26390	26390	30245
Lincoln	0	70	70	3296	1504	4800	0	170	170	5040
Los Alamos	0	0	0	0	0	0	0	0	0	0
Luna	0	600	600	11150	32035	43185	0	465	465	44250
McKinley	0	0	0	3875	0	3875	0	0	0	3875
Mora	0	40	40	12925	0	12925	1025	0	1025	13990
Otero	0	1695	1695	1251	1024	2275	0	3370	3370	7340
Quay	0	0	0	25081	1850	26931	4448	5100	9548	36479
Rio Arriba	0	15	15	30960	570	31530	0	0	0	31545
Roosevelt	0	15	15	0	20785	20785	0	86835	86835	107635
Sandoval	0	17	17	8855	228	9083	0	0	0	9100
San Juan	0	0	0	36985	0	36985	61233	0	61233	98218
San Miguel	0	0	0	11480	0	11480	660	240	900	12380
Santa Fe	0	110	110	8740	1490	10230	0	5420	5420	15760
Sierra	790	0	790	4162	3283	7445	0	0	0	8235
Socorro	0	100	100	11768	6702	18470	0	650	650	19220
Taos	0	0	0	27850	90	27940	0	560	560	28500
Torrance	0	10	10	0	5765	5765	0	12225	12225	18000
Union	0	0	0	4780	2350	7130	0	38260	38260	45390
Valencia	0	15	15	17245	1675	18920	0	965	965	19900
State Totals	790	4356	5146	336489	227249	563738	68116	347285	415401	984285

Key: DASW=drip irrigated acreage supplied by surface water; DAGW=drip irrigated acreage supplied by ground water; TDA=total drip irrigated acreage; FASW=flood irrigated acreage supplied by surface water; FAGW=flood irrigated acreage supplied by ground water ; TFA=total flood irrigated acreage; SASW=sprinkler irrigated acreage supplied by surface water; SAGW=sprinkler irrigated acreage supplied by ground water; TSA=total sprinkler irrigated acreage; TAI=total acres irrigated.

Table 13. Acreage irrigated by drip, flood, and sprinkler application methods and sources of irrigation water in New Mexico river basins, 1990.

RIVER BASIN	DASW	DAGW	TDA	FASW	FAGW	TFA	SASW	SAGW	TSA	TAI
Arkansas-White-Red	0	40	40	63668	5010	68678	6523	50160	56683	125401
Texas Gulf	0	1044	1044	0	50011	50011	0	225585	225585	276640
Pecos	0	290	290	44259	85343	129602	360	45170	45530	175422
Rio Grande	790	2952	3742	183563	80746	264309	0	25015	25015	293066
Upper Colorado	0	0	0	38550	0	38550	61233	0	61233	99783
Lower Colorado	0	30	30	6449	6139	12588	0	1355	1355	13973
State Totals	790	4356	5146	336489	227249	563738	68116	347285	415401	984285

Key: DASW=drip irrigated acreage supplied by surface water; DAGW=drip irrigated acreage supplied by ground water; TDA=total drip irrigated acreage; FASW=flood irrigated acreage supplied by surface water; FAGW=flood irrigated acreage supplied by ground water; TFA=total flood irrigated acreage; SASW=sprinkler irrigated acreage supplied by surface water; SAGW=sprinkler irrigated acreage supplied by ground water; TSA=total sprinkler irrigated acreage; TAI=total acres irrigated.

Maps

NOTES ON MAPS

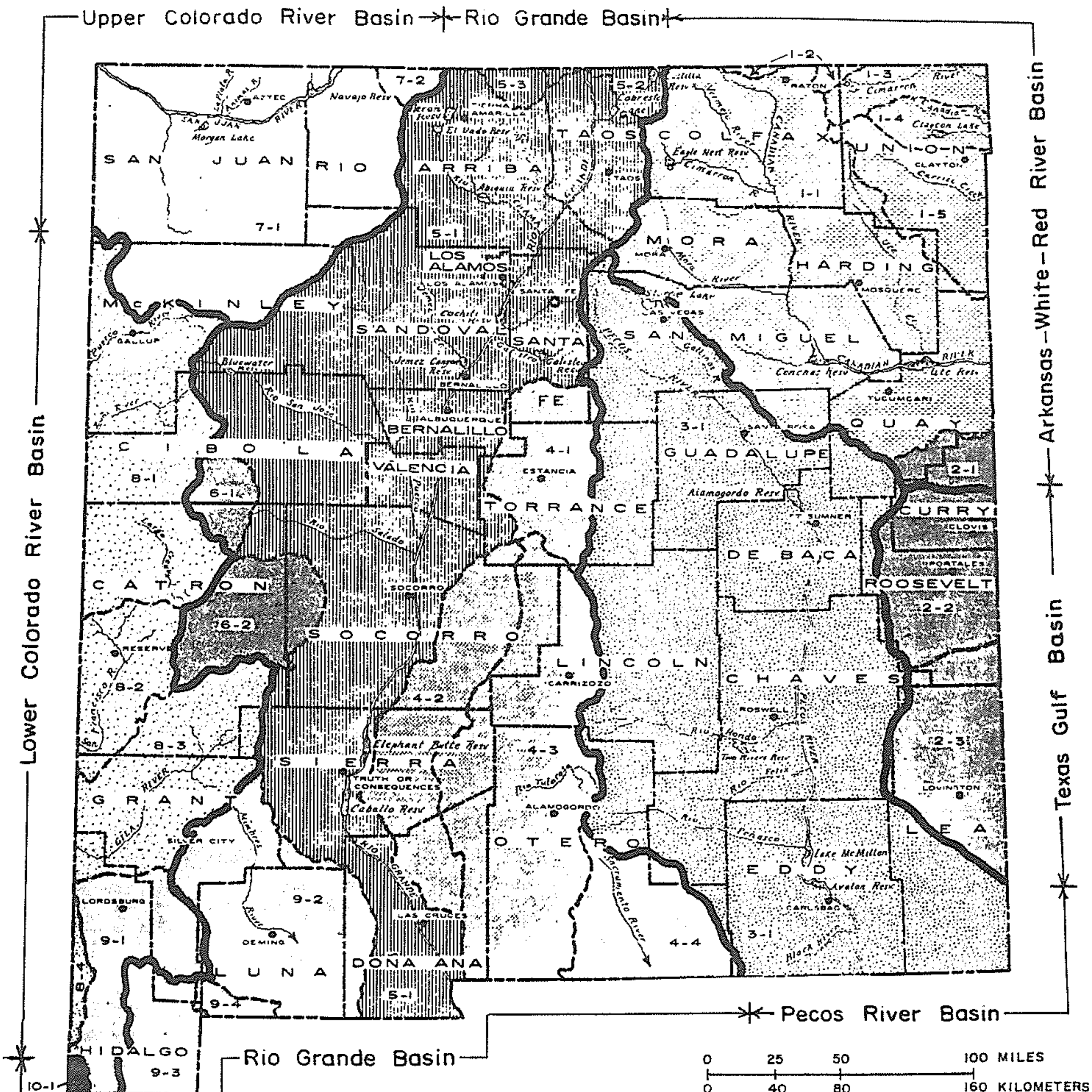
River Basins

Except for the Pecos River Basin, the river basins shown in Figure 1 have been adopted for planning purposes for both national and regional studies. The Pecos River is a tributary of the Rio Grande and joins the Rio Grande near Comstock, Texas. In national and regional planning, the Pecos River Basin is included as a sub-basin of the Rio Grande; however, in New Mexico, the basins are administered as separate units.

All river basins except the Rio Yaqui and the Pecos River encompass more than one surface-water drainage basin, some of which contribute surface flow to stream systems and some of which are topographically closed. These drainage basins are shown on Figure 2. Surface water in many of the sub-basins of the Central, Western, and Southwestern Closed Basins drains into playa lakes and does not enter river drainage systems. Most surface-water flows on the Southern High Plains also terminate in playa lakes. Stream flow in the Arkansas, Pecos, Rio Grande, San Juan, and Lower Colorado River Basins is available for use within New Mexico.

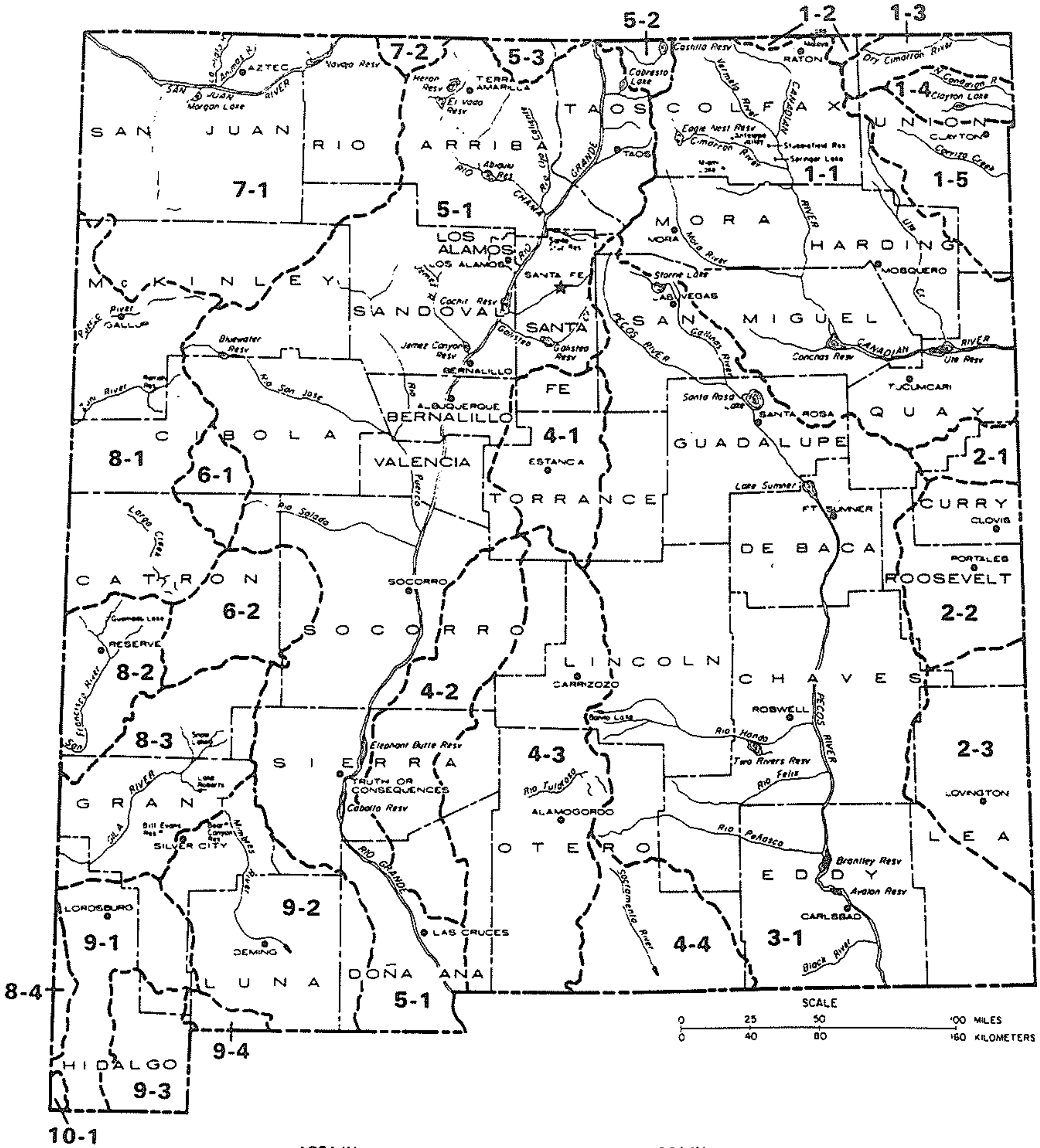
Groundwater Basins

As of June 30, 1991, the state engineer had declared 32 groundwater basins. They cover approximately 86,073 square miles, or 71% of the state.



Basin	Area/Sq. Mi.
Arkansas-White-Red River	17,636
Texas Gulf	5,409
Pecos River	25,962
Rio Grande	49,755
Upper Colorado River	9,530
Lower Colorado River	13,338
Rio Yaqui	36
State Total	121,666

Figure 1. River Basins in New Mexico

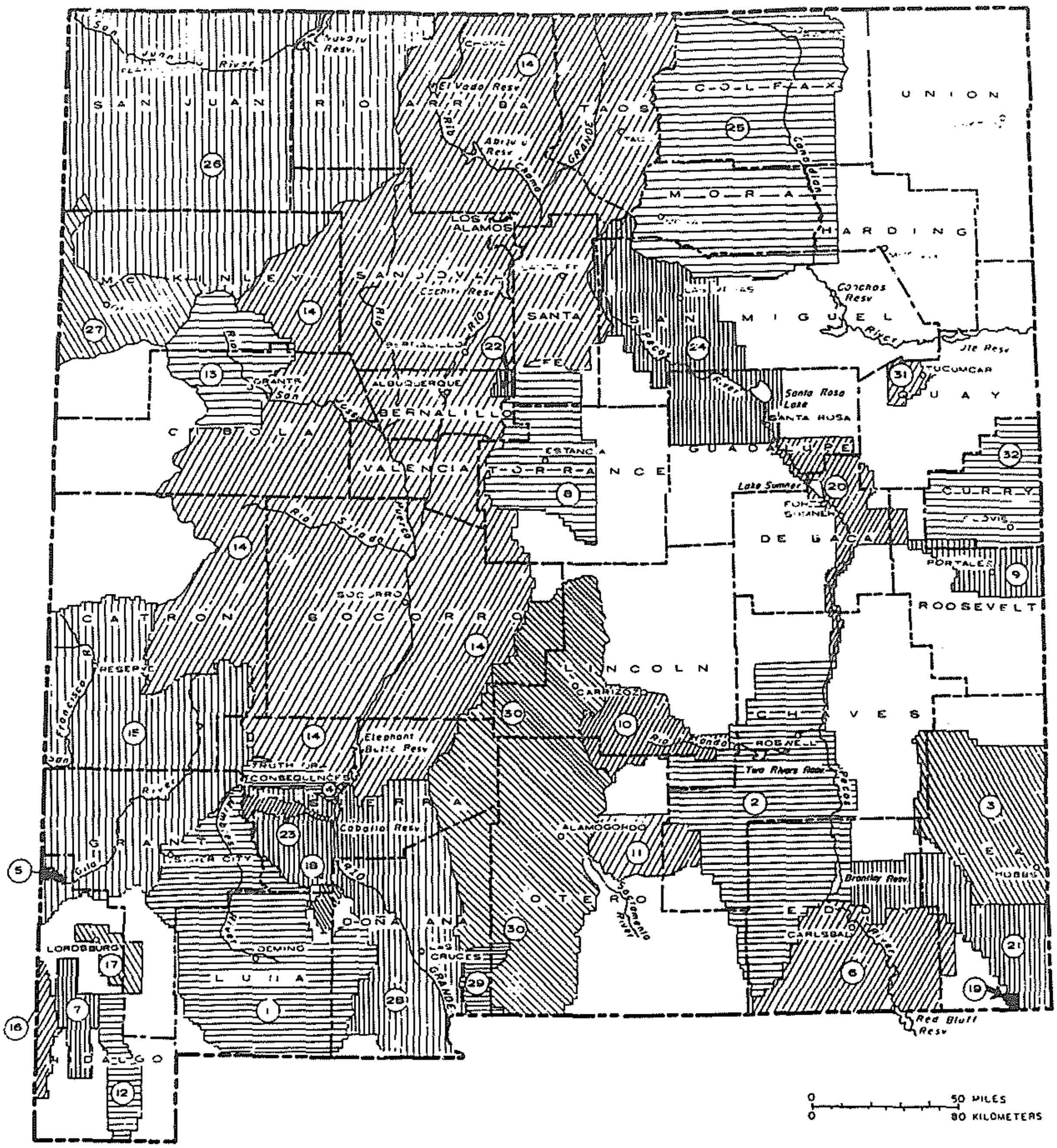


BASIN	AREA IN SQ. MILES
ARKANSAS RIVER BASIN	
1-1, CANADIAN RIVER	12,885
1-2, PURGATOIRE RIVER	132
1-3, DRY CIMARRON RIVER	1,000
1-4, NORTH CANADIAN RIVER	736
1-5, CARRIZO CREEK	2,205
TOTAL	16,958
SOUTHERN HIGH PLAINS	
2-1, RED RIVER	678
2-2, BRAZOS RIVER	2,727
2-3, LEA PLATEAU	2,682
TOTAL	6,087
PECOS RIVER BASIN	
3-1, PECOS RIVER	
TOTAL	25,962

BASIN	AREA IN SQ. MILES
CENTRAL CLOSED BASINS	
4-1, ESTANCIA BASIN	2,239
4-2, JORNADO DEL MUERTO	3,344
4-3, TULAROSA BASIN	6,749
4-4, SALT BASIN	2,375
TOTAL	14,707
RIO GRANDE BASIN	
5-1, RIO GRANDE	25,731
5-2, COSTILLA CREEK	277
5-3, RIO SAN ANTONIO	287
TOTAL	26,295
WESTERN CLOSED BASINS	
6-1, NORTH PLAINS	697
6-2, SAN AGUSTIN PLAINS	1,989
TOTAL	2,686

BASIN	AREA IN SQ. MILES
SAN JUAN RIVER BASIN	
7-1, SAN JUAN RIVER	9,276
7-2, NAVAJO RIVER	254
TOTAL	9,530
LOWER COLORADO RIVER BASIN	
8-1, LITTLE COLORADO RIVER	5,325
8-2, SAN FRANCISCO RIVER	1,836
8-3, GILA RIVER	3,549
8-4, SAN SIMON CREEK	240
TOTAL	10,950
SOUTHWESTERN CLOSED BASINS	
9-1, ANIMAS BASIN	2,388
9-2, MIMBRES BASIN	4,387
9-3, PLAYAS BASIN	1,390
9-4, WAMEL BASIN	290
TOTAL	8,455
RIO YAQUI BASIN	
10-1, RIO YAQUI TOTAL	36
STATE TOTAL	121,666

Figure 2. Surface Water Drainage Basins in New Mexico



BASIN	AREA IN SQUARE MI.
1. MIMBRES VALLEY	4,279
2. ROSWELL	4,281
3. LEA COUNTY	2,180
4. HOT SPRINGS	284
5. VIRDEN VALLEY	19
6. CARLSBAD	1,965
7. ANIMAS	426
8. ESTANCIA	1,724
9. PORTALES	628
10. HONDO	901
11. PENASCO	723
12. PLAYAS VALLEY	515
13. BLUEWATER	1,318
14. RIO GRANDE	26,209
15. GILA—SAN FRANCISCO	5,659
16. SAN SIMON	263
17. LORDSBURG VALLEY	329
18. NUTT-HOCKETT	133
19. JAL	15
20. FORT SUMNER	1,059
21. CAPITAN	1,550
22. SANDIA	73
23. LAS ANIMAS CREEK	131
24. UPPER PECOS	2,708
25. CANADIAN RIVER	5,825
26. SAN JUAN	9,727
27. GALLUP	1,439
28. LOWER RIO GRANDE	3,858
29. HUECO	255
30. TULAROSA	6,070
31. TUCUMCARI	177
32. CURRY COUNTY	1,350
	86,073

Figure 3. Groundwater Basins in New Mexico Declared by the State Engineer as of June 30, 1991

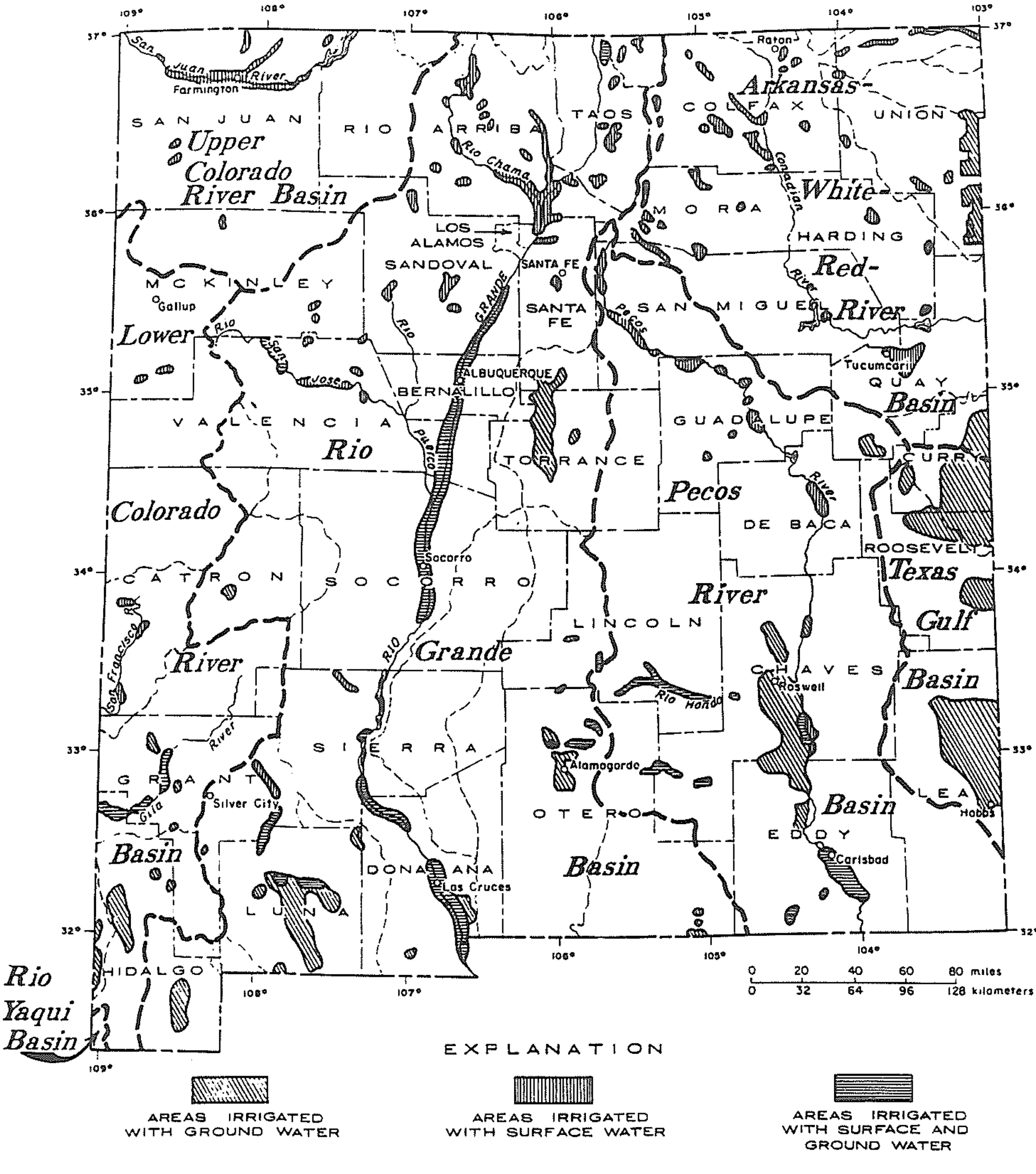


Figure 4. Lands in New Mexico Irrigated with Ground Water, Surface Water, and Ground and Surface Water Combined.