WATER RESOURCES OF TAOS COUNTY, NEW MEXICO

By Lynn A. Garrabrant

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Multiply	By	To obtain
inch	25.4	millimeter
foot	0.3048	meter
cubic foot per second	0.2832	cubic meter per second
cubic foot per second	28.32	liter per second
mile	1.609	kilometer
acre	4,047	square meter
square mile	2.590	square kilometer
acre-foot	1,233	cubic meter
acre-foot per square mile	476.1	cubic meter per square kilometer
acre-foot per year	0.001233	cubic hectometer per year
gallon per minute	0.06309	liter per second
gallon per day	0.003785	cubic meter per day

Temperature in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) by using the following equation:

$$°C = (°F - 32)/1.8$$

Sea level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

CONVERSION FACTORS, VERTICAL DATUM, ABBREVIATED WATER-QUALITY UNITS, AND ACRONYMS--Concluded

Abbreviated water-quality units used in report:

mg/L	milligrams per liter
μg/L	micrograms per liter
μS/cm	microsiemens per centimeter at 25 degrees Celsius

Acronyms used in report:

MCL	Maximum contaminant level
NMSEO	New Mexico State Engineer Office
NMWQCC	New Mexico Water Quality Control Commission
SMCL	Secondary maximum contaminant level
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

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ABSTRACT

Additional hydrologic data and a summary of existing data for Taos County were needed to assist in the management of the water resources. This report describes the occurrence, availability, and quality of ground and surface water in Taos County.

Ground water in Taos County generally is unconfined. Movement of water generally is toward the Rio Grande or perennial streams. Ground water is potable although in some areas the water is hard and has high concentrations of dissolved solids and fluoride.

Most of the ground water available for use in the county is found in the recent alluvial sediments or sediments of the Santa Fe Group of Quaternary and Tertiary age in the Costilla Plains. Depths to water range from less than 1 foot to 275 feet below land surface and well yields range from 3 to 3,000 gallons per minute. The largest yields are from irrigation wells in Sunshine Valley. Water is used for public-supply, domestic, livestock, and irrigation purposes.

Depths to water range from 5 to 1,080 feet below land surface in the few wells drilled in the basalt of the Taos Plateau. Yields from these wells range from 2 to 50 gallons per minute and water is used for domestic, livestock, and mining purposes.

In the valleys of the Sangre de Cristo Mountains, shallow wells penetrate the alluvium in the stream channels. Depths to water range from 2 to 145 feet below land surface and most well yields range from 1 to 50 gallons per minute. Water is used for public-supply, domestic, and commercial purposes.

Water levels in irrigation wells in Sunshine Valley dropped 5 to 50 feet between 1955 and 1970. Since then, irrigation with ground water has declined and water levels have risen.

There is a net increase in discharge in the streams within Taos County. The average gain in discharge between the Rio Grande at Lobatos and Rio Grande at Embudo was 271,700 acre-feet per year for water years 1931 to 1989. The highest mean monthly discharge occurs in May or June as a result of snowmelt runoff. Specific conductance ranges from 62 to 1,280 microsiemens per centimeter at 25 degrees Celsius, pH ranges from 3.8 to 9.9, and dissolved oxygen ranges from 6.5 to 19.0 milligrams per liter.

Water use in the county is divided into the following categories: irrigated agriculture, mining, public water supply, reservoir evaporation, livestock, commercial, industrial, and domestic. In 1990, surface water was the source for 93 percent of the water withdrawn in Taos County but ground water was the source for all water withdrawn for public-supply, domestic, and industrial purposes. About 95 percent of all the water depleted in the county in 1990 was used for irrigated agriculture; 28,500 acres were irrigated in 1990. Alfalfa, native pasture, and planted pasture account for 91 percent of this acreage.

INTRODUCTION

Taos County residents are facing an increasing demand for water. Ground water is the primary source for domestic use, but few data exist about the extent and quality of ground-water supplies. Although 95 percent of the water used is surface water, most of the surface water is fully appropriated (New Mexico State Engineer Office, 1990). There is concern about water availability in the future and about water-quality degradation that has occurred in localized areas. In response to this concern, the U.S. Geological Survey (USGS), in cooperation with the New Mexico State Engineer Office (NMSEO), the New Mexico Environment Department (formerly the New Mexico Environmental Improvement Division), and the New Mexico Bureau of Mines and Mineral Resources, conducted a study of the water resources of Taos County.

Purpose and Scope

This report describes the occurrence, availability, and quality of ground and surface water in Taos County. Information on water use, such as how much ground and surface water is used and for what purpose, was also compiled. Additional water-level and water-quality data were collected at selected wells.

Previous Investigations

Wilson and others (1978, 1980) conducted a countywide study to gather and interpret data on water availability and water quality for the Taos County Commission. The study identified possible water policies related to agricultural use and development of subdivisions.

Winograd (1959) reported on the occurrence and availability of ground water in the Sunshine Valley and Taos Plateau areas of central and western Taos County. He also determined that withdrawing large amounts of ground water for irrigation would ultimately reduce the accretion of ground water to the Rio Grande.

Sunshine Valley and the Taos Plateau were also included in a Southwest Alluvial Basins study conducted by the USGS. The study area also included the San Luis Basin in Colorado. Reports published for the Southwest Alluvial Basins study described water levels and recent changes in water levels (Crouch, 1985), characterized the geochemistry of the ground-water flow system (Williams and Hammond, 1989), and analyzed the hydrologic components of the basin (Hearne and Dewey, 1988).

Geographic Setting

Taos County is located in north-central New Mexico and has an area of 2,257 square miles or 1,444,500 acres. The northern border of the county is the Colorado-New Mexico State line. Taos is the county seat and the largest town in the county. The altitude ranges from 5,870 feet above sea level along the Rio Grande south of Pilar to 13,160 feet above sea level at Wheeler Peak (the highest point in New Mexico) (fig. 1). The Rio Grande flows southerly from Colorado through the county in a gorge that is as much as 860 feet deep and 1,200 feet wide. The county is located in the Southern Rocky Mountains Physiographic Province (Fenneman, 1931).

Three general physiographic subdivisions lie within Taos County: the Taos Plateau, the Costilla Plains, and the Sangre de Cristo Mountains (fig. 1). The Taos Plateau and the Costilla Plains are part of the Rio Grande Depression or Rift.

The altitude of most of the Taos Plateau ranges from about 6,000 feet in the southeast near the Rio Grande, to about 8,400 feet at the northwestern border of the county. The plateau has a gently undulating slope from the west toward the Rio Grande. Extinct volcanoes are numerous, the highest of which is Cerro de la Olla (fig. 1) with an altitude of 9,464 feet. Eolian sand dunes exist in the southern part of the Taos Plateau. There are no perennial streams in the Taos Plateau, only arroyos that drain southeast toward the Rio Grande. The largest arroyo is the Aguaje de la Petaca (fig. 1). Vegetation in this area includes sagebrush and other shrubs, grasses, cacti, and piñon and juniper trees. Much of the soil in the north and central parts of the plateau is shallow (3-20 inches), stony and cobbly, and moderately permeable (Hacker and Carleton, 1982). Fractured basalt underlies the shallow soils and crops out in many areas. The soils are deeper in the southern part of the plateau and the eolian sand deposits (as much as 60 inches deep) have a high permeability. Land use includes grazing (by wildlife and domestic animals), recreation, and mining.

Alluvial-fan or valley-fill materials make up the Costilla Plains, which slope gently down from the base of the Sangre de Cristo Mountains toward the Rio Grande. This area is sometimes referred to as the Piedmont. The part of the plains that extends north of the Red River to the Colorado border is called Sunshine Valley (fig. 1). The altitude of the Costilla Plains ranges from about 5,800 feet on the Rio Grande to about 8,000 at the base of the Sangre de Cristo Mountains. A few extinct volcanoes rise above the plains; Ute Mountain (fig. 1) is the highest with an altitude of 10,093 feet. Many perennial streams that originate in the Sangre de Cristo Mountains flow through the plains and discharge into the Rio Grande. Sagebrush, apache plume, blue gramma, galleta, piñon, juniper, cottonwood, and willow are some of the shrubs, grasses, and trees found in this area. The moderately deep soil is derived from alluvium of various sources and ages. The soil is often calcareous at depths greater than 15 inches (Hacker and Carleton, 1982). Land use includes irrigation, residential, recreation, grazing, and some sand and gravel mining.

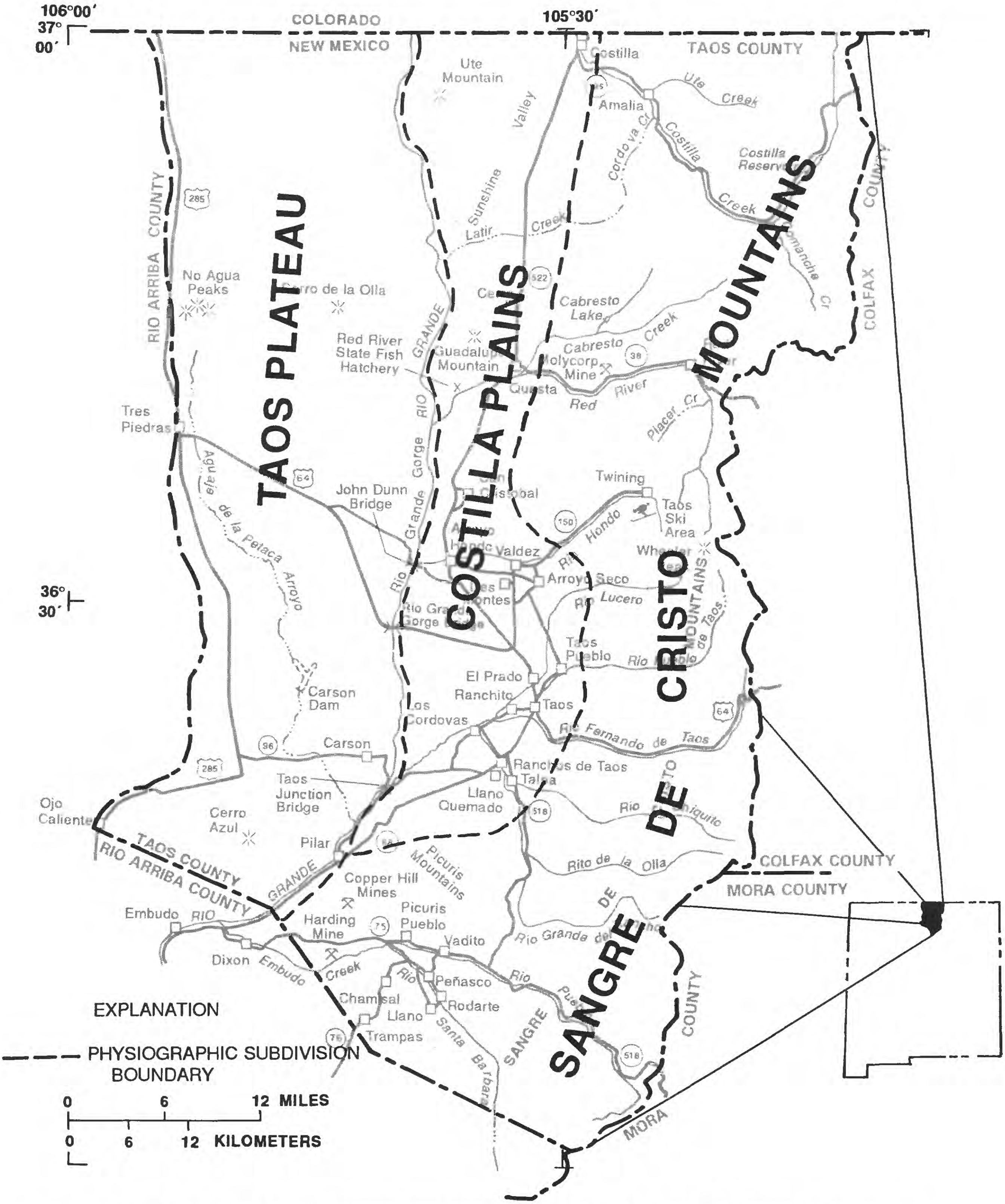

Figure 1. --Taos County study area and general physiographic subdivisions in the county (modified from Upson, 1939).

The Sangre de Cristo Mountains consist of metamorphic, sedimentary, and igneous rocks and are a fault-block range of steep terrain. These mountains are the east prong of the Southern Rocky Mountains. Altitudes range from about 8,000 feet to 13,160 feet. All perennial streams in Taos County originate in the Sangre de Cristo Mountains. Most of the rain and snowfall in this area results in runoff, which is the source of water for a variety of uses. Vegetation includes spruce, fir, pine, and aspen trees as well as shrubs, forbs, and grasses. The soils are cobbly or gravelly and are well drained (Hacker and Carleton, 1982). The land is used for timber production, recreation, grazing, and mining. Many summer cabins, year-round residences, and tourist lodges are concentrated in the mountain valleys.

Climate

Most of Taos County is semiarid with mild summers and cold winters. It is usually dry and sunny. The majority of precipitation occurs as rainfall during summer thundershowers. The crop-growing season is short due to the high altitude and low nighttime temperatures. As of 1989, four weather stations were in operation at Cerro, Red River, Taos, and Tres Piedras (fig. 1). The average annual precipitation, snowfall, and temperature for these stations and discontinued stations that have 20 or more years of data are listed in table 1 (tables are in the back of the report). The U.S. Soil Conservation Service maintains snowfall data for eight sites in the county, three of which are snow-telemetry sites in the Sangre de Cristo Mountains (Gallegos Peak, Red River Pass #2, and North Costilla) (see fig. 8). Snow is measured manually at the other five sites.

The average annual precipitation ranges from about 10 to 14 inches at weather stations in the Taos Plateau and Costilla Plains and about 14 to 21 inches in the Sangre de Cristo Mountains (table 1). July and August are the wettest months, and the winter months are the driest at the lower altitudes. The average annual precipitation (1961-85) ranges from 19.0 to 27.8 inches at the snow telemetry sites in the Sangre de Cristo Mountains; March is the wettest month and June is the driest (U.S. Department of Agriculture, 1989).

Normally, precipitation varies greatly from year to year; by computing a 5-year moving average of the annual precipitation the trends over time become clearer. Over the past 20 years or more the precipitation at the Red River and Tres Piedras weather stations has been increasing (fig. 2).

In the Sangre de Cristo Mountains, about one-third of the annual precipitation occurs as snowfall during December to March. In the Costilla Plains and Taos Plateau, snowfall accounts for only 13 to 18 percent of the annual precipitation. Average annual snowfall at the active weather stations (1931-83) and the discontinued stations (period of record) ranges from about 22.5 inches in Ojo Caliente to 131.6 inches in Red River (table 1).

The average annual temperature at the active weather stations for the period of record ranges from 39.4 to 47.1 degrees Fahrenheit (°F) (table 1). The warmest months are July and August and the coldest are December and January. There is often a 30° range between the high and low temperatures during a 24-hour period. The average maximum monthly temperature at the weather stations ranges from 36 °F in January to 86 °F in July. The average minimum monthly temperature ranges from 3.5 °F in January to 50.6 °F in July (Kunkel, 1984).

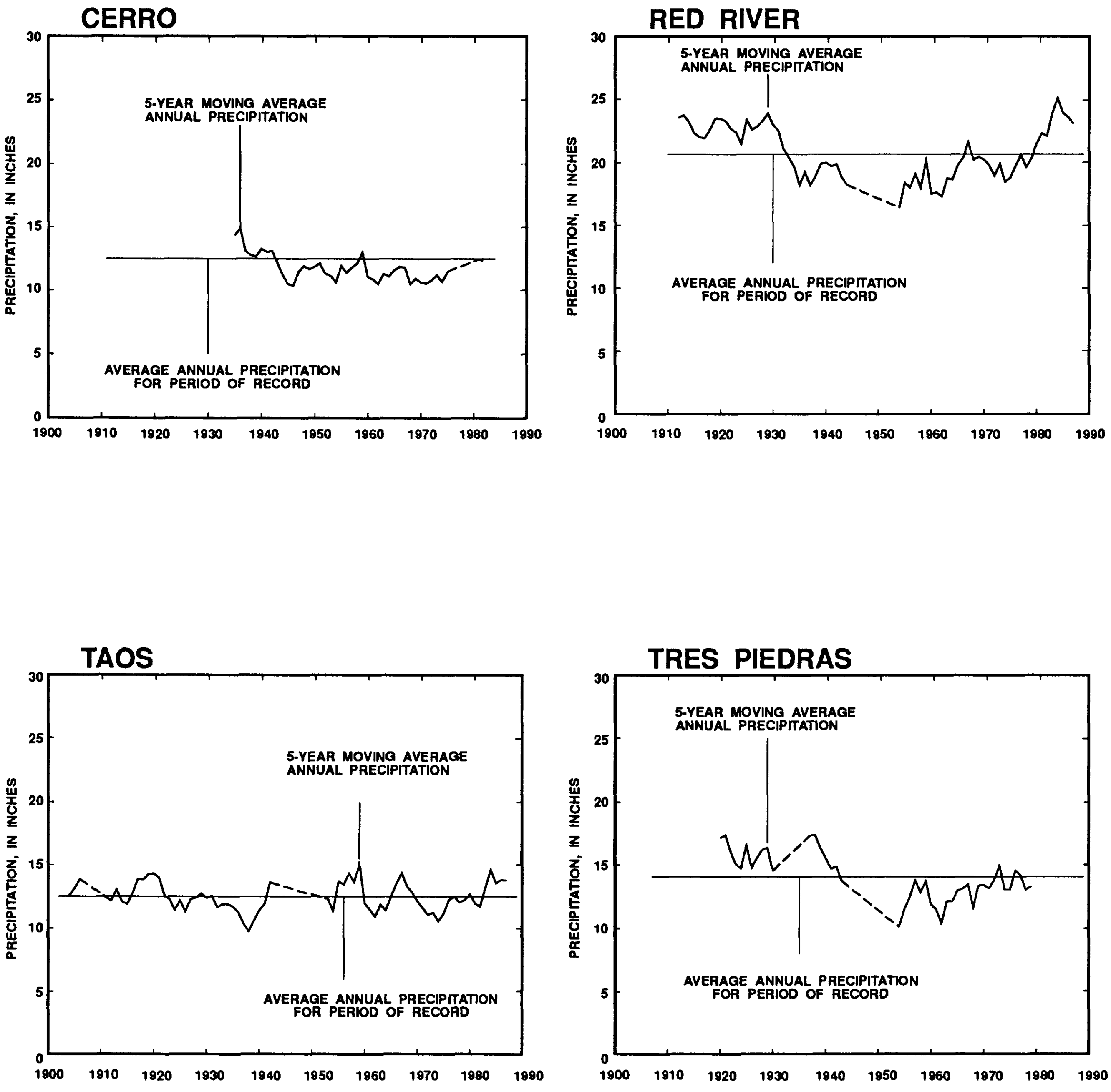

Figure 2.--Average annual precipitation for period of record and 5-year moving average of annual precipitation at Cerro, Red River, Taos, and Tres Piedras weather stations. Dashed lines indicate years of missing data.

Estimates of annual evaporation rates range from 43 to 56 inches (free water-surface evaporation or shallow lake evaporation). The May to October average (1956-70) class A pan evaporation ranges from 38 to 54 inches (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1982).

Geologic Setting and Mineral Resources

Geologic information on Taos County is found in Hawley (1978), Baldridge and others (1984), Bauer and others (1990, 1991), and plate 1 of this report (plate 1 has two sheets). Rocks of Precambrian age are the oldest rocks in the county and are found predominantly in the Sangre de Cristo Mountains and locally at Cerro Azul and near Tres Piedras. The types of rocks of Precambrian age present include granite, gneiss, schist, quartzite, and pegmatites, and are of metamorphic and igneous origin. In Sunshine Valley, the depth to the Precambrian basement may be more than 3,000 feet below land surface (McKinlay, 1956, p. 21). Rocks of Precambian age have undergone folding, faulting, fracturing, foliation, alteration, compression, metamorphism, erosion, weathering, and uplift. The north-trending Picuris-Pecos Fault (pl. 1) is a prominent structural feature that juxtaposes rocks of Precambrian and Pennsylvanian age in the Picuris Mountains (Miller and others, 1963, p. 47).

Sedimentary rocks of Paleozoic age are found in the southern Sangre de Cristo Mountains in Taos County and in a few small exposures in the northern Sangre de Cristo Mountains. Although there are some small outcrops of rock of Permian and Mississippian age in the southern Sangre de Cristo Mountains, most rocks of this era are of Pennsylvanian age. The southern mountains are lower in altitude and are more rounded than the irregularly shaped, higher mountains to the north that contain Precambrian rocks (Muehlberger and Muehlberger, 1982, p. 71). The rock types present in the southern Sangre de Cristo Mountains are arkose, conglomerate, dolomite, limestone, sandstone, red and gray shale, and siltstone (Miller and others, 1963, p. 22, 38). During the Paleozoic the region was episodically covered by a shallow sea that encroached into northern New Mexico from the south (Winograd, 1959, p. 12).

Rocks of Mesozoic age are absent from the surface of Taos County. Near the end of the Cretaceous, a deformational event known as the Laramide orogeny began over a broad regional area that included Taos County. During this orogeny the Sangre de Cristo Mountains were uplifted (Winograd, 1959, p. 12).

Sedimentary and volcanic rocks of Cenozoic age are predominant in the Taos Plateau and Costilla Plains. Several extinct shield volcanoes and volcanic cones are still visible. A pulse of volcanism occurred about 30-18 million years ago that coincided with the early structural development of the Rio Grande Rift (Baldridge and others, 1984, p. 8). The mountains were uplifted again during the evolution of the Rio Grande Rift in the middle to late Tertiary period (Miocene and Pliocene time). McKinlay (1956, p. 21) estimated the vertical uplift of the mountains to be 7,000 feet. Young fault scarps along the western edge of the mountains indicate that the fault system has recently been active and that uplift continues (Baltz, 1978, p. 221).

The Taos Plateau and Costilla Plains are part of the Rio Grande Rift that formed as the mountains were uplifted. The rift in Taos County is an asymmetrical, east-tilted graben. The eastern edge of the graben is bounded by a north-south fault that is buried along the western flank of the Sangre de Cristo Mountains; no major fault exists on the western edge. This graben is the most actively subsiding graben of the rift (Muehlberger and Muehlberger, 1982, p. 65). Alluvial fans have gradually coalesced along the western edge of the mountains to form the Costilla Plains (Keller and others, 1984, p. 51). Volcanism was contemporaneous with rifting in the area (Dungan and others, 1989, p. 451). Interbedded basalts and basin-fill sediments cover a large portion of the Taos Plateau (Lambert, 1966, p. 43). The Servilleta Basalt is between 4.5 and 2.8 million years old (Manley, 1984, p. 65). Alluvial sediments, ash, and lava flows were alternately deposited in the rift during the late Tertiary period. About 600 feet of interbedded sediments and Servilleta Basalt flows are exposed along the Rio Grande at the Rio Grande Gorge Bridge. The total thickness of these upper Tertiary sediments and volcanic rocks (collectively referred to as the Santa Fe Group) may be 2,000 to 3,000 feet in the Costilla Plains (Baltz, 1978, p. 211). The dominant basin-fill unit in the Costilla Plains and Taos Plateau is the Santa Fe Group of Miocene to early Pleistocene age (Chapin, 1988; Dungan and others, 1989). The lower Santa Fe Group of Miocene age includes the Chamita and Tesuque Formations in the southern part of the county. The upper Santa Fe Group (Pliocene and Quaternary age) consists of fluvial lacustrine deposits, alluvial-fan materials, sand-dune facies, buff silt, volcanic ash, and the Servilleta Basalt. The alluvium deposited by the Rio Grande during the Pliocene is included in the upper Santa Fe Group (Personius and Machette, 1984, p. 83).

Rio Grande Gorge incision has occurred mainly in Quaternary time (Heffern, 1990, p. 233). Quaternary alluvial deposits of Pleistocene and Holocene age are found in the Costilla Plains and in most mountain valleys (Pazzaglia and Wells, 1990, p. 429). Alluvial fans formed as the uplifted mountains eroded. In the southern part of the Taos Plateau eolian sand dunes overlie the Servilleta Basalt. Landslide deposits and colluvium are present in the Rio Grande Gorge and in small areas throughout the mountains. Alluvium is found along streams and rivers, in Sunshine Valley, and in the Taos area.

Precious metal deposits in Precambrian rocks are found in the Twining, Red River, Costilla Massif, and Picuris mining districts and include gold, silver, copper, tungsten, and uranium. The Copper Hill mines (fig. 1) in the Picuris District were active in the early 1900's (Just, 1937, p. 36). A glassy quartz that contained copper, silver, and gold was extracted from the Copper Hill mines. The Tungsten mine nearby produced minor amounts of tungsten ore. Neither mine was credited with any significant production. The Harding pegmatite mine (fig. 1) is a world-class complex of pegmatite. During World War II the strategic minerals lepidolite, microlite, tantalite-columbite, beryl, and spodumene were mined (Bauer and others, 1991, p. 110).

There are small prospects of Pennsylvanian coal in the Rio Fernando de Taos Canyon. However, these coal lenses are too impure and thin to be economically mined (Schilling, 1960, p. 115).

Molybdenite is currently the most important mineral resource in Taos County. This mineral is extracted from Tertiary igneous rocks at the Molycorp Mine east of Questa in the Sangre de Cristo Mountains. Perlite is mined at the volcanic No Agua Peaks (fig. 1) and Cerro de la Olla in the northwest part of the county. Some placer gold deposits are found in the Tertiary and Quaternary gravels of the Rio Grande Valley and Red River districts. The Red River district deposits may have eroded from Miocene(?) pyrite gold deposits in the Sangre de Cristo Mountains (Schilling, 1960, p. 27).

Water Management

Surface water and ground water in New Mexico belong to the public and are subject to appropriation for beneficial use. The procedures for administering water are based on the doctrine of prior appropriation. Most of the surface water has been fully appropriated (New Mexico State Engineer Office, 1990).

The State Engineer has jurisdiction over the appropriation of water in declared ground-water basins. A permit is required to withdraw ground water for any purpose in Taos County because the whole county lies within the declared Rio Grande ground-water basin (New Mexico State Engineer Office, 1990).

Two interstate compacts involve the waters of the county--the Rio Grande Compact and the Costilla Creek Compact. The Rio Grande Compact, approved by Congress in 1939, regulates water in Colorado, New Mexico, and Texas. The Costilla Creek Compact, approved in 1946, regulates water in Colorado and New Mexico. The USGS collects the streamflow data needed for the administration of these two compacts. An appointed watermaster regulates the delivery of water stored in Costilla Reservoir (fig. 1) and the flow of Costilla Creek during the irrigation season according to priorities outlined in the Compact.

Well-Numbering System

The system of numbering wells in New Mexico is based upon the common subdivision of public lands into sections. This numbering system has been projected onto the unsurveyed land grants in Taos County to number wells in these grants. The local well number (local identifier) is divided by periods into four parts (fig. 3). The first part is the township north or south of the New Mexico Base Line, the second is the range east or west of the New Mexico Principal Meridian, and the third part is the section. The fourth part of the well number, which consists of three or four digits, refers to the 160-, 40-, 10-, and 2.5-acre tracts, respectively, in which the well is situated in the section. For this purpose, the section is divided into four quarters, numbered 1, 2, 3, and 4 in the normal reading order, for the northwest, northeast, southwest, and southeast quarters, respectively. The first digit of the fourth part is the quarter section, which is a tract of 160 acres. The 160-acre tract is divided into four 40-acre tracts numbered in the same manner, and the second digit is the 40-acre tract. The 40-acre tract is divided into four 10-acre tracts, and the third digit is the 10-acre tract. It is not always possible to locate the well to a fourth digit, or 2.5-acre tract, so some of the local well numbers have only three digits in this part.

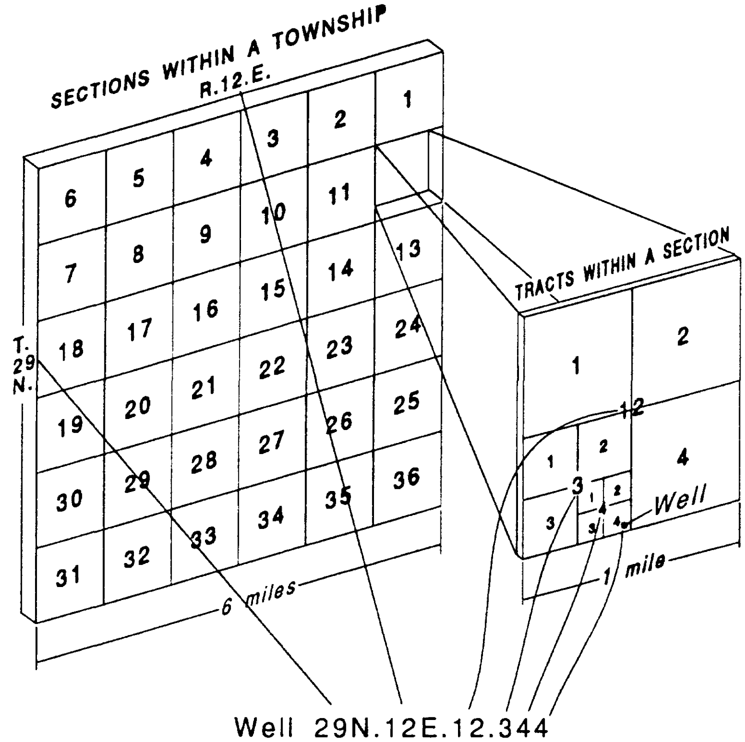

Figure 3.--Well-numbering system in New Mexico.

A zero in the tract part means that the well is centrally positioned or has not been located accurately enough to be placed within a tract or quarter section. Thus, well 29N.12E.12.344 is in the SE 1/4 SE 1/4 SW 1/4 sec. 12, T. 29 N., R. 12 E. (fig. 3). This report also uses a well reference number (see pl. 2 and table 3). The "site identifier" in table 3 is a 15-digit identification number formed initially from the latitude and longitude of the site. However, this number is an "identifier" and not a "locator."

Wells located in the Sangre de Cristo Grant in northern Taos County are numbered according to a local system that is offset from the New Mexico system. The explanation above still applies but the numbering and location of the townships and ranges are different. Wells in the grant land south of the Colorado-New Mexico State line are in Townships 1 S. or 2 S., and are in Ranges 73 W. or 74 W., in reference to the Sixth Principal Meridian. The locations of the township and range lines of both systems are shown on plate 2.

Acknowledgments

The author wishes to thank all of the county residents who provided access to their wells for sampling and water-level measurements and who provided valuable information on their wells. Paul Bauer and others at the New Mexico Bureau of Mines and Mineral Resources compiled the geologic map for this study. This report was reviewed by Dr. John Hawley and Paul Bauer, New Mexico Bureau of Mines and Mineral Resources, and Elaine Pacheco, New Mexico State Engineer Office. Their comments and suggestions are greatly appreciated.

GROUND-WATER RESOURCES

The aquifers in rocks of Quaternary and Tertiary age are the source for virtually all the ground water used in the county. Ground water is used mainly for domestic and mining purposes. Ground water from wells is potable in most parts of the county.

Occurrence and Movement

Ground water is found in the alluvial sediments of the Costilla Plains and in the valley alluvium of perennial and intermittent streams throughout the county. The alluvial sediments can be divided into the most recent Quaternary (Holocene) deposits near the surface and the alluvial sediments of early Quaternary and late Tertiary age, referred to as the Santa Fe Group. The thickness of the recent alluvial sediments is unknown. The Santa Fe Group consists of alluvial sediments interbedded in places with volcanic rocks and clay deposits (Winograd, 1959, p. 15). The Santa Fe Group underlies the recent alluvial sediments of the Costilla Plains and underlies and intertongues with the Servilleta Basalt of Pliocene age in the Taos Plateau. A limited amount of water is found in the basalt at depths greater than 200 feet in the plateau. Ground water is usually present under unconfined conditions. Spiegel and Couse (1969) reported perched conditions north of Arroyo Seco, and north and east of Ranchos de Taos. Winograd (1959, p. 43) concluded that water occurs in perched or semiperched conditions in parts of Sunshine Valley and isolated parts of the Taos Plateau. Winograd reported that widespread fine-grained deposits are present in the western half of T. 30 N., R. 12 E. in Sunshine Valley, thus restricting the amount of water that could be withdrawn for irrigation in this part of the township. His conclusions were based on the geologic logs of test holes drilled by the U.S. Army Corps of Engineers and other test drilling for irrigation supplies in the area. Hearne and Dewey (1988) also reported the presence of less permeable clay beds that separate the shallow alluvial sediments from the underlying volcanic rocks (fig. 4) in isolated areas in Sunshine Valley.

On the Taos Plateau, precipitation and the resulting runoff from arroyos recharge the basalt. These volcanic rocks are underlain by alluvial sediments at depths exceeding 700 feet (Winograd, 1959, p. 36). In the northern part of the Taos Plateau, water moves southeasterly through the fractured, eastward-dipping basalt toward the Rio Grande. The amount of water that reaches the sediments below the basalt is unknown. As in the Costilla Plains, water discharges as seeps or springs in the canyon walls of the Rio Grande Gorge. In the southern half of the Taos Plateau, the basalt is not as thick and water moves through the basalt to the underlying sediments (Winograd, 1959, p. 36). Because few well data exist in this area it is difficult to estimate how much water remains in the sediments and how much discharges to the Rio Grande.

The shallow alluvial and Santa Fe Group aquifers of the Costilla Plains are directly recharged by precipitation and the infiltrating runoff of rain and snow from the Sangre de Cristo Mountains. Winograd (1959, p. 32) estimated the recharge in Sunshine Valley to be 20,000 acre-feet per year. Water moves down through the alluvial aquifer to the Santa Fe Group sediments that are interbedded with volcanic rocks. Water moves through the fractured volcanic rocks and ultimately discharges to the Rio Grande through seeps and springs (fig. 4). A map of the potentiometric surface in Sunshine Valley in 1980 shows that ground water moves west toward the Rio Grande (Crouch, 1985).

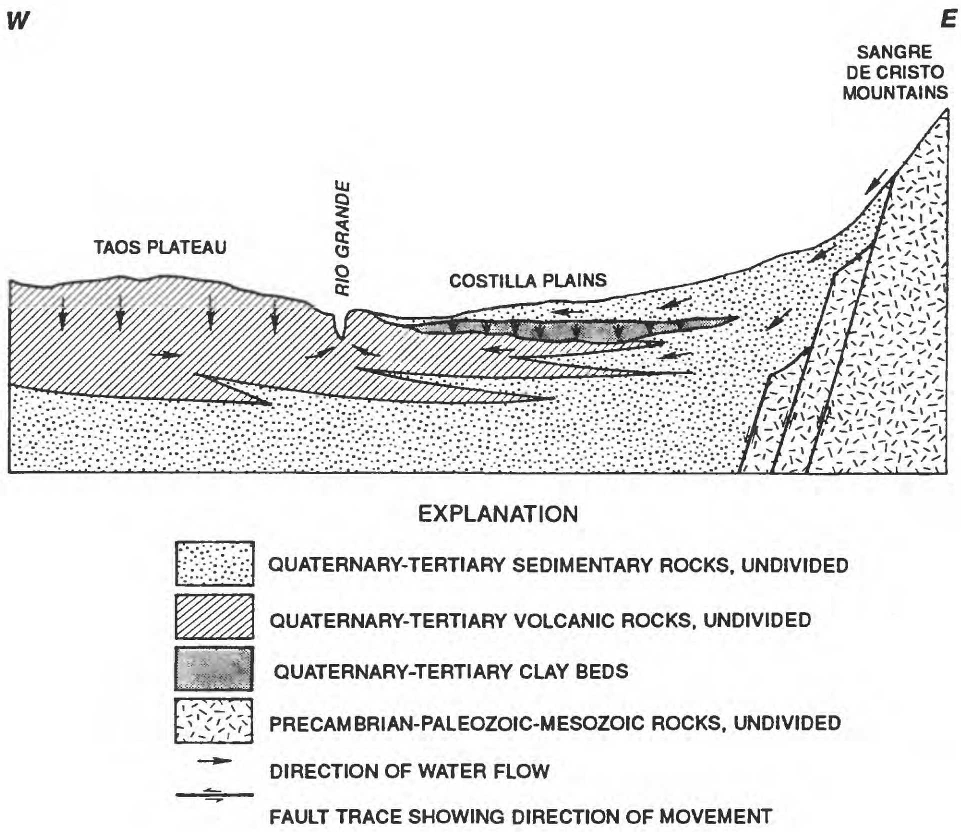

Figure 4.--Generalized west-to-east section across the Taos Plateau and the Costilla Plains in Taos County, New Mexico (from Hearne and Dewey, 1988).

Water is withdrawn from shallow wells in the alluvium of stream valleys of the Sangre de Cristo Mountains. Precipitation and the ensuing runoff recharge the alluvium. Generally, the Precambrian and Tertiary rocks in the mountains do not store or yield much water.

Well Characteristics

Wells in most areas of the county penetrate the alluvial sediments near the surface or the Santa Fe Group at greater depths. The majority of wells in the county are used for domestic purposes and range from shallow, dug wells to public-supply wells 200 to 300 feet deep. Ranges in depths to water, well depths and yields, and surface geology by physiographic subdivision and local area are listed in table 2. This information does not represent an inventory of all wells in the county, but is included to give information representative of various parts of the county. The location of wells, water use, and most recent water-level measurements by the USGS are shown on plate 2. Records for each of these wells and geologic log data for selected wells are listed in tables 3 and 4. In Taos County it is difficult to distinguish between recent alluvial sediments and older sediments of the Santa Fe Group in the log data. The volcanic rocks often are considered as part of the Santa Fe Group.

In the sparsely populated Taos Plateau the few wells that exist are deep and yield little water. Depths to water in wells range from 5 to 1,080 feet below land surface (table 2). Well depths range from 25 to 1,200 feet and yields range from 2 to 50 gallons per minute. The depths to water below land surface and well depths are the greatest in this region. Some precipitation infiltrates the basalt in areas where it is fractured, but not much water is stored in the basalt. In the northern half of the Taos Plateau, wells are in volcanic rocks such as basalt, andesite, and rhyolite. Wells in Tres Piedras are in Precambrian rocks or in the lower to middle Santa Fe Group. Wells in the southwestern part of the Taos Plateau (including Carson) may tap the upper Santa Fe Group, eolian deposits, middle to lower Santa Fe Group, basalt and andesite, or silicic volcanics. Water is used for domestic, livestock, and mining purposes.

Most wells in Taos County are in the Costilla Plains. Depths to water range from less than 1 foot in El Prado (near Taos) to 275 feet below land surface in Sunshine Valley (table 2). Well depths range from 7 feet in San Cristobal to 535 feet in Sunshine Valley and well yields range from 3 gallons per minute in Arroyo Hondo to 3,000 gallons per minute in Sunshine Valley (fig. 1). Wells are drilled in the alluvium, Santa Fe Group, piedmont alluvial deposits and, in the Arroyo Hondo area, in the basalt and andesite. Each town has numerous private, domestic wells in addition to the public-supply wells. There are a few livestock and irrigation wells in Sunshine Valley.

Wells in the valleys of the Sangre de Cristo Mountains are usually shallow and penetrate the recent alluvial sediments. Depths to water range from 2 to 145 feet below land surface (table 2); well depths range from 14 to 503 feet. Well yields are generally small--1 to 50 gallons per minute except for the town of Red River's public-supply wells, which yield as much as 525 gallons per minute and are probably hydraulically connected to the Red River. In the upper Rio Pueblo Valley, shallow wells probably penetrate the alluvium, but deeper wells may penetrate the limestone of Pennsylvanian age. The wells in the Amalia area (fig. 1) are in landslide deposits and colluvium. Water is used for public-supply, domestic, and commercial purposes.

In Sunshine Valley, the recent alluvial sediments are present near the surface, and Santa Fe Group sediments overlie basalt in the northern and eastern parts of the valley (west of Buena Vista; pl. 2). Depths to water are shallowest in the south-central part of the valley and increase slightly to the east and increase more to the north (pl. 2). The Santa Fe Group sediments are interbedded with basalt in the western part of the valley. Hearne and Dewey (1988, p. 38) reported several thousand feet of interbedded gravel, sand, silt, clay, and volcanic rocks in the Costilla Plains. The alluvial sediments are composed of eroded materials from the Sangre de Cristo Mountains and flood-plain deposits (Wilkins and others, 1980).

In the late 1940's and early 1950's about 44 irrigation wells were drilled in Sunshine Valley (Winograd, 1959, p. 10). Winograd estimated that about 3,500 acre-feet was withdrawn in 1955 to irrigate 2,200 acres. The yields from these wells usually varied from 600 to 1,200 gallons per minute and static water levels ranged from 18 to 271 feet. Between 1955 and 1970, water levels dropped 5 to 50 feet throughout the Sunshine Valley (fig. 5). The lowest water levels shown in figure 5 were measured when the well was pumping. Winograd (1959, p. 42) determined that extensive pumping of these wells in Sunshine Valley directly affected flow in the Rio Grande. The New Mexico State Engineer included the area as part of the Rio Grande declared ground-water basin to help protect the flow of the Rio Grande. However, during the early 1970's, the use of many of the irrigation wells was discontinued and water levels generally are higher after 1980 than before 1960 (fig. 5). Well 168 (fig. 5) is one of only a few irrigation wells in use today and its water level has not recovered. In 1985 an estimated 263 acre-feet was withdrawn to irrigate about 380 acres (Wilson, 1986).

Springs

Taos County has numerous springs; 20 were inventoried prior to this study (pl. 2; table 3). These springs are located along fault zones in igneous rocks of Tertiary and Quaternary age along the Rio Grande and Red River and in fractured rocks of Precambrian age. Spring water recharges the flow of perennial rivers, especially the Rio Grande and the Red River. The Red River State Fish Hatchery diverts spring water for its use south of Questa.

Summers (1965a, b; 1976) inventoried the thermal waters of New Mexico and identified seven areas of thermal springs in Taos County. The New Mexico Energy, Minerals, and Natural Resources Department (1988, p. 61) identified two "Known Geothermal Resource Fields" in Taos County: one is Ojo Caliente in the southwest corner (reference number 18, pl. 2), and the other includes the Ponce de Leon Spring (27), Manby Spring (63), and Warmsley Spring (80) in the south-central part of the county. The report lists a spring in Ojo Caliente having a surface-water temperature greater than 50 degrees Celsius (°C) or 122 °F. The water temperatures of the other springs are between 20 and 50 °C (68 and 122 °F). The public uses some of the hot springs for recreation purposes.

Water Quality

The quality of ground water is important because ground water is used for these purposes: mining, public water supply, irrigated agriculture, domestic, commercial, industrial, and livestock. Specific-conductance values and hardness, dissolved solids, and fluoride concentrations are elevated in some areas due to the rock formations present. The USGS collected water samples from wells and springs prior to and during this study. In addition, the New Mexico Environment Department (New Mexico Environmental Improvement Division, 1974a, b; 1980) summarized water-quality data for the Mutual Domestic Water Consumer Association's public-supply wells.

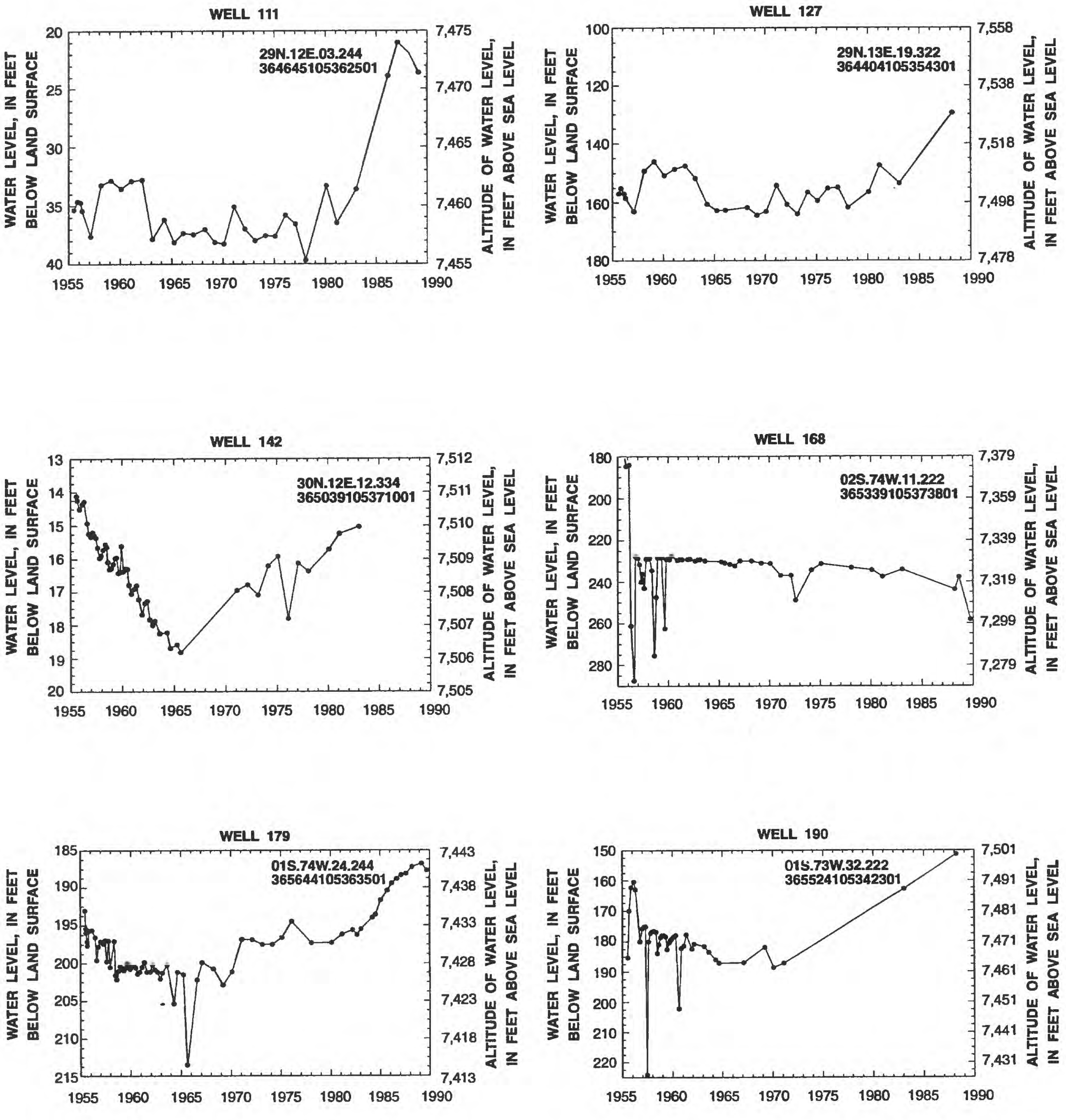

Figure 5.--Water levels in selected wells in Sunshine Valley, 1955-90 (number at top indicates the well reference number on pl. 2 and table 3).

Standards

The New Mexico Water Quality Control Commission (NMWQCC) (1988, p. 21) has established human health, domestic water supply, and irrigation water-quality standards for ground water (table 5). The U.S. Environmental Protection Agency (USEPA) (1988a, b) has defined primary and secondary drinking-water regulations and some of these are listed in table 5. Primary regulations include the maximum contamination level (MCL) for constituents that affect health; these levels are enforceable. The secondary maximum contaminant levels (SMCL's) are listed for constituents that affect the aesthetic quality of drinking water; these levels are not federally enforceable.

Overview of Prominent Constituents

The USGS intermittently collected and analyzed water-quality data for 61 wells and 19 springs from 1955 to 1990 (fig. 6). These data are summarized by constituent in table 6. Water samples were collected only once from most of these wells. Selected water-quality analyses (properties, major ions, and trace elements) from these wells and springs are listed in table 7. Only the most recent data are listed in table 7 and summarized in table 6 for the few wells that were sampled more than once because there were no significant changes in concentrations between the sample dates.

Specific conductance is a measure of the capacity of water to convey an electric current. Dissolved minerals in the water separate into ions carrying positive and negative charges. The more ions that are present, the greater the conductance. Specific conductance ranges from 108 to 1,200 microsiemens per centimeter at 25 degrees Celsius (μS/cm) (table 6) in ground water throughout Taos County. The New Mexico Environment Department (New Mexico Environmental Improvement Division, 1980) suggested that specific conductance should not be more than 1,000 μS/cm in drinking water. Ground-water samples from Ojo Caliente, Peñasco, Questa, Ranchos de Taos, Pilar, and the Rio Fernando de Taos Valley have higher specific-conductance values (375-1,200 μS/cm) (fig. 6) than the rest of the county. The ground water in these areas contains naturally occurring minerals. Water samples from wells in the northern Taos Plateau and Sunshine Valley generally have values of specific conductance less than 300 μS/cm.

The hardness of water represents the total concentration of calcium and magnesium ions expressed as calcium carbonate, in milligrams per liter (mg/L). Hardness is commonly described by the following classification: 0-60 mg/L--soft; 61-120 mg/L--moderately hard; 121-180 mg/L--hard; and greater than 180 mg/L--very hard (Hem, 1985, p. 159). Concentrations in water samples collected by the USGS range from 32 to 640 mg/L calcium carbonate (table 6). Soft to moderately hard ground water is found in parts of the Taos Plateau and Sunshine Valley and the Ponce de Leon Spring (27, pl. 2). Very hard water is found in Peñasco, Ojo Caliente, Cerro, Taos, Ranchos de Taos, Questa, and in the Rio Fernando de Taos Valley (fig. 7).

The predominant cation is calcium and the predominant anion is bicarbonate in ground water in most areas of Taos County. In water from wells and springs in igneous rocks, sodium is sometimes more prevalent than calcium. Sodium is the prevalent cation and sulfate and chloride are more prevalent than bicarbonate in the springs emerging from rocks of Precambrian age.

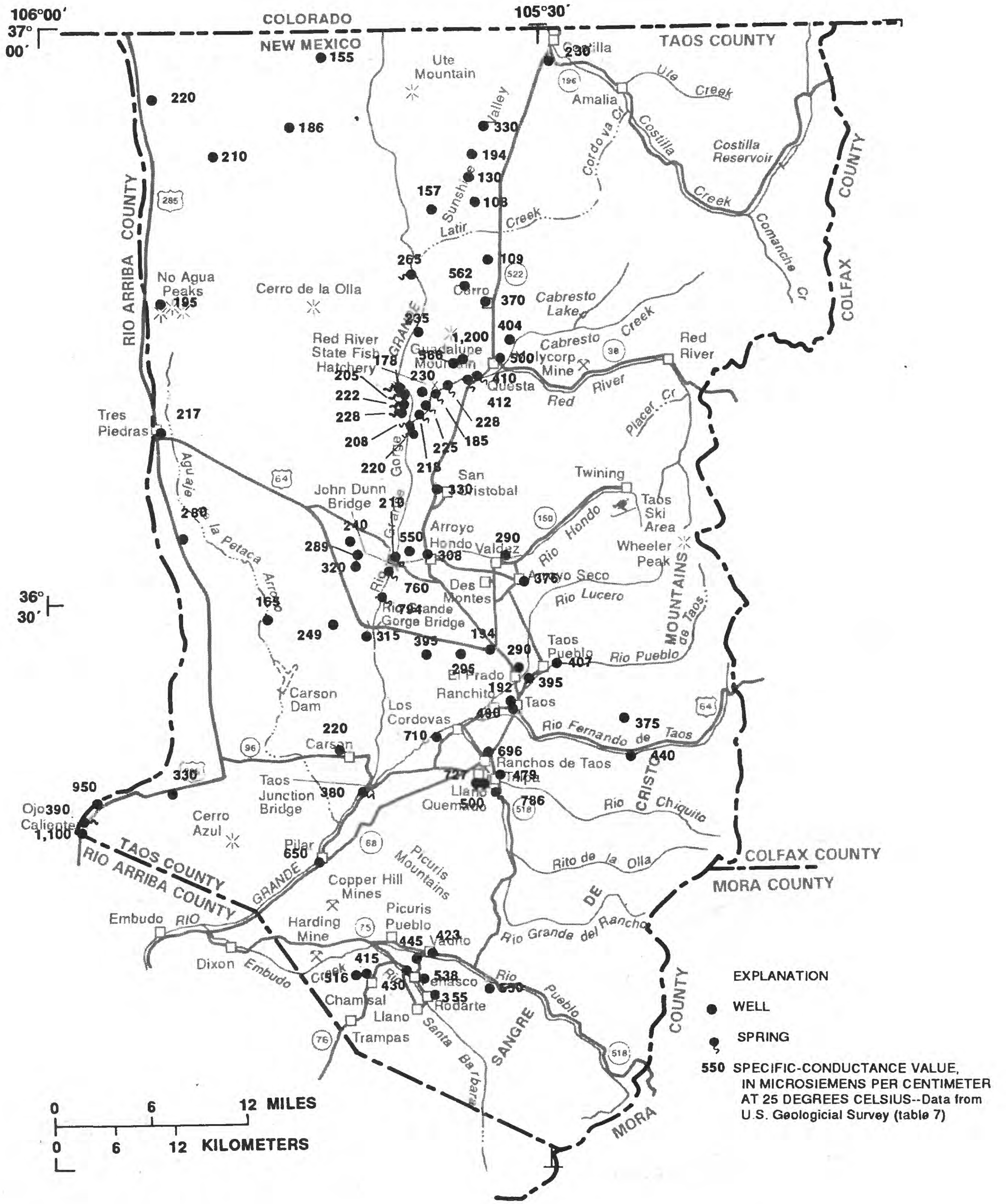

Figure 6.--Specific-conductance values in water samples from selected wells and springs.

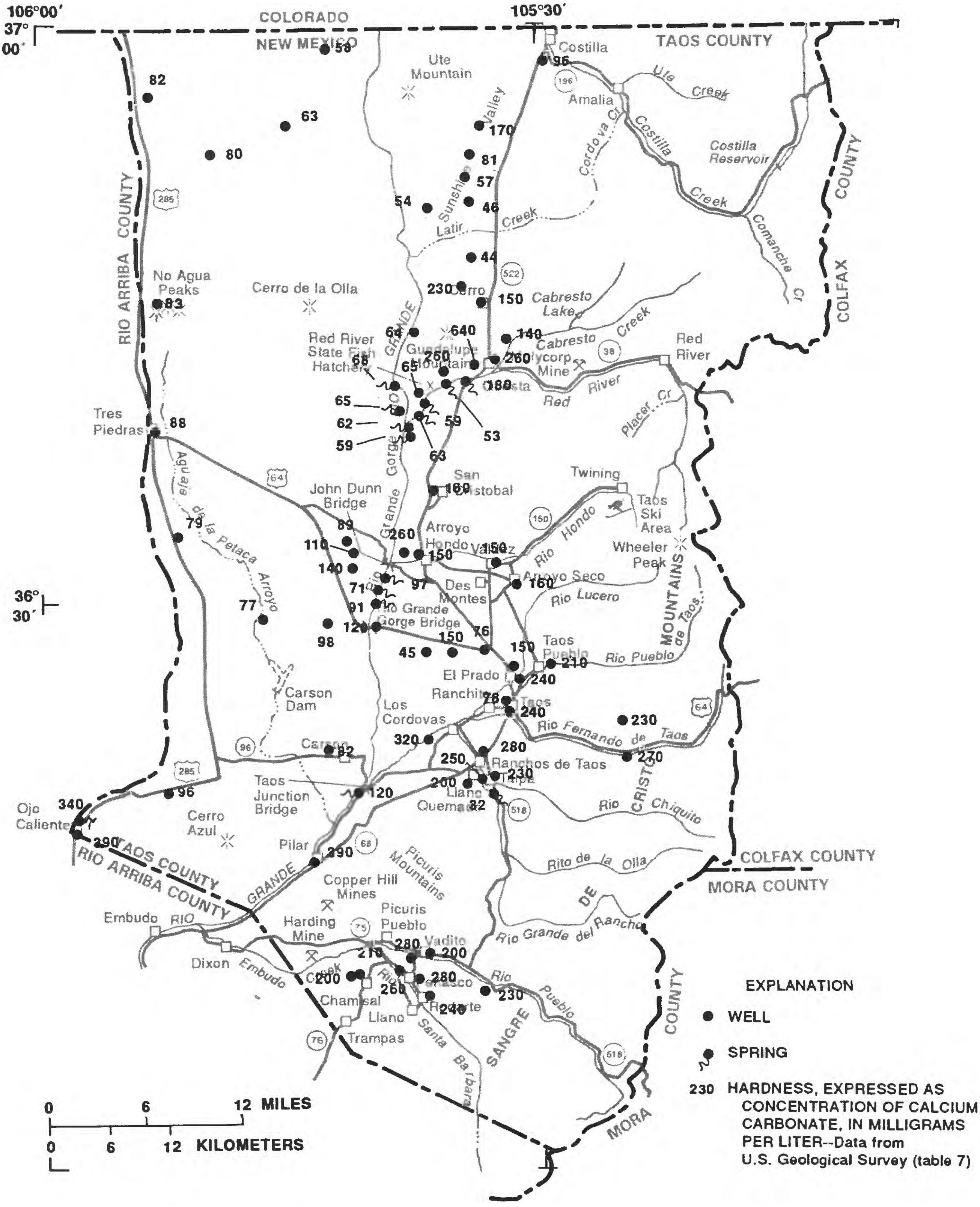

Figure 7.--Hardness, expressed as concentration of calcium carbonate, in water samples from selected wells and springs.

Dissolved solids is the total amount of dissolved ions in solution. The major ions present are calcium, magnesium, sodium, potassium, bicarbonate, carbonate, sulfate, and chloride. The concentrations of dissolved solids range from 73 to 928 mg/L (table 6). Three well samples have concentrations (816, 653, and 928 mg/L) that exceed the USEPA's SMCL for drinking water of 500 mg/L; two are from wells in Ojo Caliente (20 and 21, pl. 2) and the third is from Questa (90, pl. 2). The high dissolved-solids concentration in the water at Questa may be due to the well's location downgradient from the mine tailings pond of Molycorp, Inc. The lowest concentrations are in water from the Taos Plateau (except Ojo Caliente) and Sunshine Valley.

According to the New Mexico Environment Department (New Mexico Environmental Improvement Division, 1980), New Mexico is one of the few areas in the country that has naturally elevated levels of fluoride. Fluoride is commonly associated with volcanic rocks, especially obsidian and rocks high in alkali metals. Fluoride concentrations range from 0.1 to 18 mg/L (table 6). The concentration of 18 mg/L was from the Ponce de Leon Spring (27, pl. 2). On the basis of data analyzed for the Mutual Domestic Water Consumer Associations wells (New Mexico Environmental Improvement Division, 1980), fluoride concentrations were higher than the NMWQCC human health standard of 1.6 mg/L and the USEPA drinking-water MCL of 4.0 mg/L at Chamisal (8.0 mg/L), Des Montes (8.5 mg/L), and Llano Quemado (6.5 mg/L). The New Mexico Environment Department also analyzes well water that citizens bring to their periodic "water fairs." In January of 1988 at a fair held in Taos, the range in fluoride concentrations was 0.12 to 20.3 mg/L in 91 samples from Taos and the surrounding communities (Anna Maria Deardorff, New Mexico Environment Department, oral commun., 1988). The highest concentrations were in two samples from the Ranchos de Taos area, but 82 of the samples contained concentrations below 1.0 mg/L.

Trace elements are usually present in water in minor concentrations (less than 1.0 mg/L). These constituents include heavy metals and sometimes are indicative of pollution. Many trace elements are toxic to humans, animals, fish, and plants. The trace elements in table 7--arsenic, barium, boron, cadmium, chromium, iron, lead, manganese, mercury, molybdenum, selenium, silver, and zinc--were listed because there are sufficient data and New Mexico standards or USEPA MCL's for these elements. The Iron Spring at Ojo Caliente (18, pl. 2) contained a boron concentration of 1.5 mg/L (1,500 micrograms per liter (μg/L)) that exceeded the NMWQCC irrigation standard of 0.75 mg/L. The lead concentration of 0.11 mg/L (110 μg/L) at a spring downstream from the Red River State Fish Hatchery (99, pl. 2) exceeded the NMWQCC human health standard and USEPA MCL of 0.05 mg/L. One sample from a well north of Cerro (153, pl. 2) had a manganese concentration of 0.06 mg/L (60 μg/L) that exceeded the USEPA SMCL of 0.05 mg/L.

SURFACE-WATER RESOURCES

About 93 percent of the water used in the county in 1990 was surface water. The Rio Grande and several perennial tributaries are the source for almost all of the surface water diverted for irrigation, commercial, mining, and livestock purposes.

Occurrence

The Sangre de Cristo Mountains in eastern Taos County receive between 15 and 40 inches of precipitation per year. This precipitation is the source of streamflow of 11 perennial streams or rivers. These streams generally flow westerly and are all tributaries of the Rio Grande. The Rio Grande originates in Colorado and flows through Taos County from north to south. Many arroyos, or gullies, flow only during rainstorms. At least 125 known acequias, or ditches (Saavedra, 1987), divert water from the perennial streams during the irrigation season.

The only two reservoirs in the county, Costilla Reservoir and Cabresto (Lake) Reservoir (fig. 8), were built for irrigation purposes. Costilla Reservoir, completed in 1920, has a maximum storage capacity of 14,540 acre-feet of water. It is owned by the Rio Costilla Cooperative Livestock Association. In August 1988 work began on the repair and rehabilitation of the dam and construction of a new spillway (New Mexico State Engineer Office, 1990). Cabresto Reservoir (Lake), completed in 1928, has a storage capacity of about 732 acre-feet of water and the Llano Irrigation Company uses it for irrigation. Carson Dam, an earthfill dam built in 1935, was abandoned in 1961 because leaks prevented it from being used for irrigation (Ray Acosta, New Mexico State Engineer Office. oral commun., 1991).

Taos County has no large natural lakes, but numerous small lakes formed by glacial action are found in the Sangre de Cristo Mountains. Small lakes also have formed in natural depressions or lowland areas in other parts of the county.

Streamflow Characteristics

As of 1990, the USGS maintained continuous streamflow records at 15 gaging stations in or near Taos County. The locations of the active and discontinued gaging stations are shown in figure 8. Descriptive data on the gaging stations, such as drainage area, period of record, and average and maximum discharge are listed in table 8; note that the "Rio Hondo" and the "Arroyo Hondo" are the same river. The gaging station "Rio Hondo near Valdez" is upstream from the "Arroyo Hondo at Arroyo Hondo" gaging station (table 8; fig. 8).

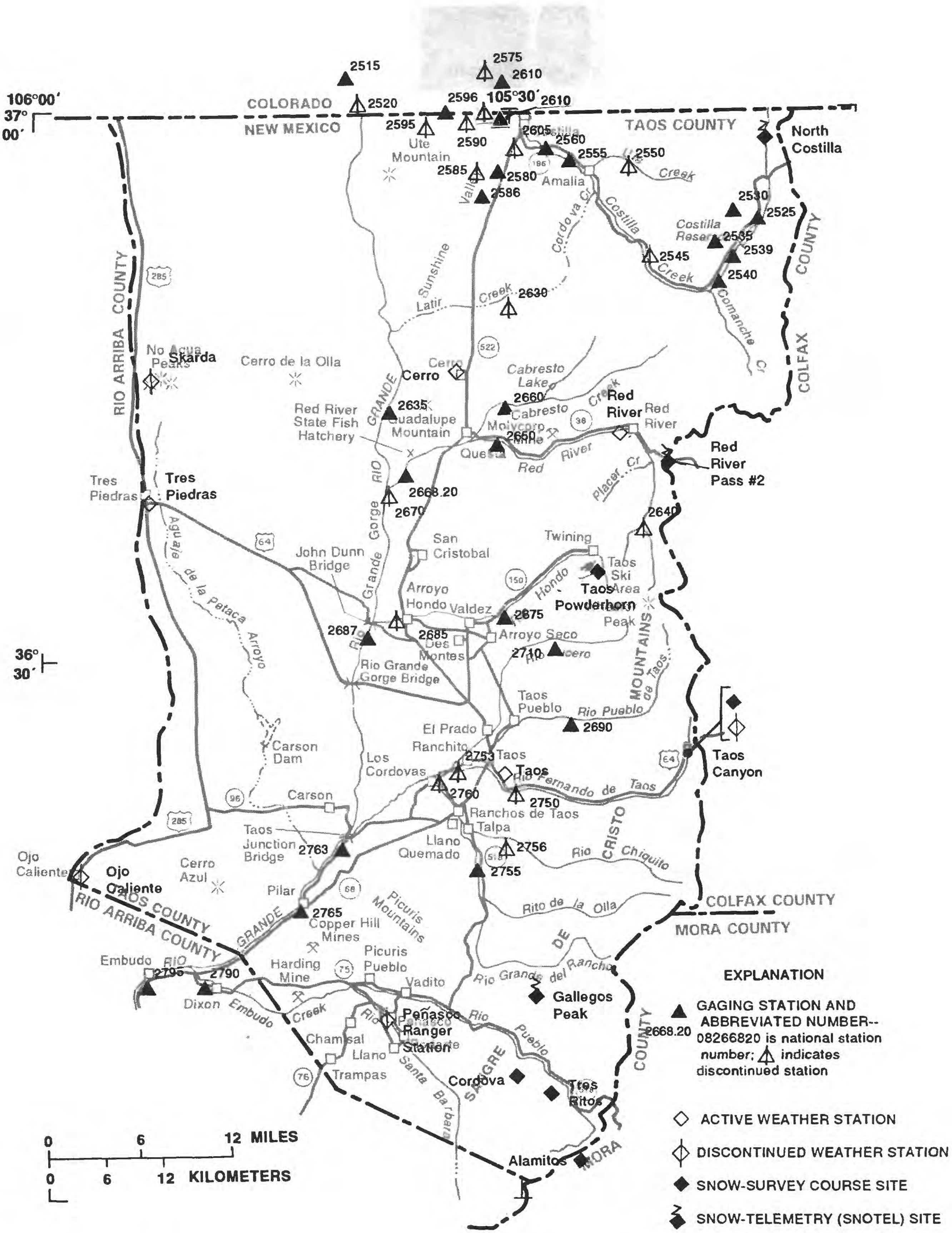

Figure 8.--Surface-water gaging stations, weather stations, and snow sites. See table 8 for gaging station names.

During water years 1900-30 the average discharge was 612,900 acre-feet per year at Rio Grande near Lobatos, Colorado (table 8) (about 5 miles upstream from the Colorado-New Mexico State line); the average discharge at Rio Grande at Embudo (about 7 miles downstream from the study area) was 823,200 acre-feet per year. For water years 1931 to 1989 the average discharge at Lobatos was 328,200 acre-feet per year and at Embudo was 599,900 acre-feet per year (table 8); the average discharge gained between these two stations was 271,700 acre-feet per year. The decrease in the average annual discharge after 1930 at both stations was largely due to upstream development for irrigation.

The USGS maintains and records discharge at nine gaging stations for the Costilla Creek Compact during the irrigation season (May to September). Costilla Reservoir stores water that is used for irrigation in Colorado and New Mexico. Some diversions are upstream from the reservoir, but the largest canals, the Acequia Madre and the Cerro Canal, divert water from Costilla Creek near the town of Costilla (pl. 2). During the irrigation season, these two canals divert most of the streamflow of Costilla Creek. The discharge near the headgate of the Acequia Madre ranged from 8 to 11 cubic feet per second during the 1989 irrigation season, and the discharge in the Cerro Canal at Costilla near the headgate ranged from 7.5 to 53 cubic feet per second.

The mean annual discharge at the Red River near Questa, the Rio Pueblo de Taos below Los Cordovas, and Embudo Creek at Dixon (fig. 9), the three largest tributaries of the Rio Grande, ranges from about 10 to 180 cubic feet per second. The mean annual discharge for the Rio Grande at Embudo ranges from about 300 to 2,100 cubic feet per second (fig. 10). The 5-year moving average of mean annual discharges smooths out these variations and provides a clearer picture of streamflow trends (fig. 10). For example, the 5-year moving average for 1980 was computed as the average of the mean annual discharges for 1978 to 1982. From 1936 to 1950 the 5-year moving average at the Rio Grande at Embudo mostly was above the average for the period of record (828 cubic feet per second); from 1950 to 1980 it was below. During the 1980's, the 5-year moving average was again above the average for the period of record.

The seasonal streamflow patterns are fairly uniform from one stream to another throughout Taos County. The largest percentage of runoff occurs during the spring when the mountain snow melts. The spring runoff season can last from March to July, but the highest mean monthly discharge occurs in May or June (fig. 11). Discharge increases temporarily in the summer months due to short, intense thunderstorms. The months of lowest mean discharge are December, January, and February for the smaller tributaries of the Rio Grande, such as the Rio Hondo near Valdez. September and October are the months of lowest mean discharge for the Rio Grande at Embudo and the Rio Pueblo de Taos near Los Cordovas. In the months of low flow, ground-water inflow represents a larger percentage of the total streamflow.

Flow-duration curves are useful tools for characterizing streamflow. The flow-duration curve is a cumulative frequency curve that shows the percentage of time specified discharges were equaled or exceeded during a given period. For example, figure 12A shows that the mean daily discharge of 33 cubic feet per second at Embudo Creek at Dixon was equaled or exceeded 50 percent of the time. Figure 12B shows that 90 percent of the time the mean daily discharge at the Rio Grande at Embudo is about 260 cubic feet per second, and at the Rio Grande near Cerro is about 80 cubic feet per second. The shape and steepness of the curve are also important indicators for comparing streamflow characteristics--a flatter curve indicates a more regulated stream.

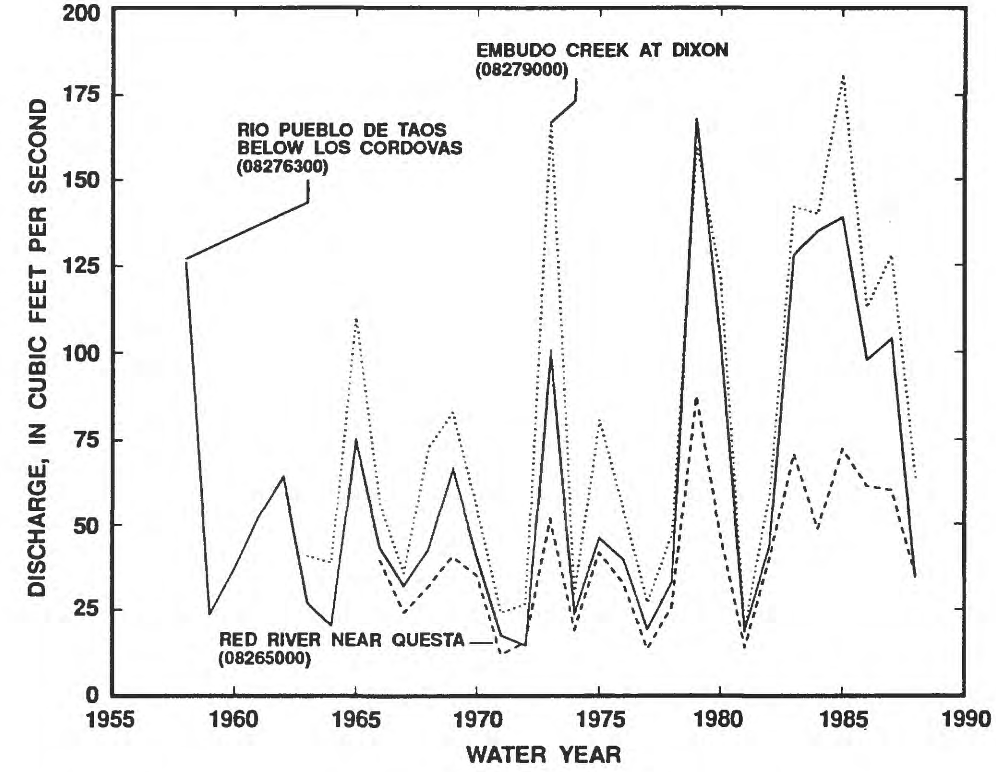

Figure 9.--Mean annual discharge of three major tributaries of the Rio Grande.

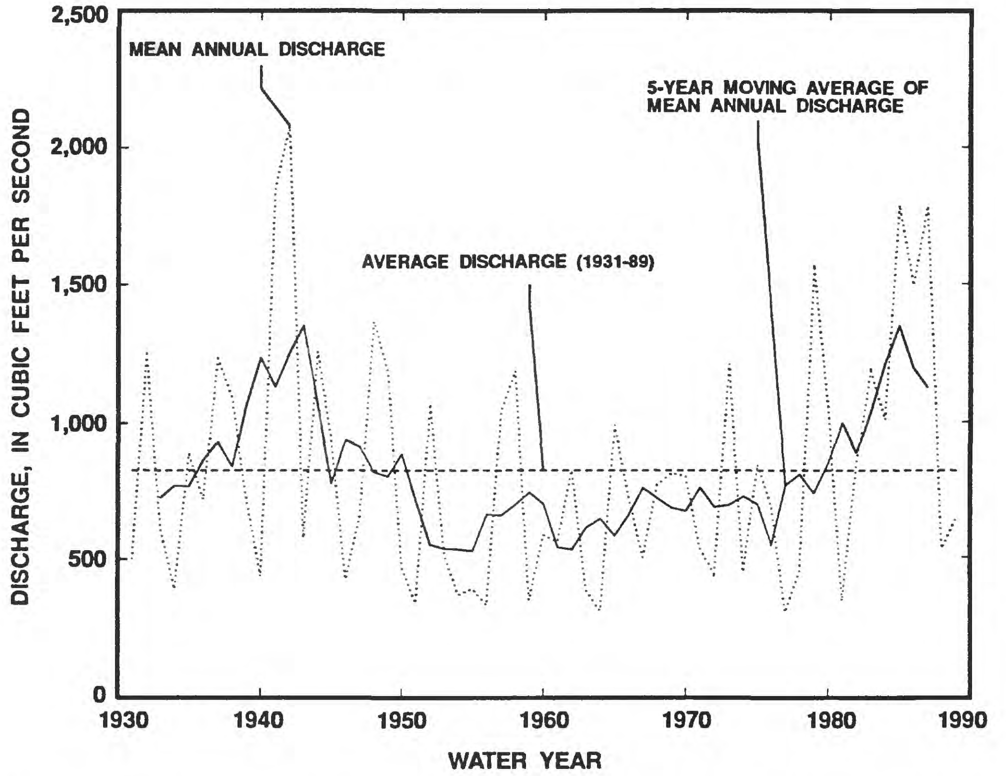

Figure 10.--Mean annual discharge, average discharge for 1931-89, and 5-year moving average of mean annual discharge for the Rio Grande at Embudo (08279500).

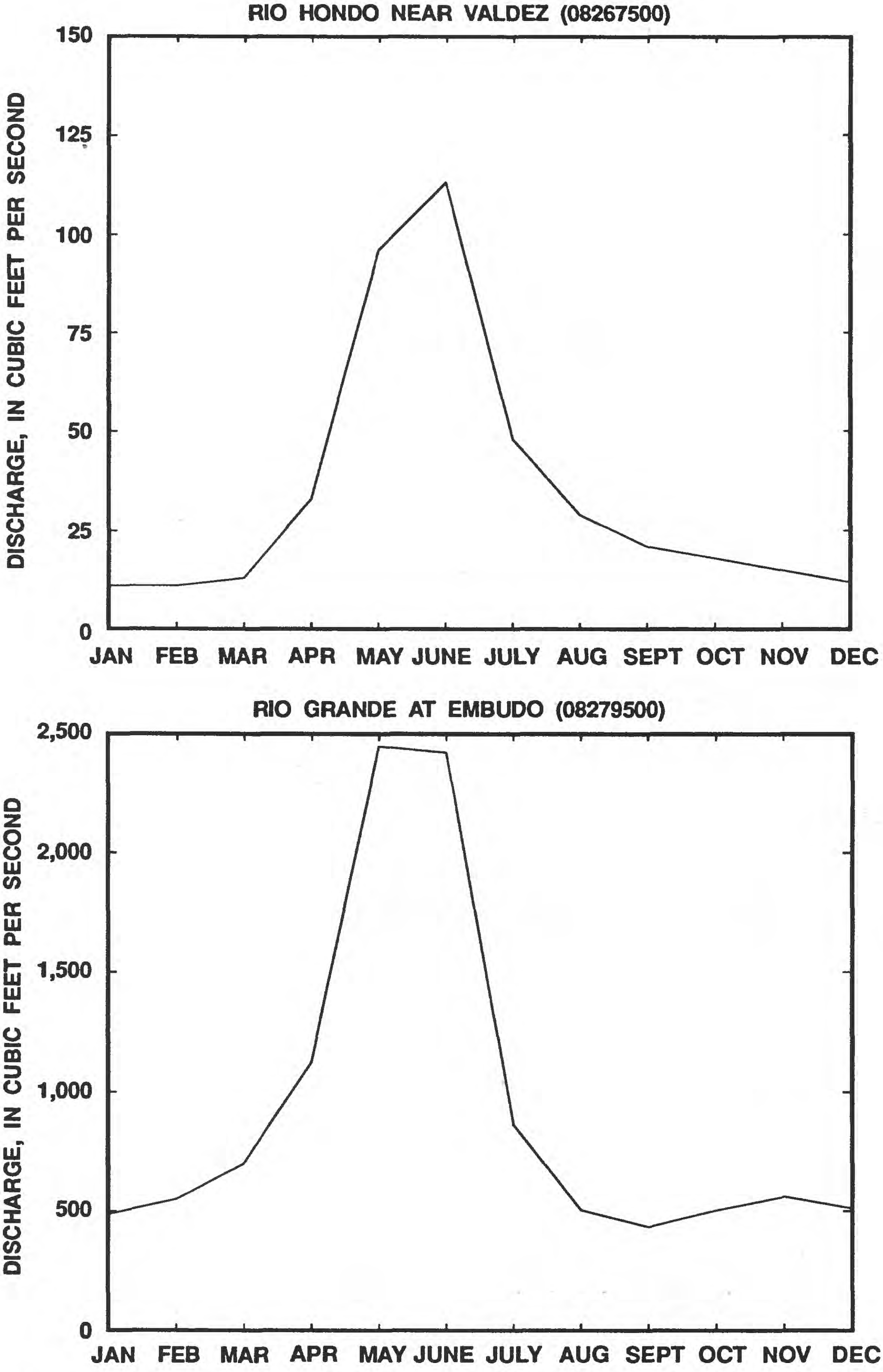

Figure 11.--Mean monthly discharge for the period of record at the Rio Hondo near Valdez and the Rio Grande at Embudo.

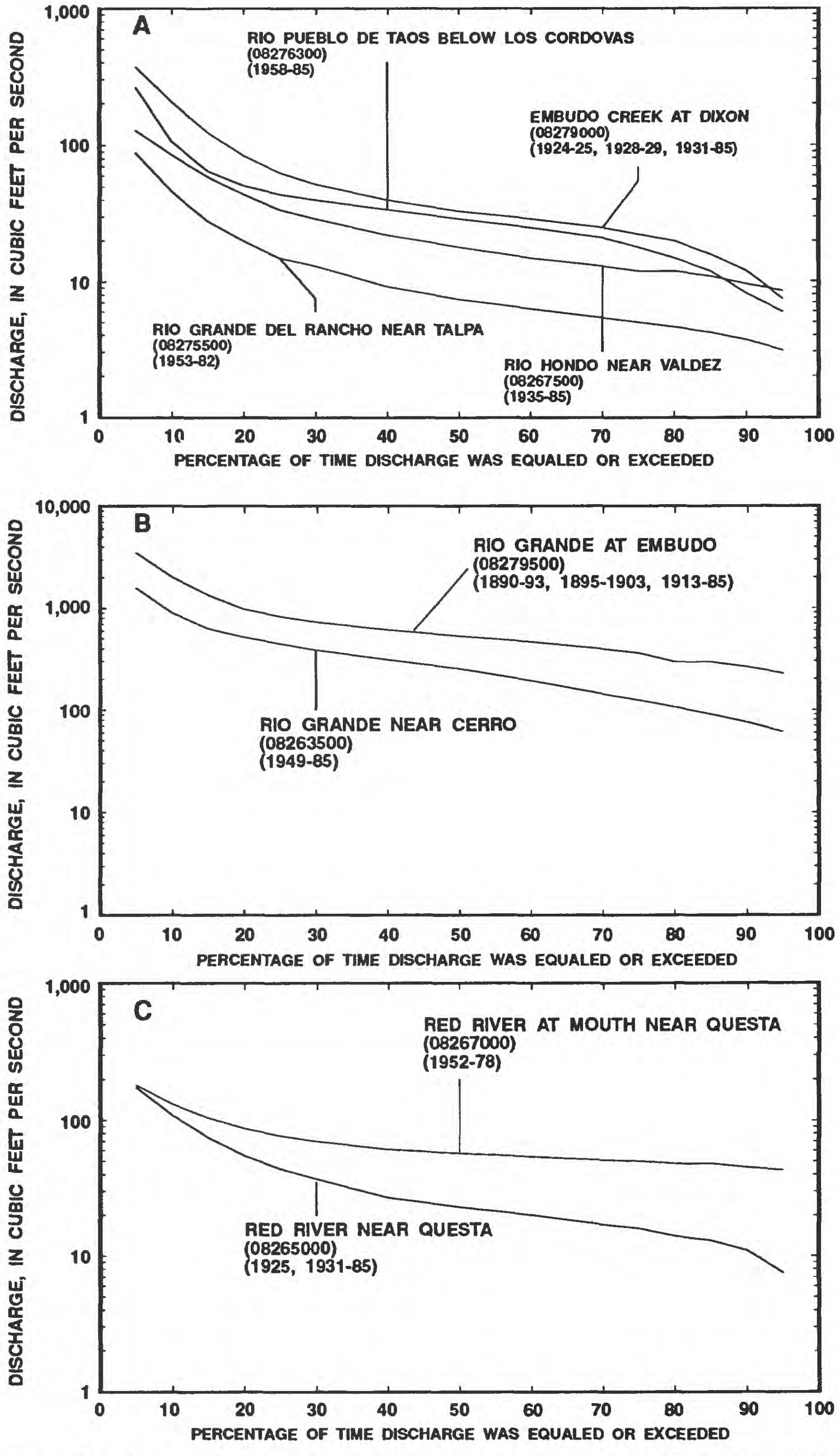

Figure 12.--Flow-duration curves for mean daily flows for (A) four tributaries of the Rio Grande; (B) the Rio Grande near Cerro and at Embudo; and (C) the Red River near Questa and at the mouth (data from Waltemeyer, 1989).

Some stream reaches in Taos County gain water year-round due to ground-water accretion. The Red River, between Questa and its confluence with the Rio Grande, gains about 35 cubic feet per second (about 25,400 acre-feet per year) from several springs near the Red River State Fish Hatchery (Garn, 1984, p. 52). The flow-duration curve for Red River at the mouth reflects this gain in discharge (fig. 12C). The curve for the station at the mouth is flatter at the 85- to 95-percentile range than the curve for the station near Questa, indicating greater sustained base flows due to ground-water inflow. The Rio Grande also gains about 96 cubic feet per second (about 69,600 acre-feet per year) in the reach between Ute Mountain (just south of the Colorado-New Mexico State line) and the confluence of the Red River (Winograd, 1959, p. 40). The Rio Grande is reported to also gain water in the reach from the John Dunn Bridge to Taos Junction Bridge (Wilson and others, 1978). In all of these reaches, springflow from the basalt canyon walls helps sustain streamflow year-round.

Water Quality

The water quality of perennial streams varies with the streamflow, time of year, and location. Rainfall runoff and point- and non-point-source pollution can cause the water quality of a stream to deteriorate. Generally, dissolved-solids concentrations are lowest in the reaches of streams in the Sangre de Cristo Mountains where there is less human activity.

Standards

The NMWQCC designates the uses for which the surface waters of the State shall be protected and defines the water-quality standards necessary to sustain the designated uses. The numerical standards and uses are summarized in table 9 and the streams to which they apply are shown in figure 13. "These standards may not be attainable when streamflow is less than the critical low flow; the critical low flow is defined as the minimum average 7-consecutive-day flow that occurs with a frequency of once in 10 years" (New Mexico Water Quality Control Commission, 1991, p. 8). In many cases standards are exceeded in times of low flow when the river has a decreased ability to dilute certain constituents or during periods of high flow when turbidity and suspended sediment are naturally greater.

Water quality in Taos County can be impaired by point sources and non-point sources of degradation. Three towns and one mine have National Point Discharge Elimination System permits (issued by the USEPA): Taos, Red River, Twining (municipal permits), and Molycorp, Inc. (industrial permit). The permits dictate that certain effluent standards for specific constituents cannot be exceeded in the water that is discharged to watercourses. Non-point sources can include agriculture, silviculture, construction, recreation, resource-extraction activities, and runoff from developed areas, roads, and overgrazed rangelands.

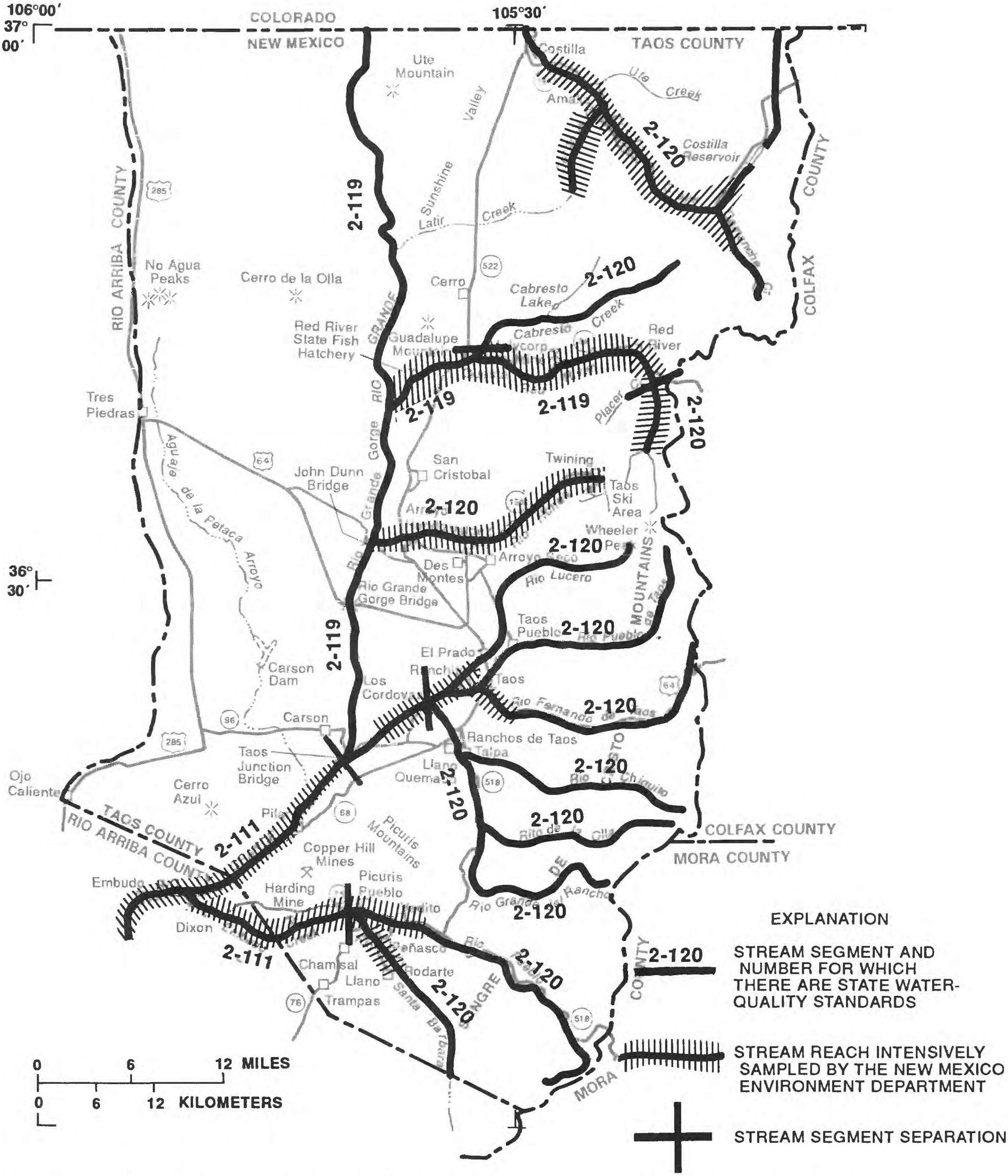

Figure 13.--Stream segments for which there are State water-quality standards and stream reaches intensively sampled by the New Mexico Environment Department. See table 9 for description of stream segments (modified from New Mexico Water Quality Control Commission, 1991).

Overview of Prominent Constituents

The USGS collects water-quality data at six sites on a regular basis and collects data at other sites on an intermittent basis (table 10). The locations of these sites are shown in figure 14. The summary of water-quality analyses in table 11 is for the stations where water samples are actively collected or where 20 or more samples have been collected.

Specific conductance generally is low in samples from small, mountainous watersheds (Costilla Creek, Cabresto Creek, Rio Hondo near Valdez, Rio Pueblo de Taos below Taos, and Rio Lucero) in contrast to samples from large watersheds that are affected by human activity (Embudo Creek, Rio Pueblo de Taos below Los Cordovas, Red River, and the Rio Grande). Specific conductance ranges from a minimum of 62 μS/cm (Rio Lucero near Arroyo Seco) to a maximum of 1,280 μS/cm (Red River at Fish Hatchery near Questa) (table 11). The median varies from 100 μS/cm at Rio Lucero near Arroyo Seco to 460 μS/cm at Rio Pueblo de Taos below Los Cordovas (fig. 15).

The pH ranges from a minimum of 3.8 (Red River near Questa) to a maximum of 9.9 (Red River at Fish Hatchery near Questa) (table 11). The median varies from 7.3 (Red River at mouth near Questa) to 8.5 (Arroyo Hondo at Arroyo Hondo).

Dissolved-oxygen concentrations range from a minimum of 6.5 mg/L (Arroyo Hondo at Arroyo Hondo, and Rio Grande below Taos Junction Bridge near Taos) to a maximum of 19.0 mg/L (Red River near Questa); the median varies from 8.2 mg/L (Red River below Fish Hatchery near Questa) to 10.2 mg/L (Rio Lucero near Arroyo Seco) (table 11).

Median alkalinity concentrations are higher than 100 mg/L as calcium carbonate in Arroyo Hondo at Arroyo Hondo, Rio Pueblo de Taos below Los Cordovas, and Embudo Creek at Dixon, and are lower (less than 55 mg/L) in the Red River near Questa, Cabresto Creek near Questa, Red River below Questa, and Rio Lucero near Arroyo Seco (table 11). Concentrations range from a minimum of 0 mg/L (Red River near Questa) to a maximum of 315 mg/L (Red River at mouth near Questa).

The minimum dissolved-solids concentration is 46 mg/L at Rio Lucero near Arroyo Seco and the maximum is 690 mg/L at the Red River above State Fish Hatchery near Questa (table 11). The median varies from 64 mg/L at Rio Lucero near Arroyo Seco to 322 mg/L at Red River above State Fish Hatchery near Questa. The lower Red River and the Rio Grande generally have the highest concentrations of dissolved solids, and the Rio Hondo near Valdez, Rio Lucero, Cabresto Creek, and Costilla Creek have the lowest concentrations.

Calcium and magnesium are the prevalent cations and bicarbonate and sulfate are the prevalent anions. Most streams in Taos County contain low concentrations of trace elements with the exception of the Red River. The trace elements found in the Red River are discussed in the following section.

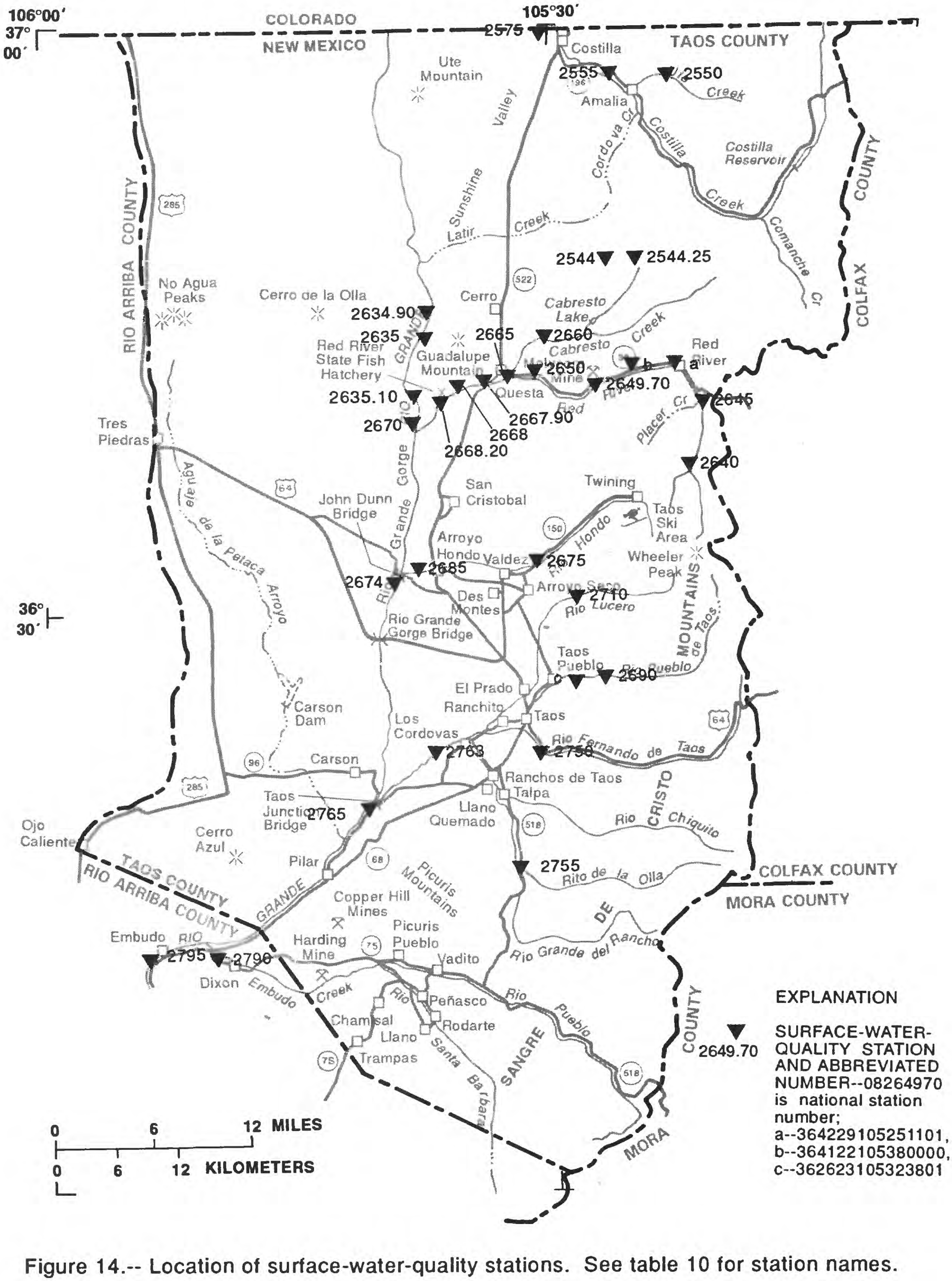

Figure 14.-- Location of surface-water-quality stations. See table 10 for station names.

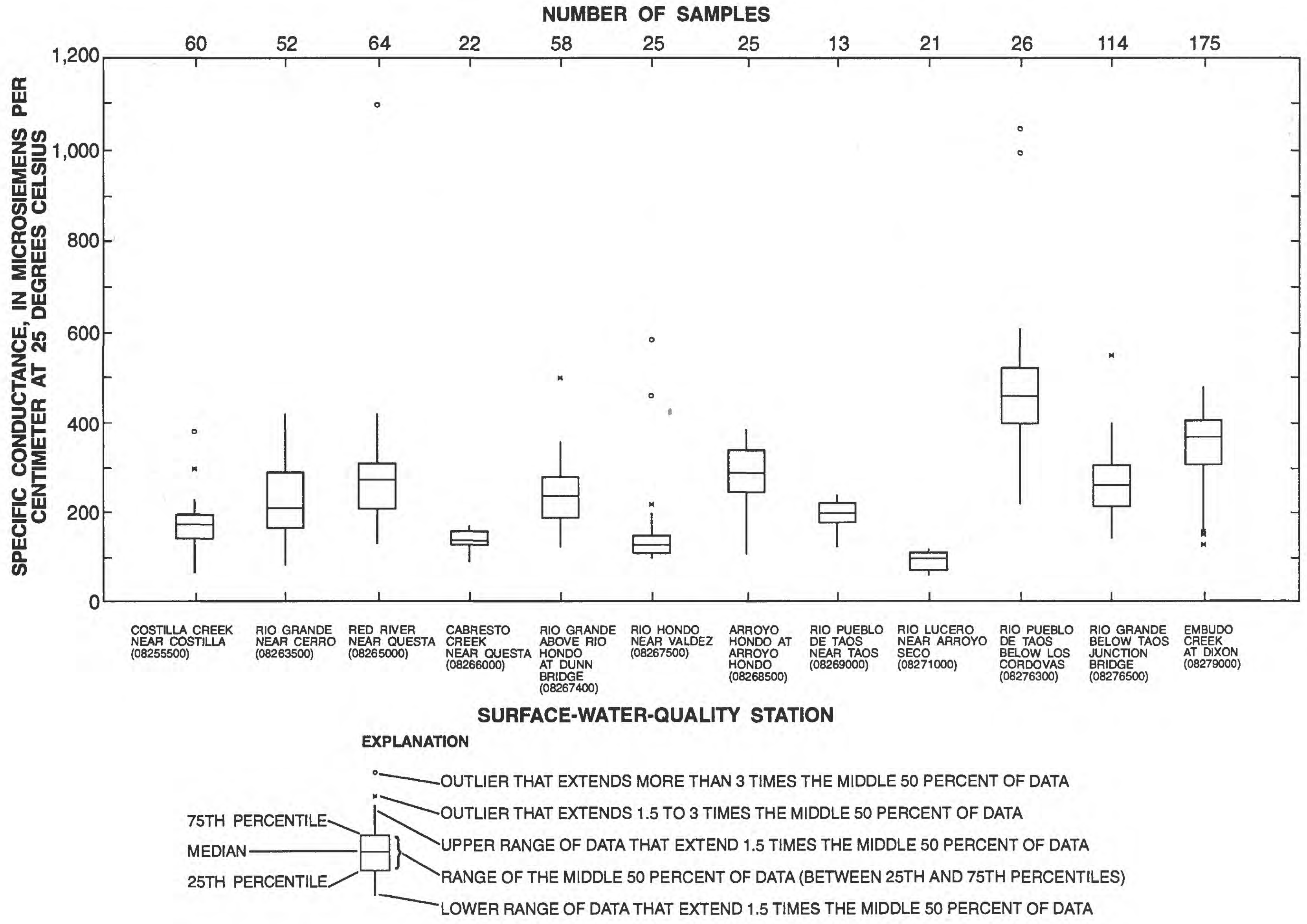

Figure 15.--Specific-conductance values in the Rio Grande and tributaries of the Rio Grande. See figure 14 for location of stations.

Suspended-sediment concentrations vary greatly due to the spring runoff and other runoff from rainfall that add large amounts of sediment to the streams and rivers. Concentrations range from a minimum of 0 mg/L (Red River below Zwergle Damsite near Red River, Cabresto Creek near Questa, Rio Hondo near Valdez, Red River below Fish Hatchery near Questa) to a maximum of 24,700 mg/L (Rio Grande below Taos Junction Bridge near Taos) (table 11). The median varies from 4.0 mg/L (Red River near Red River) to 42 mg/L (Red River near Questa).

Intensive Stream Surveys

The New Mexico Environment Department has conducted several intensive water-quality surveys of various stream or river segments in Taos County (fig. 13). These surveys assess the general water quality of the stream or river and determine if State standards are exceeded.

The stream that has been studied and sampled the most is Red River. In addition to the New Mexico Environment Department surveys, the USGS, U.S. Bureau of Land Management, the USEPA, and the U.S. Forest Service have collected samples. The quality of water in the Red River is often degraded due to toxic trace elements from point and non-point sources (Garn, 1985, p. 462). During runoff, several State water-quality standards are usually exceeded due to water running off the sulfide-rich volcanic soils of the barren, south-facing slopes of the basin. The towns of Red River and Questa discharge effluent from their sewage treatment facilities to the river. Molycorp, Inc. also discharges treated water from its tailings ponds into the river. Since 1976, there have been more than 30 breaks in the tailings slurry pipeline that is next to the Red River (Smolka and Tague, 1987, p. 10). Trace elements from the runoff and slurry precipitate out or are adsorbed onto sediment. The blue-gray color during low flows of the river near the Questa Ranger Station may be due to aluminum in particulate phase (Smolka and Tague, 1989, p. 13).

In samples collected from the Red River by the USGS and the U.S. Bureau of Land Management, the median specific-conductance values and sulfate and molybdenum concentrations are higher in water collected at Red River above State Fish Hatchery near Questa and at Red River at State Fish Hatchery near Questa (fig. 16A-C) than at other stations on the Red River due to the treated effluent from Molycorp's tailings ponds (Garn, 1984, p. 58). In figures 16C and 16D values were estimated for some stations if the values were below the detection limit. Median manganese concentrations are higher "near" and "below Questa" (fig. 16D) and are most likely due to natural leaching of mineralized areas between Red River and Questa (Garn, 1984, p. 57).

Some of the properties and constituents whose concentrations have exceeded State standards in samples collected from the Red River by the USGS and New Mexico Environment Department include: pH, dissolved solids, turbidity, sulfate, total phosphorus, aluminum, arsenic, barium, cadmium, copper, cyanide, iron, lead, manganese, molybdenum, silver, and zinc. The segment of the Red River between the town of Red River's wastewater treatment plant and Questa has a low potential for a reproducing trout population, but the lower Red River (below the State Fish Hatchery) contains a stable reproducing trout population (Smolka and Tague, 1987, p. 25-26).

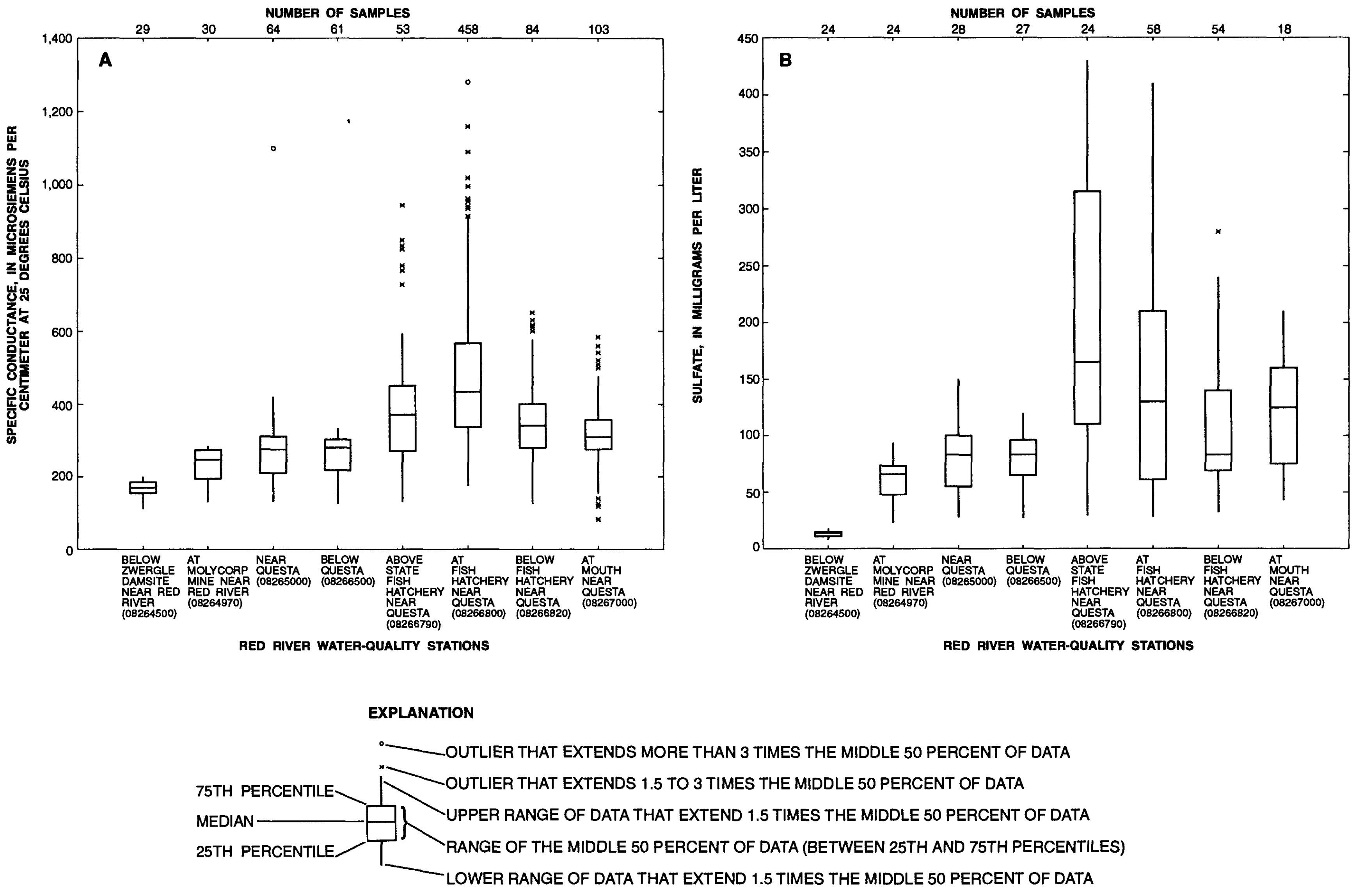

Figure 16.--Selected water-quality properties and constituents in the Red River: (A) specific conductance; (B) sulfate; (C) molybdenum; and (D) manganese. See figure 14 for location of stations.

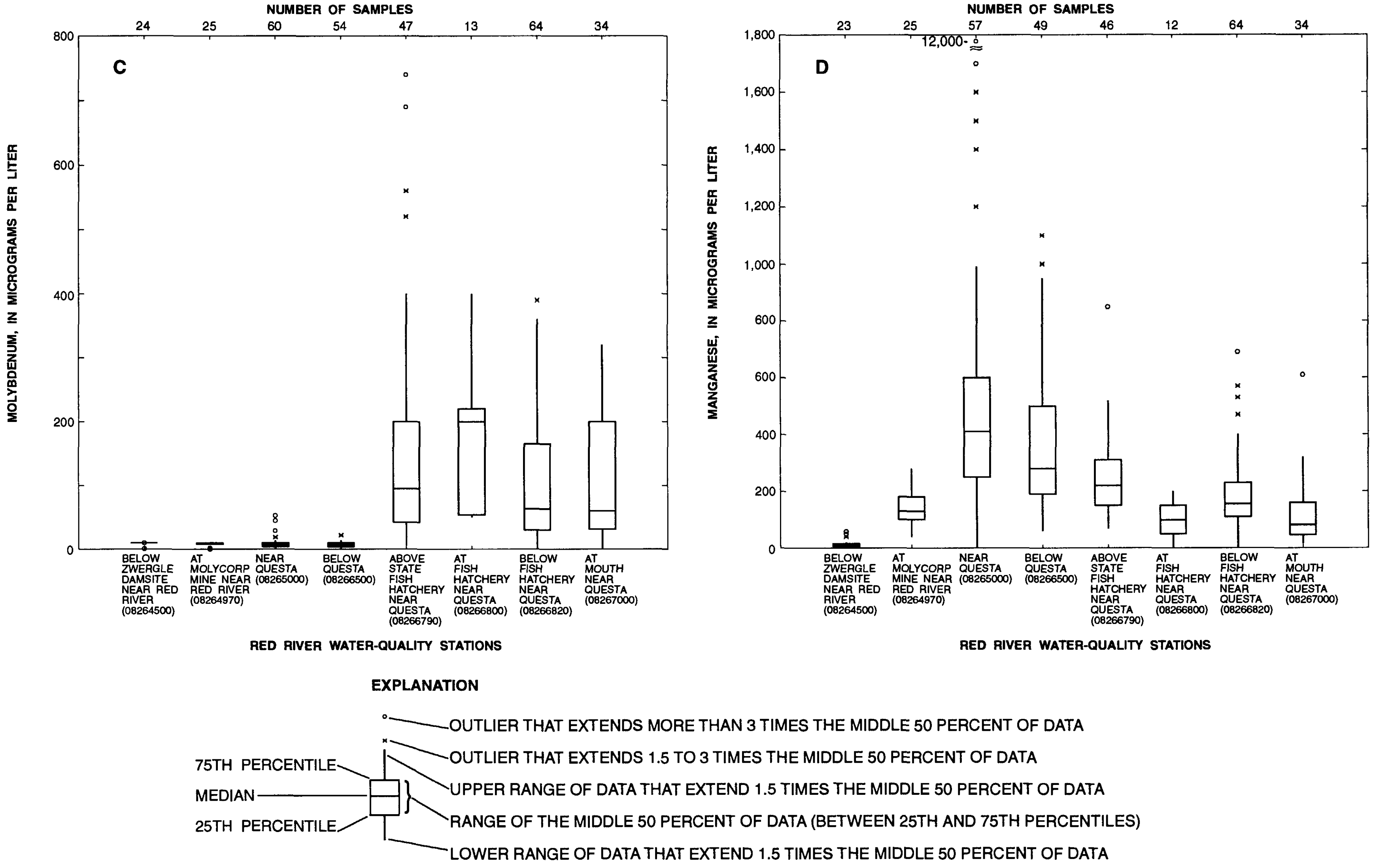

Figure 16.--Selected water-quality properties and constituents in the Red River: (A) specific conductance; (B) sulfate; (C) molybdenum; and (D) manganese--Concluded. See figure 14 for location of stations.

The water quality of the Rio Hondo is also degraded at times. The Taos Ski Area is located in the Rio Hondo Basin, and the Twining wastewater treatment plant discharges into the river near the ski area. A new wastewater treatment plant started operating in 1982, but when the plant is not operating properly, the sewage effluent contains nutrients that tend to cause excessive algal growth in the Rio Hondo (Jacobi and Smolka, 1983, p. 16; 1984b, p. 7; Smolka, 1986, p. 16). The most recent survey was conducted during the winter of 1985-86, when streamflow was low and discharge from the treatment plant was high (Smolka, 1986). The effluent contained concentrations of total phosphorus and total ammonia that exceeded the standards of the National Point Discharge Elimination System permit. However, the composition of the existing benthic macroinvertebrate community indicated that the Rio Hondo meets the criteria for a high-quality mountain stream and has a reproducing trout population (Smolka, 1986, p. 3-4).

The New Mexico Environment Department surveyed the Rio Santa Barbara, the Rio Pueblo, and Embudo Creek on September 2-3, 1986, and found the water quality in these three streams to be "excellent" (Smolka, 1987b, p. 1). The New Mexico Environment Department concluded that the designated uses in these streams seem to be unimpaired.

In August 1985 water from the Rio Pueblo de Taos and its tributaries near Taos and Los Cordovas was sampled by the New Mexico Environment Department. Potter (1986) concluded that the effluent from the Taos wastewater treatment plant contributed to some of the violations of State standards during low-flow conditions. The violated standards were those for dissolved oxygen, pH, and turbidity. Water samples were collected again from February through September 1989 (New Mexico Environmental Improvement Division, 1990, p. 3). During this time the State standard for fecal coliform was exceeded three times and the State standard for non-ionized ammonia was exceeded five times downstream from the Taos wastewater treatment plant. The fishery inventory indicated that healthy and diverse populations were present.

The New Mexico Environment Department collected water samples from the 45-mile reach of the Rio Grande between Taos Junction Bridge and Otowi Bridge (south of Taos County) during July 1989 (New Mexico Environmental Improvement Division, 1990, p. 96). No State water-quality standards were exceeded. The benthic macroinvertebrate communities appeared to be healthy, although there was a reduction in the number of taxa and diversity downstream.

Water samples from Costilla and Cordova Creeks were collected by the New Mexico Environment Department October 14-16, 1982. These streams are designated as high-quality coldwater fisheries by the NMWQCC and the water quality was "very good" (Smolka and Jacobi, 1983). Background information was collected prior to the development of a ski area near Cordova Creek. The New Mexico Environment Department concluded that "minor" degradation of Cordova Creek had occurred due to construction of parking lots and roads, which increase the amount of sediment in the stream. Another study done February 23-26, 1987, on Costilla Creek and four of its tributaries--Ute Creek, Latir Creek, Comanche Creek, and Cordova Creek--determined that the water quality was "excellent" (Smolka, 1987a, p. 3). A few State standards were exceeded in water from the tributaries: those for pH, turbidity, and phosphorus. Cordova Creek, by the ski area, contained high concentrations of dissolved solids, suspended solids, turbidity, and phosphorus due to its unstable channel and runoff from the parking lots and roads.

Lake Studies

The USGS studied the Latir Lakes area to determine the effects, if any, of acid rain on high-altitude natural lakes (Scott Anderholm, Hydrologist, U.S. Geological Survey, oral commun., 1990). The study included nine paternoster lakes, ranging in altitude from 11,061 to 11,893 feet in the Sangre de Cristo Mountains northeast of Cerro. Water samples from the lakes and their outflow were collected. Preliminary results show that the lakes are naturally alkaline and do not seem to be significantly affected by acid rain.

Another study of high mountain lakes (Lynch and others, 1988) included four lakes in the Wheeler Peak Wilderness Area (pl. 2) in Taos County. The study determined that Middle Fork, Lost, Horseshoe, and Williams Lakes have low alkalinities and have experienced some loss of buffering capacity (ability to neutralize acid rain).

The NMWQCC identified three lakes on public land in Taos County where the use of the lakes as high-quality coldwater fisheries is impaired or "not fully supported" (New Mexico Water Quality Control Commission, 1990, p. 244-245). Agriculture and recreation are listed as the probable sources of degradation in Cabresto, Heart, and Goose Lakes.

WATER USE

The NMSEO and the USGS estimate water-use data in New Mexico by county and river basin at 5-year intervals. The NMSEO collects most of the water-use data in New Mexico. There are some differences in the data format, categories of water use, and terminology used by the NMSEO and USGS. Except where otherwise noted, the NMSEO's 1990 data and terminology from Wilson (1992) are used in this section. The categories of water use in Taos County are irrigated agriculture, mining, public water supply, domestic, commercial, industrial, and reservoir evaporation.

The total amount of water withdrawn in Taos County was about 112,000 acre-feet in 1990; total depletions were about 43,000 acre-feet (Wilson, 1992). A withdrawal is defined by Wilson (1992) as the total amount of water taken or diverted from a surface- or ground-water supply, and a depletion is the amount of water consumed by humans, incorporated into crops, or otherwise unavailable for reuse. As in most counties in New Mexico, the majority of water in Taos County is used for irrigated agriculture. About 95 percent of the water depleted in 1990 was used for irrigated agriculture (fig. 17). All other categories of use make up the remaining 5 percent of depletions. The second largest category of water use is mining (fig. 17). The withdrawals and depletions of surface and ground water by category in 1990 are listed in table 12.

Surface water was the source for about 93 percent of the total withdrawals in 1990. However, all the water withdrawn for public water supply, domestic, and industrial purposes was ground water. About 39 percent of the total surface- and ground-water withdrawals was depleted.

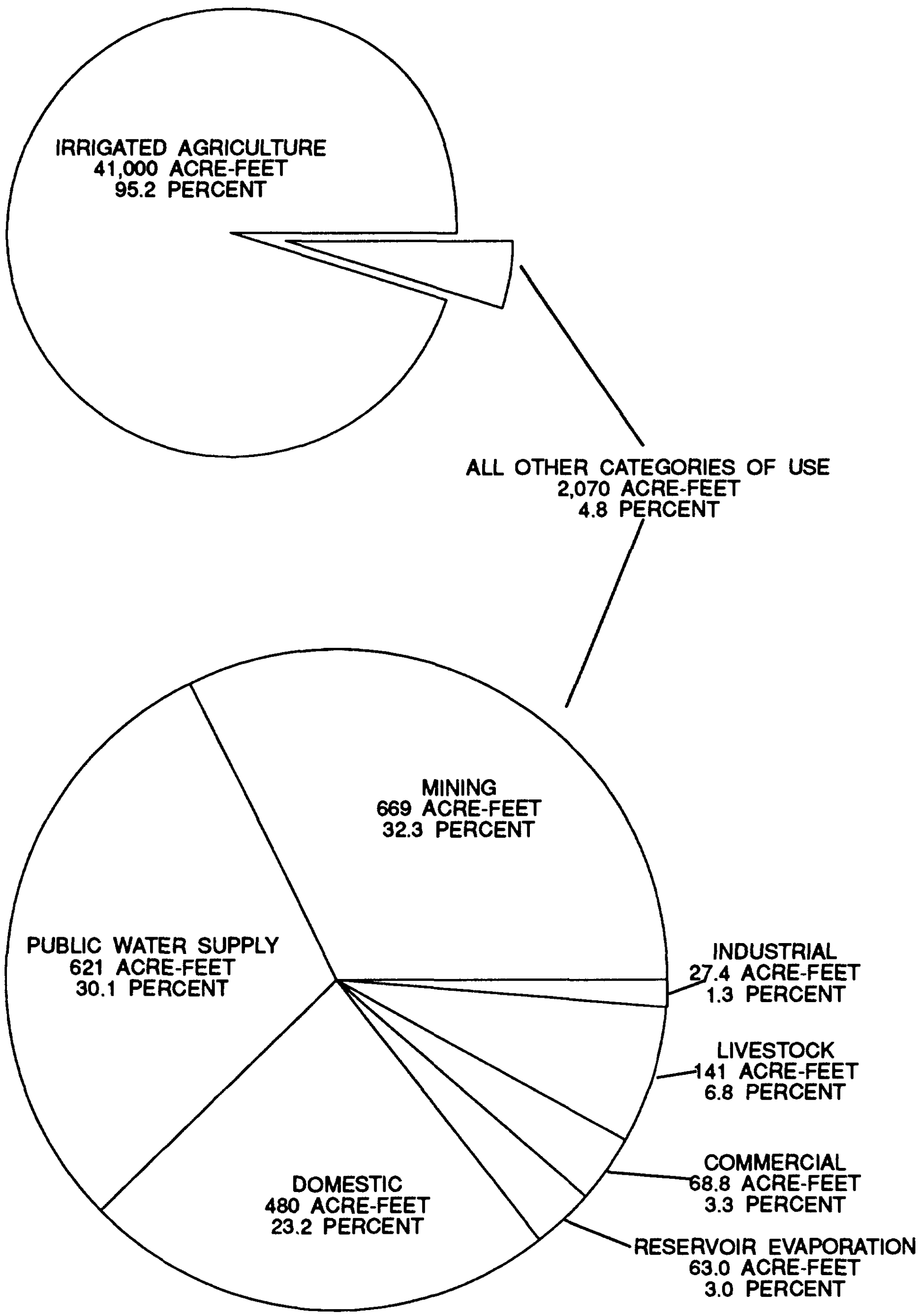

Figure 17.--Depletions of water by category of use in 1990 (data from Wilson, 1992).

Because of the limited amount of historical water-use data for Taos County, drawing conclusions about trends in water use is difficult. The NMSEO has reported data on water use by county at 5-year intervals from 1975 to 1990. Water-use data collected by the NMSEO in 1965 and 1970 were reported by river basins (defined by the NMSEO) and not by county. Total withdrawals and depletions in 1975, 1980, 1985, and 1990 are shown in figure 18A. Overall from 1975 to 1990, total withdrawals and total depletions have decreased (fig. 18A). The withdrawal of surface water generally has increased while the withdrawal of ground water has decreased (fig. 18B). This may be due to the increase in surface water used and the decrease in ground water used for irrigation in Sunshine Valley. Both surface- and ground-water depletions generally have decreased (fig. 18C), possibly reflecting more efficient irrigation methods.

Most of the surface- and ground-water rights in the county are fully appropriated. No new permits or water rights can be granted, except for small domestic and stock-watering uses, unless existing rights are retired or transferred. Interbasin transfers of water (such as the San Juan-Chama Project in northwestern New Mexico) may provide some additional water to the towns in Taos County that have contracts with the U.S. Bureau of Reclamation for some of the project water. These factors will limit the amount of water used in Taos County in the future.

Irrigated Agriculture

The water-use category of irrigated agriculture is water that is applied to farm crops. Alfalfa, native pasture, and planted pasture make up 91 percent of the irrigated crops in Taos County (Lansford and others, 1991). Most of the water withdrawn for irrigation in 1990 was surface water diverted from the tributaries of the Rio Grande. About 28,500 acres were irrigated in 1990 and the total amount of surface and ground water withdrawn was about 105,000 acre-feet (Wilson, 1992). Only about 1,200 acre-feet of the total amount withdrawn was ground water. Total depletions were about 41,000 acre-feet. There are at least 125 known acequia or ditch associations and at least 4,500 reported irrigators in Taos County (Saavedra, 1987). The total acres irrigated has fluctuated over the years, but overall has decreased from a peak of 35,310 acres in 1972 (Lansford and others, 1978) to 28,500 acres in 1990 (Wilson, 1992). About 48 percent of the irrigated acreage is in the vicinity of Taos (fig. 19). All of the acreage irrigated with surface water was flood irrigated. In 1990, about 12,200 acres were idle and fallow (Lansford and others, 1991).

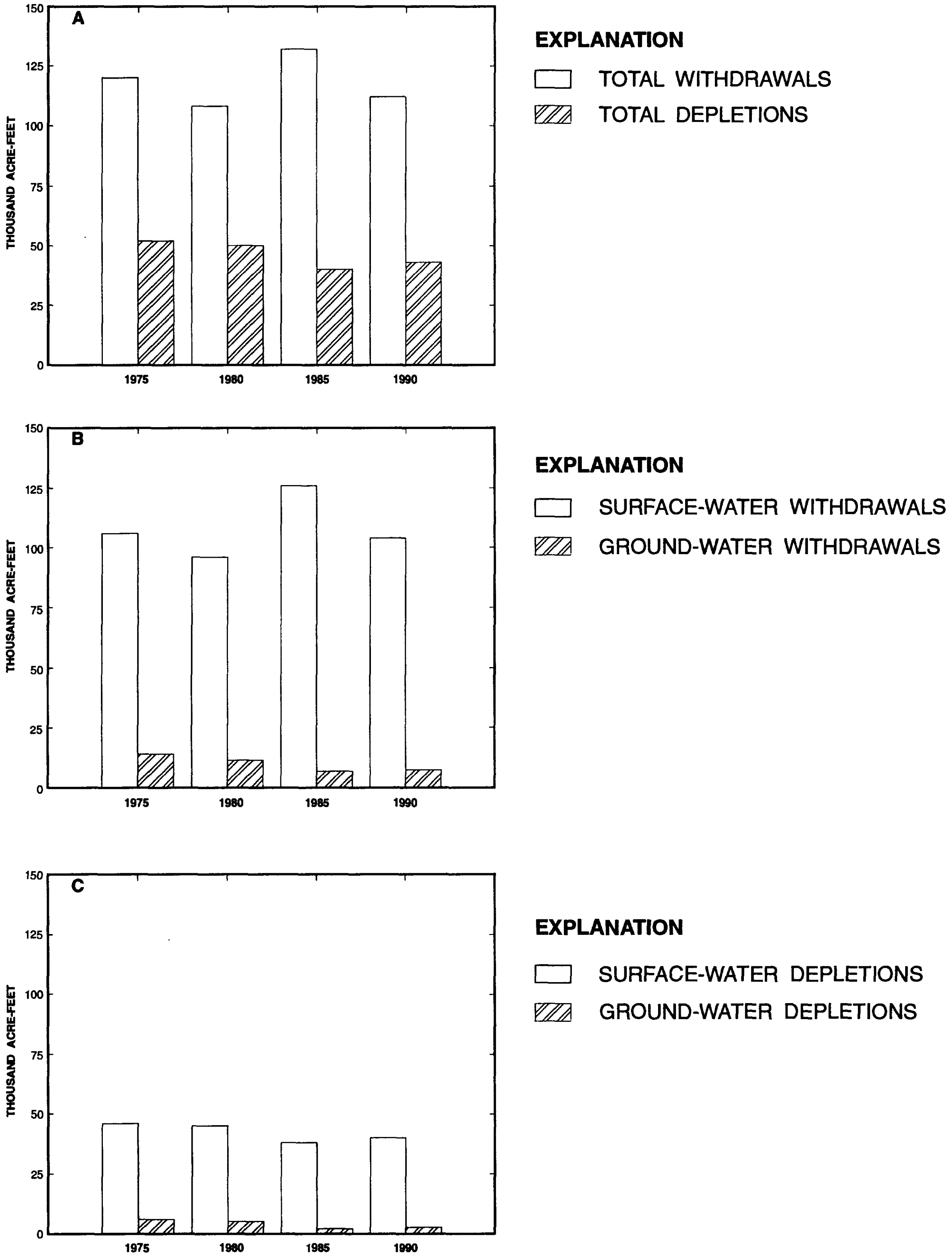

Figure 18.--Water use in 1975, 1980, 1985, and 1990: (A) total withdrawals and depletions; (B) surface- and ground-water withdrawals; and (C) surface- and ground-water depletions (data from Sorensen, 1977, 1982; and Wilson, 1986, 1992).

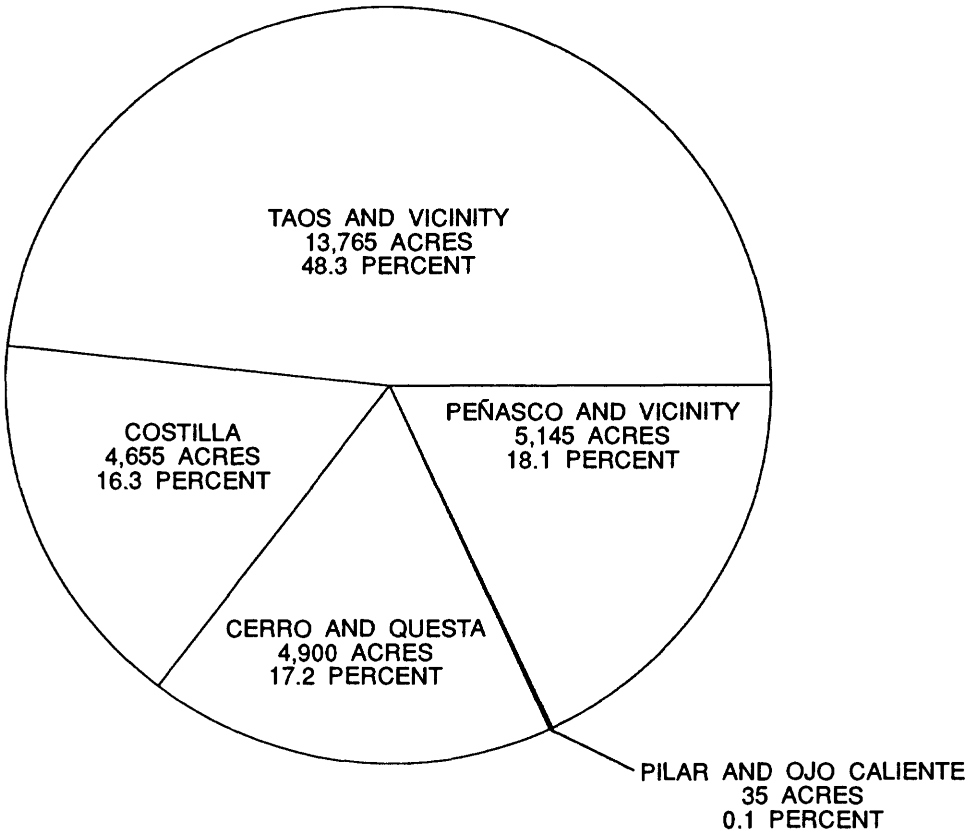

Figure 19.--Irrigated land by geographic area in 1990 (data from Wilson, 1992).

Mining

The category of mining includes water used in the extraction and processing of minerals. About 3,940 acre-feet was withdrawn for mining purposes in 1990; 77 percent was ground water. About 669 acre-feet was depleted (table 12). Most of the withdrawals were for use at Molycorp Inc.'s molybdenum mine near Questa. Molycorp Inc. is the largest producer of molybdenum in New Mexico, accounting for about 90 percent of the State's production, and is the third largest molybdenum mine in the world (New Mexico Energy and Minerals Department, 1986, p. 102, 104). Molycorp Inc. suspended operations in 1991.

Two perlite mines were in operation in 1990: the No Agua Mine, operated by Manville Products Corporation, and El Grande Mine, operated by Grefco, Inc. (New Mexico Energy, Minerals, and Natural Resources Department, 1991, p. 58). These mines are in the northwestern part of the county in the No Agua Peaks.

Public Water Supply

Public water supply refers to water withdrawn by publicly or privately owned water suppliers. Water suppliers that have at least 15 service connections or serve an average of 25 people daily for 60 days or more during the year are included in this category (Wilson, 1992). In 1990, about 1,680 acre-feet of water was withdrawn (table 12) and delivered for residential (domestic) use throughout the county and commercial use in the larger towns such as Questa and Taos.

The town of Taos is the largest public supplier in Taos County. In 1990 Taos withdrew 848 acre-feet of ground water and 382 acre-feet was depleted. The population served was estimated to be 4,065 in 1990 and the gallons used per capita per day was 186 (Wilson, 1992, p. 112).

About 1,800 people live at Taos Pueblo (Ray Lujan, Taos Pueblo, oral commun., 1989) and the population of Questa is 1,707 (Wilson, 1992, p. 112). In addition, there are about 30 Mutual Domestic Water Consumer Associations and two water and sanitation districts (El Prado and Twining). The amount of water used by communities varies according to their population and water rights.

Domestic and Commercial

This category represents water that is self supplied for domestic and commercial use. All of the withdrawals for domestic use were from ground water and amounted to about 1,070 acre-feet in 1990; depletions totaled 480 acre-feet (table 12). Total withdrawals for commercial use were 178 acre-feet and depletions totaled 69 acre-feet (table 12).

Other

The remaining categories of water use include livestock, industrial, and reservoir evaporation. Livestock water use is water used in cleaning, waste disposal, and washing. Livestock in Taos County includes beef cattle, milk cows, chickens, horses, hogs, pigs, and sheep. Taos County has the smallest number of cattle in the State except for Los Alamos County (U.S. Department of Agriculture, 1990). In 1990 withdrawals for livestock were estimated to be about 141 acre-feet and virtually all of it was depleted (table 12).

Costilla Reservoir holds water for irrigation purposes; in 1990 the estimated evaporation was 63 acre-feet (table 12). Evaporation was estimated by multiplying the average surface area for the year by the net evaporation rate at the reservoir location. Because the evaporated water is not readily available for reuse, the depleted amount equals the withdrawal amount. Withdrawals for industrial use were 92 acre-feet; depletions amounted to 27 acre-feet.

SUMMARY

The primary aquifers in Taos County are the alluvial sediments of late Quaternary age and the Santa Fe Group of Quaternary and Tertiary age. Alluvial sediments are present in most of the Costilla Plains and in the stream valleys of the Sangre de Cristo Mountains. A limited amount of water is found in the basalt of the Taos Plateau. Ground water generally is unconfined and is perched in places. Ground-water movement is toward the Rio Grande.

Few wells exist in the sparsely populated Taos Plateau. Depths to water range from 5 to 1,080 feet below land surface and well yields range from 2 to 50 gallons per minute. The extensive basalt is thick, fractured in areas, and does not store water well. Water from the Taos Plateau is used for domestic, livestock, and mining purposes.

Most wells in the county are in the Costilla Plains region. Water is withdrawn from the alluvial sediments near the surface and from the Tertiary sediments and volcanic rocks of the Santa Fe Group at greater depths. The deposits of the Santa Fe Group are often interbedded with basalt. Depths to water range from less than 1 foot to 275 feet below land surface and well yields range from 3 to 3,000 gallons per minute. Water is used for public-supply, domestic, livestock, and irrigation purposes.

Most wells in the Sangre de Cristo Mountains tap the alluvial sediments in the stream valleys. Depths to water range from 2 to 145 feet below land surface and most wells yield from 1 to 50 gallons per minute. Water is used for public-supply, domestic, and commercial purposes.

Between 1955 and 1970 water levels in wells dropped 5 to 50 feet throughout Sunshine Valley due to the many wells in use for irrigation. Since that time ground-water irrigation has declined and water levels generally are higher after 1980 than before 1960.

Ground water is the source for all domestic use and is potable in most parts of Taos County. In Peñasco, Ojo Caliente, Cerro, Taos, Pilar, Ranchos de Taos, Questa, and the Rio Fernando de Taos Valley, the ground water is harder and specific-conductance values are higher than in the rest of the county due to naturally occurring minerals. Fluoride concentrations are higher in the Llano Quemado, Chamisal, Des Montes, and Ranchos de Taos areas. Spring water quality varies, but specific-conductance values and concentrations of dissolved solids and some trace elements generally are higher in spring water than in water from wells.

The Rio Grande and its 11 perennial tributaries were the source of water for about 93 percent of the water used in Taos County in 1990. Surface water was diverted for irrigation, commercial, mining, and livestock purposes. Costilla and Cabresto Reservoirs store water for irrigation.

The USGS collects continuous streamflow records at 15 gaging stations and partial-record streamflow records at 9 gaging stations. The average discharge of the Rio Grande upstream from the study area at Lobatos, Colorado, was 328,200 acre-feet per year for water years 1931 to 1989, and was 599,900 acre-feet per year downstream from the study area at Embudo. The mean annual discharge at the Rio Grande at Embudo ranges from 300 to 2,100 cubic feet per second and in the perennial streams varies from 10 to 180 cubic feet per second. Seasonal flow patterns show that the highest mean monthly discharge occurs during May or June due to runoff from snowmelt in the Sangre de Cristo Mountains.

The Red River gains about 35 cubic feet per second due to ground-water accretion between Questa and its confluence with the Rio Grande. The Rio Grande gains about 96 cubic feet per second between Ute Mountain near the Colorado - New Mexico State line and the confluence of the Red River. The Rio Grande also gains an unknown amount of water between the John Dunn Bridge and the Taos Junction Bridge. These gains are due to ground-water discharge as springs in the basalt canyon walls in all of these reaches.

The quality of surface water generally is better in the upstream reaches where there is less human activity. Specific conductance ranges from 62 to 1,280 μS/cm, pH ranges from 3.8 to 9.9, and dissolved oxygen ranges from 6.5 to 19 mg/L. The New Mexico Environment Department has conducted several intensive water-quality surveys of stream and river segments throughout Taos County. The Red River has been studied the most. Sulfate, molybdenum, and manganese are a few of the constituents whose concentrations exceeded State standards at times in reaches of the Red River.

Water-quality studies of high mountain lakes indicate that the Latir Lakes are naturally alkaline but that Middle Fork, Lost, Horseshoe, and Williams Lakes have low alkalinities and are less able to neutralize acid rain. Agriculture and recreation were identified by the New Mexico Environment Department to be the probable causes of degradation that prevent Cabresto, Heart, and Goose Lakes from meeting State standards for use as coldwater fisheries.

In 1990 about 112,000 acre-feet of water was withdrawn and about 43,000 acre-feet was depleted. About 95 percent of the amount depleted was used for irrigated agriculture. Water was also withdrawn and depleted for these categories of water use: mining, public water supply, reservoir evaporation, livestock, commercial, industrial, and domestic. Surface water was the source for about 93 percent of the withdrawals, but all of the water withdrawn for public-supply, domestic, and industrial purposes was ground water. Surface-water withdrawals generally have increased and ground-water withdrawals have decreased from 1975 to 1990; surface- and ground-water depletions have decreased.

Almost all of the water withdrawn for irrigated agriculture was surface water. Alfalfa, native pasture, and planted pasture make up 91 percent of the irrigated crops in the county. About 28,500 acres were irrigated in 1990 and about 12,200 acres were idle and fallow. Almost half of the irrigated acreage is in the vicinity of Taos.

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Table 1.--Climatological records for weather stations in Taos County, New Mexico

[deg F, degrees Fahrenheit; --, no data. Data from U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1954-89; New Mexico State Engineer Office, 1956a, b; Kunkel, 1984]

Station	Latitude and longitude (degrees, minutes)	Altitude (feet above sea level)	Average annual precipitation (inches)	Average annual snowfall, 1931-83 (inches)	Average annual temperature (deg F)	Period of record
			Active stations			
Cerro	36° 45' 105° 36'	7,655	12.50	61.8	44.1	1910-89
Red River	36° 42' 105° 24'	8,676	20.65	131.6	39.4	1906-89
Taos	36° 23' 105° 36'	6,967	12.55	35.0	47.1	1889-1989
Tres Piedras	36° 40' 105° 59'	8,140	14.09	47.7	42.3	1905-89
			Discontinued stations[1]			
Skarda	36° 46' 105° 58'	8,280	13.39	57.2	--	1940-83
Ojo Caliente	36° 18' 106° 03'	6,294	10.00	22.5	--	1949-82
Taos Canyon	36° 23' 105° 25'	8,225	19.70	--	--	1909-43
Peñasco Ranger Station	36° 10' 105° 41'	7,920	14.93	59.6	--	1931-76

[1]For the discontinued stations the average annual snowfall is for the period of record.

Table 2.--Ranges in depths to water, well depths and yields, and surface geology by physiographic subdivision

[Surface geologic units: Qa, alluvium; Qe, eolian deposits; Ql, landslide deposits and colluvium; Qp, piedmont alluvial deposits; QTs, upper Santa Fe Group; Tlp, Los Pinos Formation (lower Santa Fe Group); Tnb, basalt and andesite flows; Tsf, lower and middle Santa Fe Group; IP, Pennsylvanian rocks, undivided; Xp, lower Proterozoic plutonic rocks, --, unknown; <, less than. Data from U.S. Geological Survey files; Winograd, 1959; and Wilson and others, 1980]

Physiographic subdivision and town or area	Range in depths to water (feet below land surface)	Range in well depths (feet below land surface)	Range in well yields (gallons per minute)	Surface geologic units (pl. 1)
Taos Plateau				
Ojo Caliente	12 - 107	54 - 300	10 - 20	Qa, Tsf
Tres Piedras	5 - 247	25 - 390	10 - 12	Tnb, Xp, Tlp
Other areas	8 - 1,080	240 - 1,200	2 - 50	Qa, Qe, QTs, Tnb, Tsf
Costilla Plains				
Pilar	6 - 60	32 - 116	--	Qa
Ranchos de Taos, Talpa, Llano Quemado	4 - 213	8 - 300	5 - 42	Qa, Qp
Taos and nearby towns	<1 - 120	25 - 229	8 - 30	Qa, Qp, QTs
Valdez, Arroyo Seco, Des Montes	3 - 180	50 - 375	8 - 110	Qp
Arroyo Hondo (town)	4 - 175	18 - 260	3 - 40	Qp
San Cristobal	5 - 125	7 - 170	15 - 20	Qp
Questa	5 - 223	20 - 500	10 - 35	Qa, Qp
Cerro	35 - 195	60 - 245	5 - 15	Qa
Sunshine Valley area	4 - 275	50 - 535	10 - 3,000	Qa, Qp
Costilla	35 - 140	53 - 222	5 - 10	Qa, Ql
Sangre de Cristo Mountains				
Peñasco and nearby towns	3 - 119	14 - 300	3 - 50	Qa, QTs, Tsf
Rio Pueblo Valley	4 - 29	58 - 200	--	Qa, IP
Rio Fernando de Taos Valley	10 - 145	50 - 503	1 - 22	Qa, Tlp, IP
Red River (town)	2 - 135	30 - 240	10 - 525	Qa
Amalia	4 - 40	25 - 160	1 - 20	Qa, Qp

Table 3.--Records of selected wells and springs in Taos County, New Mexico

[Site type: GW, water well; SP, spring. Primary use of water: H, domestic; I, irrigation; N, industrial; P, public supply; R, recreation; S, stock; T, institutional; U, unused; Z, other. --, unknown]

Reference number (pl. 2)	Site identifier	Local identifier	Site type	Altitude of land surface (feet above sea level)	Primary use of water	Water level (feet below land surface)	Date water level measured	Depth of well (feet below land surface)	More than one water-level measurement	Geologic log in table 4	Chemical data in table 7
1	361022105440801	22N.11E.02.214	GW	7,400	P	--	--	150			x
2	361028105435801	22N.11E.02.2223	GW	7,485	H	107.23	05-26-89	320	x		x
3	360950105441001	22N.11E.02.432	GW	7,520	H	60.00	08-01-79	200			
4	361015105412101	22N.11E.05.1413	GW	7,640	P	--	--	255		x	
5	361014105412001	22N.12E.05.1414	GW	7,640	P	[1]118.76	08-25-88	255			
6	361030105405501	22N.12E.05.212	GW	7,700	U	96.30	05-26-89	--	x		
7	360950105404001	22N.12E.05.442	GW	7,700	U	[2]5.00	01-01-53	140	x	x	
8	360909105402101	22N.12E.09.3144	GW	7,905	U	4.06	06-12-89	21			x
9	361002105361001	22N.13E.06.3241	GW	7,860	P	[1]28.22	06-13-89	--			
10	361001105360701	22N.13E.06.3242	GW	7,860	P	[1]4.35	06-13-89	200			x
11	360752105305201	22N.13E.24.1231	GW	8,460	P	9.85	06-13-89	--			
12	360751105305301	22N.13E.24.1232	GW	8,460	P	10.34	06-13-89	--			
13	360612105290401	22N.14E.32.1111	GW	8,930	H	29.38	06-13-89	58			
14	361140105432001	23N.11E.25.324	GW	7,260	U	6.27	02-02-83	--			
15	361153105435301	23N.11E.26.2443	GW	7,196	U	7.68	06-12-89	21			
16	361127105400801	23N.12E.28.344	GW	7,450	P	[2]25.00	06-28-60	158	x	x	
17	361125105405401	23N.12E.29.4344	GW	7,460	H	8.16	09-27-88	20			x
18	361816106030801	Ojo Caliente, Iron	SP	--	--	--	--	--			x
19	361804106025001	24N.08E.24.140	GW	6,240	H	30.00	08-06-57	54			
20	361755106025501	24N.08E.24.321	GW	6,200	P	[1]28.58	08-18-88	80	x	x	x
21	361935106020401	24N.09E.07.310	GW	6,300	H	[1]14.67	08-18-88	50	x	x	
22	362000105571501	24N.09E.11.124	GW	6,750	H	[2]560.00	06-16-76	650		x	x
23	361956105442201	Gijosa Grant	SP	--	--	--	--	--			x
24	361609105472201	24N.11E.32.4214	GW	6,070	H	[1]58.29	10-13-88	75		x	
25	362032105365501	24N.12E.01.321	GW	7,050	P	--	--	195		x	
26	362029105364301	24N.12E.01.3224	GW	7,039	H	108.76	06-15-89	165			x
27	361925105362001	Rancho del Rio Gr.	SP	--	--	--	--	--			x
28	362045105354801	24N.13E.06.141	GW	7,000	P	[2]120.00	03-09-55	300		x	x
29	361958105354801	24N.13E.07.1232	GW	7,010	H	24.51	06-14-89	50			
30	361633105344401	24N.13E.32.1214	GW	7,380	T	7.51	06-14-89	--			
31	361634105343401	24N.13E.32.1223	GW	7,385	T	3.88	06-14-89	20			
32	361614105343401	24N.13E.32.1444	GW	7,440	T	22.20	06-14-89	65			
33	361612105343401	24N.13E.32.3222	GW	7,455	T	17.74	06-14-89	70			
34	362153105463701	25N.11E.28.343	GW	6,830	H	306.10	08-05-80	384			x
35	362153105480001	25N.11E.29.3334	GW	6,870	U	302.19	08-03-89	--	x		
36	362458105370801	25N.12E.12.1334	GW	6,900	H	20.70	06-16-89	100			
37	362407105372801	25N.12E.14.2431	GW	6,885	T	118.05	06-16-89	225			
38	362246105395801	25N.12E.21.434	GW	6,640	U	40.40	08-03-89	530	x		x
39	362304105365001	25N.12E.24.3123	GW	6,820	H	16.05	06-15-89	80			
40	362228105364301	25N.12E.25.1422	GW	6,884	H	27.17	06-13-89	43			
41	362127105361801	25N.12E.36.2434	GW	6,950	U	28.60	06-14-89	54			
42	362604105323501	25N.13E.03.123	GW	7,120	T	--	--	139			x
43	362553105345501	25N.13E.05.1432	GW	6,996	H	20.77	10-14-88	131			x
44	362523105343401	25N.13E.05.4334	GW	6,960	U	6.28	02-08-91	--	x		
45	362520105345001	25N.13E.08.123	GW	6,930	U	0.52	03-03-89	--	x		
46	362531105343201	25N.13E.08.212	GW	6,95	U	6.70	02-09-87	500	x		x
47	362459105340701	25N.13E.08.2441	GW	6,980	H	11.96	06-15-89	80			
48	362457105340601	25N.13E.08.2443	GW	6,980	H	15.42	06-15-89	--			x
49	362448105341801	25N.13E.08.4142	GW	6,970	H	22.45	06-14-89	--			
50	362453105341401	25N.13E.08.421	GW	6,950	P	[2]38.00	01-01-63	330		x	

Table 3.--Records of selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Site identifier	Local identifier	Site type	Altitude of land surface (feet above sea level)	Primary use of water	Water level (feet below land surface)	Date water level measured	Depth of well (feet below land surface)	More than one water-level measurement	Geologic log in table 4	Chemical data in table 7
51	362450105341501	25N.13E.08.421	GW	6,970	U	17.18	10-22-75	--			
52	362436105342001	25N.13E.08.4341	GW	6,970	P	[2]38.00	01-01-63	204			x
53	362415105351501	25N.13E.18.241	GW	6,875	U	4.34	10-22-75	--			
54	362208105360701	25N.13E.30.323	GW	6,950	P	70.00	10-24-58	181		x	x
55	362124105344701	25N.13E.32.3221	GW	7,110	H	212.83	06-13-89	--			
56	362347105265101	25N.14E.16.4233	GW	8,960	P	--	--	15			x
57	362157105265201	25N.14E.28.4431	GW	7,980	H	--	--	30			x
58	362158105224601	25N.15E.29.331	GW	8,485	P	71.12	06-01-89	190			
59	362146105230201	25N.15E.31.221	GW	8,525	R	53.20	06-01-89	210			
60	362139105223801	25N.15E.32.114	GW	8,490	P	46.42	06-01-89	215			
61	362135105222901	25N.15E.32.141	GW	8,510	P	[1]17.30	06-01-89	175			
62	362915105504701	26N.10E.14.322	GW	7,400	S	11.30	08-05-80	--			x
63	363030105432501	Antonio Martinez	SP	--	--	--	--	--			x
64	362845105462501	26N.11E.21.211	GW	7,110	H	--	--	700			x
65	362835105440701	26N.11E.23.232	GW	6,970	P	--	--	--			x
66	362746105401501	26N.12E.22.123	GW	7,065	P	--	--	650			x
67	362728105365501	26N.12E.25.3213	GW	7,152	U	57.23	03-27-91	500		x	
68	362731105362201	26N.12E.25.4122	GW	7,110	U	11.85	03-03-89	500	x		x
69	362820105362001	26N.12E.26.421	GW	7,155	Z	167.98	09-28-88	--	x		x
70	362636105365801	26N.12E.36.3213	GW	7,038	H	60.23	06-16-89	120			
71	363207105340701	26N.13E.04.113	GW	7,600	P	[2]7.00	11-10-58	204		x	x
72	362820105355101	26N.13E.19.3213	GW	7,230	H	32.27	06-14-89	--			
73	362759105354801	26N.13E.19.3433	GW	7,205	U	53.43	08-03-89	280	x		
74	363312105560801	27N.09E.24.433	GW	7,850	H	[2]1,080.00	11-24-78	1,197		x	x
75	363224105453001	27N.11E.26.333	GW	7,040	H	--	--	400			x
76	363257105444901	27N.11E.27.224	GW	--	--	--	--	--			x
77	363150105445001	27N.11E.35.311	GW	7,060	S	760.00	07-16-80	800			x
78	363544105381001	27N.12E.11.1211	GW	7,460	H	[2]9.00	09-16-88	34			x
79	363151105424201	27N.12E.31.311	SP	--	--	--	--	--			x
80	363215105422301	27N.12E.31.Warm Sp.	SP	--	--	--	--	--			x
81	363204105410201	27N.12E.32.2312	GW	6,750	H	37.77	06-14-89	90			x
82	363210105401401	27N.12E.33.123	GW	6,780	--	[2]16.00	01-01-63	18			x
83	363208105400301	27N.12E.33.1242	GW	6,780	U	4.14	06-14-89	--			
84	363212105342801	27N.13E.32.2123	GW	7,518	H	48.04	09-28-88	95			x
85	363908105580601	28N.09E.22.220	GW	8,115	P	28.96	08-02-55	--		x	
86	363842105580401	28N.09E.22.420	GW	8,120	P	30.10	08-05-55	58		x	
87	363853105575301	28N.09E.23.244	GW	8,100	P	--	--	35			x
88	363650105483701	28N.11E.31.431	GW	7,660	H	[2]721.30	12-08-77	807		x	
89	364142105371701	28N.12E.01.113	GW	--	--	--	--	--			x
90	364141105370901	28N.12E.01.114	GW	--	--	--	--	--			x
91	364130105371801	28N.12E.01.133	SP	--	--	--	--	--			x
92	364137105364701	28N.12E.01.Fish H.	SP	--	--	--	--	--			x
93	364112105384001	28N.12E.03.441	SP	--	--	--	--	--			x
94	364058105412201	28N.12E.08.Big Ar.	SP	6,880	--	--	--	--			x
95	364058105411701	28N.12E.08. N. Big	SP	6,880	--	--	--	--			x
96	364043105411101	28N.12E.08.142	SP	--	--	--	--	--			x
97	364047105411101	Big Arsenic Springs	SP	--	--	--	--	--			x
98	364052105393201	28N.12E.09.22.Sp.	SP	--	--	--	--	--			x
99	364036105394401	28N.12E.09.243	SP	--	--	--	--	--			x
100	364042105393901	28N.12E.09.Mottl	SP	--	--	--	--	--			x
101	364057105401701	28N.12E.09.BLM	GW	7,570	P	[2]487.00	09-29-72	546			x
102	363957105411401	28N.12E.17.Little	SP	--	--	--	--	--			x
103	364105105410501	28N.12E.17.2111	SP	6,860	--	--	--	--			x
104	364543105572901	29N.09E.11.320	GW	8,390	N	[2]810.00	07-16-80	1,300			x
105	364443105581001	29N.09E.15.300	GW	8,520	H	31.99	08-02-55	--			

Table 3.--Records of selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Site identifier	Local identifier	Site type	Altitude of land surface (feet above sea level)	Primary use of water	Water level (feet below land surface)	Date water level measured	Depth of well (feet below land surface)	More than one water-level measurement	Geologic log in table 4	Chemical data in table 7
106	364603105511101	29N.10E.11.1143	GW	7,745	S	415.75	12-02-88	--			
107	364450105440801	29N.11E.14.410	GW	7,660	U	[2]342.00	01-02-47	554			x
108	364336105434701	29N.11E.23.444	GW	7,590	S	[2]310.00	09-16-46	362			
109	364706105372001	29N.12E.02.222	GW	7,535	H	37.70	07-28-55	--			
110	364639105374501	29N.12E.02.411	GW	7,510	H	35.97	07-30-55	--			
111	364645105362501	29N.12E.03.244	GW	7,495	I	26.15	03-27-91	168	x	x	
112	364618105403401	29N.12E.05.444	SP	--	--	--	--	--			x
113	364609105402201	29N.12E.09.112	SP	--	--	--	--	--			
114	364607105375301	29N.12E.11.124	GW	7,550	P	--	--	125			x
115	364527105364801	29N.12E.12.344	GW	7,550	P	82.48	07-30-55	125			x
116	364520105365501	29N.12E.13.121	GW	7,595	U	86.80	12-14-56	93		x	
117	364520105361601	29N.12E.13.211	GW	7,596	H	79.84	07-30-55	--			
118	364422105403201	29N.12E.20.BLM	GW	7,530	H	--	--	415			x
119	364705105344601	29N.13E.05.121	GW	7,898	U	46.58	08-04-89	--	x		
120	364653105345501	29N.13E.05.131	GW	7,860	--	65.08	07-27-55	78			
121	364527105360001	29N.13E.07.443	GW	7,618	H	80.48	08-23-55	--			
122	364519105353501	29N.13E.18.211	GW	7,670	H	176.85	08-25-55	--			
123	364447105352701	29N.13E.18.414	GW	7,650	H	211.16	08-23-55	240		x	
124	364427105354401	29N.13E.19.122	GW	7,667	H	155.18	08-23-55	170			
125	364400105355001	29N.13E.19.231	GW	7,660	I	150.75	02-06-61	180	x		
126	364358105354701	29N.13E.19.320	GW	7,651	I	156.95	08-23-55	301		x	
127	364404105354301	29N.13E.19.322	GW	7,658	I	129.51	03-16-88	300	x		
128	364341105342301	29N.13E.20.434	GW	7,450	P	7.00	01-01-53	70			x
129	364240105352201	29N.13E.31.221	GW	7,475	H	--	--	30			x
130	365038105533501	30N.10E.08.444	GW	7,922	S	[2]584.00	01-01-53	616		x	x
131	364948105455201	30N.11E.15.333	GW	7,626	--	[2]297.00	01-01-46	--			x
132	364940105442701	30N.11E.23.120	GW	7,667	U	333.02	01-11-55	350			
133	364812105460101	30N.11E.28.4421	GW	7,638	U	310.56	08-16-55	335			
134	364811105455801	30N.11E.28.4422	GW	7,640	S	321.00	10-20-89	360			
135	365159105364801	30N.12E.01.144	GW	7,510	I	10.25	02-23-73	--	x		x
136	365148105364401	30N.12E.01.3244	GW	7,512	U	8.69	03-15-88	--	x		
137	365142105364801	30N.12E.01.342	GW	7,515	I	21.78	07-15-55	146			x
138	365130105371801	30N.12E.02.444	GW	7,500	U	4.82	05-19-89	--	x		
139	365101105393201	30N.12E.09.422	GW	7,450	--	17.40	07-25-55	152		x	
140	365129105381701	30N.12E.11.1112	GW	7,471	U	12.67	03-15-88	--	x		
141	365105105375101	30N.12E.11.144	GW	7,486	I	38.40	07-26-55	260		x	
142	365039105371001	30N.12E.12.334	GW	7,525	I	15.03	01-25-83	29	x		
143	365029105393901	30N.12E.16.223	GW	7,436	U	13.15	11-27-61	127	x		x
144	365021105393901	30N.12E.16.231	GW	7,431	U	[2]12.00	06-01-53	--			
145	365024105394201	30N.12E.16.241	GW	7,435	I	113.00	03-15-88	--	x		
146	364943105402201	30N.12E.21.111	GW	7,414	--	92.15	11-27-61	222	x	x	
147	364942105375401	30N.12E.23.122	GW	7,512	--	181.38	02-14-63	251	x	x	
148	364923105364401	30N.12E.24.144	GW	7,589	I	38.24	08-24-55	410		x	
149	364918105361301	30N.12E.24.422	GW	7,627	I	63.16	03-16-88	417	x	x	
150	364757105372801	30N.12E.35.221	GW	7,516	I	18.10	03-16-88	310	x	x	
151	365035105360801	30N.13E.18.111	GW	7,578	U	66.11	03-16-88	--	x		
152	365035105360501	30N.13E.18.1121	GW	7,597	U	70.85	02-08-91	500	x		
153	365047105354601	30N.13E.18.122	GW	--	--	--	--	500		x	
154	364857105351101	30N.13E.19.444	GW	7,731	H	[3]38.06	02-20-56	--		x	
155	364015105340501	30N.13E.20.422	GW	--	I	82.68	01-27-83	--			
156	364813105350801	30N.13E.30.4422	GW	7,750	I	35.06	03-15-88	--	x		
157	364759105360701	30N.13E.31.1112	GW	7,640	U	72.51	03-19-90	--	x		x
158	365623105583501	31N.09E.10.143	GW	8,113	S	--	--	685			x
159	365624105511301	31N.10E.11.1314	GW	7,747	S	414.40	10-20-89	--	x		
160	365524105445201	31N.11E.14.311	GW	7,595	S	257.75	10-20-89	--	x		

Table 3.--Records of selected wells and springs in Taos County, New Mexico--Concluded

Reference number (pl. 2)	Site identifier	Local identifier	Site type	Altitude of land surface (feet above sea level)	Primary use of water	Water level (feet below land surface)	Date water level measured	Depth of well (feet below land surface)	More than one water-level measurement	Geologic log in table 4	Chemical data in table 7
161	365504105465201	31N.11E.16.333	GW	7,605	--	[2]276.00	01-02-47	323			x
162	365444105484701	31N.11E.19.140	GW	7,634	S	311.00	01-01-51	365			x
163	365225105382501	31N.12E.34.444	GW	7,542	U	116.03	02-15-57	--	x		
164	365305105380201	31N.12E.35.123	GW	7,544	U	162.75	01-26-83	--	x	x	
165	365830105464701	32N.11E.28.3433	GW	7,670	S	340.26	01-12-56	350		x	x
166	365409105373801	02S.74W.02.244	GW	7,564	I	246.29	03-15-88	--	x		
167	365359105382301	02S.74W.02.312	GW	7,542	I	243.55	09-29-89	476	x		
168	365339105373801	02S.74W.11.222	GW	7,559	I	258.19	09-29-89	435	x		
169	365340105363301	02S.74W.12.222	GW	7,546	I	31.91	03-15-88	250	x		
170	365414105340401	02S.73W.04.141	GW	7,610	U	84.98	05-12-89	--	x		
171	365408105334201	02S.73W.04.234	GW	7,645	U	120.35	05-12-89	149	x		
172	365410105345601	02S.73W.05.244	GW	7,587	I	74.30	02-08-91	--	x		
173	365300105361601	02S.73W.07.30	GW	7,536	I	--	--	--			x
174	365250105350001	02S.73W.08.344	GW	7,555	U	53.00	06-23-60	80	x		
175	365240105333501	02S.73W.16.214	GW	7,660	U	103.63	03-16-88	--	x		
176	365245105354501	02S.73W.17.322	GW	7,537	U	27.74	03-15-88	--	x		
177	365815105374001	01S.74W.11.424	GW	7,582	U	241.10	01-25-83	--	x		
178	365705105374001	01S.74W.23.222	GW	7,596	I	274.78	12-15-56	430	x		
179	365644105363501	01S.74W.24.244	GW	7,628	U	187.43	03-27-91	270	x		
180	365535105374001	01S.74W.26.442	GW	7,585	U	238.45	08-08-63	256	x		
181	365437105374201	01S.74W.35.444	GW	7,570	I	242.57	09-29-89	--	x		
182	365944105312001	01S.73W.02.221	GW	7,750	U	82.39	08-04-89	--	x		
183	365710105320001	01S.73W.14.334	GW	7,818	I	107.83	02-22-56	160	x		
184	365708105352801	01S.73W.19.222	GW	7,665	I	181.57	03-14-88	420	x		
185	365642105352801	01S.73W.19.422	GW	7,659	I	194.57	02-03-76	446	x		
186	365630105320001	01S.73W.23.314	GW	7,840	U	206.37	08-21-90	--	x		
187	365551105345401	01S.73W.29.322	GW	7,652	I	165.39	03-15-88	--	x		
188	365551105342301	01S.73W.29.422	GW	7,672	I	186.93	03-15-88	500	x		
189	365524105345601	01S.73W.32.122	GW	7,636	U	138.25	03-15-88	535	x		
190	365524105342301	01S.73W.32.222	GW	7,651	U	151.30	03-15-88	525	x		
191	365458105345501	01S.73W.32.322	GW	7,622	U	108.76	03-15-88	490	x		
192	365458105342301	01S.73W.32.422	GW	7,636	U	128.12	01-25-83	505	x		
193	365520105400501	01S.73W.33.212	GW	7,675	I	174.25	10-14-58	212	x		
194	365827105314801	Sangre de Cristo	GW	7,819	--	--	--	--			x

[1]Well had been recently pumped when water level was measured.
[2]Water level was reported (not measured by the U.S. Geological Survey).
[3]Well was being pumped at time of water-level measurement.

Table 4.--Geologic log records and water levels for selected wells in Taos County, New Mexico

[Undiff., undifferentiated. See table 3 for date of water-level measurement]

Reference number (pl. 2)	Local identifier	Water level (feet below land surface)	Depth to top of interval (feet)	Depth to bottom of interval (feet)	Lithology
7	22N.12E.05.442	5.00	0.00	2.00	Sedimentary, undiff.
			2.00	140.00	Sand and gravel
16	23N.12E.28.344	25.00	0.00	4.00	Sedimentary, undiff.
			4.00	33.00	Shale
			33.00	158.00	Sand
20	24N.08E.24.321	28.58	0.00	31.00	Sand and gravel
			31.00	34.00	Gravel
			34.00	39.00	Sand
			39.00	49.00	Sand and gravel
			49.00	51.00	Boulders
			51.00	56.00	Sand
			56.00	65.00	Clay
			65.00	70.00	Sand
			70.00	[1]88.00	Sand and gravel
			88.00	[1]93.00	Sand
			93.00	[1]110.00	Basalt
			110.00	[1]113.00	Sand and gravel
			113.00	[1]122.00	Sand and gravel
22	24N.09E.11.124	560.00	0.00	300.00	Sand
			300.00	650.00	Clay
			650.00	[1]660.00	Granite
28	24N.13E.06.141	120.00	0.00	28.00	Conglomerate
			28.00	125.00	Clay
			125.00	135.00	Sand
			135.00	170.00	Clay
			170.00	180.00	Sand
			180.00	280.00	Clay
			280.00	292.00	Sand
			292.00	300.00	Clay
50	25N.13E.08.421	38.00	0.00	38.00	Clay
			38.00	60.00	Gravel
			60.00	142.00	Clay
			142.00	148.00	Gravel
			148.00	195.00	Clay
			195.00	202.00	Gravel
			202.00	330.00	Clay
54	25N.13E.30.323	70.00	0.00	2.00	Sedimentary
			2.00	11.00	Volcanic, undiff.
			11.00	178.00	Sand and gravel
			178.00	181.00	Clay

Table 4.--Geologic log records and water levels for selected wells in Taos County, New Mexico--Continued

Reference number (pl. 2)	Local identifier	Water level (feet below land surface)	Depth to top of interval (feet)	Depth to bottom of interval (feet)	Lithology
71	26N.13E.04.113	7.00	0.00	4.00	Sedimentary
			4.00	15.00	Sandstone
			15.00	191.00	Sand and gravel
			191.00	204.00	Clay
74	27N.09E.24.433	1,080.00	0.00	350.00	Sedimentary
			350.00	400.00	Gravel and clay
			400.00	640.00	Basalt
			640.00	663.00	Gravel
			663.00	675.00	Sandstone
			675.00	720.00	Clay
			720.00	745.00	Clay
			745.00	760.00	Sand and gravel
			760.00	838.00	Clay
			838.00	860.00	Basalt
			860.00	875.00	Clay
			875.00	887.00	Basalt
			887.00	1,080.00	Sand and gravel
			1,080.00	1,177.00	Sand and gravel
			1,177.00	1,197.00	Clay
85	28N.09E.22.220	28.96	0.00	20.00	Clay
			20.00	62.00	Granite
86	28N.09E.22.420	30.10	0.00	3.00	Alluvium
			3.00	39.00	Saprolite
			39.00	[1]61.50	Granite
88	28N.11E.31.431	721.30	0.00	13.00	Alluvium
			13.00	80.00	Basalt
			80.00	136.00	Sand and gravel
			136.00	300.00	Basalt
			300.00	460.00	Sand
			460.00	585.00	Basalt
			585.00	807.00	Sand
107	29N.11E.14.410	342.00	0.00	7.00	Alluvium
			7.00	358.00	Basalt
			358.00	366.00	Silt
			366.00	376.00	Basalt
			376.00	407.00	Basalt
			407.00	415.00	Sand
			415.00	454.00	Basalt
			454.00	461.00	Sand
			461.00	485.00	Basalt
			485.00	554.00	Sand
111	29N.12E.03.244	26.15	0.00	10.00	Alluvium
			10.00	60.00	Sand and gravel
			60.00	70.00	Gravel
			70.00	153.00	Clay
			153.00	167.50	Gravel
			167.50	168.00	Basalt
123	29N.13E.18.414	211.16	0.00	85.00	Clay
			85.00	155.00	Clay
			155.00	195.00	Sand
			195.00	240.00	Sand

Table 4.--Geologic log records and water levels for selected wells in Taos County, New Mexico--Continued

Reference number (pl. 2)	Local identifier	Water level (feet below land surface)	Depth to top of interval (feet)	Depth to bottom of interval (feet)	Lithology
126	29N.13E.19.320	156.95	0.00	10.00	Alluvium
			10.00	190.00	Sand and gravel
			190.00	200.00	Clay
			200.00	285.00	Sand and gravel
			285.00	[1]300.00	Sand
130	30N.10E.08.444	584.00	0.00	21.00	Basalt
			21.00	62.00	Basalt
			62.00	140.00	Basalt
			140.00	175.00	Basalt
			175.00	205.00	Volcanic, undiff.
			205.00	270.00	Basalt
			270.00	305.00	Volcanic, undiff.
			305.00	350.00	Volcanic, undiff.
			350.00	430.00	Basalt
			430.00	450.00	Sand
			450.00	470.00	Basalt
			470.00	488.00	Basalt
			488.00	520.00	Volcanic, undiff.
			520.00	545.00	Basalt
			545.00	585.00	Volcanic, undiff.
			585.00	600.00	Sand
			600.00	616.00	Conglomerate
131	30N.11E.15.333	297.00	0.00	3.00	Alluvium
			3.00	59.00	Basalt
			59.00	74.00	Clay
			74.00	125.00	Basalt
			125.00	138.00	Clay
			138.00	198.00	Basalt
			198.00	228.00	Volcanic, undiff.
			228.00	357.00	Basalt
139	30N.12E.09.422	17.40	0.00	10.00	Alluvium
			10.00	25.00	Clay
			25.00	30.00	Sand and gravel
			30.00	105.00	Clay
			105.00	132.00	Sand
			132.00	152.00	Basalt
141	30N.12E.11.144	38.40	0.00	10.00	Alluvium
			10.00	60.00	Sand and gravel
			60.00	170.00	Sand and gravel
			170.00	260.00	Clay
146	30N.12E.21.111	92.15	0.00	9.00	Alluvium
			9.00	21.00	Sand and gravel
			21.00	63.00	Clay
			63.00	181.00	Basalt
			181.00	[1]221.00	Clay

Table 4.--Geologic log records and water levels for selected wells in Taos County, New Mexico--Continued

Reference number (pl. 2)	Local identifier	Water level (feet below land surface)	Depth to top of interval (feet)	Depth to bottom of interval (feet)	Lithology
147	30N.12E.23.122	181.38	0.00	20.00	Sand and gravel
			20.00	45.00	Clay
			45.00	110.00	Sand
			110.00	155.00	Clay
			155.00	195.00	Sand
			195.00	212.00	Clay
			212.00	[1]266.50	Basalt
148	30N.12E.24.144	38.24	0.00	90.00	Sand and gravel
			90.00	185.00	Sand and gravel
			185.00	250.00	Clay
			250.00	300.00	Shale
			300.00	355.00	Clay
			355.00	375.00	Clay
			375.00	410.00	Sand and gravel
149	30N.12E.24.422	63.16	0.00	8.00	Alluvium
			8.00	67.00	Clay
			67.00	175.00	Clay
			175.00	245.00	Gravel
			245.00	288.00	Sand and gravel
			288.00	350.00	Sand and gravel
			350.00	369.00	Clay
			369.00	417.00	Sand
150	30N.12E.35.221	18.10	0.00	75.00	Clay
			75.00	110.00	Clay
			110.00	135.00	Sand
			135.00	145.00	Gravel
			145.00	175.00	Clay
			175.00	200.00	Gravel
			200.00	220.00	Shale
			220.00	[1]346.00	Basalt
161	31N.11E.16.333	276.00	0.00	42.00	Clay
			42.00	60.00	Sand
			60.00	323.00	Basalt
164	31N.12E.35.123	162.75	0.00	14.00	Clay
			14.00	35.00	Sand and gravel
			35.00	47.00	Clay
			47.00	104.00	Sand and gravel
			104.00	144.00	Clay
			144.00	236.00	Gravel
			236.00	270.00	Clay
			270.00	290.00	Basalt
			290.00	323.00	Clay
			323.00	334.00	Basalt

Table 4.--Geologic log records and water levels for selected wells in Taos County, New Mexico--Concluded

Reference number (pl. 2)	Local identifier	Water level (feet below land surface)	Depth to top of interval (feet)	Depth to bottom of interval (feet)	Lithology
165	32N.11E.28.3433	340.26	0.00	4.00	Alluvium
			4.00	70.00	Basalt
			70.00	132.00	Basalt
			132.00	162.00	Basalt
			162.00	245.00	Basalt
			245.00	345.00	Volcanic, undiff.
			345.00	[1]355.00	Basalt

[1]Depth to bottom of interval during drilling was greater than the completed depth of the well.

Table 5.--Ground-water standards and regulations

[mg/L, milligrams per liter. (i), irrigation standard; (h), human health standard; (d), domestic water-supply standard. --, not applicable. From New Mexico Water Quality Control Commission, 1988; and U.S. Environmental Protection Agency, 1988a, b]

Inorganic constituent or property	New Mexico Water Quality Control Commission ground-water standard (mg/L)		U.S. Environmental Protection Agency drinking-water regulation Maximum Contaminant Level	
			Primary (mg/L)	Secondary[1] (mg/L)
Aluminum	5.0	(i)	--	0.05
Arsenic	0.1	(h)	0.05	--
Barium	1.0	(h)	1.0	--
Boron	0.75	(i)	--	--
Cadmium	0.01	(h)	0.010	--
Chloride	250	(d)	--	250
Chromium	0.05	(h)	0.05	--
Cobalt	0.05	(i)	--	--
Copper	1.0	(d)	--	1.0
Cyanide	0.2	(h)	--	--
Dissolved solids	1,000	(d)	--	500
Fluoride	1.6	(h)	4.0	--
Iron	1.0	(d)	--	0.3
Lead	0.05	(h)	0.05	--
Manganese	0.2	(d)	--	0.05
Mercury	0.002	(h)	0.002	--
Molybdenum	1.0	(i)	--	--
Nickel	0.2	(i)	--	--
Nitrate-N	10.0	(h)	10.0	--
pH (units)	6-9	(d)	--	6.5-8.5
Selenium	0.05	(h)	0.01	--
Silver	0.05	(h)	0.05	--
Sulfate	600	(d)	--	250
Zinc	10.0	(d)	--	5.0

[1]Secondary regulations are not federally enforceable.

Table 6.--Summary of water-quality analyses from wells and springs in Taos County, New Mexico

[μS/cm, microsiemens per centimeter at 25 degrees Celsius; deg C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate. Data were analyzed by the New Mexico Environment Department and the U.S. Geological Survey]

Constituent	Number of samples	Minimum	Maximum
Specific conductance (μS/cm)	80	108	1,200
pH (units)	79	6.6	8.5
Temperature (deg C)	44	7.0	40.0
Hardness (mg/L $CaCO_3$)	74	32	640
Alkalinity (mg/L $CaCO_3$)	59	51	271
Dissolved solids (mg/L)	61	73	928
Calcium (mg/L)	72	11	200
Magnesium (mg/L)	72	1.2	35
Sodium (mg/L)	60	2.3	890
Potassium (mg/L)	60	0.6	24
Bicarbonate (mg/L)	60	62	440
Sulfate (mg/L)	72	2.6	570
Chloride (mg/L)	76	0.6	270
Fluoride (mg/L)	53	0.1	18

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico

[µS/cm, microsiemens per centimeter at 25 degrees Celsius; deg C, degrees Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter. Site type: GW, well; SP, spring. --, no data; <, less than; ND, not detectable]

Reference number (pl. 2)	Local identifier	Site type	Date	Specific conductance, field (µS/cm)	pH, field (standard units)	Temperature, water (deg C)	Carbon dioxide, dissolved (mg/L as CO_2)	Hardness, total (mg/L as $CaCO_3$)	Alkalinity, field (mg/L as $CaCO_3$)	Dissolved solids (mg/L)
1	22N.11E.02.214	GW	12-11-63	516	7.4	--	18	200	230	349
2	22N.11E.02.2223	GW	09-27-88	415	7.5	--	--	210	--	266
4	22N.12E.05.1413	GW	08-25-88	430	7.0	10.5	--	260	--	--
7	22N.12E.05.442	GW	12-11-63	538	7.2	--	33	280	270	322
8	22N.12E.09.3144	GW	06-12-89	355	6.7	--	--	240	151	--
10	22N.13E.06.3242	GW	06-13-89	550	7.1	--	--	230	248	309
16	23N.12E.28.344	GW	12-10-63	423	7.4	--	15	200	200	299
17	23N.12E.29.4344	GW	09-27-88	445	7.3	--	--	280	--	--
18	Ojo Caliente Grant Iron Spring	SP	12-03-74	390	6.6	40.0	83	--	170	--
20	24N.08E.24.321	GW	08-18-88	1,100	6.6	18.5	--	390	--	816
21	24N.09E.07.310	GW	08-18-88	950	7.0	18.0	--	340	--	653
22	24N.09E.11.124	GW	07-17-80	330	7.3	22.0	12	96	120	275
23	Gijosa Grant Rio Grande Spring	SP	07-23-76	380	7.5	17.0	7.1	120	120	263
24	24N.11E.32.4214	GW	10-13-88	650	6.8	15.0	--	390	--	--
25	24N.12E.01.321	GW	12-17-63	727	7.5	--	11	200	180	473
26	24N.12E.01.3224	GW	06-15-89	500	7.7	--	--	250	208	--
27	Rancho del Rio Grande Grant (Ponce de Leon Hot Spring)	SP	12-03-74	786	7.8	32.0	2.0	32	65	491
28	24N.13E.06.141	GW	12-12-63	479	7.3	--	21	230	220	288
34	25N.11E.28.343	GW	08-05-80	220	8.1	19.0	1.8	82	120	185
38	25N.12E.21.434	GW	05-21-81	710	7.6	13.0	--	320	--	444
42	25N.13E.03.123	GW	12-13-63	407	7.4	--	15	210	200	245
43	25N.13E.05.1432	GW	10-14-88	290	7.2	--	--	150	158	--
46	25N.13E.08.212	GW	12-12-73	192	7.8	--	2.8	78	89	124
48	25N.13E.08.2443	GW	06-15-89	395	7.1	--	--	240	195	--
52	25N.13E.08.4341	GW	09-06-79	490	7.3	12.5	22	240	230	301

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Date	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium, dissolved (mg/L as Na)	Potassium, dissolved (mg/L as K)	Bicarbonate, field (mg/L as HCO_3)	Sulfate, dissolved (mg/L as SO_4)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO_2)	Arsenic, dissolved (µg/L as As)	Barium, dissolved (µg/L as Ba)
1	12-11-63	59	13	--	--	280	27	12	0.7	59	--	--
2	09-27-88	72	7.3	14	6.0	260	10	9.3	--	18	--	--
4	08-25-88	80	15	9.0	3.0	260	22	<5.0	--	16	--	--
7	12-11-63	100	8.0	5.9	2.0	330	22	5.6	0.2	15	--	--
8	06-12-89	80	9.2	6.0	3.0	--	19	<10	--	9.6	--	--
10	06-13-89	64	17	13	5.0	--	48	8.0	--	5.2	--	--
16	12-10-63	65	9.7	--	--	240	25	2.2	0.9	60	--	--
17	09-27-88	88	15	5.0	1.0	260	33	<5.0	--	22	--	--
18	12-03-74	--	--	890	--	210	--	270	--	--	--	--
20	08-18-88	100	34	130	3.0	440	190	100	--	23	--	--
21	08-18-88	100	21	92	6.0	420	140	70	--	15	--	--
22	07-17-80	27	6.9	39	8.6	150	22	30	0.9	64	--	--
23	07-23-76	38	5.6	39	3.4	140	74	4.0	0.4	30	--	--
24	10-13-88	130	16	14	3.0	--	20	<5.0	--	12	--	--
25	12-17-63	68	8.4	--	--	220	140	30	4.2	26	--	--
26	06-15-89	80	12	19	3.0	--	64	<10	--	12	--	--
27	12-03-74	11	1.2	150	4.6	79	120	92	18	54	--	--
28	12-12-63	71	12	--	--	270	35	3.0	0.1	9.9	--	--
34	08-05-80	20	7.7	17	3.8	140	8.4	2.7	0.6	50	6	10
38	05-21-81	96	19	27	2.6	--	120	20	0.3	21	--	--
42	12-13-63	67	9.7	8.0	0.7	240	19	1.0	2.1	16	--	--
43	10-14-88	58	2.4	5.0	1.0	--	8.9	<5.0	--	8.2	--	--
46	12-12-73	25	3.8	10	0.8	110	7.6	0.9	0.1	21	1	<100
48	06-15-89	68	17	7.0	5.0	--	21	<10	--	6.3	--	--
52	09-06-79	75	12	14	1.0	280	33	5.1	0.2	18	<1	--

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Date	Boron, dissolved (µg/L as B)	Cadmium, dissolved (µg/L as Cd)	Chromium, dissolved (µg/L as Cr)	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)	Zinc, dissolved (µg/L as Zn)
1	12-11-63	--	--	--	0	--	--	--	--	--	--	--
2	09-27-88	--	--	--	--	--	--	--	--	--	--	--
4	08-25-88	--	--	--	--	--	--	--	--	--	--	--
7	12-11-63	--	--	--	0	--	--	--	--	--	--	--
8	06-12-89	--	--	--	--	--	--	--	--	--	--	--
10	06-13-89	--	--	--	--	--	--	--	--	--	--	--
16	12-10-63	--	--	--	0	--	--	--	--	--	--	--
17	09-27-88	--	--	--	--	--	--	--	--	--	--	--
18	12-03-74	1,500	--	--	--	--	--	--	--	--	--	--
20	08-18-88	--	--	--	--	--	--	--	--	--	--	--
21	08-18-88	--	--	--	--	--	--	--	--	--	--	--
22	07-17-80	40	--	--	<10	--	<3	--	--	--	--	--
23	07-23-76	60	--	--	--	--	--	--	--	--	--	--
24	10-13-88	--	--	--	--	--	--	--	--	--	--	--
25	12-17-63	--	--	--	10	--	--	--	--	--	--	--
26	06-15-89	--	--	--	--	--	--	--	--	--	--	--
27	12-03-74	500	--	--	20	--	<10	--	--	--	--	--
28	12-12-63	--	--	--	0	--	--	--	--	--	--	--
34	08-05-80	40	<1	0	<10	15	6	0	--	1	0	550
38	05-21-81	--	--	--	<10	--	20	--	--	--	--	--
42	12-13-63	--	--	--	0	--	--	--	--	--	--	--
43	10-14-88	--	--	--	--	--	--	--	--	--	--	--
46	12-12-73	1	ND	--	30	2	<10	--	--	2	ND	30
48	06-15-89	--	--	--	--	--	--	--	--	--	--	--
52	09-06-79	<20	--	--	<10	--	<1	--	--	--	--	--

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Local identifier	Site type	Date	Specific conductance, field (µS/cm)	pH, field (standard units)	Temperature, water (deg C)	Carbon dioxide, dissolved (mg/L as CO_2)	Hardness, total (mg/L as $CaCO_3$)	Alkalinity, field (mg/L as $CaCO_3$)	Dissolved solids (mg/L)
54	25N.13E.30.323	GW	12-12-63	696	7.5	--	15	280	250	447
56	25N.14E.16.4233	GW	06-02-89	375	7.4	--	--	230	182	--
57	25N.14E.28.4431	GW	06-02-89	440	7.6	--	--	270	171	274
62	26N.10E.14.322	GW	08-05-80	165	7.2	9.0	10	77	82	127
63	Antonio Martinez or Godoi Grant (Manby Hot Spring)	SP	12-03-74	794	6.9	34.0	41	91	170	522
64	26N.11E.21.211	GW	07-17-80	249	8.1	13.0	2.2	98	140	206
65	26N.11E.23.232	GW	07-16-80	315	8.5	20.0	1.2	120	190	238
66	26N.12E.22.123	GW	07-16-80	395	9.0	19.0	0.3	45	130	272
68	26N.12E.25.4122	GW	11-15-73	194	7.8	--	2.6	76	83	128
69	26N.12E.26.421	GW	09-28-88	295	7.8	--	--	150	--	--
71	26N.13E.04.113	GW	12-16-63	376	7.1	--	29	160	190	231
74	27N.09E.24.433	GW	07-17-80	280	8.1	16.0	2.3	79	150	276
75	27N.11E.26.333	GW	07-16-80	289	8.0	25.5	2.4	110	120	248
76	27N.11E.27.224	GW	08-05-80	240	8.1	13.5	1.9	89	120	187
77	27N.11E.35.311	GW	07-16-80	320	8.5	23.5	0.8	140	140	273
78	27N.12E.11.1211	GW	09-15-88	330	6.7	--	--	160	--	209
79	27N.12E.31.311 Warm Spring	SP	07-22-76	760	8.0	37.0	3.2	71	160	558
80	27N.12E.31 Stark Spring	SP	08-19-82	210	7.9	15.0	2.0	97	82	154
81	27N.12E.32.2312	GW	06-14-89	550	7.6	--	--	260	219	--
82	27N.12E.33.123	GW	12-05-63	308	7.2	--	17	150	140	188
84	27N.13E.32.2123	GW	09-28-88	290	7.4	--	--	150	--	--
87	28N.09E.23.244	GW	12-19-63	217	7.4	--	6.4	88	82	139
89	28N.12E.01.113	GW	03-08-66	566	7.5	10.0	9.8	260	160	369
90	28N.12E.01.114	GW	03-08-66	1,200	7.1	8.5	16	640	110	928
91	28N.12E.01.133 Embargo Spring	SP	03-09-66	412	7.2	8.5	17	180	140	258
92	28N.12E.01 Fish Hatchery Cold	SP	02-22-82	410	7.0	7.0	26	--	130	--
93	28N.12E.03.441	SP	03-09-66	228	7.7	17.0	3.1	53	80	155
94	28N.12E.08 Big Arsenic Seep	SP	07-24-90	178	8.1	15.5	--	68	--	164
95	28N.12E.08 N. Big Arsenic Spring	SP	08-27-86	205	8.1	16.5	--	--	--	--
96	28N.12E.08.142 Big Arsenic Sp.	SP	10-07-80	228	8.2	17.0	1.0	65	84	158

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Date	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium, dissolved (mg/L as Na)	Potassium, dissolved (mg/L as K)	Bicarbonate, field (mg/L as HCO_3)	Sulfate, dissolved (mg/L as SO_4)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO_2)	Arsenic, dissolved (µg/L as As)	Barium, dissolved (µg/L as Ba)
54	12-12-63	89	14	--	--	300	110	7.8	0.7	14	--	--
56	06-02-89	56	22	6.0	1.0	--	29	<10	--	5.4	--	--
57	06-02-89	72	22	9.0	2.0	--	47	12	--	5.4	--	--
62	08-05-80	22	5.4	2.3	5.7	100	7.8	2.8	0.2	30	1	100
63	12-03-74	27	5.7	130	9.2	200	130	56	3.8	58	--	--
64	07-17-80	28	6.7	17	4.9	170	5.2	2.8	0.6	53	6	100
65	07-16-80	39	5.0	27	7.8	220	5.9	3.1	0.7	32	--	--
66	07-16-80	16	1.3	73	2.7	140	61	16	0.7	21	2	40
68	11-15-73	23	4.6	10	0.8	100	10	2.3	0.3	24	3	<100
69	09-28-88	40	12	--	24	120	43	8.6	--	9.7	--	--
71	12-16-63	43	13	--	--	230	7.6	1.7	0.7	23	--	--
74	07-17-80	27	2.7	31	14	180	7.8	5.8	0.8	91	6	70
75	07-16-80	28	8.9	26	5.8	150	15	9.5	0.6	60	--	--
76	08-05-80	26	5.9	19	4.8	140	4.6	3.2	1.0	50	--	--
77	07-16-80	36	11	19	5.4	160	21	6.2	0.1	52	--	--
78	09-15-88	52	8.5	8.0	2.0	150	53	5.9	--	5.3	--	--
79	07-22-76	21	4.6	150	11	200	150	58	2.9	67	--	--
80	08-19-82	28	6.6	10	3.1	100	23	2.9	0.3	29	<1	28
81	06-14-89	76	17	22	3.0	--	37	<10	--	17	--	--
82	12-05-63	55	4.1	4.2	0.7	170	19	1.5	0.3	17	--	--
84	09-28-88	50	7.3	6.0	2.0	140	31	<5.0	--	6.8	--	--
87	12-19-63	26	5.6	--	--	100	8.0	9.8	0.4	22	--	--
89	03-08-66	82	13	19	2.0	190	130	5.2	0.3	23	--	--
90	03-08-66	200	35	30	2.0	130	570	8.8	0.3	18	--	--
91	03-09-66	57	10	15	2.0	170	65	4.8	0.7	17	--	--
92	02-22-82	--	--	--	--	160	--	--	--	--	--	--
93	03-09-66	14	4.3	26	2.8	98	17	9.4	1.2	32	--	--
94	07-24-90	19	5.1	20	2.3	--	21	8.9	1.1	33	--	--
95	08-27-86	--	--	--	--	--	--	--	--	--	--	--
96	10-07-80	18	4.8	21	2.5	96	22	6.9	--	33	--	--

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Date	Boron, dissolved (µg/L as B)	Cadmium, dissolved (µg/L as Cd)	Chromium, dissolved (µg/L as Cr)	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)	Zinc, dissolved (µg/L as Zn)
54	12-12-63	--	--	--	10	--	--	--	--	--	--	--
56	06-02-89	--	--	--	--	--	--	--	--	--	--	--
57	06-02-89	--	--	--	--	--	--	--	--	--	--	--
62	08-05-80	40	<1	0	50	0	40	0	--	0	0	210
63	12-03-74	270	--	--	40	--	<10	--	--	--	--	--
64	07-17-80	30	1	10	<10	2	1	0	--	0	0	1,800
65	07-16-80	70	--	--	<10	--	<3	--	--	--	--	--
66	07-16-80	80	<1	10	170	1	3	0	--	1	0	190
68	11-15-73	<20	<2	--	40	3	<10	--	1	6	ND	<20
69	09-28-88	--	--	--	--	--	--	--	--	--	--	--
71	12-16-63	--	--	--	0	--	--	--	--	--	--	--
74	07-17-80	30	1	0	40	2	10	0	--	1	0	1,400
75	07-16-80	40	--	--	<10	--	<3	--	--	--	--	--
76	08-05-80	200	--	--	60	--	6	--	--	--	--	--
77	07-16-80	40	--	--	20	--	30	--	--	--	--	--
78	09-15-88	--	--	--	--	--	--	--	--	--	--	--
79	07-22-76	250	--	--	--	--	--	--	--	--	--	--
80	08-19-82	--	<1	<10	6	<1	3	<0.10	--	<1	<1	40
81	06-14-89	--	--	--	--	--	--	--	--	--	--	--
82	12-05-63	--	--	--	10	--	--	--	--	--	--	--
84	09-28-88	--	--	--	--	--	--	--	--	--	--	--
87	12-19-63	--	--	--	20	--	--	--	--	--	--	--
89	03-08-66	90	--	--	--	--	--	--	--	--	--	--
90	03-08-66	80	--	--	--	--	--	--	--	--	--	--
91	03-09-66	80	--	--	10	0	--	--	--	--	--	60
92	02-22-82	--	--	--	5	3	2	--	12	--	--	9
93	03-09-66	50	--	--	0	0	--	--	--	--	--	20
94	07-24-90	--	--	--	3	--	<1	--	--	--	--	--
95	08-27-86	--	0.10	2	5	--	<1	--	4	--	--	13
96	10-07-80	--	--	--	<10	--	2	--	<10	--	--	<3

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Local identifier	Site type	Date	Specific conductance, field (µS/cm)	pH, field (standard units)	Temperature, water (deg C)	Carbon dioxide, dissolved (mg/L as CO_2)	Hardness, total (mg/L as $CaCO_3$)	Alkalinity, field (mg/L as $CaCO_3$)	Dissolved solids (mg/L)
97	Big Arsenic Springs	SP	03-27-85	222	8.4	--	--	--	75	--
98	28N.12E.9.22 Spring blw Hatchery	SP	04-27-79	185	--	11.5	--	--	--	--
99	28N.12E.09.243	SP	03-10-66	218	7.2	16.5	9.9	63	80	152
100	28N.12E.09.Mottl Spring	SP	07-25-90	225	8.2	17.5	--	59	--	157
101	28N.12E.09.BLM Visitor Center	GW	07-23-90	230	8.2	19.0	--	65	--	162
102	28N.12E.17. Little Arsenic Sp.	SP	07-24-90	208	8.2	15.0	--	62	--	153
103	28N.12E.17.2111 Little Arsenic	SP	09-06-79	220	8.2	14.5	1.0	59	82	152
104	29N.09E.11.320	GW	07-16-80	195	8.1	29.5	1.8	83	120	183
112	29N.12E.05.444	SP	08-21-55	265	7.2	--	12	--	96	--
114	29N.12E.11.124	GW	12-04-63	562	7.4	--	18	230	240	352
115	29N.12E.12.344	GW	12-04-63	370	7.4	--	14	150	170	230
118	29N.12E.20.BLM Chiflo Well	GW	07-24-90	235	8.3	18.5	--	64	--	163
128	29N.13E.20.434	GW	12-04-63	404	7.5	--	12	140	190	252
129	29N.13E.31.221	GW	09-16-88	500	7.0	--	--	260	--	342
130	30N.10E.08.444	GW	06-01-81	210	7.6	--	--	80	--	181
135	30N.12E.01.144	GW	08-31-55	194	7.2	10.0	9.8	81	80	--
137	30N.12E.01.342	GW	06-10-59	130	8.0	11.5	1.2	57	59	90
143	30N.12E.16.223	GW	07-25-55	157	7.1	--	11	54	71	--
153	30N.13E.18.122	GW	11-14-73	108	8.4	--	0.4	46	51	73
157	30N.13E.31.1112	GW	11-21-73	109	7.7	--	2.0	44	53	86
158	31N.09E.10.143	GW	08-13-80	220	8.1	13.5	1.5	82	99	176
162	31N.11E.19.140	GW	01-12-56	186	8.0	--	1.6	63	82	143
165	32N.11E.28.3433	GW	06-01-81	155	7.5	12.0	--	58	--	137
173	02S.73W.07.30	GW	08-11-88	330	7.3	11.0	--	170	--	182
194	Sangre de Cristo Grant	GW	09-05-79	230	7.1	11.0	15	96	98	146

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico--Continued

Reference number (pl. 2)	Date	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium, dissolved (mg/L as Na)	Potassium, dissolved (mg/L as K)	Bicarbonate, field (mg/L as HCO_3)	Sulfate, dissolved (mg/L as SO_4)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO_2)	Arsenic, dissolved (µg/L as As)	Barium, dissolved (µg/L as Ba)
97	03-27-85	--	--	--	--	--	--	--	--	--	--	--
98	04-27-79	--	--	--	--	--	--	--	--	--	--	--
99	03-10-66	18	4.3	20	2.9	98	17	6.6	1.3	32	--	--
100	07-25-90	15	5.2	21	2.4	--	19	8.4	1.3	33	--	--
101	07-23-90	17	5.4	22	2.3	--	19	7.5	1.4	32	--	--
102	07-24-90	17	4.7	20	2.7	--	15	7.2	1.2	35	--	--
103	09-06-79	16	4.6	19	2.6	100	19	4.4	1.3	34	1	--
104	07-16-80	25	5.1	10	6.6	140	4.3	2.3	0.4	58	3	30
112	08-21-55	--	--	--	--	120	--	7.5	--	--	--	--
114	12-04-63	63	17	--	--	290	50	2.8	0.7	21	--	--
115	12-04-63	42	11	--	--	210	17	2.0	0.4	23	--	--
118	07-24-90	17	5.2	21	2.7	--	21	6.9	1.5	33	--	--
128	12-04-63	44	8.5	--	--	230	29	0.6	0.6	18	--	--
129	09-16-88	80	15	20	3.0	260	76	6.0	--	12	--	--
130	06-01-81	17	9.2	14	2.8	--	10	3.8	0.3	49	--	--
135	08-31-55	--	--	--	--	97	--	4.5	--	--	--	--
137	06-10-59	16	4.1	--	--	72	4.7	0.2	0.2	25	--	--
143	07-25-55	--	--	--	--	86	--	3.0	--	--	--	--
153	11-14-73	13	3.3	4.4	0.6	62	2.7	0.6	0.2	16	3	<100
157	11-21-73	13	2.8	7.1	0.7	64	2.8	1.4	0.4	25	2	<100
158	08-13-80	23	6.0	17	5.4	130	14	4.7	0.4	41	--	--
162	01-12-56	15	6.2	--	--	100	11	1.5	0.3	42	--	--
165	06-01-81	16	4.4	12	2.6	--	2.6	1.4	0.2	48	--	--
173	08-11-88	48	12	13	2.0	120	37	2.2	--	--	--	--
194	09-05-79	30	5.0	6.8	1.4	120	12	1.4	0.6	23	<1	--

Table 7.--Water-quality analyses for selected wells and springs in Taos County, New Mexico--Concluded

Reference number (pl. 2)	Date	Boron, dissolved (µg/L as B)	Cadmium, dissolved (µg/L as Cd)	Chromium, dissolved (µg/L as Cr)	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)	Zinc, dissolved (µg/L as Zn)
97	03-27-85	--	--	--	<3	--	4	--	3	--	--	6
98	04-27-79	--	ND	--	--	--	--	--	--	--	--	--
99	03-10-66	90	--	--	10	110	--	--	--	--	--	20
100	07-25-90	--	--	--	<3	--	<1	--	--	--	--	--
101	07-23-90	--	--	--	5	--	<1	--	--	--	--	--
102	07-24-90	--	--	--	7	--	<1	--	--	--	--	--
103	09-06-79	<20	--	--	<10	--	<1	--	--	--	--	--
104	07-16-80	20	<1	0	120	1	30	0	--	0	0	20
112	08-21-55	--	--	--	--	--	--	--	--	--	--	--
114	12-04-63	--	--	--	0	--	--	--	--	--	--	--
115	12-04-63	--	--	--	10	--	--	--	--	--	--	--
118	07-24-90	--	--	--	10	--	<1	--	--	--	--	--
128	12-04-63	--	--	--	0	--	--	--	--	--	--	--
129	09-16-88	--	--	--	--	--	--	--	--	--	--	--
130	06-01-81	230	--	--	50	--	10	--	--	--	--	--
135	08-31-55	10	--	--	--	--	--	--	--	--	--	--
137	06-10-59	--	--	--	--	--	--	--	--	--	--	--
143	07-25-55	--	--	--	--	--	--	--	--	--	--	--
153	11-14-73	<20	<2	--	280	20	60	--	--	3	ND	ND
157	11-21-73	7	ND	--	170	5	30	--	2	2	ND	ND
158	08-13-80	50	--	--	240	--	7	--	--	--	--	--
162	01-12-56	--	--	--	--	--	--	--	--	--	--	--
165	06-01-81	220	--	--	80	--	6	--	--	--	--	--
173	08-11-88	--	--	--	--	--	--	--	--	--	--	--
194	09-05-79	7	--	--	<10	--	<1	--	--	--	--	--

Table 8.--Active and discontinued gaging stations in or near Taos County, New Mexico

[--, no data. Stations are in New Mexico unless otherwise indicated]

Station number (fig. 8)	Station name	Drainage area (square miles)	Period of record (water years)	Number of years of record	Average discharge (cubic feet per second)	Average discharge (acre-feet per year)	Maximum discharge for period of record (cubic feet per second)	Date
			Active stations					
08251500	Rio Grande near Lobatos, Colo.	7,700	1900-30 1931-89	31 59	846 453	[1]612,900 328,200	13,200	6- 8-05
08252500	Costilla Creek above Costilla Dam	25.1	[2]1937-89	--	--	--	--	--
08253000	Casias Creek near Costilla	16.6	[2]1937-89	--	--	--	--	--
08253500	Santistevan Creek near Costilla	2.15	[2]1937-89	--	--	--	--	--
08253900	Costilla Reservoir near Costilla	--	1922-83	--	--	--	--	--
08254000	Costilla Creek below Costilla Dam	54.6	[2]1937-89	--	--	--	--	--
08255500	Costilla Creek near Costilla	195	[3]1936-89	48	44.4	32,170	1,150	5-11-42
08256000	Acequia Madre at Costilla	--	[2]1944-89	--	--	--	--	--
08258000	Cerro Canal at Costilla	--	[2]1944-89	--	--	--	--	--
08258600	Cerro Canal below Association Ditch at Costilla	--	[2]1972-89	--	--	--	--	--
08259600	Cerro Canal at State line near Jaroso, Colo.	--	[2]1973-89	--	--	--	--	--
08261000	Costilla Creek at Garcia, Colo.	200	[2]1944-89	--	--	--	--	--
08263500	Rio Grande near Cerro	8,440	1948-89	41	461	334,000	9,740	6-22-49

Table 8.--Active and discontinued gaging stations in or near Taos County, New Mexico--Continued

Station number (fig. 8)	Station name	Drainage area (square miles)	Period of record (water years)	Number of years of record	Average discharge (cubic feet per second)	Average discharge (acre-feet per year)	Maximum discharge for period of record (cubic feet per second)	Date
	Active stations--Concluded							
08265000	Red River near Questa	113	1913-65	52	55.9	[1]40,500	886	5-25-42
			[3]1966-89	24	40.0	28,980		
08266000	Cabresto Creek near Questa	36.7	1943-89	46	10.4	7,530	204	6- 2-83
08266820	Red River below Fish Hatchery, near Questa	185	1978-89	11	86.7	62,810	755	6- 8-79
08267500	Rio Hondo near Valdez	36.2	1934-89	55	34.9	25,280	541	5-13-41
08268700	Rio Grande near Arroyo Hondo	8,760	1963-89	26	688	498,500	7,550	5-19-87
08269000	Rio Pueblo de Taos near Taos	66.6	[3]1911-89	44	29.7	21,520	1,050	5-26-79
08271000	Rio Lucero near Arroyo Seco	16.6	[3]1911-89	50	[4]21.9	15,870	310	6- 8-79
08275500	Rio Grande del Rancho near Talpa	83	1952-89	34	[4]20.1	14,560	497	5-21-73
08276300	Rio Pueblo de Taos below Los Cordovas	380	1957-89	32	61.0	44,190	2,380	8-24-57
08276500	Rio Grande below Taos Junction Bridge near Taos	9,730	1925-89	64	761	551,300	9,730	6- 7-48
08279000	Embudo Creek at Dixon	305	[3]1923-89	58	[4]81.2	58,830	4,200	8-29-77
08279500	Rio Grande at Embudo	10,400	1890-1930	41	1,238	[1]896,900	16,200	6-19-03
			[6]1931-89	59	828	599,900		

Table 8.--Active and discontinued gaging stations in or near Taos County, New Mexico--Continued

Station number (fig. 8)	Station name	Drainage area (square miles)	Period of record (water years)	Number of years of record	Average discharge (cubic feet per second)	Average discharge (acre-feet per year)	Maximum discharge for period of record (cubic feet per second)	Date
			Discontinued stations					
08252000	Rio Grande at Colorado-New Mexico State line	7,890	1953-83	29	352	255,000	5,000	6-10-79
08254500	Costilla Creek near Amalia	152	1961-81	--	--	--	--	--
		--	[2]1949-59	--	--	--	--	--
08255000	Ute Creek near Amalia	12	[2]1949-59	--	--	--	--	--
08257500	Cordillera Ditch at Garcia, Colo.	--	[2]1944-83	--	--	--	--	--
08258500	Association Ditch at Costilla	--	[2]1955-71	--	--	--	--	--
08259000	Cerro Canal near Jaroso, Colo.	--	[2]1944-72	--	--	--	--	--
08259500	New Mexico Branch Cerro Canal near Jaroso, Colo.	--	[2]1944-83	--	--	--	--	--
08260500	Costilla Creek below diversion at Costilla	197	1952-86	--	--	--	--	--
08263000	Latir Creek near Cerro	10.5	1937-70	33	6.04	4,380	[5]126	6-18-65
08264000	Red River near Red River	19.2	1940-55	12	16.5	11,950	264	6-12-52
08264500	Red River below Zwergle Damsite near Red River	25.7	1963-73	10	17.7	12,820	216	6-19-65
08267000	Red River at mouth near Questa	190	1950-78	28	75.0	54,340	730	8-12-64
08268500	Arroyo Hondo at Arroyo Hondo	65.6	1912-85	69	27.2	19,710	1,060	7-19-48

Table 8.--Active and discontinued gaging stations in or near Taos County, New Mexico--Concluded

Station number (fig. 8)	Station name	Drainage area (square miles)	Period of record (water years)	Number of years of record	Average discharge (cubic feet per second)	Average discharge (acre-feet per year)	Maximum discharge for period of record (cubic feet per second)	Date
			Discontinued stations--Concluded					
08275000	Rio Fernando de Taos near Taos	71.7	1912-80	24	[4]6.78	4,910	219	5-13-73
08275300	Rio Pueblo de Taos near Ranchito	199	1957-80	23	30.7	22,240	1,290	5-26-79
08275600	Rio Chiquito near Talpa	37.0	1957-80	23	8.41	6,090	309	6- 8-79
08276000	Rio Pueblo de Taos at Los Cordovas	359	1910-65	54	58.5	42,350	[5]1,830	5-14-41

[1]Two average discharges were computed; the first listing is for predevelopment and the second is for the most recent time period after significant development and diversions upstream.
[2]Records are collected only during the irrigation season.
[3]Period of record includes some missing years or months of data that affect the average discharge.
[4]Average discharge was not based on the total period of record due to missing data for certain years.
[5]Maximum discharge was not measured or recorded, but was determined from extending the rating curve.
[6]Average discharge for 1900-30 was 1,136 cubic feet per second or 823,200 acre-feet per year.

Table 9.--State water-quality standards for interstate streams in New Mexico as of May 22, 1991

[mg/L, milligrams per liter; °C, degrees Celsius; °F, degrees Fahrenheit; FTU, formazin turbidity units; ml, milliliters; µS/cm, microsiemens per centimeter at 25 degrees Celsius. From New Mexico Water Quality Control Commission, 1991]

Stream segment number (fig. 13)	Stream segment description	Designated uses	Standards
2-111	The main stem of the Rio Grande from the headwaters of Cochiti Reservoir upstream to Taos Junction Bridge, and Embudo Creek from its mouth on the Rio Grande upstream to the junction of the Rio Pueblo and the Rio Santa Barbara (this describes segments in Taos County).	Irrigation, livestock and wildlife watering, marginal coldwater fishery, secondary contact recreation, warmwater fishery	1. In any single sample: dissolved oxygen shall be greater than 6.0 mg/L, pH shall be within the range of 6.6 to 8.6, temperature shall be less than 22 °C (71.6 °F), and turbidity shall be less than 50 FTU. 2. The monthly logarithmic mean of fecal coliform bacteria shall not exceed 1,000 per 100 ml; no single sample shall exceed 2,000 per 100 ml. 3. At mean monthly flows greater than 100 cubic feet per second, the monthly average concentration for dissolved solids shall be less than 500 mg/L, that for sulfate shall be less than 150 mg/L, and that for chloride shall be less than 25 mg/L.
2-119	The main stem of the Rio Grande from Taos Junction Bridge upstream to the New Mexico-Colorado State line, the Red River from its mouth on the Rio Grande upstream to the mouth of Placer Creek, and the Rio Pueblo de Taos from its mouth on the Rio Grande upstream to Los Cordovas.	Coldwater fishery, fish culture, irrigation, livestock and wildlife watering, secondary contact recreation	1. In any single sample: non-ionized ammonia (as N) shall not exceed 0.03 mg/L, dissolved oxygen shall be greater than 6.0 mg/L, pH shall be within the range of 6.6 to 8.8, temperature shall be less than 20 °C (68 °F), total chlorine residual shall be less than 0.002 mg/L, and turbidity shall be less than 50 FTU. 2. The monthly logarithmic mean of fecal coliform bacteria shall not exceed 100 per 100 ml; no single sample shall exceed 200 per 100 ml.

Table 9.--State water-quality standards for interstate streams in New Mexico as of May 22, 1991--Concluded

Stream segment number (fig. 13)	Stream segment description	Designated uses	Standards
2-120	The Red River upstream from the mouth of Placer Creek, all tributaries to the Red River, and all perennial reaches of tributaries to the Rio Grande in Taos and Rio Arriba Counties unless included in other segments.	Domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock and wildlife watering, secondary contact recreation	1. In any single sample: non-ionized ammonia (as N) shall not exceed 0.02 mg/L; conductivity shall be less than 400 µS/cm (500 µS/cm for the Rio Fernando de Taos); dissolved oxygen shall be greater than 6.0 mg/L or 85 percent of saturation, whichever is greater; total inorganic nitrogen (as N) shall be less than 1.0 mg/L; pH shall be within the range of 6.6 to 8.8; temperature shall be less than 20 °C (68 °F); total chlorine residual shall be less than 0.002 mg/L; total organic carbon shall be less than 7 mg/L; total phosphorus (as P) shall be less than 0.1 mg/L; and turbidity shall be less than 25 FTU. 2. The monthly logarithmic mean of fecal coliform bacteria shall not exceed 100 per 100 ml; no single sample shall exceed 200 per 100 ml.

Table 10.--U.S. Geological Survey surface-water-quality stations

[Descriptions in parentheses in station names are not part of the official name but were added to clarify the location of the site. Stations are in New Mexico unless otherwise indicated]

Station number (fig. 14)	Station name	Water-quality site only	Number of water samples	Period of record
08254400	Latir Creek Outflow Lake 2		6	1987-88
08254425	Latir Creek Outflow Lake 9		7	1987-88
08255000	Ute Creek near Amalia		1	1958
08255500	Costilla Creek near Costilla		96	1966-76
08257500	Cordillera Ditch at Garcia, Colo.		1	1972
08263490	Rio Grande at Sheeps Xing Campground near Cerro	x	2	1978
08263500	Rio Grande near Cerro		54	1976-86
08263510	Rio Grande above Red River near Cerro	x	14	1978-80
08264000	Red River near Red River		24	1962-63
08264500	Red River below Zwergle Damsite near Red River		31	1976-81
364229105251101	29N.14E.35.132 sw source (near town of Red River)	x	1	1963
364122105380000	Molycorp Outfall	x	1	1979
08264970	Red River at Molycorp Mine near Red River	x	31	1978-82
08265000	Red River near Questa		69	1978-86
08266000	Cabresto Creek near Questa		23	1978-81
08266500	Red River below Questa	x	64	1978-86
08266790	Red River above State Fish Hatchery near Questa	x	55	1978-86
08266800	Red River at Fish Hatchery, near Questa	x	508	1966-77
08266820	Red River below Fish Hatchery near Questa		94	1977-86
08267000	Red River at mouth near Questa		107	1966-84
08267400	Rio Grande above Rio Hondo at Dunn Bridge	x	63	1978-86
08267500	Rio Hondo near Valdez		51	[1]1962-91
08268500	Arroyo Hondo at Arroyo Hondo		26	1978-82
08269000	Rio Pueblo de Taos near Taos		18	[1]1987-91
362623105323801	26N.13E.34.341 (Rio Pueblo de Taos near Taos Pueblo)	x	1	1963
08271000	Rio Lucero near Arroyo Seco		26	[1]1987-91
08275000	Rio Fernando de Taos near Taos		3	1952-54
08275500	Rio Grande del Rancho near Talpa		22	1962-63
08276300	Rio Pueblo de Taos below Los Cordovas		34	[1]1981-91
08276500	Rio Grande below Taos Junction Bridge near Taos		128	[1]1975-91
08279000	Embudo Creek at Dixon		191	[1]1970-91
08279500	Rio Grande at Embudo		11	1963-69

[1]Water-quality sampling is active and systematic at that site (as of 1991); all other sites were sampled only once or intermittently.

Table 11.--Summary of selected water-quality analyses from gaging stations and surface-water-quality stations

[--, no data]

		Specific conductance (microsiemens per centimeter at 25 degrees Celsius)				pH			
Station number	Station name	Number of samples	Minimum	Maximum	Median	Number of samples	Minimum	Maximum	Median
08255500	Costilla Creek near Costilla	60	67	381	176	58	6.6	8.6	7.4
08263500	Rio Grande near Cerro	52	85	420	212	50	7.2	9.1	8.1
08264000	Red River near Red River	--	--	--	--	--	--	--	--
08264500	Red River below Zwergle Damsite near Red River	29	112	200	170	29	7.5	8.9	8.2
08264970	Red River at Molycorp Mine near Red River	30	130	285	247	30	7.2	8.4	7.9
08265000	Red River near Questa	64	132	1,100	274	62	3.8	8.2	7.5
08266000	Cabresto Creek near Questa	22	91	172	140	22	7.4	8.1	7.7
08266500	Red River below Questa	61	125	332	280	59	7.0	8.8	7.6
08266790	Red River above State Fish Hatchery near Questa	53	130	945	370	51	7.1	8.5	7.9
08266800	Red River at Fish Hatchery near Questa	458	174	1,280	434	411	6.3	9.9	7.7
08266820	Red River below Fish Hatchery near Questa	84	125	650	340	82	6.5	8.4	7.8
08267000	Red River at mouth near Questa	103	82	584	309	103	6.4	8.8	7.3
08267400	Rio Grande above Rio Hondo at Dunn Bridge	58	125	500	238	57	7.0	8.9	8.0
08267500	Rio Hondo near Valdez	20	100	584	130	18	7.4	8.4	8.0
08268500	Arroyo Hondo at Arroyo Hondo	25	110	386	290	25	7.3	8.9	8.5
08269000	Rio Pueblo de Taos near Taos	13	125	240	200	12	7.6	8.7	8.2
08271000	Rio Lucero near Arroyo Seco	21	62	120	100	20	7.4	8.3	7.6
08276300	Rio Pueblo de Taos below Los Cordovas	26	220	1,050	460	25	7.5	8.8	8.4
08276500	Rio Grande below Taos Junction Bridge near Taos	114	144	550	263	116	7.1	8.9	8.1
08279000	Embudo Creek at Dixon	175	130	480	369	150	7.1	8.7	8.1

Table 11.--Summary of selected water-quality analyses from gaging stations and surface-water-quality stations--Continued

		Dissolved oxygen (milligrams per liter)				Alkalinity (milligrams per liter)			
Station number	Station name	Number of samples	Minimum	Maximum	Median	Number of samples	Minimum	Maximum	Median
08255500	Costilla Creek near Costilla	--	--	--	--	41	21	122	80
08263500	Rio Grande near Cerro	31	7.2	12.4	9.4	43	44	123	74
08264000	Red River near Red River	--	--	--	--	--	--	--	--
08264500	Red River below Zwergle Damsite near Red River	27	7.9	12.6	8.8	26	41	98	80
08264970	Red River at Molycorp Mine near Red River	28	7.2	13.0	9.1	27	28	71	57
08265000	Red River near Questa	54	7.2	19.0	8.6	50	0	108	44
08266000	Cabresto Creek near Questa	21	7.8	10.8	8.8	20	30	52	41
08266500	Red River below Questa	54	7.2	14.4	8.5	48	26	116	49
08266790	Red River above State Fish Hatchery near Questa	46	7.0	11.2	8.8	45	27	187	64
08266800	Red River at Fish Hatchery near Questa	1	--	7.2	--	412	2	282	71
08266820	Red River below Fish Hatchery near Questa	53	6.7	16.0	8.2	66	7	155	72
08267000	Red River at mouth near Questa	29	7.0	10.6	9.0	67	21	315	74
08267400	Rio Grande above Rio Hondo at Dunn Bridge	53	6.8	11.6	9.0	44	46	110	72
08267500	Rio Hondo near Valdez	21	8.2	15.4	10.0	6	45	76	56
08268500	Arroyo Hondo at Arroyo Hondo	24	6.5	11.0	8.4	25	43	170	138
08269000	Rio Pueblo de Taos near Taos	18	6.6	12.1	10.1	5	57	101	--
08271000	Rio Lucero near Arroyo Seco	26	7.1	13.4	10.2	6	21	61	40
08276300	Rio Pueblo de Taos below Los Cordovas	28	7.7	13.3	9.4	6	95	226	162
08276500	Rio Grande below Taos Junction Bridge near Taos	72	6.5	18.0	9.4	85	46	129	89
08279000	Embudo Creek at Dixon	34	7.0	14.5	9.6	98	55	212	169

Table 11.--Summary of selected water-quality analyses from gaging stations and surface-water-quality stations--Concluded

		Dissolved solids (milligrams per liter)				Suspended sediment (milligrams per liter)			
Station number	Station name	Number of samples	Minimum	Maximum	Median	Number of samples	Minimum	Maximum	Median
08255500	Costilla Creek near Costilla	45	49	239	105	36	2	521	[1]11
08263500	Rio Grande near Cerro	25	93	272	158	31	3	181	29
08264000	Red River near Red River	--	--	--	--	24	1	32	4
08264500	Red River below Zwergle Damsite near Red River	24	69	128	108	22	0	211	6
08264970	Red River at Molycorp Mine near Red River	24	86	201	164	24	1	755	13
08265000	Red River near Questa	26	91	248	180	48	2	6,550	42
08266000	Cabresto Creek near Questa	15	60	180	96	15	0	288	5
08266500	Red River below Questa	27	90	222	183	44	7	1,780	30
08266790	Red River above State Fish Hatchery near Questa	24	91	690	322	33	2	1,970	24
08266800	Red River at Fish Hatchery near Questa	58	106	664	300	96	4	1,140	18
08266820	Red River below Fish Hatchery near Questa	52	101	497	226	70	0	2,130	30
08267000	Red River at mouth near Questa	18	--	378	[1]291	28	5	2,740	26
08267400	Rio Grande above Rio Hondo at Dunn Bridge	24	93	258	177	43	5	4,840	37
08267500	Rio Hondo near Valdez	13	66	284	80	41	0	76	5
08268500	Arroyo Hondo at Arroyo Hondo	17	--	239	[1]207	18	3	779	25
08269000	Rio Pueblo de Taos near Taos	12	80	157	126	--	--	--	--
08271000	Rio Lucero near Arroyo Seco	16	46	78	64	2	3	9	--
08276300	Rio Pueblo de Taos below Los Cordovas	17	137	435	260	23	5	174	27
08276500	Rio Grande below Taos Junction Bridge near Taos	99	52	336	184	69	6	24,700	38
08279000	Embudo Creek at Dixon	132	78	278	220	9	4	182	22

[1]Value is estimated by using a log-probability regression to predict the values of data below the detection limit.

Table 12.--Water use in Taos County, New Mexico, 1990--withdrawals and depletions by category

[Modified from Wilson, 1992]

Water-use category	Withdrawals (acre-feet) Surface water	Withdrawals (acre-feet) Ground water	Withdrawals (acre-feet) Total	Depletions (acre-feet) Surface water	Depletions (acre-feet) Ground water	Depletions (acre-feet) Total
Irrigated agriculture	103,253	1,211	104,464	40,037	926	40,963
Mining	908	3,029	3,937	154	515	669
Public water supply	0	1,676	1,676	0	621	621
Domestic	0	1,066	1,066	0	480	480
Reservoir evaporation	63	0	63	63	0	63
Livestock	58	83	141	58	83	141
Commercial	45	133	178	9	60	69
Industrial	0	92	92	0	27	27
Totals	104,327	7,290	111,617	40,321	2,712	43,033