

WHERE TO GET WATER INFORMATION IN NEW MEXICO

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September 30, 1981

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The work upon which this publication is based was supported by funds provided by the State of New Mexico as authorized by Chapter 209, Laws of 1979.

FOREWORD

by Tom Bahr, Director, WRRI

The 1979 Legislature of the State of New Mexico directed the New Mexico Water Resources Research Institute to study the feasibility of managing and inventorying a data base on water availability and use in New Mexico (Chapter 209, Laws of 1979). The New Mexico WRRI delegated the task of information gathering and synthesis to the authors of this report and the findings were provided to the Governor and Legislature in a report entitled "An Assessment of New Mexico's Water Data Systems - A Report to the New Mexico Legislature" dated January 7, 1981. One finding listed in the conclusion of this report was that there is a lack of knowledge among water data users about where to find water information.

One recommendation of study was to publish and make available a directory of water agencies listing their phone numbers, addresses and the type of water information that is available from each agency. Although the scope and available funding for the original study did not provide for the preparation of such a directory we used the resources that were available to prepare this report. This report is not intended to be a comprehensive directory but it represents a document that can be distributed in a timely fashion, and one we believe will be useful in providing some citizens of New Mexico with a start on where to find water information.

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INTRODUCTION

New Mexico is endowed with a wide variety of natural resources, however, the availability of water has always been and will continue to be a limiting factor in economic development. New Mexico's water resources are being placed under increasing stress by the demands of municipal, agricultural, mining, power, and recreational users. Increasing stress leads to more frequent requests for information about this critical resource. In recognition of this need, the 1979 Legislature of the State of New Mexico directed the New Mexico Water Resources Research Institute to conduct a study to ascertain what types of information are available concerning New Mexico's water, who has the information and how one should go about requesting the information. The following summarizes portions of the study's results that we believe would be of interest to the general public.

INVENTORY OF AVAILABLE INFORMATION

The large majority of information available on New Mexico's water resources is collected by four key water related governmental agencies or offices. The four are: (1) State Engineer Office, (2) U.S. Geological Survey, (3) the Environmental Improvement Division of the New Mexico Health and Environment Department, and (4) New Mexico Bureau of Mines and Mineral Resources. All four of these agencies/offices work in close cooperation in the collection and storage of water information. In addition to the four, there are various other federal, state and local agencies which are involved in the collection of water data and are identified in this publication.

The New Mexico State Engineer Office

The Constitution of New Mexico provides that "The unappropriated water of every natural stream, perennial or torrential, within the State of New Mexico, is hereby declared to belong to the public and to be subject to appropriation for beneficial use, in accordance with the laws of the state. Priority of appropriation shall give the better right" (Art. XVI, Sec. 2). It also provides that "Beneficial use shall be the basis, the measure, and the limit of the right to the use of water" (Art. XVI, Sec. 3). The New Mexico State Engineer is charged with the general supervision, measurement, appropriation and distribution of New Mexico's water in accordance with the laws of the state.

Reflecting its paramount importance in a semi-arid state, water in New Mexico is a commodity which belongs to the public and its use is closely governed by law. Article 5 of Chapter 72 (NMSA 1978) establishes the administrative procedures to be followed in the apportionment and use of surface water. Under this article any person intending to make a new apportionment of water or to change the point of diversion or place and purpose of use of an existing water right, must apply for and receive a permit from the State Engineer before doing so. Article 12 of Chapter 72 establishes procedures for the administration of groundwater appropriations which are similar for those concerning surface water except that no permit is required to appropriate groundwater at points outside underground water basin declared by the State Engineer. (A declared underground water basin is an area of the state proclaimed by the State Engineer to be underlain by a groundwater source having reasonably ascertainable boundaries.) As of September 12, 1980, the State Engineer had proclaimed 29 such "underground water basins" encompassing

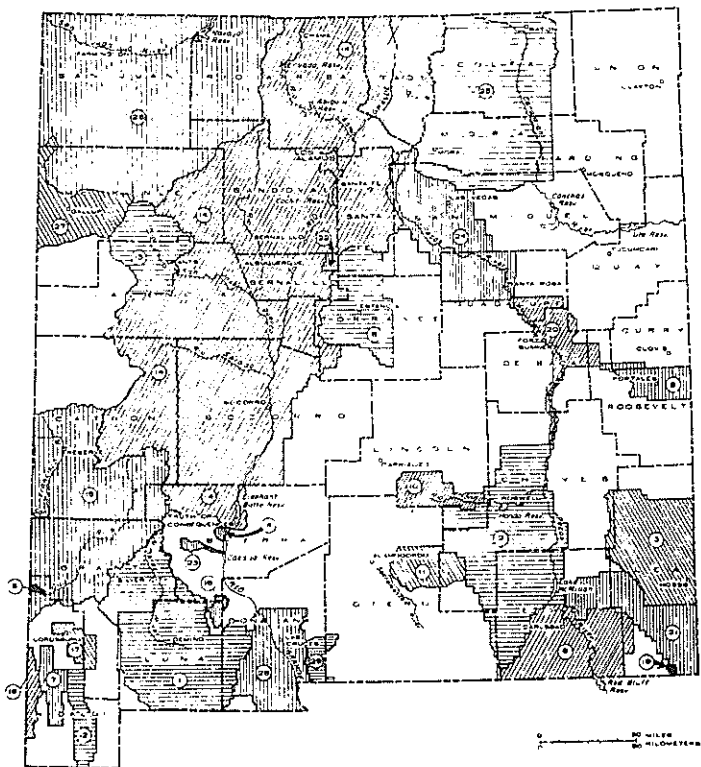
approximately 73,546 square miles--approximately three fifths of the State's area (Figure 1).

Any person desiring to obtain or transfer surface and/or groundwater in a declared basin must file an application with the State Engineer. Before issuing the permit, the State Engineer must determine that the application will not impair any existing right, the burden of proof being placed on the applicant. In most cases, a notice of the application must also be published in a newspaper of general circulation within the county to give opportunity for protest and hearing on the application before the State Engineer. The exception to the requirement of publication includes only applications for domestic, stock watering, drinking and sanitary purposes, and the irrigation of not to exceed one (1) acre of trees, lawns, and non-commercial garden in an amount not to exceed three (3) acre-feet per annum, subject to limitations imposed by the courts.

The State Engineer office has available information on:

- a) Methods and procedures of obtaining or transferring surface and groundwater rights.
- b) Records of surface and groundwater rights issued to date.
- c) State and federal court decrees regarding water rights.
- d) Past and ongoing hydrographic surveys that preliminarily identify individual ownership of water rights.
- e) Locations of declared underground water basins.

In carrying out his duties entailing general supervision of the waters of the State, the State Engineer conducts an extensive water investigation and measurement program. Information collected in this program includes:



DECLARED UNDERGROUND WATER-BASINS IN NEW MEXICO

<u>BASIN</u>	<u>AREA IN SQUARE MI.</u>	<u>BASIN</u>	<u>AREA IN SQUARE MI.</u>
1 MIMBRE VALLEY	4,374	18. SAN SIMON	368
2 ROSWELL	4,381	17. LODSBURG VALLEY	328
3 LEE COUNTY	2,180	18. MUTT-HOCKETT	183
4 HOT SPRINGS	39	19. JAL	18
5. WINDEN VALLEY	19	20. FORT RUMNER	1,089
6. CARLSBAD	1,988	21. CAPITAN	1,889
7. ANIMAS	428	22. BANDIA	73
8. ESTANCIA	1,724	23. LAB ANIMAS CREEK	78
9. PORTALES	628	24. UPPER PECOS	3,108
10. HONDO	811	28. CANADIAN RIVER	8,828
11. PEÑABO	723	2A. SAN JUAN	9,727
12. PLATAS VALLEY	918	27. RALLAP	1,439
13. BLUEWATER	1,318	29. LOWER MIEJ GRANDE	1,588
14. RIO GRANDE	28,144	30. HUELL	284
15. GILA - SAN FRANCISCO	8,889		
		TOTAL	73,548

Figure 1. Declared Underground Water Basins in New Mexico
 (Source - State Engineer of New Mexico Rule 2,
 Amendment 16, Sept. 12, 1980).

Water Use

1970 and 1975 withdrawals and depletions by water use category (i.e., irrigated agriculture, urban, rural, power, etc.) in New Mexico counties and river basins.

Surface and Groundwater Measurements

Stream flow, chemical and sediment measurements for selected stations on major rivers and tributaries throughout the state in addition to about 5,000 groundwater level measurements.

Groundwater Investigation Projects

Summaries of ongoing and past hydrologic investigations which are part of the cooperative program between the State Engineer and the U.S. Geological Survey.

Flood Hazard Areas

Flood hazard boundary maps published by the Flood Insurance Administration for 78 communities and unincorporated areas within 21 counties (as of June 1, 1980).

Water Well Drillers

Current listings of licensed drillers in New Mexico.

Mine Drill Holes

Records of plugged mine drill holes and information concerning specifications for plugging.

Dams, Reservoirs, and Natural Lakes

a) Listings of locations, capacities, and areas of reservoirs and lakes.

- b) The program includes an inventory and records of inspections of dams 25 feet or more high or impounding 50 acre-feet or more as part of the federal dam safety program.

In order that agencies and individuals concerned with development, management, and the use of water resources may have access to available information, the State Engineer publishes the more significant investigative findings. The State Engineer published a comprehensive "Bibliography of Groundwater Studies in New Mexico, 1873-1977," which contains 1,636 entries and a supplement to this bibliography entitled "Bibliography of Groundwater Studies in New Mexico, 1848-1979," which contains an additional 588 entries. These reports are available for inspection at the State Engineer Office in Santa Fe and the District Office of the U.S. Geological Survey in Albuquerque. Copies of many of the reports may be obtained by the public at no cost, others for a small fee.

Important sources of water use information in New Mexico are those records available in three State Engineer District Offices. These offices are located in Albuquerque, Deming, and Roswell, and each office is assigned administrative responsibilities within underground water basins, as declared by the State Engineer. These offices also have the responsibility for administering surface water supplies. Records of most water uses within declared underground water basins are maintained at these district offices. Well over 50 percent of the data used in water use inventories can be obtained from the three district offices whose addresses are listed at the back of this publication.

U.S. Geological Survey

The U.S. Geological Survey's (U.S.G.S.) Water Resources Division is the principal federal water data agency and as such collects and disseminates

about 70 percent of the water information currently being used by numerous state, local, private and federal agencies to develop and manage our water resources.

In New Mexico the U.S.G.S., in financial cooperation with the State Engineer, collects data and makes hydrologic and hydraulic studies relating to streamflow, reservoir content, groundwater, physical and chemical character of water, and water use. The biochemical quality of water is monitored at some stations. Approximately 140 reservoir level, stream-, and canal-gaging stations are operated under this cooperative agreement. At approximately 40 of these stations, chemicals and/or sediment content of surface water is monitored. In 1979, a total of 1,900 depth-to-water measurements from wells in 37 areas of the State were taken by U.S.G.S. and the State Engineer Office.

The U.S.G.S. is currently conducting areal appraisals of Santa Fe, Western Valencia, Lea and Harding Counties; Acoma and Laguna Pueblos and the Zuni Reservation. Areal-appraisal studies result in qualitative descriptions of water resource--including groundwater levels, stream and well discharges, aquifer and surface water characteristics, and chemical analysis of water--which can be assembled into tables, graphs and maps that provide a general description of the water resources in the study area. A goal of the U.S.G.S. is to complete county-based areal assessments for all of New Mexico.

The U.S.G.S. is also conducting river basin assessments in the San Augustin Plains and Pecos River Basins. River basin assessments are studies of hydrology in areas that are bounded by topographic drainage divides. They can yield information on precipitation-runoff relationships, stream gains and losses, effects of groundwater pumping on streams, land use effects on streamflow, changes in sediment load and quality of water. The U.S.G.S. plans to expand assessments to include all major rivers in New Mexico.

Aquifer assessments are conducted by the U.S.G.S. to produce a thorough description of the hydrology of an aquifer and of the way it responds to pumping, recharge or other stresses. These assessments are necessary to predict the life of a water supply, to serve as a guide for efficient water management and use, and to protect the aquifer from adverse stresses. Current aquifer assessments include studies of the High Plains Aquifer, Southwest Alluvial Basin, Roswell and Mimbres Basins.

Energy development activities in New Mexico have a major impact on the water resources. The U.S.G.S. is involved in studies to collect information on the effects of current and potential increased mining of coal and uranium. They are also conducting detailed hydrologic studies for analysis of the transport of nuclear and hazardous wastes by groundwater at nuclear or hazardous waste disposal sites.

A very important contribution to managing and disseminating the information collected from most sources in New Mexico is the U.S.G.S. Water Data Storage and Retrieval System (WATSTORE) and National Water Data Exchange (NAWDEX). Both of these systems allow access by all individuals to vast amounts of data which otherwise would be nearly impossible to handle. Requests for information concerning water information collected by the U.S.G.S. can be obtained by contacting the local U.S.G.S. service centers in Albuquerque, Santa Fe and Carlsbad. (Addresses are available at the back of this publication.)

New Mexico Environmental Improvement Division

The Environmental Improvement Division (EID) of the New Mexico Health and Environment Department is "responsible for environmental management and consumer protection . . . in order to insure an environment that, in the

greatest possible measure, will confer optimum health, safety, comfort and economic and social well-being on (New Mexico) inhabitants." To assist in the performance of this mandate, the Division collects three types of water data: surface water data, groundwater data, and water supply data.

The major continuing information collection effort for surface waters is the Ambient Monitoring Stations. Sampling for temperature, dissolved oxygen, pH, nutrients, and other parameters is performed on monthly basis by the U.S. Geological Survey under funding from the Interstate Stream Commission for seven stream monitoring stations. In addition, some analyses are also done for trace metals and trace organic compounds. Similar sampling at two reservoir stations is done by the EID on a quarterly basis.

In addition, the EID has available a variety of historical information from many places. This information, which has been collected by the EID and other agencies, is generally limited in parameter coverage and time period. Data from current water pollution control efforts, such as intensive surveys of selected stream reaches, are added to this information base on a regular basis.

All surface water information is retrieved through STORET, the U.S. Environmental Protection Agency's computerized information retrieval system. This information is available to the public on request through the EID.

Information on groundwater currently available through the EID falls into two basic categories: data related to assessment of water quality in the Grants Mineral Belt and data related to the State's regulations for protection of groundwater quality.

The EID is currently engaged in a Grants Mineral Belt regional monitoring program. Under this program, aquifers being recharged by streams

receiving water from mine dewatering and deionization ponds are being sampled over a five-year period to evaluate changes and trends in water quality.

Regulations promulgated by the New Mexico Water Quality Control Commission to protect groundwater quality require new dischargers to have an approved discharge plan before discharging to groundwater. Discharges already existing when the regulations became effective may also be required to have approved discharge plans. These discharge plans may require dischargers to do self-monitoring of groundwater quality. In addition the EID does spot monitoring and conducts an annual tour to monitor discharges in the Grants Mineral Belt. Both self-monitoring and EID data are available for inspection at the EID's offices in Santa Fe.

The Water Supply Section of the EID has available various types of information on community water supplies. The most important of these data are inventories of the chemical, radiological, and bacteriological quality of 600 community and 600 non-community (serving non-residents or transients with less than 25 permanent residents) water supply systems. The inventory of chemical quality, which includes nitrates, heavy metals, and secondary parameters, is updated every three years. The inventory of bacteriological quality is updated on a monthly basis. The analyses are performed by laboratories certified through a coordinated effort of the EID and the Scientific Laboratory Division. Addresses for the Administrative Office and 22 field offices can be found in the back of this publication.

New Mexico Bureau of Mines and Mineral Resources

The New Mexico Bureau of Mines and Mineral Resources is the official state agency responsible for investigating and reporting on the geology and mineral resources of New Mexico. Since the Bureau's formal establishment in

1927, water-resource investigations have continued to be a significant part of its activities. Although most investigations have been done in cooperation with the U.S. Geological Survey, New Mexico State Engineer Office, or other organizations, the results of studies have been published by the Bureau.

The comprehensive water-resource reports published by the Bureau (Groundwater Reports, Hydrologic Reports, and Hydrogeologic Sheets) include information on groundwater resources, surface water resources, climate, water chemistry, well or spring inventories, water-level data or maps, measured sections or logs, geologic maps and structure or tectonic maps for many sections of the state. The Bureau has also published statewide reports on geothermal resources, mercury content of ground and surface water, potential hazardous waste disposal sites, oil field waters, and water requirements for industry. Other Bureau reports contain information on the general availability of water in the area.

A free pamphlet, entitled "Water-Resource Information Available from New Mexico Bureau of Mines and Mineral Resources," identifies data which may be obtained from the Bureau, by area and topic.

A Bureau water resource report may contain more than a thousand well records. Searching through such information visually is tedious and time consuming; therefore, the Bureau has developed a computer program written to permit searching well-record data by any combination of 15 parameters. These include locations, owner, construction date, type of well, well depth, ground surface elevation, water depth, water elevation, aquifer, method of lift, power source, availability of a chemical analysis, availability of well logs, and availability of additional information on aquifer properties. Approximately 1,800 well records for Grant County are on computer file and data

files are planned for other counties for which reports have been published by the Bureau.

The Bureau also publishes a free 32 page pricelist which includes availability and cost of all publications and reports. The Albuquerque, Deming, Farmington, Gallup, Clovis, Hobbs, and Las Cruces public libraries, as well as the University of New Mexico and Museum of New Mexico (Santa Fe) libraries, routinely receive the Bureau's formal publications.

New Mexico Water Resources Research Institute

The New Mexico Water Resource Research Institute's duties include the support of research relating to New Mexico's water resources. Its library houses a collection of completion reports from all Institute projects and activities, as well as an extensive collection of water information. In addition, the collection contains Selected Water Resources Abstracts, as well as Environmental Protection Agency bibliographies on water quality subjects. The library also receives selected government publications, including Environmental Protection Agency reports and volumes from the Water Supply Papers series of the U.S. Geological Survey. The Institute exchanges publications with other water resources institutes and centers throughout the country, and its collection of these volumes covers a wide variety of subject areas.

U.S. Soil Conservation Service

The Snow Survey Program, initiated in New Mexico in 1937 by the U.S. Soil Conservation Service, provides predictions of spring runoff from snow-melt throughout the western United States where snowfall varies greatly from area to area and from year to year. Streamflow regulation, and water management in general, depend upon these forecasts for successful operation.

Runoff for the State's major drainage basins is forecast using stations located in New Mexico and Colorado.

Forecasts of spring runoffs are used by federal and state agencies concerned with surface water flow and supplies. The Soil Conservation Service publishes a monthly report which is printed in the State's newspapers. Monthly reports are also mailed to any interested individual.

New Mexico Department of Game and Fish

The New Mexico Department of Game and Fish collects water quality information relating to dissolved oxygen, pH, alkalinity and water temperature for most of the State's surface water. This information has been collected for years; they are not, however, collected annually from each reservoir, river or stream. The information is available from the Department in Santa Fe, at the Denver Public Library under the Fish and Wildlife Reference Service, and at the Department's area offices in Las Cruces, Roswell, Albuquerque, and Raton. The Department also has fish species data for most waters.

Other Agencies Water Information

Several state and federal agencies and many local governments, although not directly responsible for collecting information on water, do have information available on New Mexico's water resources. The address and phone numbers for many of these offices are also listed at the back of this publication.

SUMMARY OF INFORMATION COLLECTION RESPONSIBILITIES

State Engineer Office

Water Right Records

Water Use Data - withdrawals and depletion by use categories

Surface and Groundwater Data - stream flow, chemical and
sediment measurements

Groundwater Investigation Data - hydrologic investigations

Flood Hazard Data

Water Well Drillers Licenses

Mine Drilling Data - specifications and records

Dams, Reservoirs and Natural Lakes Data - descriptions

Dam Safety Data - inventories and inspection records

U.S. Geological Survey

Surface and Groundwater Data - quality and quantity measurements

Surface Water Site Data - peak, discharge and stage values

Surface and Groundwater Data - chemical, physical, biological
characteristics

Wells and Springs Inventory Data - site location and identification,
geographic characteristics, well construction history

Environmental Improvement Division

Drinking Water Supply Data - chemical analyses

Surface Water Chemical and Bacterial Data

Surface Water Biological Data

Specialized Studies - focused on situations such as the Grants
Mineral Belt

New Mexico Bureau of Mines and Mineral Resources

Surface and Groundwater Data - water chemistry, inventories,
water level measurements, well records

Geothermal Resources Data

Geologic and Tectonic Data - maps

Potential Hazardous Waste Disposal Site Data

Oil Field Data

Industrial Water Requirement Data

New Mexico Water Resources Research Institute

Water Resource Research Findings - from sponsored projects

Research Publications - depository for most water resources
research publications of interest to the state

U.S. Soil Conservation Service

Snow Survey Data - runoff forecasts for New Mexico's major drainage
basins

New Mexico Department of Game and Fish

Water Quality Data - dissolved oxygen, alkalinity and water
temperature

GLOSSARY OF WATER TERMS

GLOSSARY

Acre-foot - The volumetric measure of the quantity of water required to cover one acre to a depth of one foot. It is equal to 43,560 cubic feet, or 325,851 gallons.

Active Storage Capacity - The total amount of usable reservoir capacity available for seasonal or cyclic water storage. It is gross reservoir capacity minus inactive storage capacity and flood surcharge.

Alluvium - A deposit of sand, mud, etc., formed by flowing water.

Aquifer - A geologic formation that contains sufficient saturated permeable material to yield a usable quantity of water to wells or springs.

Artesian Water - Groundwater under sufficient pressure to rise above the level at which the water-bearing bed is reached in a well. The pressure in such an aquifer commonly is called artesian pressure, and the formation containing artesian water is an artesian aquifer.

Artificial Recharge - The addition of water to the groundwater reservoir by man's activities, such as irrigation or induced infiltration from streams or wells.

Average Annual Yield (Water) - The average annual supply of water produced by a given stream or water development over a period of 12 months.

Bank Storage - Water absorbed and stored in the banks of a stream, lake, or reservoir when the stage rises above the water table in the bank formations. Bank storage may be returned in whole or in part as seepage back to the water body when the level of the surface water returns to a lower stage.

Base Flow - Sustained or fair-weather runoff--generally that portion of the streamflow derived from discharging groundwater or other delayed sources such as lakes or snow fields.

Bedload - That part of the stream sediment load in which the particles of material move on or near the bottom of the channel.

Beneficial Use of Water - The use of water by man for any purpose from which benefits are derived, such as domestic, municipal, irrigation, livestock, industrial, power development, and recreation. Under the New Mexico constitution beneficial use is the basis, the measure, and the limit of the right to use water; therefore, beneficial use of public water diverted or impounded by manmade works is an essential element in the development of a water right.

Biochemical Oxygen Demand (BOD) - The quantity of oxygen utilized primarily in the biochemical oxidation of organic matter in a specified time and at a specified temperature.

Bolson - An alluvium-floored basin, depression, or wide valley, mostly surrounded by mountains and drained by a system that has no surface outlet. Bolson fill is the alluvial material that fills a bolson--also commonly called bolson deposits.

Closed Basin - A basin is considered closed with respect to surface flow if its topography prevents the occurrence of visible outflow. It is closed hydrologically if neither surface nor underground outflow can occur.

Confining Bed - A rock formation that will not readily transmit water and which retards or stops the free movement of water underground. Confining beds have also been called aquicludes, equitards, or semiconfining beds.

Consumptive Use (Water) - The quantity of water discharged to the atmosphere or incorporated in the products of the process in connection with vegetative or animal growth, food processing, manufacturing, industry, domestic use, power production; etc.

Cubic Foot per Second (CFS or ft³/s) - The rate of discharge representing a volume of one cubic foot passing a given point during one second. It is equivalent to 7.48 gallons per second, or 448.8 gallons per minute.

Declared Underground Water Basin - An area of the state proclaimed by the State Engineer to be underlain by a groundwater source having reasonably ascertainable boundaries. By such proclamation the State Engineer assumes jurisdiction over the appropriation and use of groundwater from the source.

Depletion (Water) - Water supply consumptively used and no longer available as a water source.

Discharge - Rate of flow at a given instant in terms of volume per unit of time; pumping discharge equals pumping rate, usually given in gallons per minute (gal/min); stream discharge, usually given in cubic feet per second (ft³/s). With respect to water underground, the movement of water out of a aquifer. Discharge may be natural, as from springs, as by seepage, or by evapotranspiration, or it may be artificial as by constructed drains or from wells.

Dissolved Oxygen - The amount of free (not chemically combined) oxygen in water. Usually expressed in milligrams per liter.

Dissolved Solids - Chemical compounds in solution (see Total Dissolved Solids).

Drainage Basin - A part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or body of impounded surface water together with all tributary surface streams and the land area that drains into any of the tributaries.

Drawdown (Groundwater) - The depression or decline of the water level in a pumped well or in nearby wells caused by pumping. At the well, it is the vertical distance between the static and the pumping level.

Ephemeral Stream - A stream or portion of a stream which flows only in direct response to precipitation. Such flow is usually of short duration. Most of the dry washes of the region may be classified as ephemeral streams.

Evaporation, Net Reservoir - The evaporative water loss from a reservoir after making allowance for precipitation on the reservoir. Net reservoir evaporation equals the total evaporation minus the precipitation on the reservoir surface.

Evapotranspiration - The process by which water is returned to the air through direct evaporation or by transpiration of vegetation.

Flood Plain - Land bordering a stream. The land was built up of sediment from overflow of the stream and is still subject to flooding when the stream is at flood stage.

Gaging Station - A particular site on a stream, canal, lake, or reservoir where systematic observations of water level or discharge are made.

Gaining Stream - A river, or reach of a stream or river, that gains flow from groundwater seepage or from springs in, or alongside the channel--sometimes called an effluent stream.

Groundwater - Water found beneath the land surface in the zone of saturation.

Groundwater Mining - The condition that exists when the annual withdrawal of water from an aquifer exceeds the annual recharge causing a decline in the groundwater level.

Groundwater Recharge - The addition of water to the zone of saturation. Infiltration of precipitation and its movement to the water table is one form of natural recharge.

Groundwater Reservoir Storage - The amount of water in storage within the defined limit of the aquifer.

Hydraulic Gradient (Groundwater) - The slope of the water table in a specific direction. Groundwater will have a tendency to move down the slope.

Hydroelectric Power - Electric power produced by water power.

Hydrograph - A graph showing the stage, flow, velocity, or other property of water with respect to time. Hydrographs of wells show the changes in water levels during the period of observation.

Impermeable - Not capable of transmitting fluids or gases in appreciable quantities. Few rocks are completely impermeable; but some--such as unweathered granite, dense basalt, welded tuff, dense limestone, and well-cemented conglomerate--may be so considered for practical purposes.

Intermittent Stream - A stream which flows for only a part of the time. Flow generally occurs for several weeks or months during or after seasonal precipitation, due to groundwater discharge, in contrast to the ephemeral stream that flows but a few hours or days following a single storm.

Irrigable Land - Land having soil, topographic, drainage, and climatic conditions favorable for sustained irrigation.

Irrigation Conveyance Loss - The loss of water in transit from a reservoir; point of diversion; or groundwater pump to the point of use, whether in natural channels or in artificial ones, such as canals, ditches, and laterals.

Irrigation Efficiency - The percentage of the water diverted from a water source that is consumed.

Irrigation Leaching Requirement - The amount of water required to move residual salts out of the root zone and maintain an adequate soil-salt balance for crop production.

Irrigation Return Flow - Applied water which is not consumptively used and returns to a surface or groundwater supply.

Losses Incidental to Irrigation - The quantity of water depleted by irrigation in excess of the beneficial irrigation consumptive use.

Milligrams per Liter (mg/l) - The weight in milligrams of any substance contained in one liter of liquid. (Equivalent to parts per million or p.p.m.)

Perched Groundwater - Water in a saturated zone of material underlain by a relatively impervious stratum which acts as barrier to downward flow and which is separated from the main groundwater body by a zone of unsaturated material above the main groundwater body.

Perennial Stream - A stream that flows continuously.

Phreatophyte - A plant that habitually obtains its water supply from the zone of saturation, either directly or through the capillary fringe.

Playa - Flat-floored bottom of an undrained desert plains basin.

Porosity - The ratio of the total volume of pore space (voids) in a rock or soil to its total volume, usually stated as a percentage. Effective porosity is the ratio of the volume of interconnected voids to the total volume. Unconnected voids contribute to total porosity but are ineffective in transmitting water through the rock.

Recharge - The addition of water to an aquifer by infiltration, either directly into the aquifer or indirectly by way of another rock formation. Recharge may be natural, as when precipitation infiltrates to the water table, or artificial, when water is injected through wells or spread over permeable surfaces for the purpose of recharging an aquifer.

Recoverable Groundwater - The amount of water which may be physically and economically withdrawn from the groundwater reservoir.

Return Flow - That part of a diverted flow which is not consumptively used and which returns to a water body.

Riparian Vegetation - Vegetation growing on the banks of a stream or other body of surface water.

Runoff - The part of the precipitation that appears in surface streams.

Saline Water - Generally, water containing more than 1,000 mg/l of dissolved solids is regarded as saline and classified as follows:

Slightly saline	1,000 to 3,000 mg/l
Moderately saline (Brackish)	3,000 to 10,000 mg/l
Very saline	10,000 to 35,000 mg/l
Brine	more than 35,000 mg/l

Note: Sea water is 35,000 mg/l.

Saltwater Encroachment or Intrusion - The invasion of a body of freshwater by saline water. It can occur either in surface or groundwater bodies.

Specific Capacity - In groundwater hydrology, the yield of a well in gallons per minute per foot of drawdown after a period of sustained pumping.

Streamflow - The discharge that occurs in a natural channel of a surface stream course.

Suspended Sediment - Sediment particles suspended in water for an appreciable length of time.

Total Dissolved Solids (TDS) - An aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, nitrates, etc., of calcium, magnesium, manganese, sodium, potassium, and other cations which form salts. High TDS solutions have the capability of changing the chemical nature of water. High TDS concentrations exert varying degrees of osmotic pressures and can be harmful to plant growth. The common and synonymously used term for TDS is "salt."

Total Sediment Load - The sum of the bedload and the suspended sediment load.

Trap Efficiency of Reservoirs - Ratio of sediment retained in a reservoir to sediment inflow expressed as a percentage.

Water Requirement - The total quantity of water required for a specified use under a predetermined or prescribed situation.

Water Right - A legal right to take possession of water occurring in a water supply and to divert that water to a specific beneficial use.

Water Table - The upper surface of zone of saturation.

Withdrawal - The act of taking water from a stream, groundwater, or other body of water into a pipe, canal, or other conduit. (Withdrawal is also referred to as diversion.)

Zone of Saturation - The zone in which all the connected voids in permeable rock or soil formation are filled with water under pressure equal to, or greater than atmospheric pressure.

Useful Addresses and Phone Numbers

STATE ENGINEER OFFICE MAIN OFFICE

Bataan Memorial Building
Santa Fe, NM 87502
827-2127

DISTRICT OFFICES

Albuquerque
2340 Menaut NE
Albuquerque, NM 87107
842-3126

Deming
216 S. Silver Ave.
Deming, NM 88030
546-2851

Roswell
909 E. 2nd Street
Roswell, NM 88201
622-6521

Las Cruces
530 S. Melendres
Las Cruces, NM 88001
526-6571

U. S. GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

Albuquerque
District Office
P.O. Box 26659
505 Marquette, NW
Albuquerque, NM 87125
766-2810

Sub District Office
3540 B Pan American Frwy.
Albuquerque, NM 87107
766-6506

Santa Fe
Room 115 Federal Building
Cathedral Place
Santa Fe, NM 87501
988-6307

Carlsbad
Room 101 Federal Building
Carlsbad, NM 88220
885-5939

Las Cruces
P.O. Box 3167
New Mexico State University
Las Cruces, NM 88003
646-1335

Farmington
P.O. Box 3402
Petroleum Club Plaza
Farmington, NM 87401
326-0311

ENVIRONMENTAL IMPROVEMENT DIVISION

MAIN OFFICE

Crown Building
Santa Fe, NM 87501
827-5271

DISTRICT OFFICES

Albuquerque
4215 Montgomery Blvd NE
Albuquerque, NM 87109
842-3355

Bernalillo
Sandoval County Courthouse
P.O. Box 700
Bernalillo, NM 87004
867-2506

Farmington
724 W. Animas
Farmington, NM 87401
327-9851

Gallup
106 W. Hill
P.O. Box 2410
Gallup, NM 87301
722-4160

Milan
708 Uranium Ave.
P.O. Box 2536
Milan, NM 87020
287-8845

Los Lunas
Valencia County Courthouse
P.O. Box 177
Los Lunas, NM 87031
865-9797

Socorro
Socorro Field Health Office
214 Heal Avenue
Socorro, NM 87801
835-0971

Espanola
215 Riverside Dr. NE
P.O. Box 4027 Fairview Sta.
Espanola, NM 87532
753-7948

Taos
Taos County Health Building
Paseo De Pueblo Sur
P.O. Box 601
Taos, NM 87571
758-8808

Las Vegas
1800 New Mexico Avenue
P.O. Box 1506
Las Vegas, NM 87701
425-7400

Raton
225 S. 3rd Street
P.O. Box 249
Raton, NM 87740
445-9477

Las Cruces
1001 N. Solano
P.O. Box 965
Las Cruces, NM 88004
523-4513

Alamogordo
Murray Morgan St. Office Bldg.
Room 106
411 10th Street
Alamogordo, NM 88310
437-7115

Deming
825 S. Silver Street
P.O. Box 1001
Deming, NM 88031
546-7559

Silver City
Hudson Plaza # 23
P.O. Box 2575
Silver City, NM 88062
538-5318

Roswell
200 E. 5th Street
Roswell, NM 88201
623-6934

Carlsbad
406 N. Guadalupe Street
Carlsbad, NM 88220
885-9023

Clovis
King St. Office Complex
820 W. 6th Street
P.O. Box 1832
Clovis, NM 88101
762-3728

Hobbs
116 1/2 N. Turner Street
Hobbs, NM 88240
393-2333

Ruidoso
4-Seasons Mall, Suite 4
2500 Sudderth Drive
P.O. Drawer 800
Ruidoso, NM 88345
257-4656

Tucumcari
Quay County Courthouse
300 S. 3rd Street
P.O. Drawer 1
Tucumcari, NM 88401
461-1671

NEW MEXICO DEPARTMENT OF GAME AND FISH

MAIN OFFICE
Yillagra Building
Santa Fe, NM
827-2143

AREA OFFICES

Albuquerque
6511 Domingo Rd., NE
Albuquerque, NM 87108
268-4374

Las Cruces
1480 N. Main Street
Las Cruces, NM 88001
524-7491

Raton
1248 3rd Street
Raton, NM 87740
445-9741

Roswell
413 N. Virginia
Roswell, NM 88201
622-2681

NEW MEXICO SOIL AND WATER CONSERVATION DIVISION

Santa Fe
1418 Luisa Street
Santa Fe, NM 87501
827-5182

Las Cruces
FIRST National Tower
Las Cruces, NM 88001
526-3761

Roswell
PETROLEUM Building
Roswell, NM 88201
623-8201

U.S. SOIL CONSERVATION SERVICE

P.O. Box 2007
517 Gold Avenue, SW
Albuquerque, NM 87102
766-3277

U.S. ARMY CORPS OF ENGINEERS

P.O. Box 1580
517 Gold Avenue, SW
Albuquerque, NM 87102
766-2781

U.S. FOREST SERVICE

Southwest Regional Office
517 Gold Avenue, SW
Albuquerque, NM 87102
766-2444

NM ENERGY & MINERALS DEPARTMENT

P.O. Box 2770
113 Washington Avenue
Santa Fe, NM 87501
827-2471

NM BUREAU OF MINES AND MINERAL RESOURCES

Water Resources Information
N.M. Bureau of Mines and
Mineral Resources
Socorro, NM 87801
835-5420 or 835-5410

U.S. BUREAU OF RECLAMATION

Southwest Regional Office
P.O. Box 252
505 Marquette, NW
Albuquerque, NM 87125
766-3739

NM WATER RESOURCES RESEARCH INSTITUTE

Box 3157
Stucky Hall
New Mexico State University
Las Cruces, NM 88003
646-4337

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