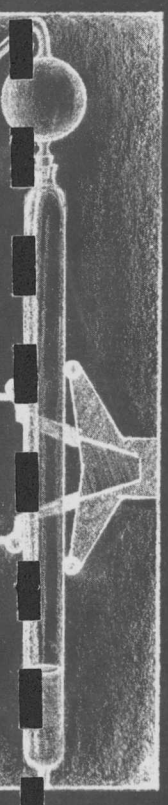
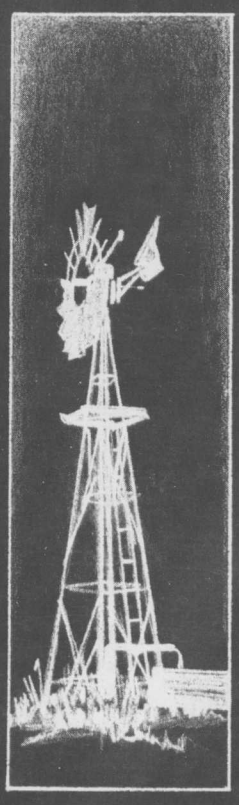
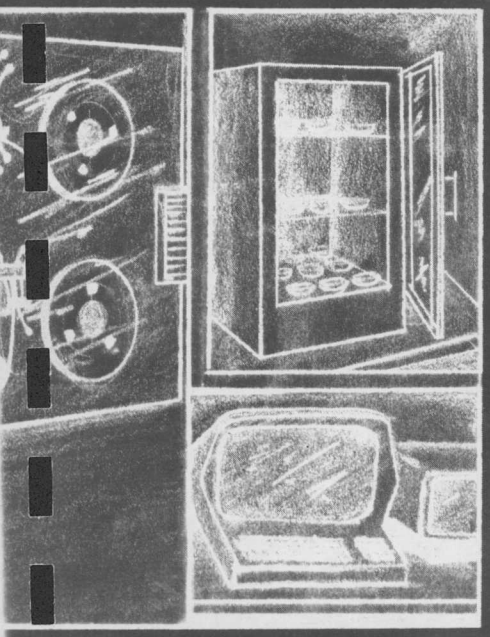
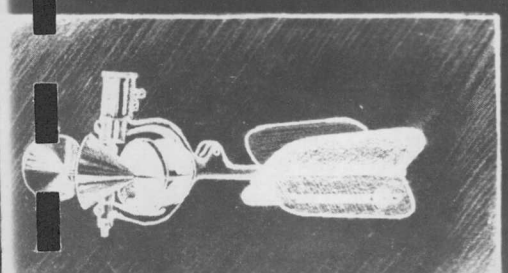


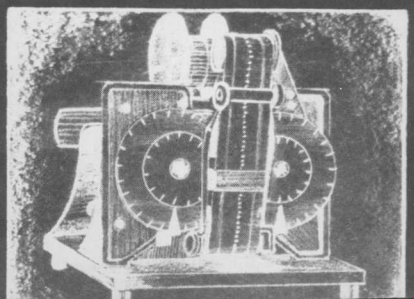


WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY IN NEW MEXICO FISCAL YEAR 1979

U. S GEOLOGICAL SURVEY
OPEN-FILE REPORT 80-408







WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY IN NEW MEXICO--FISCAL YEAR 1979

COMPILED BY R.R. WHITE AND W.K. DEIN

U.S. GEOLOGICAL SURVEY

MARCH 1980

PREFACE

This is the second of an annual series of reports in which the program of the New Mexico District, U.S. Geological Survey, Water Resources Division, is summarized. This report should be useful to cooperating agencies and to the users of water data in that it summarizes and gives the status of the basic data collection program and all current studies of the Water Resources Division in New Mexico.

The program of the New Mexico District is, for the most part, accomplished through cooperative programs with other Federal and non-Federal agencies.

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ILLUSTRATIONS

WATER RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY IN NEW MEXICO

FISCAL YEAR 1979

COMPILED BY R. R. WHITE AND W. K. DEIN

ABSTRACT

The U.S. Geological Survey's Water Resources Division investigates the occurrence, quantity, quality, distribution, and movement of the Nation's surface and underground waters, and coordinates the Federal water-data acquisition activities.

At the end of fiscal year 1979 the New Mexico District had 34 active projects, had released 10 reports during the year, and had answered thousands of requests for water-related information.

INTRODUCTION

The U.S. Geological Survey, through its Water Resources Division, investigates the occurrence, quantity, quality, distribution, and movement of the surface and underground waters that comprise the Nation's water resources, and coordinates the Federal water-data acquisition activities.

The mission of the Division is accomplished through programs supported by the U.S. Geological Survey and through programs supported and accomplished in cooperation with other Federal and nonFederal agencies. These programs involve:

1. Collecting, on a systematic basis, data needed for the continuing determination and evaluation of the quantity, quality, and use of the Nation's water resources.

2. Conducting analytical and interpretive water-resource appraisals describing the occurrence, availability, and the physical, chemical, and biological characteristics of surface and ground water.

3. Conducting supportive basic and problem-oriented research in hydraulics, hydrology, and related fields of science to improve the scientific basis for investigations and measurement techniques, and to understand hydrologic systems sufficiently well to predict quantitatively their response to stress, either natural or manmade.

4. Disseminating the water data and the results of these investigations and research through reports, maps, computerized information services, and other forms of public releases.

5. Coordinating the activities of Federal agencies in the acquisition of water data for streams, lakes, reservoirs, estuaries, and ground waters.

6. Providing scientific and technical assistance in hydrologic fields to other Federal, State, and local agencies, to licensees of the Federal Power Commision, and to international agencies on behalf of the Department of State.

"Because of its arid southwest location, New Mexico's water supply is one of its most important and valuable assets and generally is considered the key factor affecting future economic growth and quality of life in New Mexico."[1/]

The New Mexico District of the U.S. Geological Survey, Water Resources Division, along with other Federal and State agencies, shares in the responsibility for the appraisal of the quantity, quality, and distribution of surface- and ground-water resources of the State of New Mexico.

1/U.S. Department of the Interior, Western U.S. Water Plan Study, 1975.

This report contains information concerning the U.S. Geological Survey's water-resources investigations and surveillance programs in New Mexico. The New Mexico District office is located in Albuquerque with subdistrict offices and field headquarters located throughout the State (fig. 1). Requests for information should be addressed as follows:

Mr. James F. Daniel, District Chief
U.S. Geological Survey
Water Resources Division
P. O. Box 26659
Albuquerque, New Mexico 87125

Phone: (505) 766-2246

Current District programs encompass the following water-information areas:

1. Chemical quality of surface water in New Mexico
2. Chemical quality of ground water in New Mexico
3. Sediment transport in New Mexico streams
4. Surface-water supply
5. Surface-water diversions for irrigation
6. Streamflow Characteristics
   - High flow
   - Low flow
   - Flood frequency
7. Effect of urban development on storm runoff
8. Inundation from floods
9. Effects of ground-water pumping
10. Long-term monitoring of ground-water levels
11. Ground-water and surface-water relationships
12. Consumptive use of phreatophytes
13. Hydrologic impacts of energy development
14. Ground-water supplies
15. Hydrologic impacts of ground-water development


SANTA FE AREA
ALBUQUERQUE AREA
CARLSBAD AREA
SANTA FE
ALBUQUERQUE
SAN ANTONIO
ROSWELL
SILVER CITY
LAS CRUCES
CARLSBAD
SAN JUAN
RIO ARRIBA
TAOS
COLFAX
UNION
HARDING
SAN MIGUEL
QUAY
CURRY
ROOSEVELT
LINCOLN
CHAVES
DE BACA
GUADALUPE
TORRANCE
VALENCIA
BERNALILLO
SANDOVAL
SOCORRO
CATRON
SIERRA
GRANT
DONA ANA
OTERO
EDDY
LEA
LUNA
HIDALGO
MILES
KILOMETERS
EXPLANATION
Subdistrict or field headquarters responsibility area boundary
District Office
Subdistrict Office
Field Headquarters
Office

As of the end of fiscal year 1979 the District had 34 active projects. During the past year the New Mexico District prepared for release 10 reports and answered thousands of requests for water-related information.

The programs of the District are supported by Federal funding to the Geological Survey and in cooperation with other Federal, State, and local agencies. Agencies cooperating with the U.S. Geological Survey during fiscal year 1979 are:

State and Local

Albuquerque Metropolitan Arroyo Flood Control Authority
City of Albuquerque
Costilla Creek Compact Commission
Elephant Butte Irrigation District
New Mexico Bureau of Mines and Mineral Resources
New Mexico Environmental Improvement Division
New Mexico Interstate Stream Commission
New Mexico State Highway Department
Office of New Mexico State Engineer
Pecos River Commission
Pueblo of Zuni
Rio Grande Compact Commission

Federal

U.S. Department of Agriculture
  Forest Service
  Soil Conservation Service
U.S. Department of the Army
  Corps of Engineers
  White Sands Missile Range
U.S. Department of Energy
U.S. Department of Housing and Urban Development
  Environmental Protection Agency
U.S. Department of the Interior
  Bureau of Indian Affairs
  Bureau of Land Management
  Bureau of Reclamation
  National Park Service

PROJECTS IN PROGRESS

FISCAL YEAR 1979

HYDROLOGIC-DATA PROGRAM

Hydrologic-data stations are maintained by the Geological Survey at locations in New Mexico. They constitute a network for obtaining records of stream stage and discharge, reservoir and lake elevation and storage, ground-water levels, well and spring discharge, and the quality of surface and ground water (figs. 2, 3, and 4). The Water Resources Division has both a current and a historical file of hydrologic data. Data collected are stored in the Geological Survey's National Water Data Storage and Retrieval System (WATSTORE) and are available on request. These data can be retrieved in machine-readable form, as computer-printed tables or graphs, or digital plots. Computer programs are available for statistical analysis of the data and the results of these analyses are available. Local assistance in the acquisition of services or products from WATSTORE can be obtained from the District Chief, Water Resources Division, in Albuquerque. For information on data reports that are published periodically as part of this program see the "Publications of the U.S. Geological Survey" section of this report.

A summary of each data collection program follows. The summary consists of a map showing the location of the hydrologic-data stations, a list of cooperating agencies, a brief description of the program's purpose and scope, and project reports released during the prior fiscal year.

Negatives Enclosed

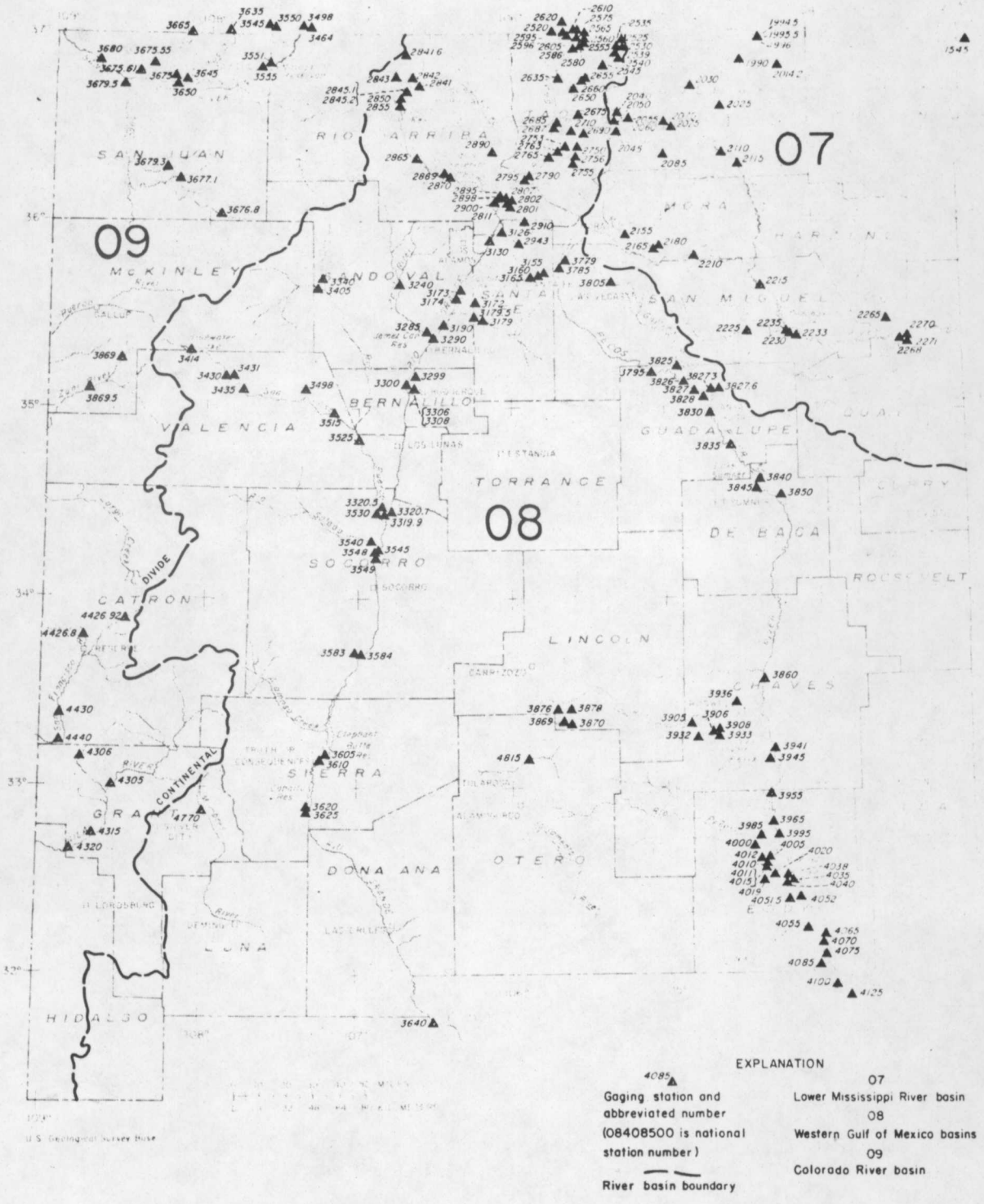


Figure 2.--Location of surface-water gaging stations in New Mexico.

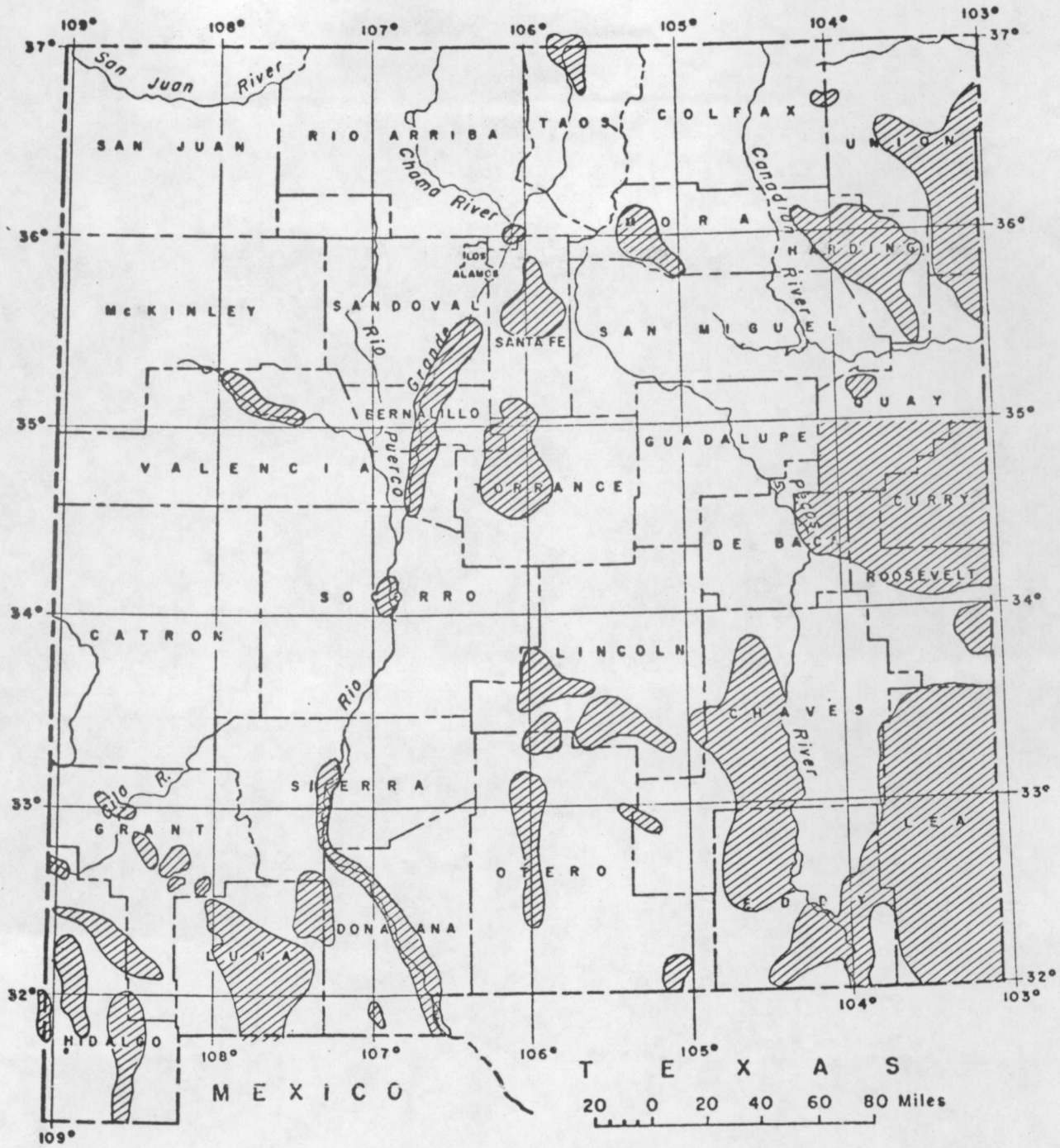
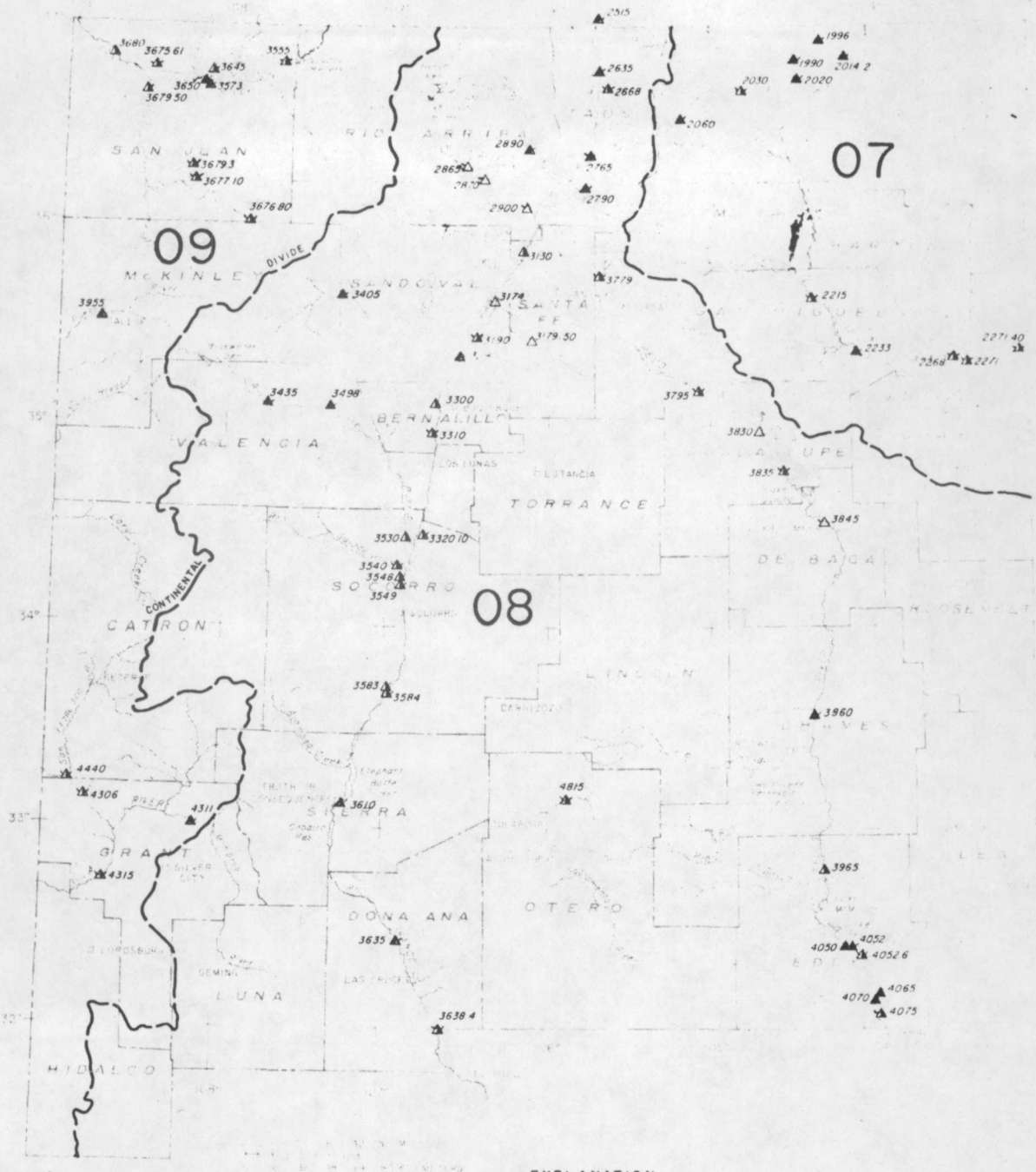


Figure 3.--Areas with many ground-water observation wells in New Mexico.

Negatives Enclosed



EXPLANATION

STATION AND SAMPLING FREQUENCY

Chemical quality: ▲ daily ▲ other than daily

Suspended sediment: △ daily △ other than daily

Chemical quality and Suspended sediment: ◭ both daily ◭ both other than daily

◭ daily chemical quality and other than daily suspended sediment

◭ daily suspended sediment and other than daily chemical quality

BASIN AND STATION NUMBER

River basin boundary:

Lower Mississippi River basin number 07

Western Gulf of Mexico basin number 08

Colorado River basin number 09

△ 227140

Number by symbol is abbreviated station number. Complete station number of example is

07 227140

Basin no. Station no.

Figure 4.--Location of water-quality gaging stations in New Mexico.

PROJECT TITLE: Surface-water data

LOCATION: Statewide

COOPERATING AGENCIES: Office of New Mexico State Engineer, New Mexico Interstate Stream Commission, Costilla Creek Compact Commission, Pecos River Commission, Albuquerque Metropolitan Arroyo Flood Control Authority, New Mexico Environmental Improvement Division, New Mexico Highway Department, Bureau of Reclamation, National Park Service, Bureau of Indian Affairs, Corps of Engineers, Forest Service, and Bureau of Land Management.

PROJECT CHIEF: Louis P. Denis (505-766-2011)

PERIOD OF PROJECT: Continuous since 1930

Purpose and Scope: Surface-water discharge (streamflow) and stage (water level) are collected for general hydrologic purposes such as assessment of water resources, areal analysis, determination of long-term trends, research and special studies, or for management and operational purposes. In New Mexico, discharge and stage data currently are being obtained at the number of stations given below.

Station classification	Number of stations
Stream stations	443
Continuous stage and discharge record:	
Water year	155
Irrigation season only	38
Cumulative discharge record:	
Irrigation season total only	108
Partial stage and discharge record:	
Peak (maximum) flow only	136
Low flow only	6
Lake and reservoir stations	8
Continuous stage and contents	4
Intermittent stage and contents	4
Total	451

Note: The gages operated as "Peak flow only" (crest-stage gages) are a part of the project "Investigation and analysis of floods for small drainage areas in New Mexico". No other gages operated for specific projects are included in this tabulation.

All stations are shown on the map (fig.2) except partial-record stations that record peak flow only (136), low flow (6), and selected stations operated only during irrigation season (126).

Note: In association with project work, there are an additional 20 sites measured regularly, and 34 measured on an occasional basis.

Reports Published or Released During Fiscal Year 1978:

U.S. Geological Survey, 1978, Water Resources Data for New Mexico, Water Year 1977. U.S. Geological Survey Water-Data Report NM-77-1, 627 p.

U.S. Geological Survey, 1978, Water Resources Data for New Mexico, Calendar Year 1976, Surface-Water Records and Water-Quality Records: New Mexico State Engineer, 597 p.

PROJECT TITLE: Ground-water data

LOCATION: Statewide

COOPERATING AGENCIES: Office of New Mexico State Engineer and Corps of Engineers

PROJECT CHIEF: Jim D. Hudson (505-766-2011)

PERIOD OF PROJECT: Continuous since 1925

Purpose and Scope: Ground-water data are collected to determine short-range changes and long-range trends in ground-water levels, to relate these data to changes in ground-water storage, and to provide the data base necessary for management of the resource. Water levels in wells, discharge of springs and wells, and water-quality data are key parameters for monitoring ground-water trends; however, they must be integrated with other observations and studies of ground-water systems in order to have the fullest meaning and usefulness. A basic network of observation wells is maintained in New Mexico for monitoring fluctuations of water levels. Other wells known as "project wells" are used for specific (generally short-term) studies and, although they are not part of the basic observation-well network, data obtained from them also are available. Beginning in 1980, most wells will be measured every five years on a rotating basis, and only selected areas will be published. The number of observation wells and springs currently being measured is given in the following table. (Project wells are not included)

Station classification	Number of stations
Observation wells:	
Levels	1700
Springs (discharge)	5

Locations of individual observation wells are not shown; however, areas of many observation wells are shown on figure 3.

Note: In association with project work, 209 wells are measured periodically and 22 wells are equipped with water-level recorders.

Reports Published or Released During Fiscal Year 1978:

Hudson, J. D., 1978, Ground-Water Levels in New Mexico, 1976: New Mexico State Engineer Basic-Data Report, 194 p.

Hudson, J. D., 1978, Ground-water depletion, in feet, allowed in the central and northern parts of Lea County, New Mexico, by U.S. Internal Revenue Service for calendar year 1977: N.Mex. State Engineer Maps LC-20 and LN-20, 2 sheets.

Hudson, J. D., 1978, Ground-water depletion, in feet, allowed in a part of Curry County, New Mexico, by U.S. Internal Revenue Service for calendar year 1977: N.Mex. State Engineer Map CU-18, 1 sheet.

Hudson, J. D., 1978, Ground-water depletion, in feet, allowed in Portales Valley, Roosevelt County, New Mexico, by U.S. Internal Revenue Service for calendar year 1977: N.Mex. State Engineer Map RO-21, 1 sheet.

U.S. Geological Survey, 1978, Water Resources Data for New Mexico, Water Year 1977: U.S. Geological Survey Water-Data Report NM-77-1, p. 563-583.

PROJECT TITLE: Chemical and biological water-quality data

LOCATION: Statewide

COOPERATING AGENCIES: Office of New Mexico State Engineer, New Mexico Interstate Stream Commission, Pecos River Commission, and Bureau of Reclamation

PROJECT CHIEF: Richard L. Lepp (505-766-2011)

PERIOD OF PROJECT: Continuous since 1937

Purpose and Scope: The chemical and biological water-quality program provides for the collection, analysis, storage, and publication of data from a network of surface- and ground-water sites in New Mexico.

Chemical and biological water-quality data are obtained at 87 continuing-record stations for surface water. Data is also collected at numerous partial-record stations and miscellaneous sites. These stations are used to monitor the quality of surface water in New Mexico. Some of these stations also are part of the Geological Survey nationwide network known as the National Stream Quality Accounting Network (NASQAN), which is used to detect nationwide trends in water quality. The types of data determined at the continuing record stations are given in the following table:

Data classification	Number of sites
Physical data:	
Water temperature	87
Specific conductance	87
pH	87
Chemical data:	
Inorganic constituents	87
Organic constituents	45
Pesticides and organic carbon	10
Organic carbon	45
Radio chemical data	11
Biological data	52

Miscellaneous water temperature data recorded at the time streamflow measurements are made are available from the sub-district offices.

Chemical water-quality data for ground water was obtained in conjunction with project activities. (In 1978 approximately 125 sites were sampled).

Reports Published or Released During Fiscal Year 1978:

U.S. Geological Survey, 1978, Water-Resources Data for New Mexico, Water Year 1977: U.S. Geological Survey Water-Data Report NM-77-1, 627 p.

U.S. Geological Survey, 1978, Water Resources Data for New Mexico, Calendar Year 1976, Surface-Water records and Water-Quality Records: New Mexico State Engineer, 597 p.

PROJECT TITLE: Sediment data

LOCATION: Statewide

COOPERATING AGENCIES: Office of New Mexico State Engineer, New Mexico Interstate Stream Commission, National Park Service, and Corps of Engineers

PROJECT CHIEF: David E. Funderburg (505-766-2011)

PERIOD OF PROJECT: Continuous since 1937

Purpose and Scope: The purpose of this project is to determine the load, size, and nature of sediment carried in New Mexico streams. Data is collected to provide information for the evaluation of sources and sinks of sediment, effects of changing land use, effects of water management on channel stability, and regional base line conditions.

Sediment data is collected at 85 sites in New Mexico. At 15 of these sites a continuous record of sediment load is computed from samples collected by local observers and (or) automatic samplers which collect at least a daily sample. Samples are collected more frequently during high-water runoff periods. The remaining sites are sampled intermittently and during peak runoff periods.

Reports Published or Released During Fiscal Year 1978:

U.S. Geological Survey, 1978, Water Resources Data for New Mexico, calendar year 1976, Surface-Water Records and Water-Quality Records: New Mexico State Engineer, 597 p.

INTERPRETIVE HYDROLOGIC INVESTIGATIONS

Hydrologic investigations include areal resource appraisals, data collection other than part of the hydrologic-data program, and research activities. The New Mexico District has 30 interpretive hydrologic investigations in progress.

A summary of each of the investigations follows and consists of a map showing the location of the study area (except for statewide studies) and a brief statement of the problem, objectives, and reports released during the prior fiscal year.

PROJECT TITLE: Hydrologic investigations of the Acoma Pueblo, New Mexico

COOPERATING AGENCY: Bureau of Indian Affairs

PROJECT CHIEF: Dennis Risser

PERIOD OF PROJECT: October 1977 to September 1980

Problem.--The Acoma Pueblo Indians (fig. 5) are in need of additional supplies of good-quality water for irrigation and public supply.

Objectives.--Determine the quantity and quality of water available for irrigation and public supply, and the possible effects of present and future water-resources development on the hydrologic system.

PROJECT TITLE: Urban flood-hydrology of Albuquerque area, New Mexico

COOPERATING AGENCIES: Albuquerque Metropolitan Arroyo Flood Control Authority and city of Albuquerque

PROJECT CHIEF: John P. Borland

PERIOD OF PROJECT: February 1976 to September 1979

Problem.--The city of Albuquerque and the Albuquerque Metropolitan Arroyo Flood Control Authority (fig. 6) require reliable flood-frequency data for design of urban drainage works and regulation of urban development. Present methodology uses unverified empirical relations and data from other urban areas. There is little data presently available regarding the chemical quality of storm runoff in the Albuquerque area.

Objectives.--To define runoff hydrograph characteristics from urban basins in the Albuquerque area and to relate the hydrograph characteristics to measurable basin and climatic variables. To investigate the applicability of empirical relations developed for other urban areas to the Albuquerque area; specifically, relations used to compute time and peak coefficients used in the Colorado urban hydrograph procedure. To develop relations between magnitude of flood discharges and measurable basin and climatic variables for watersheds in the Albuquerque area, and to provide estimates of chemical-quality of runoff.

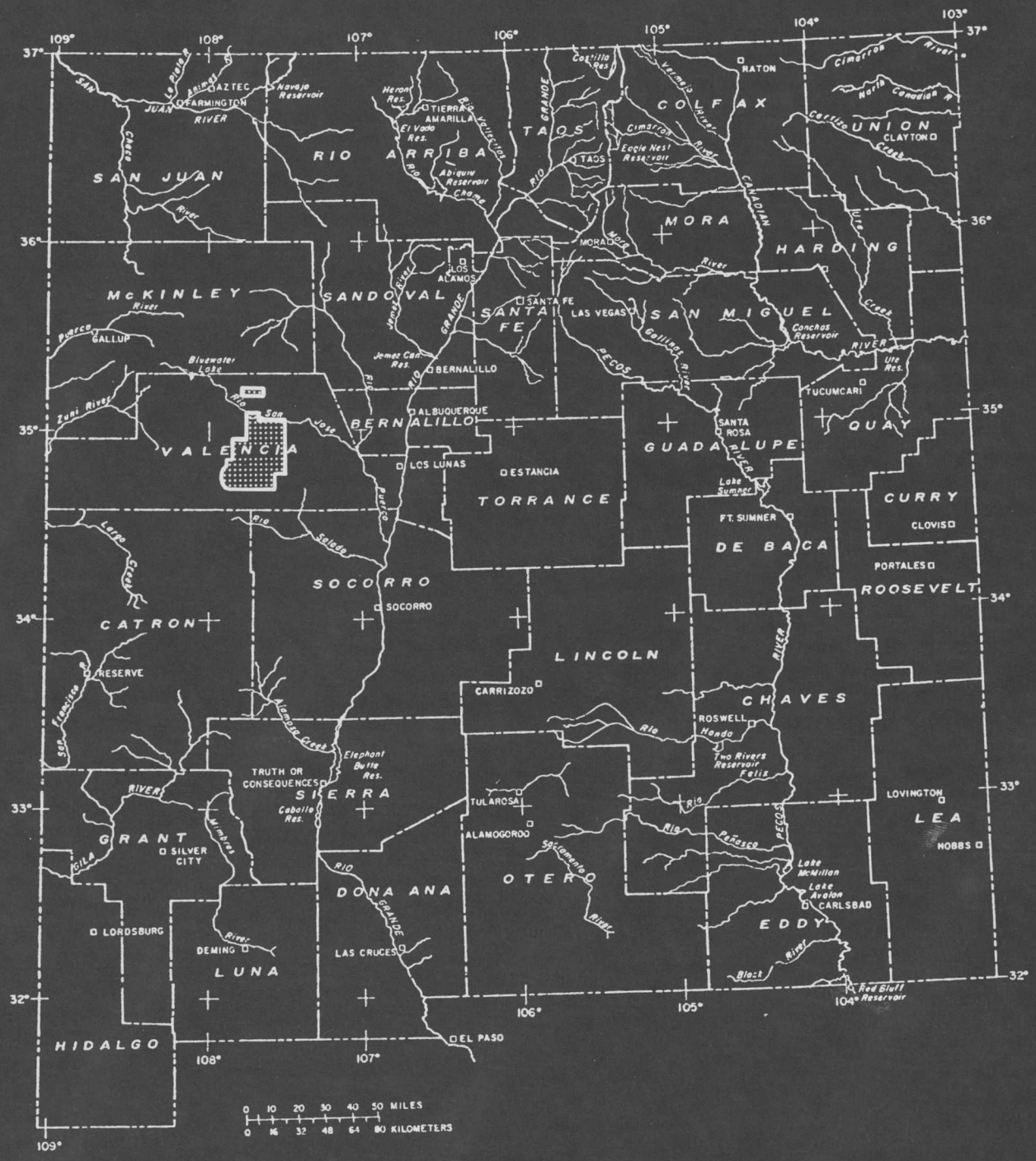


Figure 5.--Location of Acoma Pueblo lands study area, New Mexico.

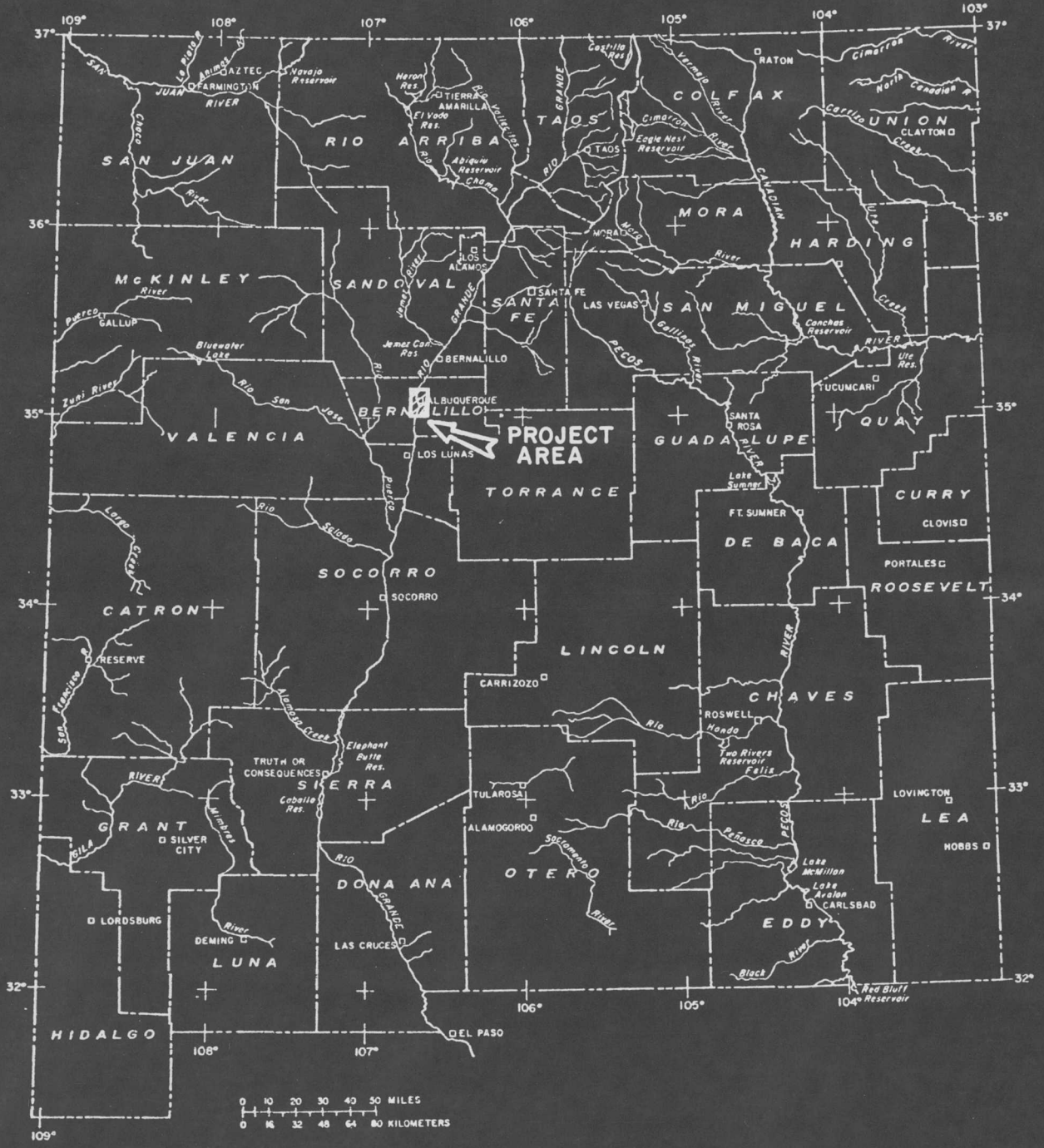


Figure 6.--Location of the Albuquerque, New Mexico flood-hydrology study area.

PROJECT TITLE: Hydrologic assessment of the Elephant Butte Irrigation District well field, Dona Ana County, New Mexico

COOPERATING AGENCY: Elephant Butte Irrigation District

PROJECT CHIEF: Clyde A. Wilson

PERIOD OF PROJECT: February 1976 to June 1979
(Report in review)

Problem.--In August 1975 the drilling and construction of five large-capacity irrigation wells was completed for the Elephant Butte Irrigation District (fig. 7). The District plans to drill more irrigation wells of similar depth and design if these five wells can continue to provide good quality water.

Objectives.--To determine coefficients of transmissivity and storage. To monitor water quality during the two- to three-year period following the initial use of the District wells. To evaluate the present well field relative to water quality and availability, and to determine potential problems in maintaining an acceptable long-term water supply.

PROJECT TITLE: Flood insurance studies

COOPERATING AGENCY: Department of Housing and Urban Development

PROJECT CHIEF: Louis P. Denis

PERIOD OF PROJECT: November 1976 to March 1979
(Completed except for report)

Problem.--The communities of Belen, Grants, and Milan (fig. 8) have made application and are presently covered under the emergency provisions of the Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. A detailed flood insurance study is required to convert coverage to the regular program of flood insurance by the Federal Insurance Administration.

Objectives.--To study flood-prone areas in and around the communities of Belen, Grants, and Milan both in detail and by approximate methods as applicable. Flood profiles will be developed for 10-, 50-, 100-, and 500-year floods. The 100-year flood boundary will be delineated and a floodway analysis done for appropriate channels.

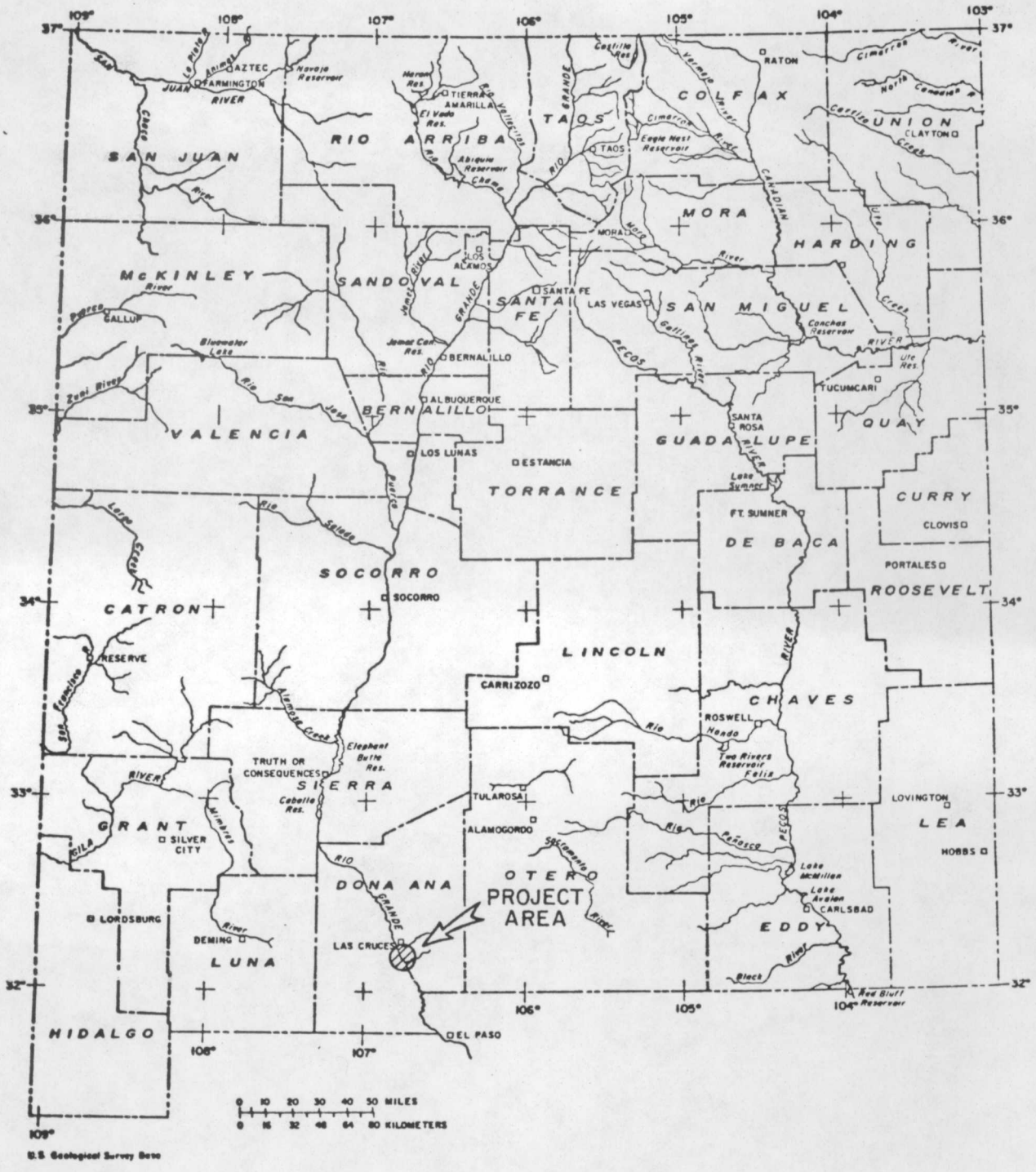


Figure 7.--Location of the Elephant Butte Irrigation District evaluation study area, New Mexico

Fig. 7

Figure 8.--Location of HUD flood insurance studies in New Mexico.

PROJECT TITLE: Investigation and analysis of floods for small drainage areas in New Mexico

COOPERATING AGENCY: New Mexico Highway Department

PROJECT CHIEF: Richard P. Thomas

PERIOD OF PROJECT: August 1966 to June 1980

Problem.--The State Highway Department needs data on the frequency and magnitude of floods to better design highway drainage structures.

Objectives.--To collect and analyze hydrologic data which can be used in the design of highway drainage structures. To relate the magnitude and frequency of flood data for drainage areas of less than 15 square miles to basin parameters easily measured by the State Highway Department.

PROJECT TITLE: Ground-water resources and geology of Harding County, New Mexico

COOPERATING AGENCY: New Mexico Bureau of Mines and Mineral Resources

PROJECT CHIEF: R. G. Roybal

PERIOD OF PROJECT: October 1966 to September 1978
(Completed except for report.)

Problem.--No previous work has been published on ground-water studies in the county (fig. 9). Ground-water information is needed to develop adequate supplies of irrigation and stock water in the county.

Objectives.--To determine the general availability and quality of ground water in the county; to determine the principal aquifers, their areal extent, and areas of recharge and discharge.

ure 9.--Location of Harding County study area, New Mexico.

Fig. 9

PROJECT TITLE: High Plains Regional Aquifer System Analysis (New Mexico)

PROJECT CHIEF: D. L. Hart, Jr.

PERIOD OF PROJECT: October 1977 to September 1982

Problem.--The Ogallala aquifer underlies about 150,000 mi^2 of land in eight western states. This study is part of a regional evaluation of the Ogallala aquifer by digital modeling. The aquifer underlies about 11,000 mi^2 in New Mexico (fig. 10) and has experienced severe water-level declines due to pumpage for irrigation and municipal use.

Objectives.--To provide the hydrologic evaluation needed to project the response of the Ogallala aquifer to future pumpage. Data will be collected to determine the quantity and quality of the water resource and the operation of the system. Data collected and analyzed will include hydrologic properties, recharge, quantity of pumpage, and distribution of pumpage.

PROJECT TITLE: Hydrologic investigations of the Laguna Pueblo, New Mexico

COOPERATING AGENCY: Bureau of Indian Affairs

PROJECT CHIEF: Dennis Risser

PERIOD OF PROJECT: October 1977 to September 1980

Problem.--The Laguna Pueblo Indians (fig. 11) are in need of additional supplies of good-quality water for irrigation and public supply.

Objectives.--Determine the quantity and quality of water available for irrigation and public supply, and predict the possible effects of present and future water-resources development on the hydrologic system.

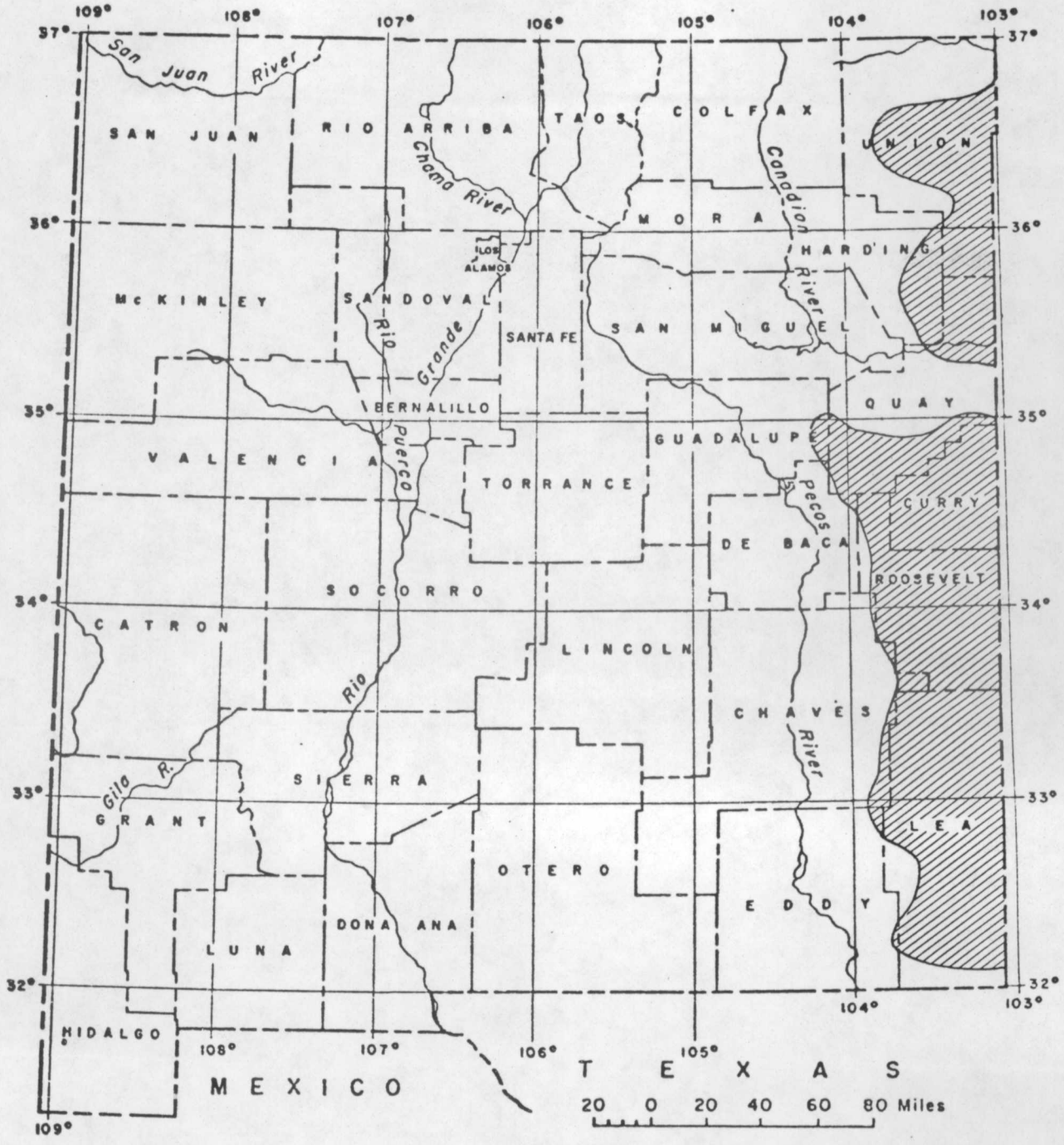


Figure 10.--Map showing location of the study area for the High Plains Regional Aquifer System.

Fig. 10

Figure 11.--Location of Laguna Pueblo lands study area, New Mexico.

Fig. 11

PROJECT TITLE: Water resources of the Mimbres Basin, New Mexico

COOPERATING AGENCY: New Mexico State Engineer

PROJECT CHIEF: John S. McLean

PERIOD OF PROJECT: July 1971 to June 1980

Problem.--Additional data concerning the water resources of the Mimbres Basin (fig. 12) are needed for administration of available water. Much of the area is irrigated; water levels in the alluvial aquifer are declining; 3,379 square miles of the 4,410 square miles in the basin have been closed to further ground-water development.

Objectives.--To collect and analyze quantitative data on the extent and hydrologic properties of aquifers so that predictions of long-term effects of ground-water withdrawals can be made.

PROJECT TITLE: Miscellaneous activities under the State Engineer Program

COOPERATING AGENCY: New Mexico State Engineer

PROJECT CHIEF: Walter A. Mourant

PERIOD OF PROJECT: Continuous since January 1960

Problem.--Many letters, telephone contacts, and personal interviews are received by the District from the public on various aspects of the water resources and geology of the State. Occasionally requests are received from the Office of the State Engineer for the compilation of specific data for which no project exists. Funds for specific projects are often exhausted before the resulting report is properly revised and processed for publication.

Objectives.--To make spot reconnaissance studies, letter and telephone reports on inquiries, and compilations of specific data. To revise reports for publication, including those for other agencies, for which funds have been exhausted but which are of advantage to the State to publish.

Figure 12.--Location of Mimbres Basin study area, New Mexico.

Fig. 12

PROJECT TITLE: New Mexico District Data Bank

COOPERATING AGENCY: New Mexico State Engineer

PROJECT CHIEF: Douglas R. Posson

PERIOD OF PROJECT: Continuous since November 1970

Problem.--Ground-water records collected during past years by the District are stored in filing cabinets by counties. Data retrieval is done by manual searches.

Objectives.--All past ground-water records will be processed for inclusion in a computer data bank. The type of data will then be known and can be retrieved as needed.

PROJECT TITLE: Water use - New Mexico

LOCATION: Statewide

COOPERATING AGENCY: New Mexico State Engineer

PROJECT CHIEF: William K. Dein

PERIOD OF PROJECT: Continuous since May 1978

Problem.--A National program has been developed using a uniform system to collect, store, and retrieve reliable water-use data which will be available for planning, operation, and management purposes. New Mexico presently has a water-use data collection program which will be modified and expanded to conform with the National program. In addition there is a need for management of water-use data which will be collected in support of regional aquifer studies in New Mexico.

Objectives.--To implement a program in cooperation with the Office of the State Engineer for the collection and computer storage of all water-use data in the State of New Mexico. Standard methods will be developed for collection, storage, and retrieval at the State level which will conform with those established for the National system.

PROJECT TITLE: Mean-annual runoff from streams in New Mexico as related to channel geometry

COOPERATING AGENCY: New Mexico State Engineer

PROJECT CHIEF: John P. Borland

PERIOD OF PROJECT: March 1976 to June 1978
(Completed except for report)

Problem.--New Mexico needs a reliable reconnaissance-type method of determining mean-annual flow at ungaged sites on ephemeral and perennial streams. Mean-annual flow data are useful for planning and in some cases for structure design.

Objectives.--To define the relation between channel characteristics and mean-annual flow for streams in New Mexico.

PROJECT TITLE: Quality-of-water montoring in the Chaco River basin in northwestern New Mexico's energy development areas.

COOPERATING AGENCY U.S. Environmental Protection Agency

PROJECT CHIEF: Kim Ong

PERIOD OF PROJECT: April 1976 to April 1980

Problem.--The demand to develop energy mineral resources in the Chaco River basin (fig. 13) and the concern to protect the environment surrounding these resources have created the need to study the associated hydrologic system. The flow in the Chaco River and the ground water in the channel alluvium will be impacted by these developments. There is concern that adverse impacts may move downstream into the San Juan River and ultimately into the Colorado River. In the past, the water resources of the Chaco River basin were not studied because the basin is sparsely populated, the natural flow in the Chaco River is ephemeral and unpredictable, the Chaco River's contribution to the total flow in the San Juan River is thought to be small, and the quality of the water resources in the basin are considered to be poor.

Consequently, insufficient water-resource data exist to define adequately the natural conditions and to assess effects of energy developments.

Objective.--The objective of this project is to collect water-resources data from selected sites along the Chaco River system that may be impacted by energy developments, particularly uranium mining and coal mining. Emphasis is being placed on collecting quality-of-water data, but streamflow data is also being collected. Other hydrologic studies have recently been initiated in the Chaco River basin with their focus on surface coal mining. The data collected under this project combined with the data collected from the other studies will be used to define natural or present water resources conditions, to assist in resolving water-supply concerns of energy developments, and to help predict impacts on the water resources by these energy developments.

13.--Location of Chaco River basin study area in northwestern New Mexico.

Fig. 13

PROJECT TITLE: Hydrologic surveillance of coal-lease areas in northwestern New Mexico

COOPERATING AGENCY: Bureau of Land Management--EMRIA (Energy Mineral Rehabilitation Inventory and Analysis)

PROJECT CHIEF: Henry R. Hejl, Jr.

PERIOD OF PROJECT: August 1974 to September 1981

Problem.--Certain areas of the San Juan Basin (fig. 14) in northwestern New Mexico are undergoing energy related resource development. Among these developments are strip mining of coal and coal gasification. These developments may affect the water resources by changing drainage patterns, increasing sediment yield, and altering the chemical quality of the water.

Objectives.--Document streamflow and ground-water characteristics and their variability in quantity and quality; obtain knowledge of the hydrologic system and of the principles, processes, and effects of coal extraction and associated development on the quantity and quality of water resources in the coal-lease areas.

PROJECT TITLE: Water resources monitoring of coal development in the San Juan Basin, New Mexico

COOPERATING AGENCY: None

PROJECT CHIEF: Jack D. Dewey

PERIOD OF PROJECT: Continuous since January 1977

Problem.--Coal mining and associated activities in the San Juan Basin (fig. 15) may have an adverse effect on the water resources of the area. Mine dewatering, changes in land use, waste disposal, stream-channel realignment, and water withdrawals for industries and municipalities may alter surface and ground-water systems, interfere with traditional water uses, and cause deterioration of remaining water resources.

Objectives.--Detect and document changes in water quality or quantity that may result from coal mining and associated activities.

Figure 14.--Location of hydrologic surveillance of coal-lease area sites in northwestern New Mexico.

Fig. 14

Figure 15.--Location of study area for coal development expanded monitoring program in New Mexico.

Fig. 15

PROJECT TITLE: Effects of energy resources development on the hydrogeologic environment of northwestern New Mexico

COOPERATING AGENCIES: New Mexico State Engineer and New Mexico Bureau of Mines and Mineral Resources

PROJECT CHIEF: Peter F. Frenzel

PERIOD OF PROJECT: August 1974 to June 1980

Problem.—Large reserves of minerals are currently being developed in the San Juan Basin of New Mexico (fig. 16). Expanded exploration and production of these minerals will be accompanied by an increasing need for large supplies of water. Production and disposal of waste water in a rather fragile environment is also anticipated. The Bureau of Indian Affairs and numerous communities are concerned with the effects of development of large supplies of ground water in the area. The few available well records in the area indicate that usable ground-water supplies are available locally; however, these probably are somewhat limited.

Objectives.--To evaluate the aquifers within the project area. Determine ground-water levels for the various aquifers and the effects of various withdrawal plans on water levels. Determine the chemical and radiochemical quality of the ground water.

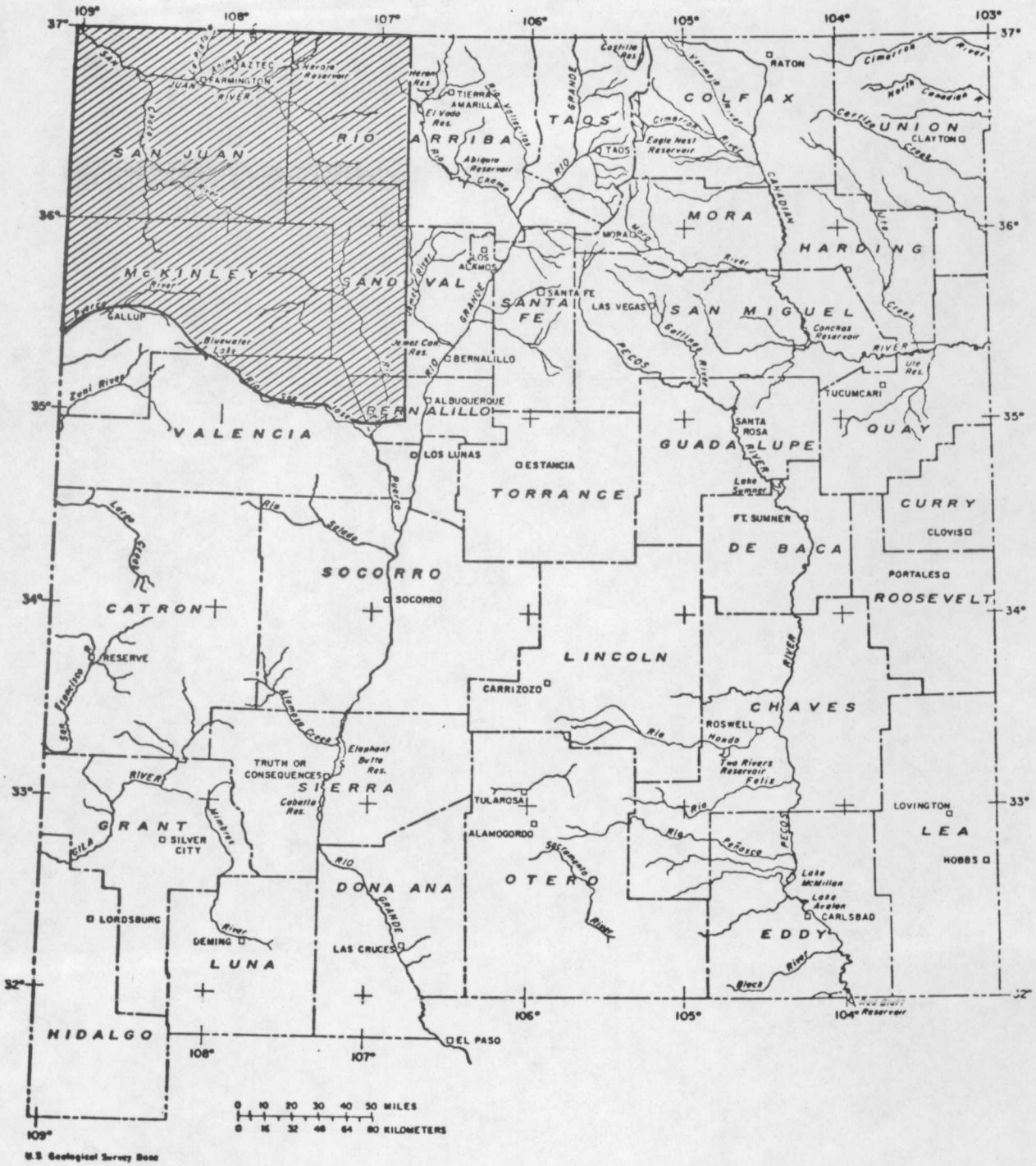


Figure 16.--Location of San Juan Basin study area, New Mexico.

PROJECT TITLE: Precipitation-Runoff Modeling of Watershed Systems in Northwestern New Mexico

COOPERATING AGENCY: Bureau of Land Mangement-EMRIA (Energy Mineral Rehabilitation Inventory and Analysis)

PROJECT CHIEF: Henry R. Hejl, Jr.

PERIOD OF PROJECT: October 1977 to September 1981

Problem.--The effects of surface mining for coal on the quantities and quality of surface flow systems in the strippable coal-lease area in the San Juan Basin (fig. 17) during a period of change in land use are unknown. The Bureau of Land Management needs to predict the effects of surface mining on the water resources in the coal-lease areas in order to manage the coal-bearing areas of the public domain.

Objectives.--The objectives are to develop, test, and verify precipitation-runoff models for predicting surface runoff characteristics and sediment yield under various land-use conditions in the coal-lease areas in Northwestern New Mexico. The emphasis will be on relating parameters used by the model to measurable physical features of a selected watershed basin to facilitate transferability of the model from an instrumented basin to uninstrumented basins.

PROJECT TITLE: Miscellaneous reach studies, Pecos River

COOPERATING AGENCY: Pecos River Commission

PROJECT CHIEF: George E. Welder

PERIOD OF PROJECT: Continuous since July 1969

Problem.--The Pecos River Commission, which administers the waters of the Pecos River in New Mexico (fig. 18) and Texas, often has need for special studies of the relation of surface and ground water in specific reaches of the river.

Objectives.--The intent of most of the studies will be to relate gains or losses in streamflow to ground-water flow conditions, transpiration, evaporation, or other flow diversions.

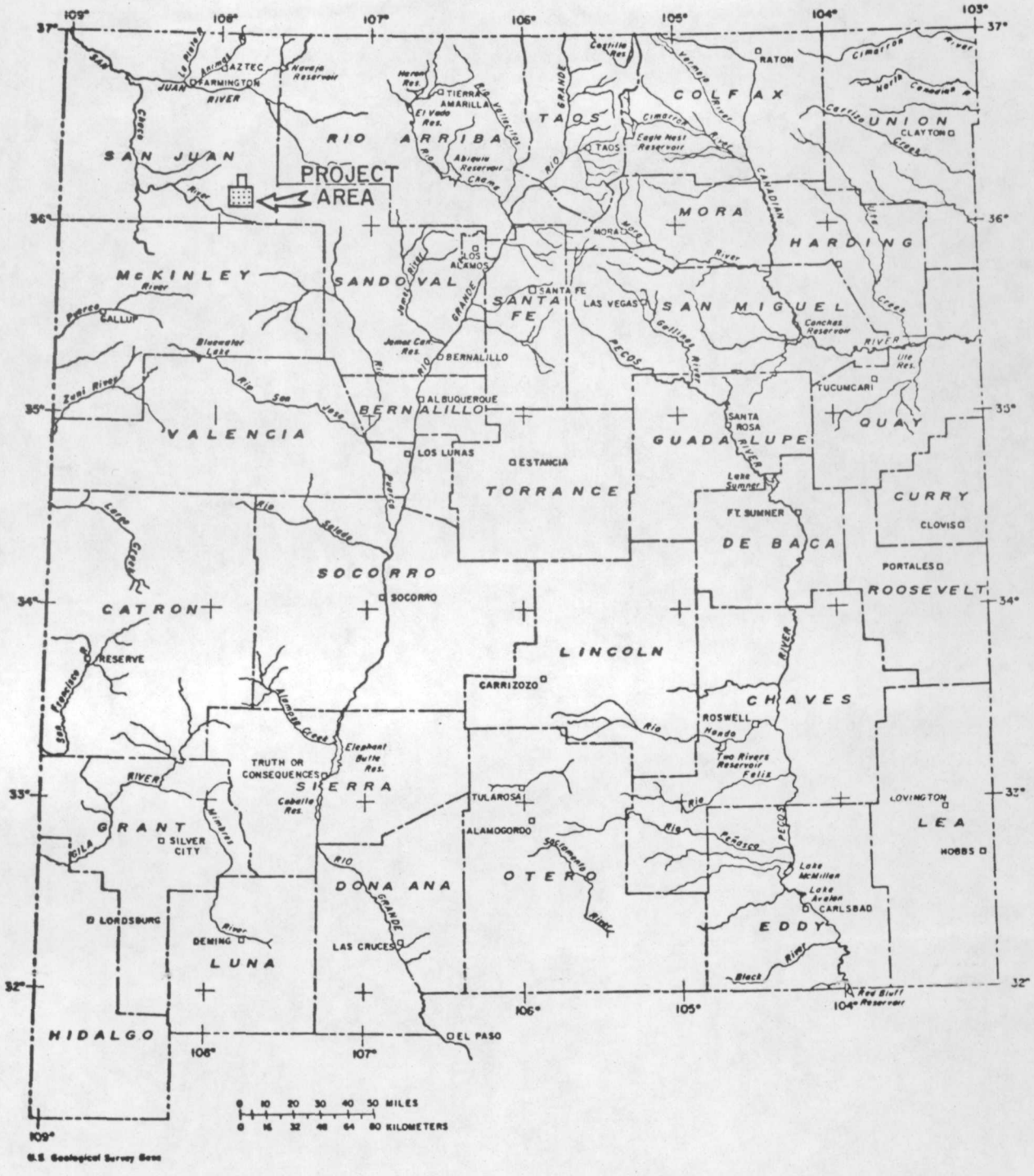


Figure 17.--Location of precipitation-runoff modeling of watershed systems in northwestern New Mexico.

Fig. 17

Fig. 18.--Location of Pecos River and major tributaries, New Mexico.

Fig. 18

PROJECT TITLE: A comprehensive study of the water resources of the lower Rio Grande Valley area, New Mexico

COOPERATING AGENCY: City of Las Cruces, Elephant Butte Irrigation District, New Mexico State Engineer, U.S. Bureau of Reclamation, and New Mexico Water Resources Research Institute

PROJECT CHIEF: Clyde A. Wilson

PERIOD OF PROJECT: July 1972 to June 1978
(Report in review)

Problem.--On May 4, 1971, the governors of New Mexico and Texas supported a proposed areal-resource study, "Rio Grande Regional Environmental Study, Elephant Butte Reservoir, New Mexico, to Fort Quitman, Texas," to evaluate water-resource development and management plans using multipurpose approaches to water-resource problems. The comprehensive study of water resources of the lower Rio Grande Valley, New Mexico, (fig. 19) is part of the regional environmental study.

Objectives.--To collect, analyze, and interpret water-resource data (mainly ground water) in the Rio Grande Valley and adjacent area, from Elephant Butte Reservoir southward to El Paso, Texas. Obtain data that will aid the city of Las Cruces to plan for the orderly development of municipal water supplies. Evaluate the availability, quantity, quality, and uses of ground water.

Figure 19.--Location of lower Rio Grande valley study area, New Mexico.

Fig. 19

PROJECT TITLE: Duties for the Rio Grande Compact Commission

COOPERATING AGENCY: Rio Grande Compact Commission

PROJECT CHIEF: Pat L. Soule

PERIOD OF PROJECT: Continuous since February 1948

Problem.--The Rio Grande Compact Commission is composed of representatives of the states of Colorado, New Mexico, and Texas. The administration of the Compact requires that streamflow and water storage data for that area of the Rio Grande basin upstream from Fort Quitman, Texas (fig. 20) be collected, compiled, correlated, and presented to the Commission.

Objectives.--Perform duties of secretary as outlined in the rules and regulations of the Rio Grande Compact Commission. Principal duty is compilation of streamflow and storage data on a monthly basis; this data is later assembled for publication in the annual report of the Commission.

Reports published or released during fiscal year 1978:
U.S. Geological Survey, 1978, report of the Rio Grande Compact Commission, 1977: Rio Grande Compact Commission, 55 p.

PROJECT TITLE: A quantitative analysis of the ground-water system in the Roswell basin, Chaves and Eddy Counties, New Mexico

COOPERATING AGENCY: New Mexico State Engineer

PROJECT CHIEF: George E. Welder

PERIOD OF PROJECT: July 1963 to September 1980
(Report in review)

Problem.--In parts of the Roswell basin (fig. 21) development of ground water for agricultural, municipal, and industrial use has caused large artesian head losses. The drop in head is causing movement of saline water into freshwater aquifers and a reduction in quantity and quality of low flow in the Pecos River, an interstate stream. The ground-water supplies in the basin need to be defined.

Objectives.--Define the geohydrologic framework of the basin and the long-term head changes in the aquifers. This information will be used in a model analysis of the basin.

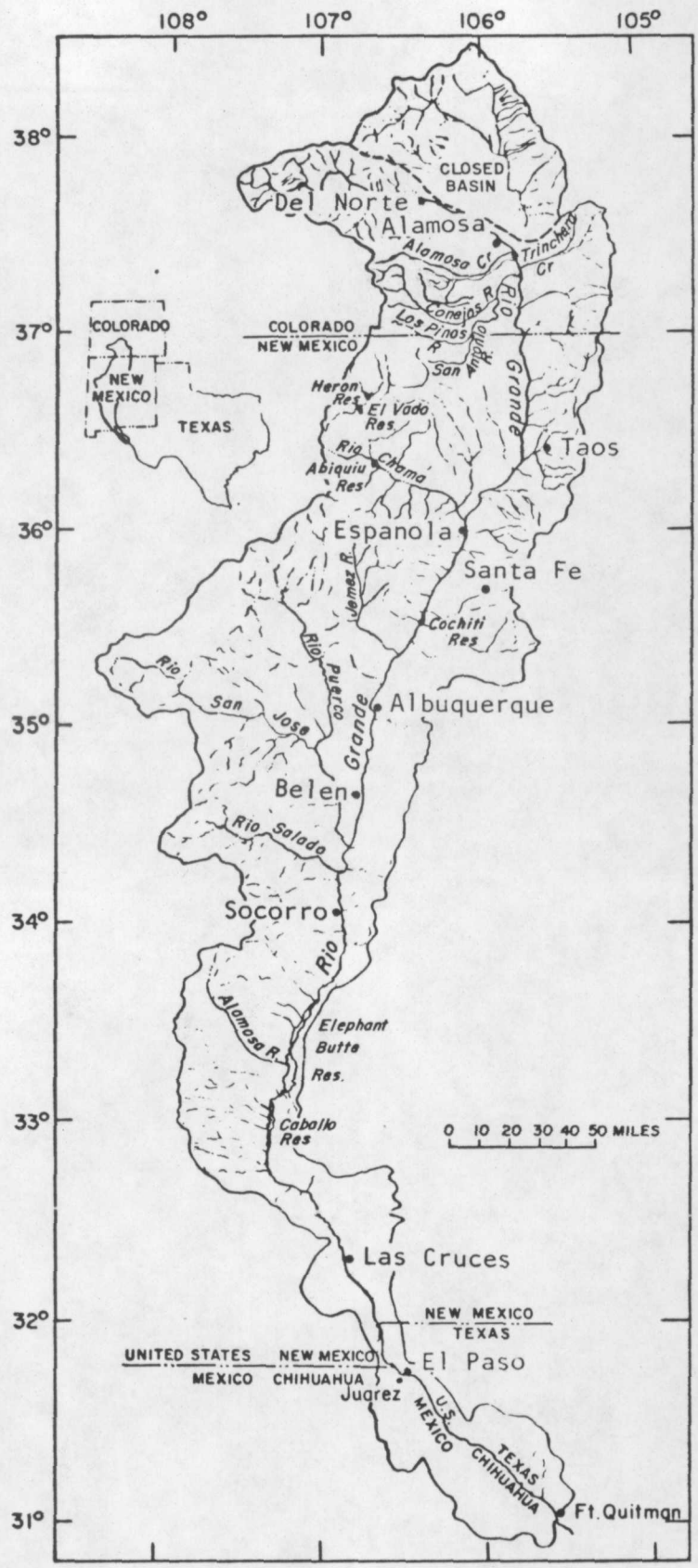


Figure 20.--Rio Grande basin above Fort Quitman, Texas.

Fig. 20

Figure 21.--Location of the Roswell basin in New Mexico.

Fig. 21

PROJECT TITLE: Ground-water resources of the San Agustin Plains and adjacent areas, Catron and Socorro Counties, New Mexico

COOPERATING AGENCY: New Mexico State Engineer Office (Financial and personnel)

PROJECT CHIEFS: Clyde A. Wilson (USGS)
James T. Everheart (NMSEO)

PERIOD OF PROJECT: October 1978 - September 1981

Problem.--The Plains of San Agustin (fig. 22) is a basin with interior surface-water drainage that has been declared by the New Mexico State Engineer. Complete information is needed on the quantity, quality, and availability of ground water in the Plains and adjacent areas for the proper management of ground-water resources. Previous to this study, very little information on the ground-water resources has been collected.

Objectives.--(1) To collect basic information of wells, springs, geology of aquifers, water use, water chemistry, aquifer hydraulic coefficients, and to analyze this data in order to define availability, quality, and quantity of ground-water. (2) To determine relationship of the aquifers in the Plains with other aquifers in adjoining basins.

PROJECT TITLE: Water resources of Santa Fe County, New Mexico

COOPERATING AGENCY: New Mexico State Engineer

PROJECT CHIEF: Walter A. Mourant

PERIOD OF PROJECT: November 1971 to January 1981

Problem.--Several land development companies have purchased large tracts of land in Santa Fe County (fig. 23) and have made plans for community developments. Water supply may be a problem in the development of these communities. A study of the quantity and chemical quality of the water resources of the county is needed for the use of those concerned with water supply, whether for household, community, stock, irrigation, or industrial use.

Objectives.--To obtain geohydrologic data and evaluate aquifer yields, chemical quality of water, relationships between surface and ground water, and the effects of water-use developments in Santa Fe County.

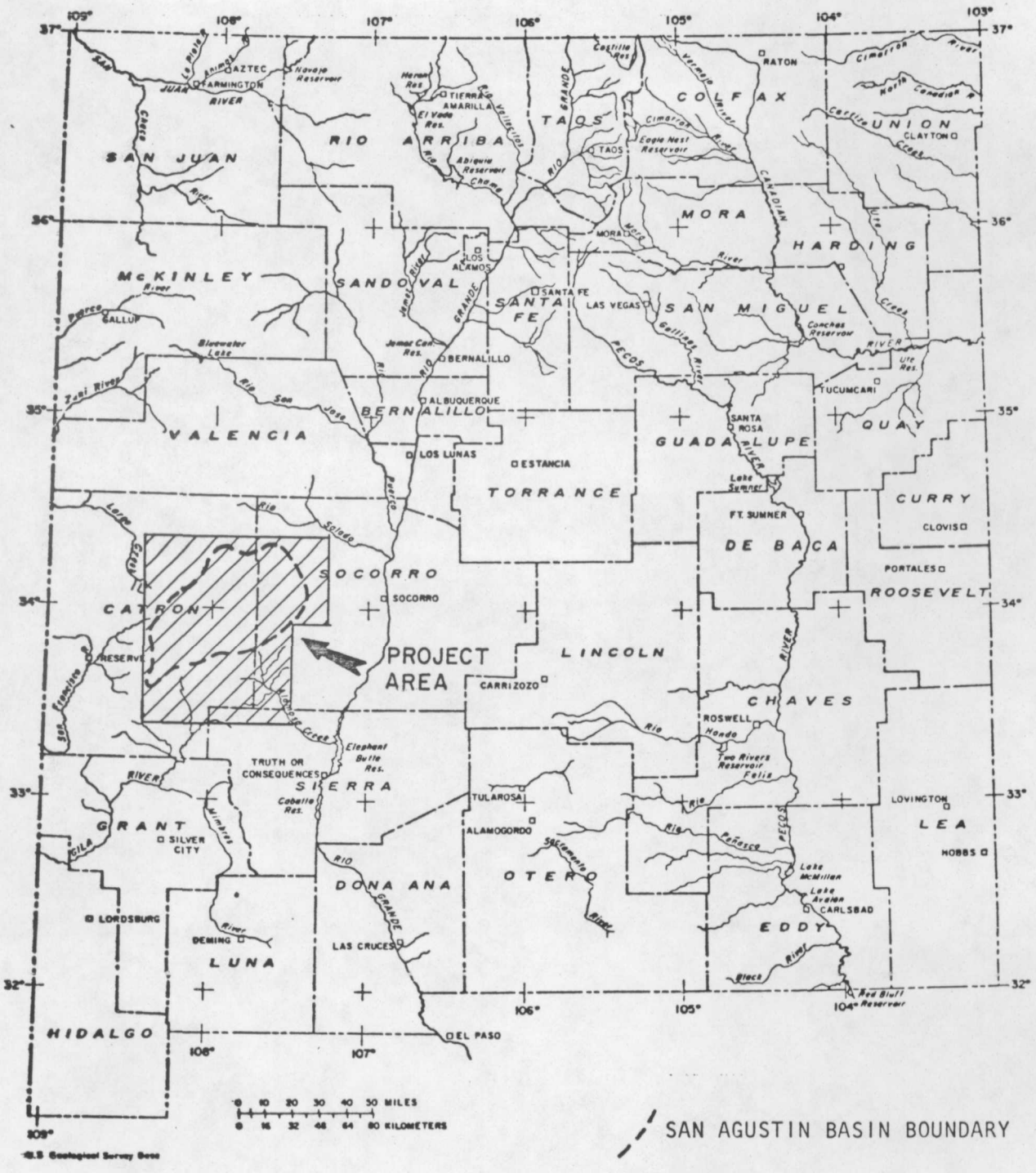


Figure 22.--Location of Plains of San Agustin Study Area, New Mexico.

Figure 23.--Location of Santa Fe County study area, New Mexico.

Fig. 23

PROJECT TITLE: Southwest Alluvial Valleys Regional Aquifer Systems Analysis (east)

COOPERATING AGENCY: None

PROJECT CHIEF: David W. Wilkins

PERIOD OF PROJECT: September 1979 to September 1982

Problem.--The Rio Grande drainage basin from north of Alamosa, Colorado to Presidio, Texas (fig. 24) is experiencing rapid population growth. In addition to population growth the recent drought has caused increased pumping from basin aquifers and a search for new sources of fresh ground water. The result is increased stress on the limited water resources of the area. Where surface-water supplies are available the difference between available surface supplies and consumptive use has been made up by developing ground-water supplies from alluvial fill adjacent to the streams. Where surface supplies are not available water supplies have been augmented by withdrawing more ground water from alluvial desert basins. Increasing use of ground water has produced declines in ground-water levels, affected through-flowing streams, and initiated water-quality changes. The magnitude of these effects are undefined for the regional aquifer system. In some ground-water basins, within the regional aquifer system, these effects are being studied but the cause and effect relationships between basins are largely undefined.

Objectives.--The over-all objective is to define the hydrology of the regional aquifer system. Specific objectives for the study of ground-water basins in the system are: to define the extent of the aquifers, their hydraulic properties, water quality; the relationship between surface and ground water; the hydraulic connection between basins; and past, present and probable future stresses. When these basin objectives are met, specific objectives for the study of the regional aquifer system are to describe water-level changes, effects on streamflow, and water quality changes as a result of past, present, and proposed development.

The study will bring together data collected from many past and present studies and data collected for this study. Digital models of the basin aquifers and regional system will be developed and available for future use.

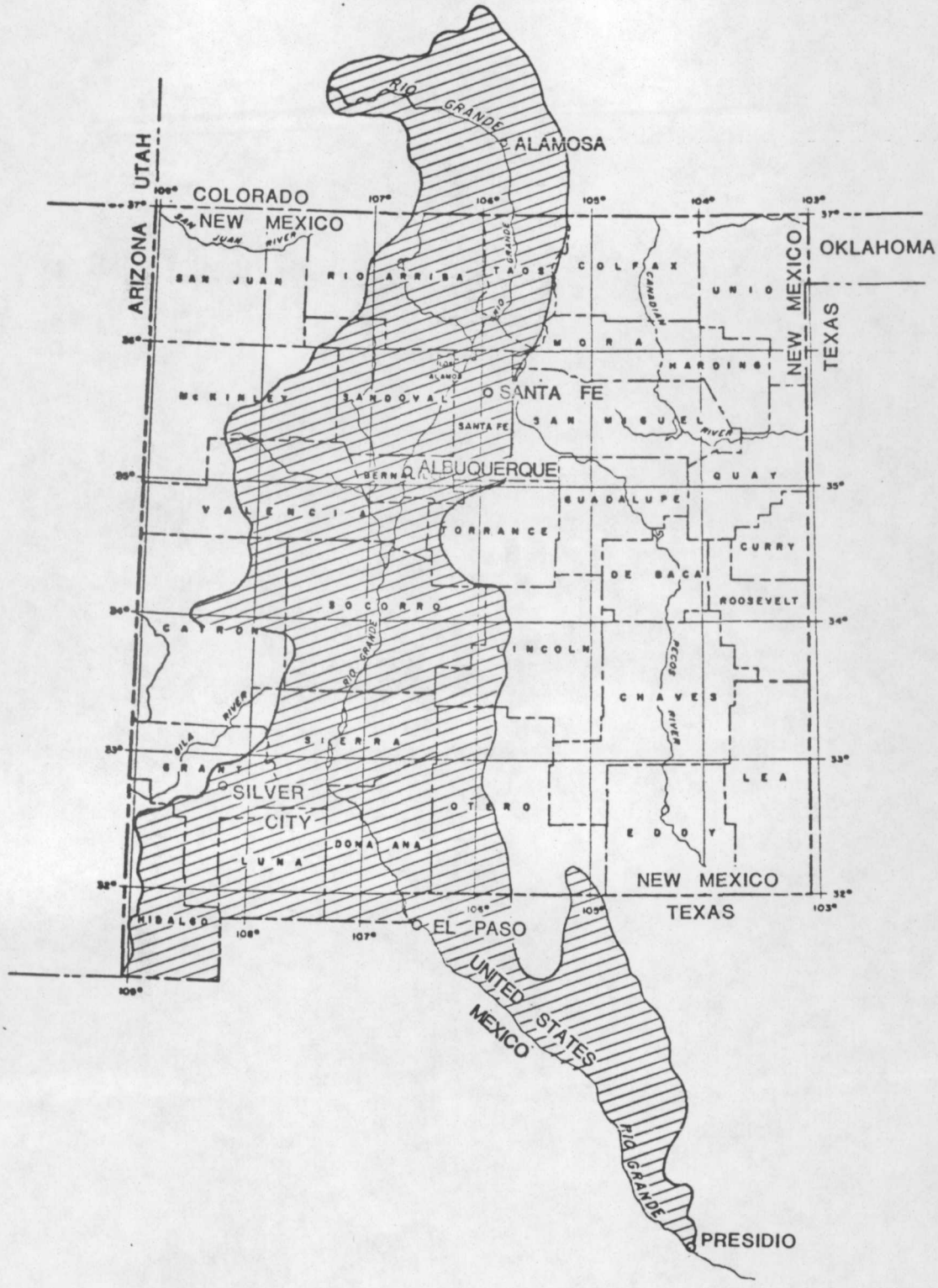


Figure 24.--Map showing location of study area for the east half of the southwest alluvial valleys, Regional Aquifer System.

Fig. 24

PROJECT TITLE: Effects of highway construction on water supply in parts of Tijeras Canyon, New Mexico

COOPERATING AGENCY: New Mexico Highway Department

PROJECT CHIEF: Jim D. Hudson

PERIOD OF PROJECT: June 1972 to March 1979
(Report in review)

Problem.--Water supplies may be adversely affected along a 15-mile reach of highway I-40 in Tijeras Canyon (fig. 25), adjacent to the eastern boundary of the city of Albuquerque, as a result of highway construction. Considerable rock needs to be moved; this will be loosened by means of explosive charges of varying sizes. The water-supply situation is not well known in this mountainous area but usually only small water supplies have been developed from wells. Some of the supplies are probably drawn from perched water systems. Opening of fractures beneath the perched water systems might result from the explosions and cause increased drainage. Permanent or temporary impairment of individual well supplies might also occur from loosening of rock in the well bore as a result of shock from explosives. In addition, supplies drawn from springs might be adversely affected.

Objectives.--To observe ground-water levels, well yields, spring yields, and the chemical quality of water along the path of highway construction, before, during, and after construction in order to determine if construction work has affected aquifer conditions or individual water sources.

Figure 25.--Location of Tijeras Canyon study area, New Mexico.

Fig. 25

PROJECT TITLE: Reconnaissance of water resources available to urban areas, New Mexico

COOPERATING AGENCY: New Mexico State Engineer

PROJECT CHIEF: John S. Mclean

PERIOD OF PROJECT: September 1972 to June 1980

Problem.--Only a few urban areas in New Mexico have been evaluated as to the quantity and quality of ground and surface water available for their use. It is known that in certain areas environmental influences have caused deterioration of the chemical quality of water supplies. In some areas better quality water or larger volumes of water may be available from alternate sources.

Objectives.--To hydrologically evaluate certain urban areas and determine if a suitable supply of water for domestic and industrial uses, projected against anticipated future population growth, will be available when needed. Attempt to define influences that may affect the future quality and quantity of the available water.

PROJECT TITLE: Continuing reconnaissance and evaluation of water resources on the White Sands Missile Range

COOPERATING AGENCY: U.S. Army, White Sands Missile Range

PROJECT CHIEF: Jim D. Hudson

PERIOD OF PROJECT: Continuous since July 1960

Problem.--The population of the missile range (fig. 26) is increasing, as is the use of ground water. Because the volume of fresh ground water is limited, the effects of increasing draft on the reservoir must be known with reference to depletion and to possible saline-water encroachment. Several wells on the missile range supply water to camp areas; continued operation of these wells is vital to the range.

Objectives.--Obtain water-level and pumpage data so periodic evaluation of reservoir depletion in the post headquarters area can be made. Monitor test wells for changes in chemical quality of the water. Observe water levels and chemical quality of water from wells in camp areas. Do short-term site studies where additional water supplies are needed. Evaluate approaches for economical recovery of the maximum available freshwater.

Reports published or released during fiscal year 1978.--
Cruz, R. R., 1978, Annual Water Resources Review, White Sands Missile Range, 1977-- U.S. Geological Survey Open-File Report 78-553, 31 p., 13 figs. 5 tables.

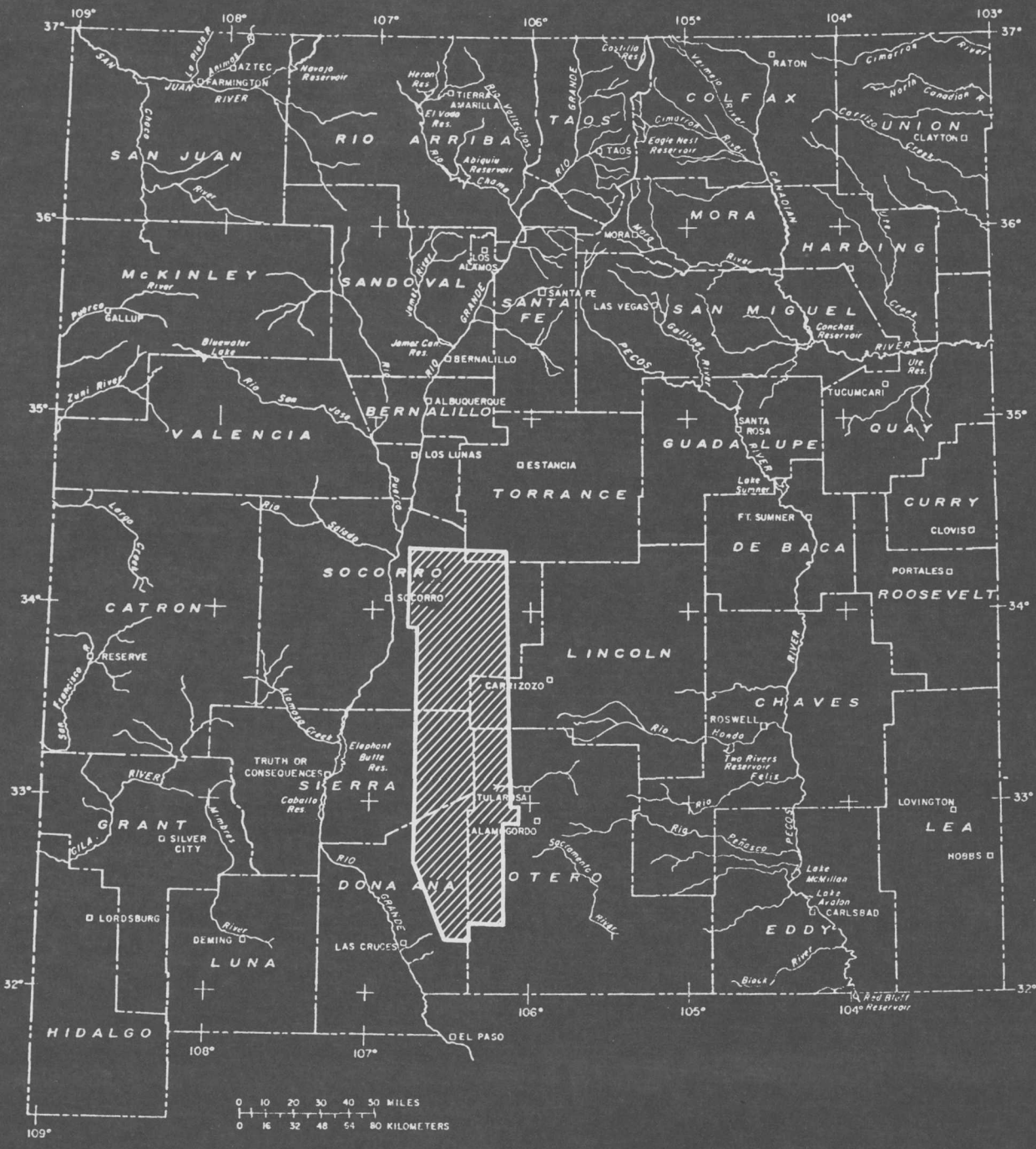


Figure 26.--Location of White Sands Missle Range, New Mexico.

PROJECT TITLE: Hydrologic investigations related to a radioactive waste repository in salt, southeastern New Mexico

COOPERATING AGENCY: Department of Energy

PROJECT CHIEF: Jerry W. Mercer

PERIOD OF PROJECT: May 1975 to September 1979

Problem.--The Department of Energy is evaluating a potential repository for medium- to high-level radioactive wastes in salt beds in southeastern New Mexico (fig. 27). Information is needed on the occurrence and movement of water in the various water-bearing beds above and below the salt to assist in evaluation of the long-term hydrologic integrity of the site as well as to assess the environmental impact of the proposed project.

Objectives.--To define the general occurrence of ground water in the area from about Roswell southeastward to the state line. To define in detail the direction and rate of movement of ground water in the Rustler Formation in the vicinity of the site, with less detailed definition down-gradient to about 30 miles from the site.

PROJECT TITLE: Water resources of the Zuni Reservation

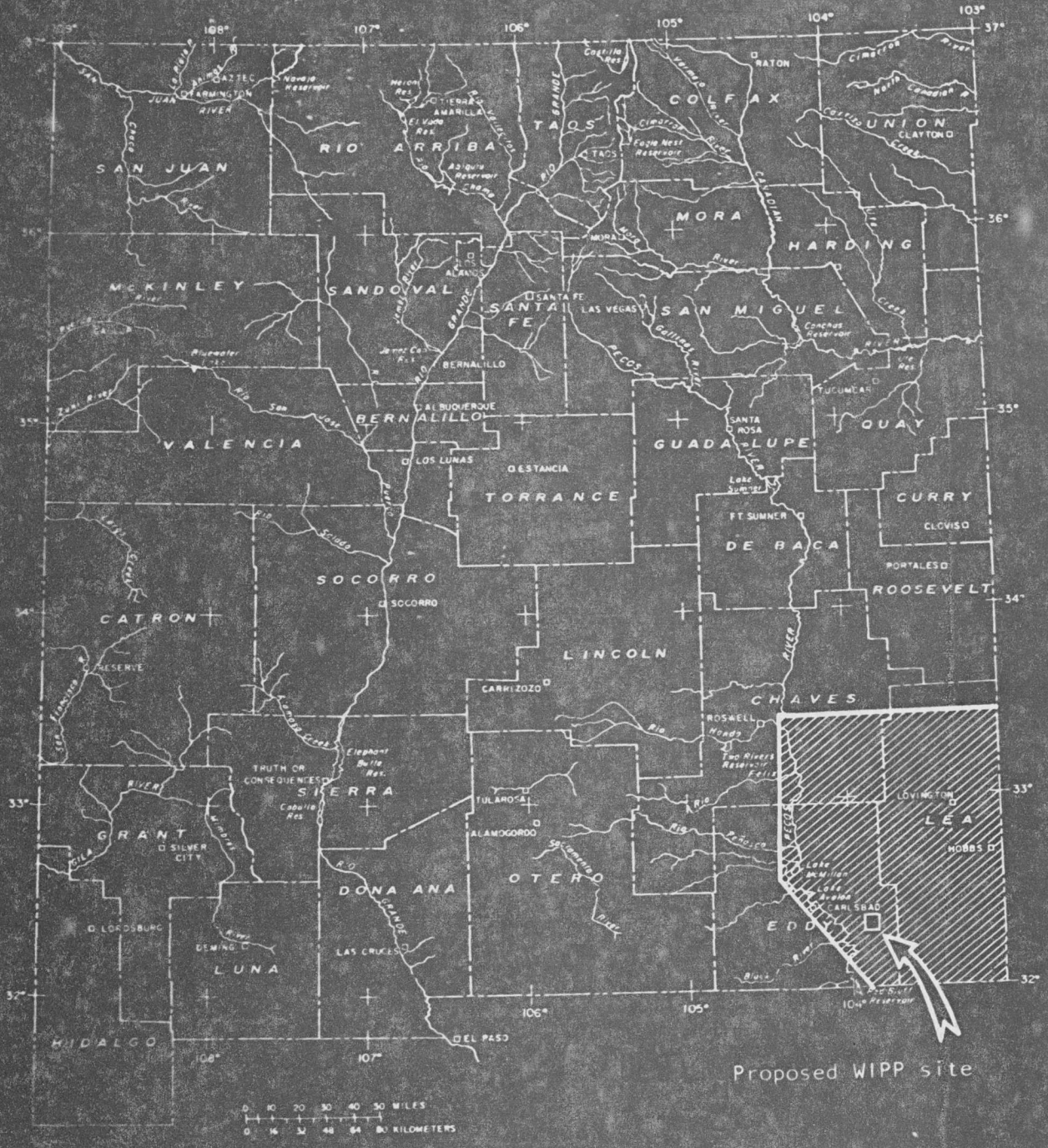
COOPERATING AGENCY: Pueblo of Zuni

PROJECT CHIEF: Brennon R. Orr

PERIOD OF PROJECT: January 1978 to June 1980

Problem.--The pueblo of Zuni (fig. 28) requires information on the yield, variability, and quality of existing water supplies, as well as the potential for developing new supplies. There is potential for industrial development and expansion of the existing communities on the reservation.

Objectives.--To provide a comprehensive analysis of the source, supply, chemical quality, and availability of water from streamflow, springs, and wells on the reservation. This analysis will include an estimate of the effects of developing additional water supplies from existing water sources.



27.--Location of radioactive waste repository study area and proposed waste isolation pilot plant site near Carlsbad, New Mexico.

Fig. 27

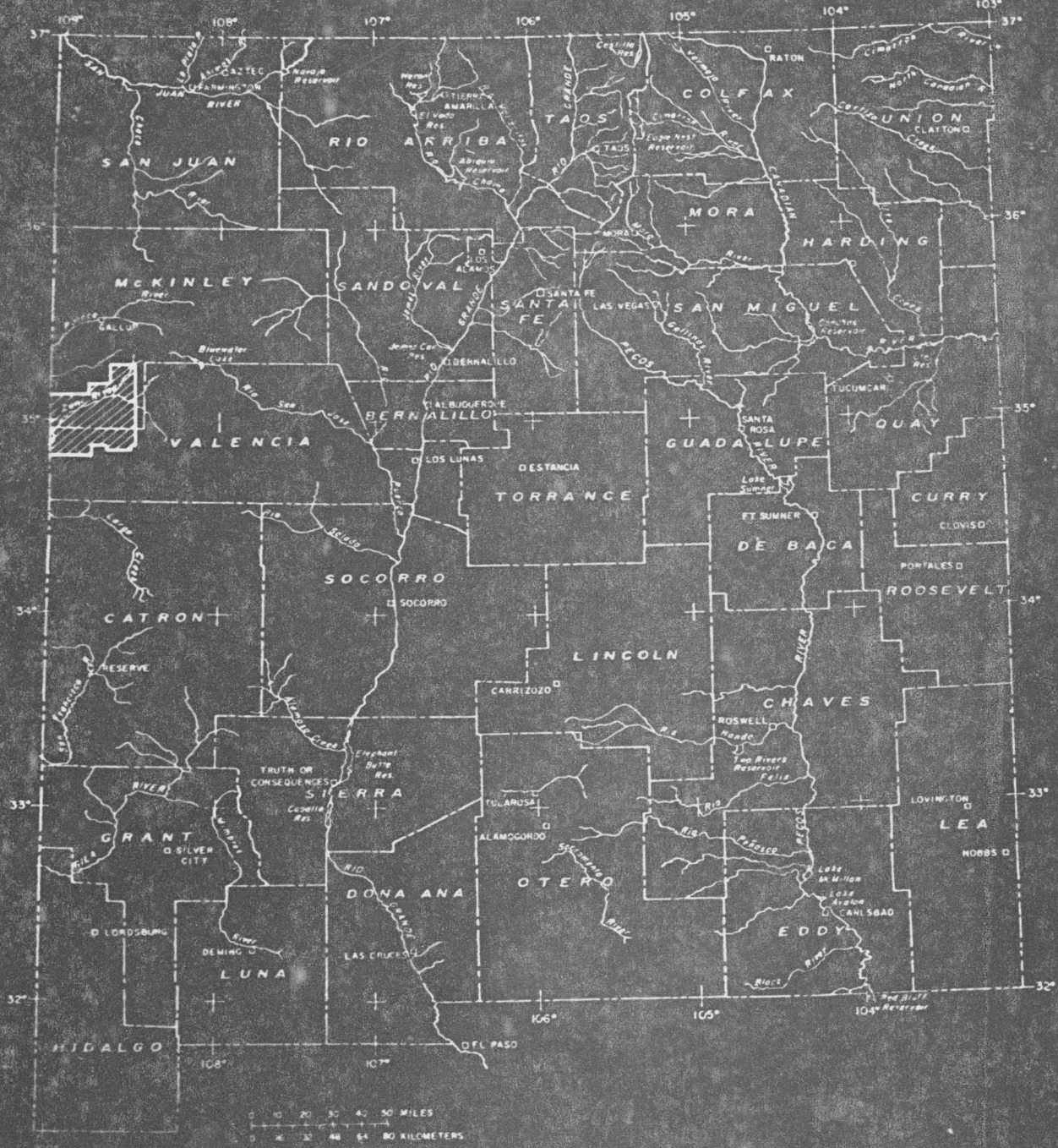


Fig. 28 Location of the Zuni Indian Reservation study area in New Mexico.

NAWDEX

The concept and purpose of NAWDEX

NAWDEX (National Water Data Exchange) is a confederation of water-oriented organizations working together to provide timely and convenient access to their data. This concept is directed at closer coordination of water-data dissemination activities; improving communication within the water-data community; more effectively utilizing the data resources, expertise, and talent within the community; improving the quality and efficiencies of techniques and procedures used for the exchange of water data; and providing water data to those who need these data in a cost-effective manner.

The purpose of NAWDEX is to identify sources of water data and to provide the linkage between those who acquire and those who use water data. The mission is being accomplished by establishing better communication between water-oriented organizations, acquiring as much information as possible on available water data, and making this information readily available to water-data users.

The organization of NAWDEX

NAWDEX is centrally managed by a Program Office located within the U.S. Geological Survey's Water Resources Division in Reston, Virginia. This office provides the coordination for all NAWDEX activities, develops the technical systems and procedures necessary for the operation of NAWDEX, maintains the data bases and other information resources required for operation, provides operational guidelines to all service centers. and serves as a liaison between members, external organizations, advisory committees, and the users of NAWDEX services and facilities.

The basic components of NAWDEX are organizations that become participating members. They are organizations that are collectors of water data, contributors from the water-data community who provide support toward program improvement, collectors of data related to water-resources activities, and users of water data. All members contribute support toward improvements in data exchange procedures and techniques.

Membership in NAWDEX is voluntary and open to any organization active in the field of water resources. This includes organizations from the federal, state, interstate, local governmental, academic, and private sectors of the water-data community. There are no dues or fees associated with membership. Members are required, however, to sign a Memorandum of Understanding with the Program Office which defines that office's responsibilities and a general commitment of the member to take an active role in NAWDEX activities, to provide information on its data holdings for indexing purposes, and to provide data from its holdings upon request. The Program Office is not empowered to sign membership documents with foreign or international organizations. These organizations are invited, however, to participate in NAWDEX through an established relationship with the Program Office and will be indentified in NAWDEX as foreign affiliates.

Each member takes an active role in the planning, development, and execution of NAWDEX activities. Each member is an advisor to the Program Office and mechanisms exist to assure continued communication between members, to assure active participation of all members in an equal and equitable manner, and to maintain an awareness of the needs of the water-data community in order to achieve maximum program effectiveness.

NAWDEX services

A variety of services are provided by NAWDEX to assist its users to identify needed water data, to locate these data, and to refer users to the proper sources for obtaining the data. It is not a function of NAWDEX to become a repository of water data. Instead, the data held by NAWDEX members are indexed by the Program Office to provide a central source of information on water data available from a large number of organizations.

NAWDEX services are provided through the Program Office and a nationwide network of Local Assistance Centers. This network was established in January 1977 and consists of 51 centers located in 45 states and Puerto Rico. The centers provide convenient access to NAWDEX services as well as making local-area expertise available in the identification and location of needed data.

The New Mexico District Office of the Water Resources Division, U.S. Geological Survey has been designated the Local Assistance Center for New Mexico. All requests to the Local Assistance Center should be addressed to:

Mr. James F. Daniel, District Chief
U.S. Geological Survey
Water Resources Division
P.O. Box 26659
Albuquerque, New Mexico 87125
Attn: Ms Linda Beal

Telephone: (505) 766-2011

For other services or additional information, contact: NAWDEX, U.S. Geological Survey, 421 National Center, Reston, Virginia 22092, Telephone (703) 860-6031.

PUBLICATIONS OF THE U.S. GEOLOGICAL SURVEY AND REFERENCE SOURCES ON THE HYDROLOGY AND GEOLOGY OF NEW MEXICO

Professional Papers, Water-Supply Papers, Bulletins, Circulars, and the Yearbook of the Geological Survey are available from the U.S. Geological Survey, Branch of Distribution, 1200 South Eads Street. Arlington, Virginia 22202 (authorized agent of the Superintendent of Documents, Government Printing Office). Hydrologic Investigations Atlases, Hydrologic Unit Maps, topographic maps, and other maps pertaining to New Mexico are sold by the U.S. Geological Survey, Branch of Distribution, P.O. Box 25286, Federal Center, Denver, Colorado 80225. Microfiche and black and white paper copies of open-file reports may be obtained from the Open-File Services Section, Branch of Distribution, USGS, Box 25425, Federal Center, Denver, Colorado 80225. The Water-Resources Investigations series is available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22151.

Records of streamflow, ground-water levels, and quality-of-water data were published for many years as Geological Survey Water-Supply Papers (WSP) in the series explained below. Beginning with the 1975 water year, however, these series have been replaced by a new publication series, "U.S. Geological Survey Water-Data Reports." This new series combines under one cover for each state streamflow data, water-quality data for surface and ground water, and ground-water level data from the basic network of observation wells. For New Mexico, the first report of this series was entitled "Water Resources Data for New Mexico - Water Year 1975: U.S. Geological Survey Water-Data Report NM-75-1." Other publication series of general interest are explained below. Further information on these publications can be obtained from the District Chief, U.S. Geological Survey, Water Resources Division, P.O. Box 26659, Albuquerque, New Mexico 87125.

Streamflow records.--Records of daily flows of streams prior to 1971 were published in the Water-Supply Paper series "Surface Water Supply of the United States" which was released in numbered parts as determined by natural drainage basins. Until 1961 this was an annual series; monthly and yearly summaries of these data were compiled in two reports: "Compilation of Records of Surface Waters of the United States through September 1950" and "Compilation of Records of Surface Waters of the United States, October 1950 to September 1960." For the period 1960-70, two 5-year compilations were published. Data for New Mexico are published in Part 7 volume 2, Part 8 volumes 1 and 2, and Part 9 volumes 2 and 3. For the years 1961-74, these data also were released annually on a State-boundary basis.

Ground-water records.--Prior to 1975 ground-water levels and artesian pressures in observation wells were reported by geographic areas in a Water-Supply Paper series published at 5-year intervals. Data for New Mexico are found in "Ground-Water Levels in the United States, Southwestern States." The New Mexico State Engineer Office also publishes ground-water data in a hydrologic-data series entitled, "Ground-Water Levels in New Mexico."

Quality-of water records.--Data for quality of surface water prior to 1971 were published annually in the Water-Supply Paper series "Quality of Surface Waters of the United States," which also was released in numbered parts as determined by natural drainage basins. Data for New Mexico are in Parts 7, 8, and 9. For the years 1964-74, these data also were released annually on a state-boundary basis.

Methods of estimating the frequency and magnitude of floods for selected streams are given in the Water-Supply Paper series "Magnitude and Frequency of Floods in the United States," which is composed of reports released in parts by drainage basins; data for New Mexico are in Parts 7, 8, and 9. The Geological Survey also has outlined flood-prone areas on topographic maps as part of a nationwide Federal program for managing flood losses. In New Mexico, 67 topographic maps have been completed. Flood-prone area maps of New Mexico are listed in "Index of flood maps prepared by the U.S. Geological Survey through 1973," Water Resources Investigations 57-73. Information on these maps is available from the District Chief, Water Resources Division, Albuquerque.

Summaries of research in progress and results of completed investigations are published each fiscal year in the Professional Papers "Geological Survey Research." Recent editions are: fiscal year 1974, PP 900; 1975, PP 975, PP 1000; 1977, PP 1050; 1978, PP 1100.

Summary statements about the immediate national water situation are presented in the Water Resources Review, which is issued monthly. The Review may be obtained free on application to the U.S. Geological Survey, 420 National Center, Reston, Virginia 22092.

Indexes to the "Catalog of Information on Water Data" are available free from the District Chief in Albuquerque or the Office of Water Data Coordination, U.S. Geological Survey, 417 National Center, Reston, Virginia 22092. Current editions are as follows: (1) station listings for streamflow and stage, quality of surface water, and quality of ground water, 1974 [21 volumes by water-resources regions--stations in New Mexico are listed in Volumes 11 (Arkansas-White-Red Region), 12 (Texas-Gulf Region), 13 (Rio Grande Region), 14 (Upper Colorado Region), and 15 (Lower Colorado Region)]; (2) index to areal investigations and miscellaneous water-data activities, 1970 (one volume); and (3) index to ground-water stations, 1968 (one volume).

The "U.S. Geological Survey Annual Report" (known as the "Yearbook" since 1977) provides a comprehensive description of the Federal Government's largest earth-science agency.

Topographic maps for New Mexico may be purchased from the Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, Colorado 80225. Available free from the same address is an "Index to Topographic Maps of New Mexico" which is updated yearly to show current availability. The USGS Mapping Center issues a quarterly edition of "Advance Material Available," which details the status of current mapping programs; unedited advance prints are often available more than a year before maps are published in final form.

USGS topographic maps may be purchased from private dealers in every major city in the state. Dealer prices may be slightly higher than Survey prices.

Many libraries maintain reference files of the published maps of the Geological Survey. In New Mexico, maps are deposited in the libraries listed below:

Albuquerque:	Library, University of New Mexico
Las Cruces:	Documents Division, New Mexico State University
Las Vegas:	Donnelly Library, New Mexico Highlands University
Santa Fe:	New Mexico State Library, Museum of New Mexico
Socorro:	New Mexico Bureau of Mines and Mineral Resources

A book entitled "Publications of the Geological Survey, 1879-1961," lists all books published by the Survey through 1961. A supplement lists publications issued between 1962 and 1970, and annual supplements have appeared since that time. A monthly series, "New Publications of the Geological Survey," lists the most recent books and maps published by the Survey.

A complete compilation of State reports is given in "List of Geological Survey Geologic and Water-Supply Reports and Maps for New Mexico." This list is available free from the Branch of Distribution, U.S. Geological Survey, 1200 S. Eads Street, Arlington, Virginia 22202.

The Survey has published three bibliographies for parts of New Mexico, listing publications from all sources. The first of these, printed in 1978, is USGS Bulletin 1458, entitled "Bibliography of the Geology and Hydrology of the Albuquerque Greater Urban Area, Bernalillo and Parts of Sandoval, Santa Fe, Socorro, Torrance, and Valencia Counties, New Mexico." Another list was published in 1979 as Water Resources Investigations 79-76, entitled "Bibliography of Geology and Hydrology, Eastern New Mexico." A third list is a "Bibliography of Geology and Hydrology, San Juan Basin, New Mexico, Colorado, Arizona, and Utah," which was published in 1979 as USGS Bulletin 1481. These three publications are for sale from the Branch of Distribution in Arlington. A fourth bibliography on southwestern New Mexico is currently in press.

The New Mexico State Engineer Office in 1978 published a "Bibliography of Ground-Water Studies in New Mexico. 1873-1977" (compiled by Robert L. Borton). An update of this is currently in progress. This is the most complete bibliography available on a statewide basis. It is available without cost from the New Mexico State Engineer Office, Bataan Memorial Building, Santa Fe, New Mexico 87503. A list of publications by the State Engineer Office may be obtained from the same address.

The New Mexico Water Resources Research Institute, located at New Mexico State University, coordinates a wide variety of water studies. A free list of publications may be obtained by writing New Mexico State University, P.O. Box 3167, Las Cruces, New Mexico 88003.

A free list of the publications of the New Mexico Bureau of Mines and Mineral Resources may be obtained from the Bureau at Socorro, New Mexico 87801. Bureau publications include mining, geology, hydrology, and energy resources statewide. The Bureau offers for sale a "Bibliography of New Mexico Geology and Mineral Technology" in their Bulletin series. Publications of the New Mexico Geological Society may also be purchased from the Bureau of Mines and Mineral Resources.

A list of theses and dissertations by geology students at the University of New Mexico may be obtained from the Department of Geology, University of New Mexico, Albuquerque, New Mexico 87131.

A general historical and cultural bibliography of New Mexico is "20,000 Years of History--A New Mexico Bibliography", by Frances Leon Swadesh. There are some geologic and irrigation references. Other historical references to irrigation and water right conflicts can be found in the indexes to the "New Mexico Historical Review" and "El Palacio" (Bulletin of the Museum of New Mexico). The "New Mexico Historical Review" index should be available for use at all major libraries in the state, and the "El Palacio" index is available at the Zimmerman Library at the University of New Mexico.

PUBLISHED REPORTS OF THE NEW MEXICO DISTRICT

FISCAL YEAR 1979

Clement, Ralph W., 1978, Temperature in streams of New Mexico for the period October 1964 to September 1969, Water-Resources Investigations 78-140, 30 p.; available from U.S. Department of Commerce, National Technical Information Service, Springfield, Virginia 22151.

Cruz, R. R., 1979, Annual water-resources review, White Sands Missile Range, 1978, Open-File Report 79-985, 23 p.

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Dewey, J. D., Roybal, R. E. and Funderburg, D. E., 1979, Hydrologic data on channel adjustments 1970 to 1975, on the Rio Grande downstream from Cochiti Dam, New Mexico, before and after closure, Water-Resources Investigations 79-70, 531 p.; available only from U.S. Department of Commerce, National Technical Information Service, Springfield, Virginia 22151.

Hart, Don L. and Smith, Christian, 1979, Ground water in the vicinity of Capulin, New Mexico, Water-Resources Investigation Report 79-79, 58 p.; available only from U.S. Department of Commerce, National Technical Information Service, Springfield, Virginia 22151.

Hudson, J. D., 1979, Ground-water levels in New Mexico, 1977: New Mexico State Engineer Basic Data Report, in press.

Lyford, F. P., 1979, Ground water in the San Juan Basin, New Mexico and Colorado, Water-Resources Investigation 79-73, 22 p.; available only from U.S. Department of Commerce, National Technical Information Service, Springfield, Virginia 22151.

Mercer, J. W. and Orr, B. R., 1979, Interim data report on the geohydrology of the proposed waste isolation pilot plant site, southeast New Mexico, Eddy County, Water-Resources Investigation 79-98-, 179 p.; available only from U.S. Department of Commerce, National Technical Information Service, Springfield, Virginia 22151.

Soule, P. L., and Wilkins, D. W., 1979, Water-Resources Investigations of the U.S. Geological Survey, New Mexico District Fiscal Year 1978, Open-File Report 79-560, 84 p.

U.S. Geological Survey, 1979, Water Resources data for New Mexico--Calendar year 1977: New Mexico State Engineer Data Report, 587 p.

_____1979, Water Resources data for New Mexico--Water year 1978, 677 p.

Wright, Ann Finley, 1979, Bibliography of geology and hydrology, San Juan Basin, New Mexico, Colorado, Arizona, and Utah, Geological Survey Bulletin 1481, 123 p.

_____1979, Bibliography of geology and hydrology of Eastern New Mexico, Water-Resources Investigations 79-76, 170 p.; available only from U.S. Department of Commerce, National Technical Information Service, Springfield, Virginia 22151.