A Plan to Study the Aquifer System of the Central Valley of California

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A PLAN TO STUDY THE AQUIFER SYSTEM OF THE CENTRAL VALLEY OF CALIFORNIA

By Gilbert L. Bertoldi

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Menlo Park, California
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UNITED STATES DEPARTMENT OF THE INTERIOR

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CONVERSION FACTORS

For readers who prefer to use International System (SI) units rather than inch-pound units, the conversion factors for the terms used in this report are listed below:

Inch-pound unit	Multiply by	SI (metric) unit
acre-feet	1233	cubic meters
feet	0.3048	meters
inches	25.4	millimeters
miles	1.609	kilometers
square miles	2.590	square kilometers

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ABSTRACT

Unconsolidated Quaternary alluvial deposits comprise a large complex aquifer system in the Central Valley of California. Millions of acre-feet of water are pumped from the system annually to support a large and expanding agribusiness industry. Since the 1950's, water levels have been steadily declining in many areas of the valley and concern has been expressed about the ability of the entire ground-water system to support agribusiness at current levels notwithstanding its ability to function at projected expansion levels. At current levels of ground-water use, an estimated 1.5 to 2 million acre-feet is withdrawn from storage each year; that is, 1.5 to 2 million acre-feet of water is pumped annually in excess of annual replenishment. The U.S. Geological Survey has initiated a 4-year study to develop geologic, hydrologic, and hydraulic information and to establish a valleywide ground-water data base that will be used to build computer models of the ground-water flow system. Subsequently, these models may be used to evaluate the system response to various ground-water management alternatives. This report describes current problems, objectives of the study, and outlines the general work to be accomplished in the study area.

INTRODUCTION

Many areas of the United States are dependent upon ground water either as a large part of or as their total water supply. National recognition of the importance of ground water to the economy of the United States was heightened by the energy crisis when it was discovered that the principal untapped source of water that could be used for expanded development of the vast coal reserves of the Northern Great Plains was a little-studied limestone aquifer known as the Madison Limestone. In 1975 the U.S. Geological Survey initiated a study of the Madison Limestone aquifer as part of its activities in support of the national energy program. In 1976 and 1977, the western part of the United States experienced major drought, and again the importance of ground water reached the national limelight. So important were the concerns over this national resource, the United States House of Representatives issued Committee Report Number 95-392 on June 6, 1977. This report introduced a national program for the analysis of regional aquifer systems and stated that "the committee expects the U.S. Geological Survey to press this program vigorously."

The Central Valley aquifer analysis project is a part of the National Regional Aquifer Systems Analysis Program. Although the Central Valley lies entirely within the State of California, its long history of ground-water development and the complexity and immensity of the economic ties related to ground-water development make it among the first areas in the United States considered for study. This document is a work plan that defines the general problem, states the purpose of the study, and outlines the study approach.

The Area

The Central Valley of California is one of the most notable structural depressions in the world. Surrounded by mountains and filled with alluvium derived from the mountains, the valley extends about 500 miles from Red Bluff in the north to the Tehachapi Mountains in the south (fig. 1). It varies in width from about 20 to 50 miles and covers about 16,000 square miles. Thomas (1976) subdivided the Central Valley into four parts--Sacramento Valley, Delta, San Joaquin Valley, and Tulare Basin (fig. 1). Topographically, except for Sutter Buttes, the Central Valley has little areal relief. Most of the valley lies close to sea level in elevation, but along its margins it is higher. Maximum elevation in the valley is about 1,700 feet near the apexes of some alluvial fans in the southern part of Tulare Basin. Most of the valley boundary along the eastern edge is about 500 feet above sea level and most of the western boundary ranges from 50 to 350 feet above sea level. The valley has only one natural outlet, Carquinez Strait, through which the combined discharge of the Sacramento and San Joaquin Rivers flows on its way to San Francisco Bay.

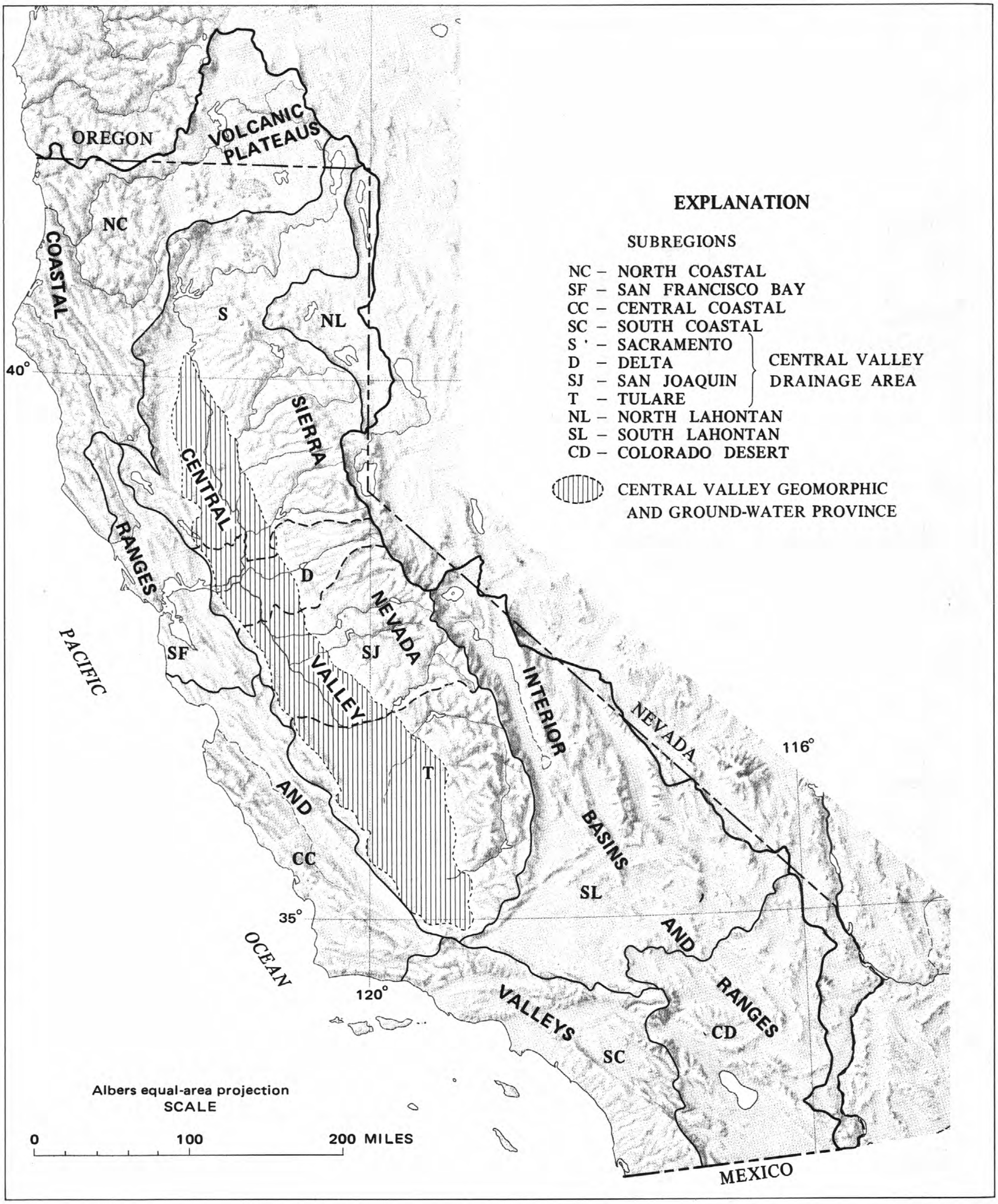

FIGURE 1.--Subregions and landforms of the California Region. (Modified from Thomas, 1976)

Climate in the valley is arid to semiarid with average annual precipitation ranging from 14 to 20 inches in the Sacramento Valley and 5 to 14 inches in the San Joaquin-Tulare Basin parts of the valley (Rantz, 1969). Soils are deep and fertile and the growing season is long, allowing much of the valley to be double or triple cropped.

Given the amenable climate and fertile soils, it is no wonder that the Central Valley boasts one of the greatest agricultural economies in the world. Four of the nation's top five agricultural counties (in terms of the value of crops sold, 3.1 billion dollars) lie in the San Joaquin Valley and Tulare Basin; and approximately 40 percent of the nation's fruits, nuts, and vegetables (1976 value about 1.5 billion dollars) are grown in the Central Valley (U.S. Agricultural Crop Reporting Service, written commun., 1976).

Problems

For the purpose of this document, water problems in California can be discussed under three broad headings: (1) problems of natural distribution, (2) political, legal, and social problems, and (3) technical-hydrologic problems. Categories (1) and (2) will be cursorily treated because these categories have been discussed or documented at great length in papers that are referenced herein.

The natural distribution of water in California is the root of all water problems within the Central Valley. Most simply stated, the Central Valley has an average annual water deficiency under natural conditions (precipitation minus evapotranspiration) as great as 40 inches; whereas the bordering Sierra Nevada, Klamath Mountains, and Cascade and northern Coast Ranges have an average annual surplus of water (fig. 2). Paradoxically, agricultural development and human population are concentrated in the precipitation-deficient valleys. If an applied irrigation-water requirement of 30 inches is added to the annual natural deficit, the average annual water deficiency in the valley may be as much as 70 inches.

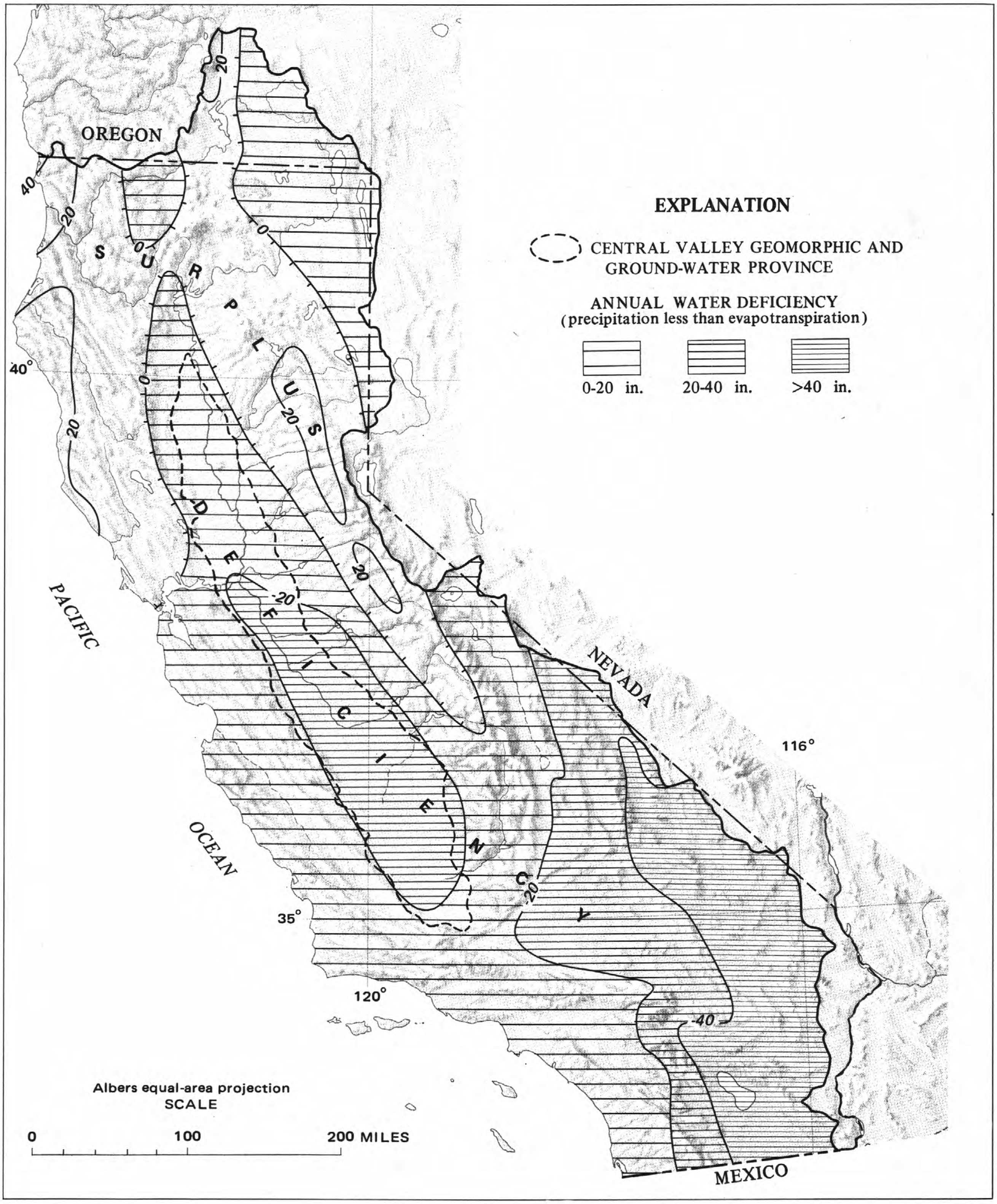

FIGURE 2.--Water-surplus and water-deficient areas in the California Region. (Modified from Thomas, 1976)

The natural distribution of ground water in the valley is different from that of precipitation or surface water in that there is ground water stored everywhere in the valley, even where little rainfall normally occurs. Prior to intensive development, the presence and use of ground water in the Central Valley was documented by Mendenhall, Dole, and Stabler (1916, p. 31, 35) when they reported "along the axis of the valley a zone with an area of 4,300 square miles within which flowing waters are available," and that about half of the 1,122 wells in the San Joaquin Valley in 1905-06 were flowing artesian wells. In 1912, Harding and Robertson (1912, p. 172) estimated a total pumpage for the San Joaquin Valley of about 250,000 acre-feet. In the Sacramento Valley about 1,660 wells were in use in 1913 (Bryan, 1923, p. 5), and the majority of these were hand augered or hand dug because "throughout the valley the alluvium at a depth of a few feet is saturated with water." About 112,000 acre-feet of ground water was being pumped from aquifers of the Sacramento Valley in 1913. Total pumpage for the Central Valley for 1913 is estimated to have been 362,000 acre-feet.

In the early 1950's the State of California and the U.S. Geological Survey cooperated in a series of ground-water reconnaissance studies that revealed nearly continuous annual declines of water levels for large areas of the San Joaquin Valley and for some interstream areas of the Sacramento Valley. In the Central Valley, the average annual pumpage has increased from its 1913 beginnings of about 362,000 acre-feet to about 12 million acre-feet. Pumpage in years of severe drought has been about 18.5 million acre-feet (California Department Water Resources, 1977a, p. 126). In many parts of the valley, the water withdrawn has been replenished within months by percolation of precipitation and stream losses; in other areas, replenishment of aquifers has been ample in years of abundant precipitation and streamflow, but in years of subnormal rainfall or drought there is no replenishment. In some parts of the Central Valley, pumping has caused progressive decline of water levels in wells and depletion of ground-water storage (fig. 3).

The principal areas of storage depletion, as of 1977, are shown in figure 3. Pumping depressions in the Central Valley are noteworthy because water levels have declined more than 100 feet under extensive areas. Water levels reached record lows in many wells during the 1960's, especially in 1961 and 1966, which were the driest years of the decade. Levels were rising during the wetter years, 1969 and 1970, although they continued to decline in areas near Sacramento and Stockton and in the southern part of the Tulare Basin (California Department of Water Resources, 1971a). In several irrigation districts of the Tulare Basin and in parts of Fresno County in the San Joaquin Basin, water levels in wells have risen more than 65 feet since 1951, following the availability of irrigation water from the Friant-Kern Canal. In western Fresno County water levels have risen about 200 feet since 1969 following the arrival of irrigation water from the California Aqueduct. If 1977 drought conditions had continued into 1978, the California Department of Water Resources estimated that there would have been a decrease in ground-water storage, in the Central Valley, of 8 million acre-feet (California Department of Water Resources, 1977b, p. 130).

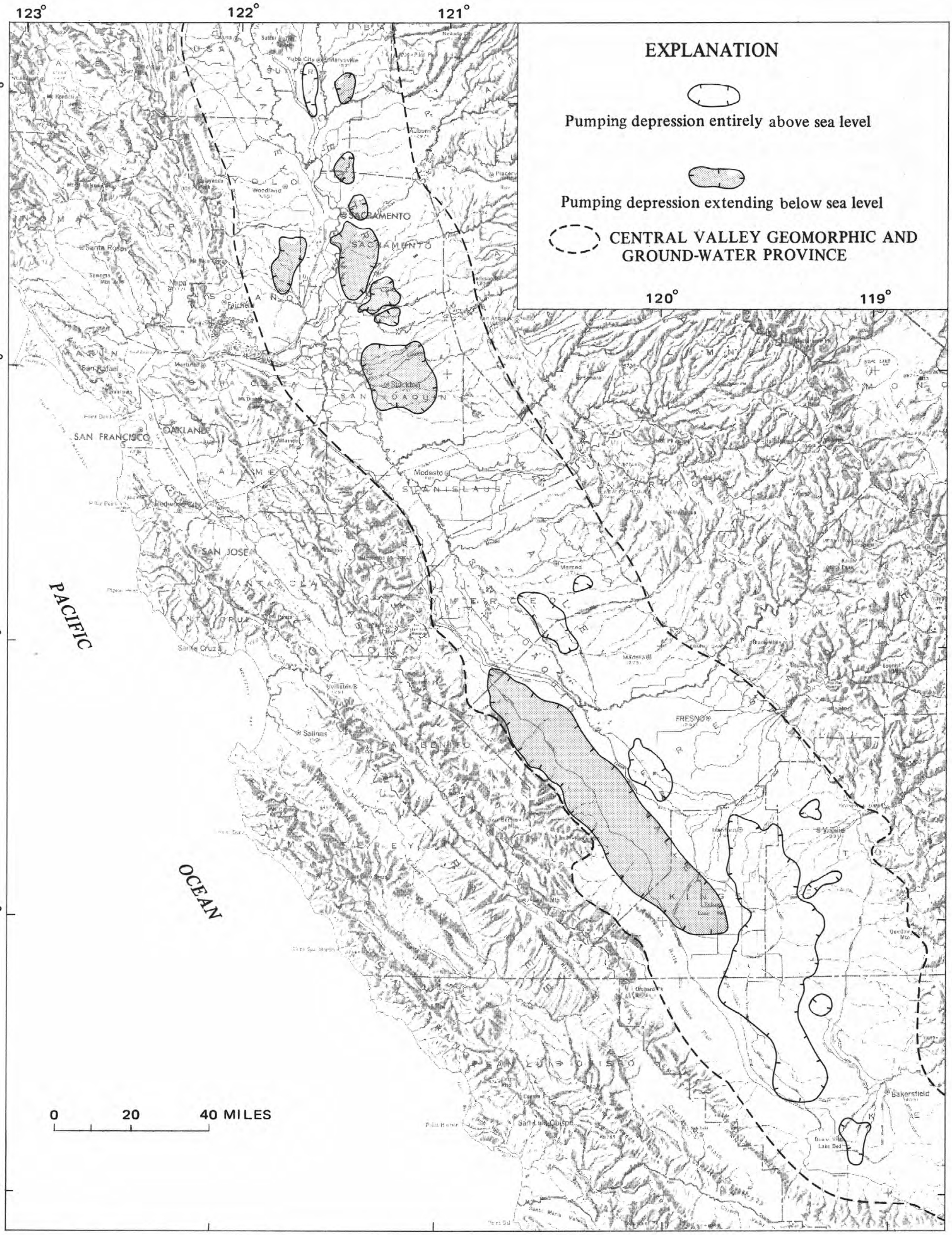

FIGURE 3.--Pumping depressions (caused by pumping from wells) indicating depletion of storage. (Modified from Thomas, 1976)

From an examination of figures 1 and 2 it seems that the general solution to the ground-water problem would be a regional plan that entails the conjunctive use of ground water and surface water. Scientists have long recognized the desirability of conjunctive use of ground water and surface water in the valley, as evidenced by studies made during the formulation of the California Water Plan (primarily a plan to distribute excess surface water) in the early 1950's. Those studies indicated that the objectives of the plan could not be achieved without full, careful, and coordinated use of ground-water resources (California Department of Water Resources, 1957). Several years earlier, the U.S. Bureau of Reclamation (1949, p. 214) in relation to the development of the Central Valley Project stated, "* * * special attention must be given to the problem of using ground-water reservoirs to best advantage. Only by the full use of these underground basins can the irrigable areas of the east side of the San Joaquin Valley be developed completely."

Why then has coordinated use of surface and ground water never really been implemented? The answer lies partially within the realm of the political, legal, and social institutions (Problem Heading 2, p. 4) of California. Thomas (1976, p. E45, E46) summarized the problem in the following passages:

> "In California, however, private property rights have been asserted and protected, particularly as to ground water, stemming from the common-law maxim 'Cujus est solum ejus est usque ad coelum et ad infernos'--roughly, the landlord owns everything above and beneath his land from heaven to hell. Federal or State agencies thus can lose control of and title to the water they put into ground-water reservoirs: 'Leakage from the canal would be quite effective, but how would we collect for it?' (Bain and others, 1966, p. 414). The Bureau of Reclamation, supplying water under contract to several local agencies in San Joaquin Valley, necessarily lines its canals with concrete where they traverse the natural recharge areas of ground-water reservoirs, to prevent 'loss' by seepage.
>
> "Nor do State agencies have managerial authority over ground-water reservoirs. At a panel discussion of practical considerations in implementing public policy (McGauhey, 1967, p. 78), moderator Harvey Banks asked John Teerink, Deputy Director of the California Department of Water Resources: 'How can we bring about the necessity of coordinated operation of long aqueducts and ground-water basins to even out aqueduct flows without undue interference with local control of ground-water basins?' Mr. Teerink replied: 'In determining the need for regulatory storage along the California Aqueduct, we looked for surface storage reservoir sites. We did consider that ground storage was a real possibility. But there did not exist, and there does not exist today, any means by which the State can involve itself in ground-water basin management, so we had to go to surface storage.'

"* * * Eight years later the California Water Plan still faced the same impediment (California Department of Water Resources, 1970a, p. 72): 'Full realization of such integrated surface water-ground water system operations in areas where the ground water resource is available will require legal and legislative action and social and political acceptance.'

"This action may be delayed yet awhile. Fortunately, the California Legislature has generally supported local initiative in ground-water basin management and also the conjunctive use of surface and ground water. * * * Conjunctive use of surface and ground water currently depends heavily upon the conjunctive operations of local agencies, whose dominant concern is ground water, and Federal and State agencies, whose dominant concern is surface water."

Although political, social, and economic action are probably very necessary to the implementation of ground-water/surface-water conjunctive-use plans at any level of government, no conjunctive-use planning can be done without basic data upon which to describe the hydrologic system and quantitatively define the technical hydrologic problems (Problem Heading 3, p. 4). Because the 300 water agencies in the Central Valley have been concerned mostly with delivery of surface water, they have until recently abdicated responsibility for the development of technical ground-water information to Federal or State agencies.

Federal and State agencies, in turn, have not placed much emphasis on quantification because legal authority for management of ground water is vested in local agencies. In recent years some of the more progressive local agencies have turned to the Federal or State agencies for specific quantitative ground-water information, only to find that the scientific data that would allow formulation of ground-water management plans were unavailable.

Purpose and Scope

Historically, hydrologic studies in the Central Valley have been made within limited geographic areas or with the purpose of attempting to define only a part of the system. Water-supply problems in the Central Valley are not limited to single localized areas but affect the entire valley (region)--a decision to increase pumpage in the city of Modesto may have an effect as far away as Fresno. Therefore, the purposes of the Central Valley aquifer investigation are to gather, interpret, and verify hydrologic information from widely scattered sources and to develop ways to evaluate aquifer responses to changes in ground-water management practices. The scope of the project will include investigations in the five subject areas, and their subareas, listed below:

I. Physical aquifer parameters
   A. Distribution of clay, including aquitards and aquicludes (as used by Poland, Lofgren, and Riley, 1972)
   B. Distribution of potentiometric heads
   C. Storage coefficients
      1. Confined
      2. Unconfined (specific yield)
   D. Hydraulic conductivities, transmissivities
   E. Hydraulic boundaries
   F. Subsidence, water of compaction, changes in specific storage

II. Elements of recharge
   A. Climate
      1. Types and location
      2. Precipitation
      3. Trends
   B. Infiltration from streambeds
      1. Tributaries from Sierra Nevada
      2. Tributaries from Klamath Range
      3. Tributaries from southern Coast Ranges
      4. Tributaries from northern Coast Ranges
   C. Infiltration on soils
      1. Distribution and infiltration characteristics of canals
      2. Infiltration of applied irrigation water
      3. Deep percolation of precipitation
         (a) Soil barriers to vertical flow
         (b) Rate of movement
   D. Ground-water flow entering at boundaries of the valley and interflow among aquifers

III. Elements of discharge
   A. Pumpage
      1. Irrigation
         (a) Land use
         (b) Evaporation potential of soils, ponds, lakes, and canals
         (c) Cropping trends
      2. Drainage
      3. Industrial and public supply
   B. Ground-water outflow
   C. Streamflow
      1. San Joaquin River at Vernalis
      2. Sacramento River at Hood

IV. Elements of ground-water quality
   A. General inorganic character of currently used aquifers
   B. Areas of potential degradation
   C. Natural sources of pollution
   D. Character and extent of saline aquifers
   E. Possible changes in water quality of currently used aquifers in relation to expected changes in storage
   F. Base of potable water
   G. Effects of irrigation on water quality
   H. Effects of solid and liquid wastes on ground water

V. Energy considerations and ground water
   A. Availability and quality for nuclear powerplant cooling
   B. Power consumption related to changes in pumping levels

Approach

Products of the study will be a series of reports that describe the Central Valley aquifer system, as it was before development of ground water, as it is currently, and what may happen to the system with further development. For the reports to be meaningful, attempts will be made to extract quantitative data by using simulation and statistical models to analyze the system. Information input to the model will be developed from existing data where possible. There is a scarcity of geologic data for the Pleistocene and Pliocene alluvium in the Sacramento Valley and no recent water-quality data for parts of both the Sacramento and San Joaquin Valleys. To correct these deficiencies and others that may be discovered, special one-time field collections will be made.

Several management alternatives are currently being considered by the State of California as outlined in the report of the Governor's Commission to Review California Water Rights Law (Wright, 1978). All these management alternatives are currently being approached with caution because, as the Governor's Commission (p. 164) stated, "Uncertainty exists in most places regarding the extent of rights to ground water and the extent of present and local needs for ground-water resources. Reliable data on the effect of a transfer upon these rights and needs is generally unavailable." Hopefully, models developed during this study will provide the instrument through which planners at all levels of government may assess the effect of the various suggested management plans.

PLAN OF STUDY

The Central Valley aquifer study will include the study of a series of post-Eocene continental deposits consisting of intercalated beds of gravel, sand, silt, clay, tuff, conglomerate, sandstone, siltstone, and claystone.

In the San Joaquin Valley, at least two aquifers have been defined, separated by an extensive lacustrine clay known as the Corcoran Clay Member of the Tulare Formation of Pleistocene age. All potable fresh water in the San Joaquin Valley is in continental deposits, of late Tertiary and Quaternary age, that range in thickness from a few feet along the valley boundaries to 16,000 feet in the south-central part of the Tulare Basin. The thickest sections occur along the axis of the valley trough.

Information on alluvial fill in the Sacramento Valley is scarce; therefore, the number of aquifers present is not known, and most authors have assumed that water-table conditions exist throughout the saturated thickness of the system. Hydrographs from several deep wells and discrepancies in water-level measurements among several closely spaced wells of varying depth imply that there may be several aquifers in the Sacramento Valley.

In the Sacramento Valley, Oligocene and younger rocks will be studied in an attempt to define confining beds and aquifers and the hydraulic relations among them. The Central Valley aquifer study began in fiscal year 1978 and will continue through fiscal year 1981.

Administration

A table of organization for the project has been established and all positions have been filled.

The administrative work consists of five elements: (1) plans and staff, (2) contracts, (3) special reports, (4) technical reports, and (5) special interagency liaison. All elements of administration have been established and are functioning. This report constitutes the final overall work plan for the study; first contract specifications have been drafted and let for bid; a special committee comprising members from the private and governmental sectors has been formed as an information dissemination medium.

Data

During the first 18 months of this study, data will be gathered from Federal, State, local, and private agencies. The data will be coded for computer processing and subsequently stored for further analytical use. Data will be stored in the U.S. Geological Survey WATSTORE computer system to assure maximum accessibility, ease of updating, and interfacing capabilities with other Survey analytical computer programs.

After the available data are collected and stored, maps showing the areal distribution of the data will be computer generated, and statistical analyses will be made to determine the variation in distribution. From these analyses, gaps in the data matrices will be detected and direction for field collection of data to fill those gaps can be obtained.

For the Central Valley it is expected that data for water levels, precipitation, soils, pumpage, land use, and streamflow are adequate. It is already known that recent water-quality data are inadequate for the San Joaquin Valley and nonexistent for one 400-square-mile area of the Sacramento Valley. Geologic data, primarily aquifer boundaries and characteristics, are not sufficient to define parts of the aquifer system in the Sacramento Valley.

All the data matrices will provide initial input to the digital model. By comparing calculated responses with measured responses in the aquifer system, sensitivity of given parameters may be tested and the need for further refinement of the data matrices can be evaluated. In addition, the data base may be helpful in checking concepts used to build the flow model and, if necessary, aid in making changes to these concepts so that predictive capabilities can be improved.

Special Investigations

Information for many of the variables needed to build a flow model is already available from existing data. Geologic information for much of the Sacramento Valley for the part of the aquifer from 100 feet below land surface to the Pliocene Tehama Formation, or about 2,500 feet below land surface, is not available. This situation has developed mainly because surface water has been abundant in the past and few deep water wells were drilled. Most water wells that were drilled are generally less than 100 feet deep and therefore yielded no information on most of the aquifer system. Three deep, exploratory wells will be drilled for the purpose of obtaining (1) geologic logs, (2) core samples, (3) electric logs, (4) sonic logs, (5) formation water samples, and (6) water-level measurements.

These items will be used to ascertain porosity and age of deposits, lithologic sequences, specific yields, hydraulic conductivities, mineral composition, thermal gradients, water quality, and head differentials.

A second special study will involve use of the mineral and water-quality analyses from the test wells in the Sacramento Valley, plus similar data from U.S. Bureau of Reclamation test wells in the San Joaquin Valley, and thermodynamic calculations to determine the minerals with which water is in equilibrium--for the purpose of determining the geochemical controls on water quality. For clay minerals, data can be analyzed using stability plots. The state of mineral equilibrium in the aquifer system is of particular importance in the study of the change in water type from calcium bicarbonate to sodium bicarbonate as water moves across the valley. Ion-exchange and ion-dissolution mechanisms have been offered as hypotheses for the change in water type, but until now they have not been tested with field data. Techniques now available should make it possible to determine whether an ion-exchange or ion-dissolution mechanism is responsible for the change of water types across the valley.

Computer Models

A large-scale (36-square-mile nodal area) flow model of the regional system will be made from existing data and refined as additional data are collected or qualified for use. Calibration of the large-scale model is possible with available data. In addition to the large-scale model, small-scale subsystem models can be built to provide more detailed analyses in selected areas.

The selection of areas for subsystem modeling will depend primarily on the availability of data and the length of record. Computer models have been developed for parts of Kern, Fresno, and Sacramento Counties, the cities of Merced, Modesto, and Madera, and parts of the Sacramento Valley.

A steady-state (natural condition) model will be attempted as the first step in the modeling process. The objective of the steady-state model will be to evaluate predevelopment flow patterns and, most importantly, refine or narrow the range of values of hydraulic conductivities throughout the system until they are hydrologically rational.

Once a steady-state model is completed, the next phase in the modeling effort is to build a transient-state model (that simulates changes imposed by manmade stresses) of the system using transmissivities obtained from the steady-state model. This technique reduces the number of hydraulic parameters that the modeler has to adjust during calibration of the transient-state model.

The third phase in the modeling process is to use the verified transient-state model to predict the effects of various stresses that might be applied to the system. In that regard, both the regional model and the subsystem models will be used to simulate various ground-water management alternatives. Management alternatives will be taken from various plans of local, county, and State agencies. The simulation will assess the impact on the ground-water supply and aid planners in making major water-use decisions. The models will be available for analysis of all management alternatives that might be suggested in the future.

Reports

Several reports are planned as products of this investigation. Most of the early ones will be map reports covering subjects such as:

1. General quality of currently used ground water
2. Thickness and areal extent of major confining beds
3. Recharge from applied water
4. Infiltration from ungaged and gaged streams
5. Areas and sources of ground-water degradation
6. Variation in aquifer hydraulic characteristics
7. Areal extent of aquifers
8. Historical and recent water levels

In addition to map reports, it is expected that several reports discussing specific techniques used in the various subinvestigations will be prepared. Final reports consisting of analyses of the entire system will be published.

BIBLIOGRAPHY

A bibliography of about 600 references, chosen by scanning abstracts and making computer searches (private industry and Federal agencies), and personal contributions (not occurring in any other source), is presented in the following pages. .The criteria used for including a publication in the bibliography were:

1. Subject matter must be water oriented.
2. Subject matter must pertain specifically to the Central Valley area.
3. Subject matter must be complete within given publication.
4. Publication must be readily available to other researchers.

The bibliography is in current U.S. Geological Survey format with entries arranged alphabetically by author. An expanded version is being used as a primary reference tool for staff members.

Adams, Frank, 1913, Irrigation resources of California and their utilization: U.S. Department of Agriculture Office Experiment Station, Bulletin 254, 95 p.

____1929, Irrigation districts in California: California Department of Public Works, Division of Water Resources, Bulletin 21, 421 p.

Addicott, W. O., 1970a, Miocene gastropods and biostratigraphy of the Kern River area, California: U.S. Geological Survey Professional Paper 642, 174 p.

____1970b, Tertiary paleoclimatic trends in the San Joaquin basin, California: U.S. Geological Survey Professional Paper 644-D, p. D1-D19.

____1970c, Tertiary climatic change in San Joaquin basin, California--Evidence from shallow-water mollusks [abs.]: American Association of Petroleum Geologists Bulletin, v. 54, no. 3, p. 561.

Allen, V. T., 1929, The Ione formation of California: California University, Department of Geological Science, Bulletin 18, p. 337-448.

Almgren, A. A., and Schlax, W. N., Jr., 1957, Post-Eocene age of "Markley Gorge" fill, Sacramento Valley, Calif.: American Association of Petroleum Geologists Bulletin, v. 41, no. 2, p. 326-330.

American Association of Petroleum Geologists, Cenozoic Correlation Committee, 1952, Generalized sketch section across the San Joaquin Valley, California: American Association of Petroleum Geologists-Society of Economic Paleontologists and Mineralogists-Society of Exploration Geophysicists Guidebook, field trip, March 1952, p. 136-137.

Anderson, C. A., 1933, The Tuscan Formation of northern California: California University, Department of Geological Science, Bulletin 23, p. 215-276.

Anderson, C. A., and Russell, R. D., 1939, Tertiary formation of northern Sacramento Valley, Calif.: California Division of Mines Report 35, p. 219-253.

Anderson, D. W., and Axtell, L. H., 1972, Geothermal resources in California, <u>in</u> Geothermal overviews of the western United States, 1972: Geothermal Resource Council, Davis, Calif.

Anderson, F. M., 1911, The Neocene deposits of Kern River, California, and the Temblor Basin: California Academy of Science Proceedings, v. 4, no. 3, p. 73-146.

_____1943, Synopsis of the later Mesozoic in California: California Division of Mines Bulletin 118, p. 183-186.

Arkley, R. J., 1962, The geology, geomorphology, and soils of the San Joaquin Valley in the vicinity of the Merced River, California: California Division of Mines and Geology Bulletin 182, p. 25-31.

Arnold, Ralph, and Anderson, Robert, 1910, Geology and oil resources of the Coalinga district, California: U.S. Geological Survey Bulletin 398.

Atwill, E. R., 1943, Cantua-Vallecitos area in Geologic formations and economic development of the oil and gas fields of California: California Division of Mines Bulletin 118, p. 471-474.

Axelrod, D. I., 1944, The Pliocene sequence in central California: Carnegie Institute of Washington Publication 553, p. 207-224.

Bacon, Forrest, 1971, California's Geologic Atlas complete: California Geology, v. 24, no. 6, p. 99-103.

Bader, J. S., 1964, A reconnaissance of saline ground-water in California: U.S. Geological Survey open-file report, 14 p.

_____1967, Water-level records for wells in California, 1961-65: U.S. Geological Survey open-file report, 8 p. and appendix (1,200 p.).

_____1969a, California District Manual--Water-well and spring numbering: U.S. Geological Survey open-file report, 11 p.

_____1969b, Ground-water data as of 1967, San Joaquin basin subregion, California: U.S. Geological Survey open-file report, 16 p.

_____1969c, Ground-water data as of 1967, Sacramento Basin subregion, California: U.S. Geological Survey open-file report, 16 p.

Bailey, E. H., 1966, Geology of northern California: California Division of Mines and Geology Bulletin 190, 508 p.

Bailey, E. H., Blake, M. C., Jr., and Jones, D. L., 1970, Character and significance of the ophiolitic oceanic crust that forms the base of the Great Valley sequence in western California [abs.]: Geological Society of America, Abstracts with Programs, v. 2, no. 2, p. 68-69.

Bailey, E. H., Irwin, W. P., and Jones, D. L., 1964, Franciscan and related rocks and their significance in the geology of western California: California Division of Mines and Geology Bulletin 183, 177 p.

Bailey, T. E., 1975, Ground water quality monitoring for California's needs in Total water management for California's long-range needs: California University Water Resources Center Report 33, p. 174-188.

Bain, J. S., Caves, R. E., and Margolis, Julius, 1966, Northern California's water industry: Baltimore, Johns-Hopkins Press, 766 p.

Balch, W. T., and Jans, Melvin, 1957, Water-spreading activities of the Kern County Land Company and North Kern Water Storage District, in Conference on water spreading for ground-water recharge, Proceedings: California University Water Resources Center Contribution 7, p. 57-60.

Balding, G. O., and Page, R. W., 1971, Data for wells in the Modesto-Merced area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 122 p.

Balding, G. O., Scott, K. M., and Hotchkiss, W. R., 1969, Data for wells in the Tracy-Dos Palos Area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 74 p.

Bandy, O. L., and Arnal, R. E., 1969, Middle Tertiary basin development, San Joaquin Valley, California: Geological Society of America Bulletin, v. 80, no. 5, p. 783-819.

Banks, H. O., Richter, R. C., Coe, J. J., and others, 1954, Artificial recharge in California: American Society of Civil Engineers Meeting, Austin, Texas, Sept. 8, open-file report.

Barbat, W. F., 1939, The Pliocene of the San Joaquin Valley, California [abs.] Pacific Scientific Congress, 6th, Berkeley, California, 1939, compte rendu: American Association of Petroleum Geologists Bulletin, v. 23, no. 12, p. 1877.

____1947, Stratigraphy of San Joaquin Valley [abs.]: Oil and Gas Journal, v. 45, no. 47, p. 128.

Barnes, Ivan, Irwin, W. P., and Gibson, H. A., 1975, Geologic map showing springs rich in carbon dioxide or chloride in California: U.S. Geological Survey open-file map.

Barnes, R. M., 1921, Notes on core sampling in connection with rotary drilling as practiced by Shell Company of California in the Coalinga oil field (Fresno County): California Oil Fields, v. 6, no. 12, p. 16-21.

Baumann, Paul, 1965, Technical development in ground-water recharge, in Advances in hydroscience, v. 2, Chow, V. T., ed.: New York, Academic Press, p. 209-278.

Becker, G. F., 1885, Notes on the stratigraphy of California: U.S. Geological Survey Bulletin 19, 28 p.

Behnke, J. J., and Haskell, E. E., Jr., 1968, Ground water nitrate distributions beneath Fresno, Calif.: American Water Works Association Journal, v. 60, no. 4, p. 477-480.

Berkstresser, C. F., Jr., 1973, Base of fresh ground water, approximately 3,000 micromhos, in the Sacramento Valley and Sacramento-San Joaquin delta, California: Menlo Park, Calif., U.S. Geological Survey Water-Resources Investigations 40-73, map.

Berry, W. L., 1962, Ground water in California's future, in Biennial Conference on Ground-Water Recharge, 3d, Berkeley, Calif., 1961, Proceedings: Fresno, Calif., Soil and Water Conservation Research Division, Southwest Branch, Ground-water Recharge Laboratory, 14 p.

Bertoldi, G. L., 1971a, Determination of channel capacity of reaches of Ash and Berenda Sloughs, and a reach of the Chowchilla River, Madera County, California: U.S. Geological Survey open-file report, 61 p.

____1971b, Chemical quality of ground water in the Dos Palos-Kettleman City area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 45 p.

____1974, Estimated permeabilities for soils in the Sacramento Valley, California: U.S. Geological Survey Water-Resources Investigations 51-73, 17 p.

____1976, Chemical quality of ground water in the Tehama-Colusa Canal service area, Sacramento Valley, California: Menlo Park, Calif., U.S. Geological Survey Water-Resources Investigations 76-92, 44 p.

Bertoldi, G. L., and Blodgett, J. C., 1971, Determination of channel capacity of the Fresno River downstream from Hidden Damsite, Madera County, California: U.S. Geological Survey open-file report, 37 p.

Bertoldi, G. L., and LeBlanc, R. A., 1969, Descriptions and chemical analyses for selected wells in the Dos Palos-Kettleman City area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 24 p.

Bianchi, W. C., 1964, Field measurement of soil water movement during artificial ground-water recharge: American Society of Agricultural Engineers Transactions, v. 7, no. 3, p. 341-343.

Bianchi, W. C., and Lang, G. J., 1974, The City of Fresno's Leaky Acres ground-water recharge project--Construction and performance: American Water Works Association Journal, v. 66, no. 3, p. 176-180.

Biggar, J. W., 1962, Consideration in the use of chloride and tritium in ground-water recharge operations, in Biennial Conference on Ground-Water Recharge, 3d, Berkeley, Calif., 1961, Schiff, Leonard, ed., Proceedings: Fresno, Calif., Soil and Water Conservation Research Division, Southwest Branch, Ground Water Recharge Laboratory, 3 p.

Blodgett, J. C., and Stiehr, P. L., 1974, Hydraulic analysis of flood flows in Butte Basin at State Highway 162, Glenn and Butte Counties, Calif.: U.S. Geological Survey Open-File Report 74-198, 63 p.

Bookman, Max, 1957, California's water resources and plans for their development, in Industrial uses of water in California: California University Water Resources Center Contribution 3, p. 11-23.

Brennan, Robert, 1963, Reconnaissance study of the chemical quality of surface waters in the Sacramento River basin, California: U.S. Geological Survey Water-Supply Paper 1619-Q, 44 p.

Brewer, Elijah, 1959, Ground-water replenishment in the San Joaquin Valley, Central Valley Project, in Schiff, Leonard, ed., Biennial Conference on Ground-Water Recharge, 2d, Berkeley, Calif., 1959, Proceedings: Fort Collins, Colo., Western Soil and Water Management Research Branch, p. 53.

Britton, L. J., and Averett, R. C., 1974, Water-quality data of the Sacramento River, California, May 1972 to April 1973: U.S. Geological Survey open-file report, 59 p.

_____1976, Variation in concentration of selected water-quality constituents in the Sacramento River at Bend Bridge, California: U.S. Geological Survey Water-Resources Investigations 76-14, 19 p.

Brownscombe, R. H., 1950, Report and recommendations on ground water and land drainage, Los Banos Soil Conservation District, Merced County, Calif.: U.S. Department of Agriculture Soil Conservation Service open-file report, 108 p.

Bryan, Kirk, 1916, Ground water for irrigation in the Sacramento Valley, California: U.S. Geological Survey Water-Supply Paper 375-A, p. 1-49.

_____1923, Geology and ground-water resources of the Sacramento Valley, California: U.S. Geological Survey Water-Supply Paper 495, 285 p.

_____1924, Report on proposed sites for a salt-water barrier in the lower reaches of Sacramento and San Joaquin Rivers, California: U.S. Geological Survey open-file report, 12 p.

Bue, C. D., Pritchett, H. C., and Piper, A. M., 1934, Seepage loss and gain of the Mokelumne River, California: U.S. Geological Survey Press Release (PH. 85246).

Bull, W. B., 1960, Geometry of alluvial fans in western Fresno County, California [abs.]: Geological Society of America Bulletin, v. 71, no. 12, pt. 2, p. 1836.

____1961, Causes and mechanics of near-surface subsidence in western Fresno County, California: U.S. Geological Survey Professional Paper 424-B, p. 187-189.

____1962a, Minimum elevation of the piezometric surface of the lower water-bearing zone as of 1960, Los Banos-Kettleman City area, California: U.S. Geological Survey open-file map.

____1962b, Relations of alluvial-fan size and slope to drainage-basin size and lithology in western Fresno County, California: U.S. Geological Survey Professional Paper 450-B, p. 51-53.

____1963, Alluvial-fan deposits in western Fresno County, California: Journal of Geology, v. 71, p. 251.

____1964a, Geomorphology of segmented alluvial fans in western Fresno County, California: U.S. Geological Survey Professional Paper 352-E, p. 89-129.

____1964b, Alluvial fans and near-surface subsidence in western Fresno County, California: U.S. Geological Survey Professional Paper 437-A, 71 p.

____1966, Subsidence due to artesian-head decline in the Los Banos-Kettleman City area, California [abs.]: Geological Society of America Annual Meeting, San Francisco, Calif., 1966, Program, p. 29-30.

____1968, Aquifer-system compaction and expansion due to water-level change in western Fresno County, Calif. [abs.]: Geological Society of America Cordilleran Section Meeting, Tucson, Ariz. Program, p. 43.

____1972, Prehistoric near-surface subsidence cracks in western Fresno County, Calif.: U.S. Geological Survey Professional Paper 437-C, 85 p.

____1973, Geologic factors affecting compaction of deposits in a land-subsidence area: Geologic Society of America Bulletin, v. 84, no. 2, p. 3783-3802.

____1975, Land subsidence due to ground-water withdrawal in the Los Banos-Kettleman City area, California. Part 2, Subsidence and compaction of deposits: U.S. Geological Survey Professional Paper 437-F, 90 p.

Bull, W. B., and Miller, R. E., 1975, Land subsidence due to ground-water withdrawal in the Los Banos-Kettleman City area, California. Part 1, Changes in the hydrologic environment conducive to subsidence: U.S. Geological Survey Professional Paper 437-F, 71 p.

Bull, W. B., and Poland, J. F., 1975, Land subsidence due to ground-water withdrawal in the Los Banos-Kettleman City area, California. Part 3, Interrelations of water-level change, change in aquifer-system thickness, and subsidence: U.S. Geological Survey Professional Paper 437-G, 62 p.

Burnash, R. J. C., and Ferral, R. L., 1975, Forecasts for the Sacramento River System: American Society of Civil Engineers, New York, p. 458-465.

California Assembly Interim Committee Reports, 1961-63, 1962, Ground-water problems in California--a report of the Assembly Interim Committee on Water to the California Legislature: Assembly of the State of California, v. 26, no. 4 [series], 48 p.

California Department of Engineering, 1920, Water resources of Kern River and adjacent streams and their utilization: California Department of Engineering Bulletin 9, 203 p.

California Department of Public Works, Division of Water Resources, 1931, Sacramento River basin: California Department of Public Works, Division of Water Resources, Bulletin 26, 578 p.

_____1950, Report of Sacramento-San Joaquin Water Supervision for 1949: California Department of Public Works, Division of Water Resources.

California Department of Water Resources, 1955a, Placer County investigation: California Department of Water Resources Bulletin 10, 270 p.

_____1955b, San Joaquin County Investigation: California Department of Water Resources Bulletin 11, 194 p.

_____1955c, Quality of ground water in the Stockton area, San Joaquin County: California Department of Water Resources Bulletin 65-7.

_____1955d, Seepage conditions in the Sacramento Valley: California Department of Water Resources Bulletin 125-55.

_____1956, Sacramento-San Joaquin delta ground water geology, Report 1: California Department of Water Resources Bulletin 76-1.

_____1957, The California Water Plan: California Department of Water Resources Bulletin 3, 272 p.

_____1959-1970, Water conditions in California: California Department of Water Resources Bulletins 120-59 to 120-70 (published periodically).

_____1960a, Sea-water intrusion in California: California Department of Water Resources Bulletin 63, 244 p.

_____1960b, Lower San Joaquin Valley water quality investigation: California Department of Water Resources Bulletin 89, 189 p.

_____1961, Clear Lake-Cache Creek basin investigation: California Department of Water Resources Bulletin 90, 267 p.

_____1962, Sacramento River water pollution Survey: California Department of Water Resources Bulletin 111, 112 p.

_____1963a, Ground-water conditions in central and northern California, 1959-60: California Department of Water Resources Bulletin 77-60.

_____1963b, Northeastern counties ground water investigation: California Department of Water Resources Bulletin 98, v. 1, 280 p., v. 2, 32 p.

_____1963c, Saline water conversion activities in California: California Department of Water Resources Bulletin 134-62, 135 p.

_____1963d, The California State Water Project: California Department of Water Resources Bulletin 132.

_____1963e, Calaveras area investigation: California Department of Water Resources Bulletin 97, 298 p.

_____1964a, Ground-water conditions in central and northern California, 1960-61: California Department of Water Resources Bulletin 77-61.

_____1964b, Folsom-East Sacramento ground water quality investigation: California Department of Water Resources Bulletin 133, 156 p.

_____1965a, Fresno-Clovis metropolitan area water quality investigation: California Department of Water Resources Bulletin 143-3, 76 p.

_____1965b, San Joaquin Master Drain: San Joaquin Valley drainage investigation (preliminary edition), January 1965, 50 p.

California Department of Water Resources, 1965c, Hydrologic data, 1965--Northeastern California: California Department of Water Resources Bulletin 130-64, with Appendix C, Ground-water measurements.

_____1965d, Hydrologic data: 1964, San Joaquin Valley, California Department of Water Resources, v. 4, 383 p.

_____1966, Hydrologic data: 1964, Central Coastal area: California Department of Water Resources Bulletin 130-64, v. 3.

_____1966, Madera area investigation (preliminary edition): California Department of Water Resources Bulletin 135, 248 p.

_____1967, San Joaquin County ground-water investigation: California Department of Water Resources Bulletin 146, 177 p.

_____1968, Water well standards: California Department of Water Resources Bulletin 74, 31 p.

_____1970a, The California Water Plan--Outlook in 1970: California Department of Water Resources Bulletin 160-70, 170 p.

_____1970b, Lower San Joaquin River Water Quality Investigation: Appendix F, Public hearing: California Department of Water Resources Bulletin 143-5.

_____1971a, Hydrologic data, 1970: California Department of Water Resources Bulletin 130-70, v. I, North Coastal area, 55 p.; v. II, Northeastern California; v. III, Central Coastal area, 137 p.; v. IV, San Joaquin Valley, 223 p.; v. V, Southern California.

_____1971b, Trace elements in surface waters of the San Joaquin Valley: California Department of Water Resources, San Joaquin District, memorandum report, 38 p.

_____1971c, Nutrients from tile drainage systems, Bio-Engineering aspects of agricultural drainage, San Joaquin Valley, California: California Department of Water Resources, Water Pollution Control Research Series, p. 90.

_____1971d, Mathematical simulation of salinity in the Sacramento River system: California Department of Water Resources Bulletin 156.

_____1974, The California Water Plan: Outlook in 1974: California Department of Water Resources Bulletin 160-74.

_____1974, Statewide alpha listing of water service agencies: An update of Department of Water Resources Bulletin 114, 67 p.

_____1974, Evaluation of ground water resources, Sacramento County: California Department of Water Resources Bulletin 118-3.

_____1975, San Joaquin Valley drainage monitoring program: California Department of Water Resources, San Joaquin District, Summary report.

_____1975, Vegetative water use in California, 1974: California Department of Water Resources Bulletin 113-3.

_____1975, Meeting water demands in Sacramento County: California Department of Water Resources Bulletin 104-11.

_____1975, Annual report on ground water and agricultural monitoring activities along the Peripheral Canal, 1974: California Department of Water Resources, Central District.

_____1975, California's ground water: California Department of Water Resources Bulletin 118, 135 p.

_____1975, Valley-fill areas and other water-bearing materials: California Department of Water Resources map, scale 1:750,000.

California Department of Water Resources, 1977a, The California drought 1977, an update: Second in a continuing series of unnumbered reports related to 1976-77 drought: California Department of Water Resources, 150 p.

_____1977b, The continuing California drought--Third in a series of unnumbered reports related to the 1976-77 drought: California Department of Water Resources, 138 p.

_____1977c, Guide to the preparation of the water-well drillers report: California Department of Water Resources, 20 p.

_____1977d, The Sacramento Valley water use survey: California Department of Water Resources unnumbered publication, 119 p.

_____1977e, Kern County ground water model: California Department of Water Resources, San Joaquin District.

_____1977f, Artificial recharge of ground water in the San Joaquin--Central Coastal areas: California Department of Water Resources, San Joaquin District.

_____1977g, San Joaquin Valley drainage monitoring program, 1976, Summary report: California Department of Water Resources, San Joaquin District.

California Division of Engineering and Irrigation, 1922, Water resources of Tulare County and their utilization: California Division of Engineering and Irrigation Bulletin 3, 155 p.

California Division of Mines, 1891, Preliminary mineralogical and geological map of the State of California, showing also private land grants: California Division of Mines Miscellaneous Map M-1, scale 1 inch to 12 miles.

_____1905, Map of southern part of California showing saline deposits and desert sections: California Division of Mines Miscellaneous Map M-15, scale 1 inch to 12 miles.

_____1954, Geology of southern California: California Division of Mines Bulletin 170, v. 1.

_____1954, Structure sections across part of the San Joaquin Valley, Plate 6 of Geology of southern California: California Division of Mines Bulletin 170, v. 2, chap. 2.

California Division of Water Resources, 1922, Water resources of Tulare County and their utilization: California Division of Water Resources Bulletin 3, 155 p.

_____1925, Supplemental report on water resources of California: California Division of Water Resources Bulletin 9.

_____1927, Ground water resources of the southern San Joaquin Valley, California Division of Water Resources, Bulletin 11, 146 p.

_____1930, Report to the Legislature on State Water Plan: California Division of Water Resources Bulletin 25, 204 p.

_____1934, San Joaquin River Basin, 1931: California Division of Water Resources Bulletin 29, 656 p.

_____1952, Ground water basins in California: California Division of Water Resources, Water Quality Investigative Report 3, 44 p.

California State Water Resources Board, 1951, Water Resources of California: California State Water Resources Board Bulletin 1, 648 p.

_____1952, Sutter-Yuba Counties investigation: California State Water Resources Board Bulletin 6, 174 p.

_____1955, Water utilization and requirements of California: California State Water Resources Board Bulletin 2, 227 p.

California State Water Resources Board, 1955, San Joaquin County investigation: California State Water Resources Board Bulletin 11, 249 p.

_____1958, Cache Creek investigation: Interim report: California State Water Resources Board Bulletin 20, 172 p.

California University Sanitary Engineering Research Laboratory, 1955, An investigation of sewage spreading on five California soils: California University Engineering Research Laboratory Technical Publication 12, 53 p.

California Water Pollution Control Board, 1953, Field investigation of waste water reclamation in relation to ground water pollution: California State Water Pollution Control Board Publication 6, 124 p.

Carlson, A. J., 1931, Geothermal variations in Coalinga area, Fresno County, Calif.: American Association of Petroleum Geologists Bulletin, v. 15, no. 7, p. 821-836.

Carpenter, D. L., and Lang, J. S., Jr., 1964, Post-Corcoran clay deformation along the western San Joaquin Valley, California [abs.]: Geological Society of America Special Paper 76, p. 194.

Carrigan, P. H., Jr., 1973, Calibration of U.S. Geological Survey rainfall-runoff model for peak flow synthesis--natural basins: U.S. Geological Survey computer contribution, NTIS Report PB-226 217/AS, 115 p.

Carter, R. W., Anderson, W. L., Isherwood, W. L., Rolfe, R. W., Showen, C. R., and Smith, Winchell, 1963, Automation of streamflow records: U.S. Geological Survey Circular 474, 18 p.

Cearlock, D. B., 1971, A systems approach to management of the Hanford ground-water basin, in National Ground Water Quality Symposium Proceedings: U.S. Environmental Protection Agency, Water Pollution Control Research, ser. 16060 GBR 08-71, p. 182-192.

Ceylan, Rosit, 1952, Geology and ground water resources of Saltdale quadrangle, California (Kern County): Southern California University MS thesis.

Chandler, A. E., 1901, Water storage on Cache Creek, Calif.: U.S. Geological Survey Water-Supply Paper 45, 48 p.

Chandler, T. S., 1972, Water-resources inventory, Spring 1966 to Spring 1971, Antelope Valley-East Kern Water Agency Area, California: U.S. Geological Survey open-file report, 14 p.

Chase, E. B., and Payne, F. N., 1968, Selected techniques in water resources investigations, 1966-67: U.S. Geological Survey Water-Supply Paper 1892, 164 p.

Church, H. V., Jr., and Krammes, K. F., and others, 1957, Correlation section across central San Joaquin Valley from San Andreas fault to Sierra Nevada foothills, California: American Association of Petroleum Geologists, Pacific Section, scale 1 inch to 10,000 feet.

_____1958, Correlation sections longitudinally north-south through central San Joaquin Valley from Rio Vista through Riverdale (10 north), and Riverdale through Tejon Ranch area (10 south), California: American Association of Petroleum Geologists, Pacific Section, scale about 1 inch to 3 miles.

Clendenen, F. B., 1957, Conjunctive use of surface and ground-water reservoirs, in Schiff, Leonard, ed., Conference on water spreading for ground-water recharge, Proceedings: California University Water Resources Center Contribution 7, p. 61-68.

Coe, Jack, 1957, Water-spreading activities of the California Department of Water Resources, in Schiff, Leonard, ed., Conference on water spreading for ground-water recharge, Proceedings: California University Water Resources Center Contribution 7, p. 8-13.

Cole, R. C., Koehler, L. F., Eggers, F. C., and Goff, A. M., 1943, Soil survey of the Tracy area, California: U.S. Department of Agriculture, ser. 1938, no. 5, 95 p.

Cole, R. C., Gardner, R. A., Harradine, F. F., and Eggers, F. C., 1948, Soil survey of the Newman area, California: U.S. Department of Agriculture, ser. 1938, no. 11, 94 p.

Cole, R. C., Gardner, R. A., Harradine, F. F., and others, 1952, Soil survey of the Los Banos area, California: U.S. Department of Agriculture, ser. 1939, no. 12, 119 p.

Cole, R. C., Gardner, R. A., Koehler, L. F., and others, 1945, Soil survey of the Bakersfield area, California: U.S. Department of Agriculture, ser. 1937, no. 12, 113 p.

Coppock, Ray, Ed., 1970, Research on water quality: California University Water Resources Center, 36 p.

Corapcioglu, N. Y., and Brutsaert, W., 1977, Viscoelastic aquifer model applied to subsidence due to pumping: Water Resources Research, v. 13, no. 3, p. 597-604.

Cosby, S. W., and Carpenter, E. J., 1937, Soil survey of the Lodi area, California: U.S. Department of Agriculture, Bureau of Chemistry and Soils, ser. 1932, no. 14, 52 p.

Crawford, C. B., Page, R. W., and LeBlanc, R. A., 1965, Data for wells in the Fresno area, San Joaquin Valley, Calif.: U.S. Geological Survey open-file report, 263 p.

Croft, M. G., 1965, Availability of selected electric and(or) detailed lithologic logs for the San Joaquin Valley, California: U.S. Geological Survey open-file report, 7 p.

_____1967, Basic data for three lacustrine clay deposits in the southern part of San Joaquin Valley, California: U.S. Geological Survey open-file report, 44 p.

_____1968, Geology and radiocarbon ages of late Pleistocene lacustrine clay deposits, southern part of San Joaquin Valley, California: U.S. Geological Survey Professional Paper 600-B, p. 151-156.

_____1972, Subsurface geology of the late Tertiary and Quaternary water-bearing deposits of the southern part of the San Joaquin Valley, Calif.: U.S. Geological Survey Water-Supply Paper 1999-H, 29 p.

Croft, M. G., and Gordon, G. V., 1968, Geology, hydrology, and quality of water in the Hanford-Visalia area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 63 p.

Croft, M. G., and Wahrhaftig, Clyde, 1965, General geology of the San Joaquin Valley, California, Fresno to Chaney Pumping Station, in northern Great Basin and California: International Association for Quaternary Research, 7th Congress, Guidebook, Field Conference 1, p. 133-137.

Curtin, George, 1971, Hydrogeology of the Sutter Basin, Sacramento Valley, California [abs.]: Association of Engineering Geologists Annual Meeting, Program, p. 23-24.

_____1973, Collapsing soil and subsidence, Example of San Joaquin Valley, California, in Geology, Seismicity, and Environmental impact: Association of Engineering Geologists, Los Angeles, p. 89-100.

Dale, R. H., French, J. J., and Gordon, G. V., 1966, Ground water, geology, and hydrology of the Kern River alluvial-fan area, California: U.S. Geological Survey open-file report, 92 p., Menlo Park, Calif.

Dale, R. H., French, J. J., and Wilson, H. D., Jr., 1964, The story of ground water in the San Joaquin Valley, Calif.: U.S. Geological Survey Circular 459, 11 p.

Dale, R. H., Gordon, G. V., and French, J. J., 1962, Data for wells, springs, and streams in the Kern River fan area, Kern County, Calif.: U.S. Geological Survey open-file report, 165 p., Menlo Park, Calif.

Danehy, E. A., 1972, Use of agricultural soil maps for geotechnical investigations in California [abs.]: International Geological Congress Abstracts, no. 24, p. 388.

Davis, A. L., 1974, An inventory of published and stored chemical analyses of surface water in California, 1906-71: U.S. Geological Survey open-file report, 40 p., Menlo Park, Calif.

Davis, D. M., 1953, Markley Gorge, Sacramento County, California [abs.]: American Association of Petroleum Geologists Bulletin, v. 37, p. 186.

Davis, G. H., 1961, Geologic control of mineral composition of stream waters of the eastern slope of the southern Coast Ranges, Calif.: U.S. Geological Survey Water-Supply Paper 1535-B, p. B1-B30.

_____1963, Formation of ridges through differential subsidence of peatlands of the Sacramento-San Joaquin Delta, California, in Short Papers in Geology and Hydrology: U.S. Geological Survey Professional Paper 475-C, p. C162-C165.

_____1964, Management of water in arid lands: Natural History, p. 26-33.

Davis, G. H., and Green, J. H., 1962, Structural control of interior drainage, southern San Joaquin Valley, Calif., in Geological Survey Research 1962: U.S. Geological Survey Professional Paper 450-D, p. D89-D91.

Davis, G. H., Green, J. H., Olmsted, F. H., and Brown, D. W., 1959, Ground-water conditions and storage capacity in the San Joaquin Valley, Calif.: U.S. Geological Survey Water-Supply Paper 1469, 287 p.

Davis, G. H., Lofgren, B. E., and Mack, Seymour, 1965, Use of ground water reservoirs for storage of surface water in the San Joaquin Valley, California: U.S. Geological Survey Water-Supply Paper 1618, 125 p.

Davis, G. H., and Olmsted, F. H., 1952, Geologic features and ground-water storage capacity of the Sutter-Yuba area, California: California Water Resources Board Bulletin 6, Appendix B, p. 89-104.

Davis, G. H., and Poland, J. F., 1957, Ground-water conditions in the Mendota-Huron area, Fresno and Kings Counties, Calif.: U.S. Geological Survey Water-Supply Paper 1360-G, p. 409-588.

Davis, S. N., and Hall, F. R., 1959, Water quality of eastern Stanislaus and northern Merced Counties, California: Stanford University Publications in Geological Sciences, v. 6, no. 1, 112 p.

Dean, W. W., 1971a, Floods of December 1966 in the Kern-Kaweah area, Kern and Tulare Counties, California, with a section on Geomorphic effects in the Kern River basin, by K. M. Scott: U.S. Geological Survey Water-Supply Paper 1870-C, 79 p.

_____1971b, Water-quality and quantity data, East Fork Kaweah River Basin, California, 1969: U.S. Geological Survey open-file report, 29 p.

Dibblee, T. W., Jr., Bruer, W. G., Hackel, O., and Warne, W. H., 1965, Geologic map of the southeastern San Joaquin Valley, Kern River to Grapevine Canyon, in Geology of Southeastern San Joaquin Valley, Calif.: American Association of Petroleum Geologists-Society of Economic Geologists-Society of Economic Paleontologists and Mineralogists, Pacific Section Guidebook, p. 7.

Dickinson, W. R., 1970, Tectonic setting and sedimentary petrology of the Great Valley sequence [abs.]: Geological Society of America Abstracts with Programs, v. 2, no. 2, p. 86-87.

Diller, J. S., 1886, Notes on the geology of northern California: U.S. Geological Survey Bulletin 33, 23 p.

Diltz, R. C., 1953, Ground-water test drilling program of the U.S. Bureau of Reclamation, San Joaquin Valley, Calif. [abs.]: Geological Society of America Bulletin, v. 64, p. 1504.

Dodd, J. R., and Stanton, R. J., Jr., 1971, Oxygen isotopic determination of paleosalinities within a Pliocene Bay, Kettleman Hills, Calif. [abs.]: Geological Society of America, Abstracts with Programs, v. 3, no. 7, p. 547.

Doneen, L. D., 1954, Salination of soil by salts in the irrigation water: American Geophysical Union Transactions, v. 35, p. 943-950.

___1956, Water quality problem in the Central Valley, in Conference on California ground-water situation, 1956, Proceedings: California University Water Resources Center Contribution 2, p. 138-145.

Dryden, F. D., 1972, Reclaimed waste water and ground-water management, in Biennial Conference on Ground Water, 8th, 1972, Proceedings: California University Water Resources Center Report 24, p. 38-47.

Dutcher, L. C., 1972, Proposed criteria for design of a data-collection system for ground-water hydrology in California, 1970-2000: American Geophysical Union, Water Resources Research, v. 8, no. 1, p. 188-193.

Dutcher, L. C., and Lord, R. S., 1972, Saline and offshore ground water, in Biennial Conference on Ground Water, 8th, California University Water Resources Center Report 24, p. 50-60.

Eaton, F. M., 1935, Boron in soils and irrigation waters and its effect on plants, with particular reference to the San Joaquin Valley of California: U.S. Department of Agriculture Technical Bulletin 448, 131 p.

English, W. A., 1921, Geology and petroleum resources of northwestern Kern County, California: U.S. Geological Survey Bulletin 721, 48 p.

Federal Water Quality Administration, 1969, Water quality study, lower American River, California: Federal Water Quality Administration, Pacific Southwest Regional Office, San Francisco, Calif., October 1969, 77 p.

Fenneman, N. M., 1931, Valley of California, in Physiography of western United States: New York, N.Y., McGraw-Hill Book Co., p. 472-481.

Ferreira, R. F., and Green, D. B., 1977, Distribution and abundance of benthic organisms in the Sacramento River, California: Menlo Park, Calif., U.S. Geological Survey Water-Resources Investigations 77-60, 24 p.

Feth, J. H., 1961, A new map of western conterminous United States showing the maximum known or inferred extent of Pleistocene lakes: U.S. Geological Survey Professional Paper 424-B, p. 110-112.

_____1964a, Review and annotated bibliography of ancient lake deposits (Precambrian to Pleistocene) in the western states: U.S. Geological Survey Bulletin 1080, 119 p.

_____1964b, Hidden recharge: Ground Water, v. 2, no. 4, p. 14-17.

Fogelman, R. P., 1975, Descriptions and chemical analyses for selected wells in the Tehama-Colusa Canal service area, Sacramento Valley, California: U.S. Geological Survey open-file report, 52 p.

_____1976, Descriptions and chemical analyses for selected wells in the central Sacramento Valley, California: U.S. Geological Survey Open-File Report 76-472, 71 p.

Fogelman, R. P., and Rockwell, G. L., 1977, Descriptions and chemical analyses for selected wells in the eastern Sacramento Valley, California: U.S. Geological Survey Open-File Report 77-486, 82 p.

Forbes, Hyde, 1931, Geology and underground water storage capacity of San Joaquin Valley, Appendix B, in San Joaquin River basin: California Division of Water Resources Bulletin 29, p. 531-550.

_____1941, Geology of the San Joaquin Valley as related to the source and the occurrence of the ground-water supply: American Geophysical Union Transactions, pt. 1, p. 8-20.

Ford, R. S., 1972, Ground-water geology of northern Sacramento County: University of the Pacific, 41 p., Stockton, Calif.

Forrest, L. C., 1943, Sequence of Oligocene formations in California: California Division of Mines Bulletin 118, p. 199-200, pl. III.

Fortier, Samuel, 1909, Irrigation in the Sacramento Valley, Calif.: U.S. Department of Agriculture Office Experiment Station Bulletin 207.

Fortier, Samuel, and Cone, V. M., 1909, Drainage of irrigated lands in the San Joaquin Valley, California: U.S. Department of Agriculture Office Experiment Station Bulletin 217, 58 p.

Foss, C. D., 1972, A preliminary sketch of the San Joaquin Valley stratigraphic framework, in Guidebook, geology and oil fields, west side central San Joaquin Valley: American Association of Petroleum Geologists-Society of Economic Paleontologists and Mineralogists, Pacific Section, Guidebook, 47th Annual Meeting, Bakersfield, Calif., 1972, p. 40-50.

Frink, J. W., and Kues, H. A., 1952, Unique buried Pleistocene lake deposits in the San Joaquin Valley, California [abs.]: Geological Society of America Bulletin, v. 63, no. 12, pt. 2, p. 1328-1329.

_____1954, Corcoran clay--A Pleistocene lacustrine deposit in San Joaquin Valley, California: American Association of Petroleum Geologists Bulletin, v. 38, p. 2357-2371.

Fuhriman, D. K., and Barton, J. R., 1971, Ground-water pollution in Arizona, California, Nevada, and Utah: Environmental Protection Agency, Water Pollution Control Research Series, December.

Fuqua, W. D., 1963, Shallow and deep subsidence areas in west-central San Joaquin Valley: Geological Society of Sacramento Guidebook, annual field trip, 1963, p. 59-64.

Fuqua, W. D., Lucas, C. V., and Peak, W. W., 1960, Land subsidence in the San Joaquin Valley, California, resulting from water application [abs.]: Geological Society of America Bulletin, v. 71, no. 12, pt. 2, p. 1869.

Fuqua, W. D., and Richter, Raymond, 1960, Photographic interpretation as an aid in delimiting areas of shallow land subsidence in the San Joaquin Valley, Calif.: American Society of Photogrammetry Manual of Photographic Interpretation, Washington, D.C., Appendix A of Chapter 6, p. 442-456.

Gabb, W. M., 1869, Cretaceous and Tertiary fossils. Paleontology II: California Geological Survey, 299 p.

Gibbs, H. J., 1959, A laboratory testing study of land subsidence: U.S. Department of the Interior, Bureau of Reclamation, Earth Laboratory Report EM-564, 10 p.

Gibbs, H. J., and Larcom, F. B., 1956, Report on a laboratory consolidation study for deep-seated land subsidence, San Joaquin Valley, California: U.S. Department of the Interior, Bureau of Reclamation, Earth Laboratory Report EM-468, 11 p.

Gordon, G. V., and Croft, M. G., 1964, Data for wells and streams in the Hanford-Visalia area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 432 p., Sacramento, Calif.

Goudkoff, P. P., 1945, Stratigraphic relations of upper Cretaceous in the Great Valley, California: American Association of Petroleum Geologists Bulletin, v. 29, no. 7, p. 956-1007.

Green, J. H., 1964, The effect of artesian-pressure decline on confined aquifer systems and its relation to land subsidence: U.S. Geological Survey Water-Supply Paper 1779-T, 11 p.

Green, J. H., and Cochran, W. A., 1958, Geology of the deposits of late Tertiary and Quaternary Age along the west border of the San Joaquin Valley, California, from Los Banos to Kettleman City: U.S. Geological Survey open-file map.

Grunsky, C. E., 1898a, Irrigation near Bakersfield, California: U.S. Geological Survey Water-Supply Paper 17, 96 p.

_____1898b, Irrigation near Fresno, California: U.S. Geological Survey Water-Supply Paper 18, 94 p.

_____1899, Irrigation near Merced, California: U.S. Geological Survey Water-Supply Paper 19, 59 p.

Grunwald, Crawford, and Associates, Inc., and Engineering-Science, Inc., 1970, Central Fresno County Water and Liquid Waste Program, Volume I, Findings, Conclusions, Recommendations: Report prepared for the Board of Supervisors, Fresno County, California.

Gupta, S. K., 1976, Three-dimensional Gelerkin-finite element formulation of flow and mass transport through porous media [abs., University of California, Davis, Ph.D. dissertation]: Dissertation Abstracts International, v. 37, no. 1, p. 136B.

Hackel, Otto, 1966, Summary of the geology of the Great Valley (California) in Geology of northern California: California Division of Mines and Geology Bulletin 190, p. 217-238.

Hall, F. R., 1960, Geology and ground water of a portion of eastern Stanislaus County, California: Stanford University Ph.D. thesis, Department of Geology.

Hanson, H. C., 1963, Comments on ground water geology, Los Banos (Merced County) to western Fresno County: Geological Society of Sacramento Guidebook, annual field trip, 1963, p. 65.

Harding, S. T., 1927, Ground-water resources of the southern San Joaquin Valley: California Division of Engineering and Irrigation and Water Rights Bulletin 11, 146 p.

_____1949, Inflow to Tulare Lake from its tributary streams: Tulare Lake Basin Water Storage District open-file report, 129 p.

Harding, S. T., and Robertson, R. D., 1912, Irrigation resources of central California: California Conservation Committee Report, p. 172-240.

Harradine, F. F., 1960, Soils of western Fresno County, California: California University Agricultural Experiment Station, 86 p.

Harradine, F. F., Smith, Alfred, Smith, L. H., and others, 1952, Soil Survey of the Coalinga area, California: U.S. Department of Agriculture, ser. 1944, no. 1, 91 p.

Haskell, E. E., Jr., Bianchi, W. C., and Pomeroy, C. R., 1963, Low intake rates and rising perched water tables hinder ground water recharge in southwestern Fresno County: California Agriculture, v. 17, no 9, p. 2-3.

Haskell, E. E., Jr., Leventhal, J. S., and Bianchi, W. C., 1966, The use of tritium to measure the movement of groundwater toward irrigation wells in western Fresno County, California: Journal of Geophysical Research, v. 71, no. 16, p. 3849-3859.

Heikkila, H. H., and MacLeod, G. M., 1951, Geology of Bitterwater Creek area, Kern County, Calif.: California Division of Mines Special Report 6, 20 p.

Helley, E. J., 1969, Floods in northern Californa--Past and present [abs.]: American Society of Civil Engineers, Hydraulics Division, Annual Conference, 17th, Logan, Utah.

Helley, E. J., and LaMarche, V. C., Jr., 1968, December 1964, a 400-year flood in northern California, in Geological Survey Research, 1968: U.S. Geological Survey Professional Paper 600-D, p. D34-D37.

_____1973, Historic flood information for northern California streams from geological and botanical evidence: U.S. Geological Survey Professional Paper 485-E, p. E1-E16.

Helm, D. C., 1972, Simulation of aquitard compaction due to changes in stress [abs.]: American Geophysical Union Transactions, v. 53, no. 11, p. 979.

_____1974, One-dimensional simulation of aquifer-system compaction near Pixley, California. 1, Constant parameters: Water Resources Research, v. 11, no. 3, p. 465-478.

_____1976, One-dimensional simulation of aquifer-system compaction near Pixley, California. 2, Stress-dependent parameters: Water Resources Research, v. 12, no. 3, p. 375-391.

Helm, D. C., 1977, Estimating parameters of compacting fine-grained interbeds within a confined aquifer system by a one-dimensional simulation of field observations: International Symposium on Land Subsidence, 2d, Anaheim, Calif., Dec. 1976, p. 145-156.

Helweg, O. J., and Labadie, J. W., 1977, Linked models for managing river basin salt balance. Water Resources Research, v. 13, no. 2, p. 329-336.

Hilton, G. S., Klausing, R. L., and McClelland, E. J., 1960, Data for wells, springs, and streams in the Terra Bella-Lost Hills area, Kings, Kern, and Tulare Counties, California: U.S. Geological Survey open-file report, 535 p.

Hilton, G. S., McClelland, E. J., Klausing, R. L., and Kunkel, Fred, 1963, Geology, hydrology, and quality of water in the Terra Bella-Lost Hills area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 158 p.

Hinds, N. E. A., 1952, Evolution of the California landscape: California Division of Mines Bulletin 158, 240 p.

Hoffman, R. D., 1964, Geology of the northern San Joaquin Valley: San Joaquin Geological Society, Selected papers, v. 2, p. 30-45.

Holdahl, Sanford, R., 1973, Geodetic evaluation of land subsidence in the central San Joaquin Valley of California, in Reports on Geodetic Measurements of Crustal Movements: National Oceanic and Atmospheric Administration, National Geodetic Survey, Rockville, Md.

Holmes, L. C., Eckmann, E. C., Nelson, J. W., and Guernsey, J. E., 1920, Reconnaissance soil survey of the middle San Joaquin Valley, California: U.S. Department of Agriculture Bureau of Soils Field Operations 1916, p. 2421-2529.

Holmes, L. C., Warner, J. F., and Sweet, A. I., 1911, Soil survey of the Modesto-Turlock area, California, with a brief report on a reconnaissance soil survey of the region east of the area: U.S. Department of Agriculture Bureau of Soils Report 10, p. 1129-1294.

Hoots, H. W., 1927, Heavy-mineral data at the southern end of San Joaquin Valley, California: American Association of Petroleum Geologists Bulletin 7, no. 4, p. 369-372.

Hoots, H. W., Bear, T. L., and Kleinpell, W. D., 1954, Geologic summary of the San Joaquin Valley, California, pt. 8, in chapter 2 of Jahns, R. H., ed., Geology of southern California: California Division of Mines Bulletin 170, p. 113-129.

Hotchkiss, W. R., 1972, Generalized subsurface geology of water-bearing deposits, northern San Joaquin Valley, California: U.S. Geological Survey open-file report, 18 p.

Hotchkiss, W. R., and Balding, G. O., 1971, Geology, hydrology, and water quality of the Tracy-Dos Palos area, San Joaquin Valley, Calif.: U.S. Geological Survey open-file report, 107 p.

Hotchkiss, W. R., and Dutcher, L. D., 1972, Proposed water-resources study for the Madera area, California: U.S. Geological Survey open-file report, 38 p.

Howe, E. D., 1972, Desalination and ground water management, in Biennial Conference on Ground-Water, 8th, Proceedings, California University Water Resources Center Report 24, p. 85-92.

Hughes, J. B., Jr., 1963, Geophysical exploration in the central Great Valley of California: Geological Society of Sacramento Guidebook, annual field trip, 1963, p. 98-107.

Ingersoll, R. V., 1976, Late Cretaceous turbidite and submarine-fan facies of Great Valley sequence, northern and central California: American Association of Petroleum Geologists Bulletin, v. 60, no. 13, p. 2182.

Ingerson, I. M., 1941, The hydrology of the southern San Joaquin Valley, California, and its relation to imported water supplies: American Geophysical Union Transactions, pt. 1, p. 20-43.

Inter-Agency Committee on Land Subsidence in the San Joaquin Valley, 1955, Proposed program for investigating land subsidence in the San Joaquin Valley: Inter-Agency Committee on Land Subsidence in the San Joaquin Valley, Sacramento, Calif., 60 p.

_____1958, Progress report on land-subsidence investigations in the San Joaquin Valley, California, through 1957: Inter-Agency Committee on Land Subsidence in the San Joaquin Valley, Sacramento, Calif., 160 p.

Ireland, R. L., 1963, Description of wells in the Los Banos-Kettleman City area, Merced, Fresno, and Kings Counties, Calif.: U.S. Geological Survey open-file report, 519 p.

Jackson, W. T., and Paterson, A. M., 1977, The Sacramento-San Joaquin Delta and the evolution and implementation of water policy: An historical perspective: California University Water Resources Center, Contribution 163, 192 p.

Janda, R. J., 1965, Alluvial history of the San Joaquin River at Friant, California, in Geology of the Sierran foothills in eastern Fresno and Madera Counties, Calif.: Geological Society of America, Cordilleran Section, Guidebook, p. 1-4.

_____1965, Quaternary alluvium near Friant, California, in Northern Great Basin and California: International Association for Quaternary Research, VIIth Congress, Guidebook for Field Conference 1, p. 128-133.

Jenkins, O. P., 1938, Geologic map of California: California Division of Mines, scale 1:500,000.

_____1943, Geomorphic provinces of California, in Geologic formations and economic development of the oil and gas fields of California: California Division of Mines Bulletin 118, p. 83-88.

Johnson, A. I., and Kunkel, Fred, 1963, Some research related to ground-water recharge--A progress report from the U.S. Geological Survey: U.S. Geological Survey open-file report, 17 p.

Johnson, A. I., Moston, R. P., and Morris, D. A., 1968, Physical and hydrologic properties of water-bearing deposits in subsiding areas in central California: U.S. Geological Survey Professional Paper 497-A, 71 p.

Johnson, H. R., 1909, Geology of the McKittrick-Sunset district [Kern County], California [abs.]: Science, v. 30, p. 63-64.

_____1943, Marysville Buttes (Sutter Buttes) gas field: California Division of Mines Bulletin 118, p. 610-615.

Jones, B. L., Hawley, N. L., and Crippen, J. R., 1972, Sediment transport in western tributaries of the Sacramento River, California: U.S. Geological Survey Water-Supply Paper 1798-J, p. J1-J27.

Jorgensen, L. N., Rose, M. A., Busch, R. D., and Bader, J. S., 1971, California streamflow characteristics (from records through 1968) in Volume 2, Northern Great Basin and Central Valley: U.S. Geological Survey open-file report, 763 p.

Kahanowitz, Yona, and Manning, I. C., 1954, Ground water hydrology of Pleasant Valley, Fresno County, Calif.: Stanford University, Publications in Geological Science, v. 4, 39 p.

Kazmann, R. G., 1968, From water mining to water management: Ground Water, v. 6, no. 11, p. 26-28.

Kharaks, Y. K., and Berry, F. A. F., 1974, The influence of geological membranes on the geochemistry of subsurface waters from Miocene sediments at Kettleman North Dome in California: Water Resources Research, v. 10, p. 313-327.

Kirby, J. M., 1943, Upper Cretaceous stratigraphy of the west side of the Sacramento Valley south of Willows, Glenn County, California: American Association of Petroleum Geologists Bulletin, v. 27, no. 3, p. 279-305.

Klausing, R. L., and Lohman, K. E., 1964, Upper Pliocene marine strata on the east side of the San Joaquin Valley, California: U.S. Geological Survey Professional Paper 475-D, p. 14-17.

Knott, J. M., and Dunnam, C. A., 1969, Sedimentation in upper Stony Creek basin, eastern flank of the Coast Ranges of northern California: U.S. Geological Survey Water-Supply Paper 1798-F, p. F1-F35.

Koehler, J. H., 1975, Map of the Antelope Valley-East Kern Water Agency area, California, showing ground-water subunits and areas, location of wells, and water-level contours for Spring 1975: U.S. Geological Survey open-file map.

Koenig, J. B., 1962, Index to geologic maps of California, 1957-1960: California Division of Mines and Geology Special Report 52A, 60 p.

Krammes, F. K., 1958, Stratigraphic sections and stratigraphy of San Joaquin valley, California [abs.]: American Association of Petroleum Geologists Bulletin, v. 42, no. 1, p. 217.

Kunkel, Fred, 1970, Summary of ground-water occurrence in California: U.S. Geological Survey open-file report, 7 p.

Kunkel, Fred, and Hofmann, Walter, 1966, Ground water in the San Joaquin Valley, California: U.S. Geological Survey open-file report, 14 p.

Lachenbruch, M. D., 1962, Geology of the west side of the Sacramento Valley, California: California Division of Mines and Geology Bulletin 181, p. 53-66.

Laiming, B. G., 1943, Eocene foraminiferal correlations in California: California Division of Mines Bulletin 118, p. 193-198.

_____1947, Stratigraphy of the central part of the Great Valley [California] [abs.]: Oil and Gas Journal, v. 45, no. 47, p. 127-128.

LeBlanc, R. A., 1970, Data for wells in the Dos Palos-Kettleman City area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 72 p., 56 maps.

Lee, C. H., 1913, Use and conservation of the underground reservoirs of California: Western Engineering, v. 3, p. 189-194.

Lee, K. W., 1968, Determination of channel capacity of Stony Creek downstream from Black Butte Dam, Glenn and Tehama Counties, California: U.S. Geological Survey open-file report, 15 p.

_____1969, Profiles of a reach of the San Joaquin River below Friant Dam, Fresno and Madera Counties, California: U.S. Geological Survey open-file report, 5 p.

Lerbeckmo, J. F., 1957, Authigenic montmorillonoid cement in andesitic sandstones of central California: Journal of Sedimentary Petrology, v. 27, no. 3, p. 298-305.

Lewis, R. E., and Bloyd, R. M., Jr., 1968, Water-resources inventory for 1967, Antelope Valley-East Kern Water Agency area, Calif.: U.S. Geological Survey open-file report, 16 p.

Limerinos, J. T., 1973, Estimating water loss and direct runoff from storm rainfall by the use of the infiltrometer: U.S. Geological Survey open-file report, 22 p.

Lindgren, Waldemar, 1894, Description of the Sacramento quadrangle, California: U.S. Geological Survey Geologic Atlas, Folio 5.

Lippincott, J. B., 1903, California hydrography: U.S. Geological Survey Water-Supply Paper 81, 488 p.

Lippmann, M. J., 1975, Two-dimensional stochastic model of a heterogeneous geologic system [abs.]: Dissertation Abstracts, 1975, v. 35, no. 9, p. 4503B (Ph.D. 194, University of California, Berkeley).

Livingston, P. P., 1944, Ground-water features of the San Joaquin Valley, California--A review of published and unpublished reports and papers: U.S. Geological Survey open-file report, 48 p.

Lofgren, B. E., 1960, Near-surface land subsidence in western San Joaquin Valley, California: Journal of Geophysical Research, v. 65, no. 3, p. 1053-1062.

_____1961, Measurement of compaction of aquifer systems in areas of land subsidence, _in_ Geological Survey Research 1961: U.S. Geological Survey Professional Paper 424-B, p. B49-B52.

_____1966, Parameters relating subsidence to water-level decline, California [abs.]: Geological Society of America, Annual Meeting, San Francisco, Calif., 1966, Program, p. 125-126.

_____1966, Subsidence related to ground-water withdrawal, _in_ Landslides and subsidence: Geologic Hazards Conference, 2d, Los Angeles, Calif., 1965, Proceedings, p. 105-110: California Resources Agency.

_____1968, Parameters for estimating future subsidence [abs.]: Geological Society of America Annual Meeting, Mexico City, Mexico, 1968, Program, p. 178-179.

_____1968, Four types of land subsidence in southern San Joaquin Valley, Calif., [abs.]: American Association of Petroleum Geologists, Annual Meeting, 43d, Bakersfield, Calif., 1968, Program, p. 32-33.

_____1968, Analysis of stresses causing land subsidence, _in_ Geological Survey Research 1968: U.S. Geological Survey Professional Paper 600-B, p. B219-B225.

_____1969, Field measurement of aquifer-system compaction, San Joaquin Valley, California, USA, _in_ Tison, L. J., ed., Land subsidence, v. 1: International Association of Hydrological Science, Publication 88, p. 272-284.

_____1971, Significant role of seepage stresses in compressible aquifer systems [abs.]: American Geophysical Union Transactions (EOS), v. 52, no. 11, p. 832.

_____1973, Hazards of waste disposal in ground-water basins: International Symposium on Underground Waste Management and Artificial Recharge, 2d, 1973, New Orleans, La., Preprints. Sponsors: American Association of Petroleum Geologists, U.S. Geological Survey, and the International Association of Hydrological Sciences.

Lofgren, B. E., 1975, Land subsidence due to ground-water withdrawal, Arvin-Maricopa area, California: U.S. Geological Survey Professional Paper 437-D, 55 p.

____1977, Changes in aquifer-system properties with ground-water depletion: Biennial Ground-water Conference, 11th, Fresno, Calif., 34 p.

Lofgren, B. E., and Ireland, R. L., 1973, Preliminary investigation of land subsidence in the Sacramento Valley, California: U.S. Geological Survey open-file report, 32 p.

Lofgren, B. E., and Klausing, R. L., 1969, Land subsidence due to ground-water withdrawal, Tulare-Wasco area, California: U.S. Geological Survey Professional Paper 437-B, 103 p.

Logan, J. A., 1953, Ground water geochemistry in southeastern San Joaquin Valley, California [abs.]: American Association of Petroleum Geologists Bulletin, v. 37, no. 12, p. 2778.

Logan, John, 1953, Salty ground water near Lindsay, California [abs.]: Geological Society of America Bulletin, v. 64, p. 1510.

Lowell, R. L., 1916, San Joaquin County: California Mining Bureau, State Mineralogists Report, 14th, p. 371-425.

Lustig, L. K., and Busch, R. D., 1967, Sediment transport in Cache Creek drainage basin in the Coast Ranges west of Sacramento, California: U.S. Geological Survey Professional Paper 562-A, p. A1-A36.

Lyons, J. B., 1940, Metamorphism of sediments of the deep well near Wasco (Kern County) California, and of the deeply buried Eocene sediments near Ventura, California: Journal of Geology, v. 48, p. 436-443.

Mack, Seymour, 1969, Climatic and tectonic factors affecting water quality in the San Joaquin Valley near Fresno, California: Geological Society of America Bulletin, v. 80, no. 12, p. 2527-2537.

Maddaus, W. O., and Aaronson, M. A., 1972, A regional ground water resource management model: Water Resources Research, v. 8, no. 1, p. 231-237.

Maher, J. C., Carter, R. D., and Lantz, R. J., 1972, Late Tertiary structural development at Elk Hills oil field, Kern County, California, _in_ Geological Survey Research 1972: U.S. Geological Survey Professional Paper 800-C, p. C71-C78.

Maher, J. C., and Trollman, W. M., 1968, Geologic literature on the San Joaquin Valley of California: U.S. Geological Survey open-file report, 398 p.

Maher, J. C., Trollman, W. M., and Denman, J. M., 1973, Geological literature on the San Joaquin Valley of California: Northern California Geological Society and Pacific Section of the American Association of Petroleum Geologists, 501 p.

Manning, John C., 1967, Report on ground water hydrology in the southern San Joaquin Valley: American Water Works Association Journal, v. 59, no. 12, p. 1513-1526.

____1968, Field trip to areas of active tectonism and shallow subsidence in the southern San Joaquin Valley, _in_ Guidebook, Geology and Oil Fields, West Side Southern San Joaquin Valley: Annual Meeting, Pacific Sections AAPG-SEPM-SEG, 43rd, Bakersfield, Calif., 1968, Guidebook, p. 132.

Marchand, D. E., 1976, Preliminary geologic maps showing Quaternary deposits of the northern Merced area (Crows Landing, Hatch, Turlock, Cressey, Winton, Yosemite Lake, Haystack Mountain, and Indian Gulch) eastern San Joaquin Valley, Merced and Stanislaus Counties, California: U.S. Geological Survey Open-File Report 76-836, scale 1:24,000.

_____1976, Preliminary geologic maps showing Quaternary deposits of the Doulton area (Raymond, Doulton, Little Table Mountain, and Millerton Lake West) eastern San Joaquin Valley, Madera County, California: U.S. Geological Survey Open-File Report 76-840, scale 1:24,000.

_____1976, Preliminary geologic maps showing Quaternary deposits of the Chowchilla area (Santa Rita Bridge, Bliss Ranch, Chowchilla, Brenda, and Kismet) eastern San Joaquin Valley, Madera and Merced Counties, California: U.S. Geological Survey Open-File Report 76-839, scale 1:24,000.

_____1976, Preliminary geologic maps showing Quaternary deposits of the Merced area (Gustine, Stevinson, Arena, Atwater, Merced, Planada, and Owens Reservoir), eastern San Joaquin Valley, Merced County, California: U.S. Geological Survey Open-File Report 76-837, scale 1:24,000.

_____1976, Preliminary geologic maps showing Quaternary deposits of the Madera area (Poso Farm, Firebaugh N.E., Bonita Ranch, Madera, Gregg, Lanes Bridge, Friant, and Academy), eastern San Joaquin Valley, Madera and Fresno Counties, California: U.S. Geological Survey Open-File Report 76-841, scale 1:24,000.

_____1976, Preliminary geologic maps showing Quaternary deposits of the southern Merced area (San Luis Ranch, Sandy Mush, El Nido, Plainsburg, LeGrand, and Raynor Creek), eastern San Joaquin Valley, Merced and Madera Counties, California: U.S. Geological Survey Open-File Report 76-838, scale 1:24,000.

Matum, J. R., 1968, Selected bibliography, west side southern San Joaquin Valley, California, in Geology and Oil Fields, west side southern San Joaquin Valley: Annual Meeting, Pacific Sections AAPG-SEPM-SEG, 43d, Bakersfield, Calif., 1968, Guidebook, p. 17-20.

Maughan, W. D., 1975, Implications of basin water quality plans, in Total water management for California's long-range needs: California University Water Resources Center Report 33, p. 97-196.

May, J. C., and Hewitt, R. L., 1948, The basement complex in well samples from the Sacramento and San Joaquin Valleys, California: California Journal of Mines and Geology, v. 44, no. 2, p. 129-158.

McClelland, E. J., 1963, Aquifer-test compilation for the central coastal region, California: U.S. Geological Survey open-file report, 53 p.

_____1963, Methods of estimating ground-water pumpage in California: U.S. Geological Survey open-file report, 19 p.

_____1963, Aquifer-test compilation for the San Joaquin Valley, California: U.S. Geological Survey open-file report, 40 p. (revised 1966).

_____1965, Aquifer-test compilation for northern California: U.S. Geological Survey open-file report, 43 p.

_____1973, Sacramento Valley ground-water survey: Association of California Water Agencies Ground-Water Committee, Beverly Hills, Calif., 1972, Minutes, p. 6-9.

McClelland, E. J., and Hilton, G. S., 1963, Quality of water in the Terra Bella-Lost Hills area (Kern County), San Joaquin Valley, California: U.S. Geological Survey open-file report, 48 p.

McGauhey, P. H., coordinator. 1967, Practical considerations in implementing public policy, panel discussion: Conference on Ground Water Recharge, 6th, Berkeley 1967, Proceedings, p. 34-83.

McGlashan, H. D., 1929, Surface water supply of the Sacramento River basin, California, 1895-1927: U.S. Geological Survey Water-Supply Paper 597-E, p. 189-250.

_____1930, Surface water supply of the San Joaquin River basin, California, 1895-1927: U.S. Geological Survey Water-Supply Paper 636-D, p. 101- 168.

Meade, R. H., 1967, Petrology of sediments underlying areas of land subsidence in central California: U.S. Geological Survey Professional Paper 497-C, 83 p.

_____1968, Compaction of sediments underlying areas of land subsidence in central California: U.S. Geological Survey Professional Paper 497-D, 39 p.

Meinzer, O. E., 1924, Investigations of ground water in the western part of the United States: Pan-Pacific Scientific Congress, Melbourne, Australia, 1923, v. 2, p. 1284-1290.

Melcon, Z. K., 1932, A preliminary study of the geology and ground water of the Kings River area, California (Kings County): Stanford University unpublished Master's thesis, Geology Department.

Mendenhall, W. C., 1905, Studies of California ground waters: Forestry and Irrigation, v. 11, p. 382-384.

_____1908, Preliminary report on the ground waters of San Joaquin Valley, California: U.S. Geological Survey Water-Supply Paper 222, 52 p.

Mendenhall, W. C., Dole, R. B., and Stabler, Herman, 1916, Ground water in the San Joaquin Valley, Calif.: U.S. Geological Survey Water-Supply Paper 398, 310 p.

Miller, R. E., 1961, Compaction of an aquifer system computed from consolidation tests and decline in artesian head: U.S. Geological Survey Professional Paper 424-B, p. 54-58.

_____1963, Maps and geologic and hydrologic sections for Los Banos-Kettleman City area: U.S. Geological Survey open-file report, 6 maps, 5 geologic sections, and 3 hydrologic sections.

_____1963, Subsurface geology of the water-bearing deposits in the Los Banos-Kettleman City area, western Merced, Fresno, and Kings Counties, California: U.S. Geological Survey open-file report, 92 p.

Miller, R. E., Green, J. H., and Davis, G. H., 1971, Geology of the compacting deposits in the Los Banos-Kettleman City subsidence area, California: U.S. Geological Survey Professional Paper 497-E, 46 p.

Miller, R. J., and Smith, R. B., 1976, Nitrogen balance in the southern San Joaquin Valley: Journal of Environmental Quality, v. 5, no. 3, p. 274-278.

Mitten, H. T., 1971, Ground water pumpage in parts of Yolo, Sacramento, Solano, Sutter, Colusa, and Napa Counties, California, 1966-68: U.S. Geological Survey open-file report, 4 p.

_____1972, Ground-water pumpage, San Joaquin Valley, California, 1967-68: U.S. Geological Survey open-file report, 6 p.

Mitten, H. T., 1972, Estimated ground-water pumpage in the northern part of the Sacramento Valley, California, 1966-69: U.S. Geological Survey open-file report, 6 p.

_____ 1973, Estimated ground-water pumpage in the northern part of the Sacramento Valley, California, 1970-71: U.S. Geological Survey open-file report, 4 p.

_____ 1974, Estimated ground-water pumpage in the southern part of the Sacramento Valley, California, 1969-71: U.S. Geological Survey open-file report, 4 p.

Mitten, H. T., LeBlanc, R. A., and Bertoldi, G. L., 1970, Geology, hydrology, and quality of water in the Madera area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 49 p.

Mitten, H. T., and Ogilbee, William, 1971, Ground-water pumpage in parts of Merced, Madera, Fresno, Kings, and Tulare Counties, Calif., 1962-66: U.S. Geological Survey open-file report, 8 p.

Morris, F. C., Aune, Q. A., and Gates, G. L., 1959, Clay in petroleum reservoir rocks: Its effect on permeability, with particular reference to Tejon-Grapevine area, Kern County: U.S. Bureau of Mines Investigations Report 5425, 65 p.

Moston, R. P., and Johnson, A. I., 1964, Ultrasonic dispersion of samples of sedimentary deposits: U.S. Geological Survey Professional Paper 501-C, p. 159-160.

Muir, K. S., 1977, Ground water in the Fresno area, California: U.S. Geological Survey Water-Resources Investigations 77-59, 22 p.

Nelson, J. W., Dean, W. C., and Eckmann, E. C., 1921, Reconnaissance soil survey of the upper San Joaquin Valley, California: U.S. Department of Agriculture, Bureau of Soils Field Operations 1917, p. 2535-2644.

Nelson, J. W., Guernsey, J. E., Holmes, L. C., and Eckmann, E. C., 1919, Reconnaissance soil survey of the lower San Joaquin Valley, California: U.S. Department of Agriculture, Bureau of Soils Field Operations 1915, p. 2583-2733.

Nightingale, H. I., 1970, Statistical evaluation of salinity and nitrate content and trends beneath urban and agricultural area, Fresno, Calif.: Ground Water, v. 8, no. 1, p. 22-28.

Nightingale, H. I., and Behnke, J. J., 1969, Chemistry of the San Joaquin River system under base flow conditions: American Water Works Association, v. 61, no. 8, p. 382-386.

Nightingale, H. I., and Bianchi, W. C., 1974, Ground-water quality related to irrigation with imported surface or local ground water: Journal of Environmental Quality, v. 3, no. 4, p. 356-361.

_____ 1977, Ground-water turbidity resulting from artificial recharge: Ground Water, v. 15, no. 2, p. 146-152.

Nilsen, T. H., and Clarke, S. H., Jr., 1975, Sedimentation and tectonics in the early Tertiary continental borderland of central California: U.S. Geological Survey Professional Paper 925, 64 p.

Oakeshott, G. B., 1955, Land subsidence in California: California Division of Mines and Geology, Mineral Information Service, v. 8, no. 7, p. 1-8.

_____ 1970, A Guide to information on the geology of California: California Division of Mines and Geology, Mineral Information Service, v. 23, no. 10, p. 195-199.

Oakeshott, G. B., Braun, L. T., Jennings, C. W., and Wells, Ruth, 1952, Exploratory wells drilled outside of oil and gas fields in California to December 31, 1950: California Division of Mines Special Report 23, 77 p.

Ogilbee, William, 1966, Progress report--Methods for estimating ground-water withdrawals in Madera County, California: U.S. Geological Survey open-file report, 32 p.

Ogilbee, William, and Mitten, H. T., 1970. A continuing program for estimating ground-water pumpage in California--Methods: U.S. Geological Survey open-file report, 22 p.

Ogilbee, William, and Rose, M. A., 1969, Ground-water pumpage in Kern County, San Joaquin Valley, Calif. 1962-66: U.S. Geological Survey open-file report, 5 p.

____1969, Ground-water pumpage on the west side of the San Joaquin Valley, California, 1962-66: U.S. Geological Survey open-file report, 7 p.

Olmsted, F. H., 1901, Physical characteristics of Kern River, California: U.S. Geological Survey Water-Supply Paper 46, p. 11-38.

Olmsted, F. H., and Davis, G. H., 1961, Geologic features and ground-water storage capacity of the Sacramento Valley, California: U.S. Geological Survey Water-Supply Paper 1497, 241 p.

Ordonez, J. I., and Asce, A. M., 1975, Modeling sediment deposition in a tidal river, in Symposium on modeling techniques, Volume II: American Society of Civil Engineers, New York, N.Y.

Orlob, G. T., 1976, Impact of upstream storage and diversions on salinity balance in estuaries, in Estuarine Processes, v. 2, Circulation, sediments, and transfer of material in the estuary, M. Wiley, ed.: New York, Academic Press, p. 3-17.

Owens, L. D., 1963, Regional geology of the central portion of the Great Valley of California, in Central portion of the Great Valley of California, San Juan Bautista to Yosemite Valley: Geological Society of Sacramento Guidebook, annual field trip 1963, p. 88-97.

Pacific Southwest Inter-Agency Committee, 1973, River mile index--San Joaquin River, Tulare Lake and Buena Vista Lake Basins: California Water Management Technical Subcommittee Report, 721 p.

Page, R. W., 1972, Preliminary appraisal of ground-water conditions in the vicinity of Modesto, California: U.S. Geological Survey open-file report, 44 p.

____1973, Base of fresh ground water (approximately 3,000 micromhos) San Joaquin Valley, California: U.S. Geological Survey open-file report, 13 p.

____1974, Base and thickness of the post-Eocene continental deposits in the Sacramento Valley, California: U.S. Geological Survey Water-Resources Investigations 45-73, 20 p.

____1975, Ground-water reconnaissance in the Fresno northeast area, Fresno County, Calif.: U.S. Geological Survey Open-File Report 75-315, 31 p.

____1977, Appraisal of ground-water conditions in Merced, California, and vicinity: U.S. Geological Survey Open-File Report 77-454, 43 p.

____1977, Guide for data collection to calibrate a predictive digital ground-water model of the unconfined aquifer in and near the City of Modesto, California: U.S. Geological Survey Water-Resources Investigations 76-41, 46 p.

Page, R. W., and Balding, G. O., 1973, Geology and quality of water in the Modesto-Merced area, San Joaquin Valley, California, with a brief section on hydrology: U.S. Geological Survey Water-Resources Investigations 6-73, 85 p.

Page, R. W., Bertoldi, G. L., Tyley, S. J., and Mitten, H. T., 1967, Data for wells in the Madera area, San Joaquin Valley, California: U.S. Geological Survey open-file report, 142 p.

Page, R. W., and LeBlanc, R. A., 1969, Geology, hydrology, and water quality in the Fresno area, California: U.S. Geological Survey open-file report, 193 p.

Page, R. W., Zeitz, L. R., and Kinsey, W. B., 1974, Data for municipal wells in the City of Modesto, California: U.S. Geological Survey open-file report, 80 p.

Payne, M. B., 1962, Type Panoche group (upper Cretaceous) and overlying Moreno and Tertiary strata on the west side of the San Joaquin Valley: California Division of Mines and Geology Bulletin 181, p. 165-175.

Pillsbury, A. F., 1972, Land use and ground-water management, in Biennial Conference on Ground Water, 8th, Proceedings: California University Water Resources Report 24, p. 17-21.

Piper, A. M., 1935, Active ground-water projects in California, Oregon, and Washington: American Geophysical Union Transactions, 1935, p. 441-443.

Piper, A. M., Gale, H. S., Thomas, H. E., and Robinson, T. W., 1939, Geology and ground-water hydrology of the Mokelumne area, California: U.S. Geological Survey Water-Supply Paper 780, 230 p.

Poland, J. F., 1959, Notes on rate of water penetration in subsidence test plots: Biennial Conference on Ground-Water Recharge, Agricultural Research Service, Proceedings, p. 87.

_____1961, The coefficient of storage in a region of major subsidence caused by compaction of an aquifer system, in Geological Survey Research 1961: U.S. Geological Survey Professional Paper 424-B, p. B52-B54.

_____1967, The role of pore pressures in subsidence caused by ground-water withdrawal [abs.]: Geological Society of America Annual Meeting, New Orleans, La., Program, p. 179.

_____1968, Foreword, in Johnson, A. I., Moston, R. P., and Morris, D. A., 1968, Physical and hydrologic properties of water-bearing deposits in subsiding areas in central California: U.S. Geological Survey Professional Paper 497-A, p. iii-vii.

_____1971, Subsidence and its control [abs.]: American Association of Petroleum Geologists Bulletin, v. 55, no. 11, p. 2089.

_____1973, New tritium data on movement of ground water in western Fresno County, California [abs.]: American Geophysical Union Transactions, v. 54, no. 11, p. 1077.

Poland, J. F., and Davis, G. H., 1956, Subsidence of the land surface in the Tulare-Wasco (Delano) and Los Banos-Kettleman City area, San Joaquin Valley, California: American Geophysical Union Transactions, v. 37, no. 3, p. 287-296.

_____1969, Land subsidence due to withdrawal of fluids, in Varnes, D. J., and Kiersch, George, eds., Reviews in Engineering Geology, v. 2: Boulder, Colo., Geological Society of America, p. 187-269.

Poland, J. F., Davis, G. H., Olmsted, F. H., and Kunkel, Fred, 1949, Ground-water storage capacity of the Sacramento Valley, California, Appendix D, in Water Resources of California: California State Water Resources Board Bulletin I, p. 617-632.

Poland, J. F., and Evenson, R. E., 1966, Hydrogeology and land subsidence, Great Valley, Calif., in Bailey, E. H., ed., Geology of northern California: California Division of Mines and Geology Bulletin 190, p. 239-247.

Poland, J. F., Lofgren, B. E., Ireland, R. L., and Pugh, R. G., 1975, Land subsidence in the San Joaquin Valley as of 1972: U.S. Geological Survey Professional Paper 437-H, 78 p.

Poland, J. F., Lofgren, B. E., and Riley, F. S., 1972, Glossary of selected terms useful in studies of the mechanics of aquifer systems and land subsidence due to fluid withdrawal: U.S. Geological Survey Water-Supply Paper 2025, 9 p.

Poland, J. F., and Stewart, G. L., 1975, New tritium data on movement of groundwater in western Fresno County, California: American Geophysical Union, Water Resources Research, v. 2, no. 5, p. 716-724.

Post, J. L., and Janke, N. C., 1976, The nature of the Porterville Clay, San Joaquin Valley, California: Association of Engineering Geologists Bulletin, v. 13, no. 4, p. 279-295.

Powers, W. R., III, 1970, Water resources inventory, spring 1968 to spring 1969, Antelope Valley, East Kern Water Agency area, California: U.S. Geological Survey open-file report, 15 p.

Prokopovich, N. P., 1963, Hydrocompaction of soils along the San Luis Canal alinement, western Fresno County, California, in Abstracts for 1962: Geological Society of America, Special Paper 73, p. 60.

_____1969, Prediction of future subsidence along San Luis and Delta-Mendota Canals, San Joaquin Valley, California, Land subsidence, v. 1: International Association of Hydrological Sciences Publication 89, p. 600-610.

_____1971, Predictions of ultimate residual subsidence along San Luis Canal, California: Fourth Asian Regional Conference on Soil Mechanics and Foundation Engineering, Bangkok, Thailand, 1971, Proceedings, v. 1, p. 67-73.

_____1973, Iron sulfide concretions from Tulare Formation at O'Neill Forebay Reservoir, Western Merced County, California: American Association of Petroleum Geologists Bulletin, v. 57, no. 12, p. 2443-2446.

_____1974, Methodology of moisture-density determinations in test holes, evaluation of alluvium, San Joaquin Valley, California: Association of Engineering Geologists Bulletin, v. 11, no. 1, p. 49-73.

_____1975, Past and future subsidence along San Luis Drain, San Joaquin Valley, California: Association of Engineering Geologists Bulletin, v. 12, no. 1, p. 1-22.

Prokopovich, N. P., and Farina, R. J., 1962, Land subsidence in the [Central] Valley [California]: U.S. Bureau of Reclamation, Era, v. 48, no. 4, p. 92-94.

Prokopovich, N. P., and Hebert, D. J., 1968, Land subsidence along the Delta-Mendota Canal, California: American Water Works Association Journal, v. 60, no. 8, p. 915-920.

Prokopovich, N. P., and Lepley, C. E., 1975, Textural composition of near-surface deposits in west-central San Joaquin Valley, California [abs.]: Association of Engineering Geologists Annual Meeting Program, p. 18.

Prokopovich, N. P., and Magleby, D. E., 1968, Land subsidence in Pleasant Valley area, Fresno County, California: American Water Works Association Journal, v. 60, no. 4, p. 431-424.

Rantz, S. E., 1962, Determination of tide-affected discharge of the Sacramento River at Sacramento, Calif., _in_ Short papers in Geology, Hydrology, and Topography: U.S. Geological Survey Professional Paper 450-B, p. B111-B112.

_____1969, Mean annual precipitation in the California region: U.S. Geological Survey open-file map.

_____1972, Runoff characteristics of California streams, _in_ Contributions to the hydrology of the United States: U.S. Geological Survey Water-Supply Paper 2009-A, p. A1-A38.

Rantz, S. E., and Richardson, Donald, 1961, Interchange of surface water and ground water along tributary streams in the Central Valley, California: U.S. Geological Survey Professional Paper 424-C, p. C187-C188.

Reed, R. O., 1933, Geology of California: American Association of Petroleum Geologists, 355 p.

Reiche, Parry, 1950, Geology of part of the Delta-Mendota Canal near Tracy, California: California Division of Mines Special Report 2, 12 p.

Repenning, C. A., 1960, Geologic summary of the Central Valley of California with reference to the disposal of liquid radioactive waste: U.S. Geological Survey Trace Elements Investigations Report 769, 69 p.

Repenning, C. A., Jones, D. L., and Addicott, W. O., 1969, Geology of the Great Valley: California Division of Mines and Geology Mineral Information Service, v. 22, no. 1, p. 3-6.

Retzer, J. L., Gardner, R. A., Koehler, L. F., and Cole, R. C., 1946, Soil survey of Kings County, California: U.S. Department of Agriculture, ser. 1938, no. 9, 102 p.

Retzer, J. L., Glassey, T. W., Goff, A. M., and Harradine, F. F., 1951, Soil survey of the Stockton area, California: U.S. Department of Agriculture, ser. 1939, no. 10, 121 p.

Richardson, H. E., and Prokopovich, N. P., 1968, Land subsidence in the southwestern portion of the Sacramento Valley, California [abs.]: Association of Engineering Geologists, National Meeting, Seattle, Program, p. 45-46.

Richter, R. C., and Chun, R. Y. D., 1961, Artificial recharge in California: American Society of Civil Engineers Transactions, v. 126, pt. 3, paper 3274, p. 742-762.

Riley, F. S., 1968, Direct determination of the time and stress dependency of the artesian storage coefficient [abs.]: Geological Society of America Annual Meeting, 81st, Mexico City, 1968, Program, p. 248-249.

Riley, F. S., and Lofgren, B. E., 1966, Mechanics of a compacting aquifer system near Pixley, Calif. [abs.]: Geological Society of America Annual Meeting, 79th, San Francisco, 1966, Program, p. 178.

Riley, F. S., and McClelland, E. J., 1972, Application of the modified theory of leaky aquifers to a compressible multiple-aquifer system: U.S. Geological Survey open-file report, 96 p.

Robinson, T. W., and Johnson, A. I., 1961, Selected bibliography on evaporation and transpiration: U.S. Geological Survey Water-Supply Paper 1539-R, 25 p.

Rosenberger, R. L., and Walsh, R., 1967, Estuarine water quality management in the Sacramento-San Joaquin Delta: National Symposium on Estuarine Pollution, Aug. 23-25, 1967, Proceedings.

Sacramento County, 1972, County of Sacramento Water Resources Policy, June 1972, 9 p.

Safonov, Anatole, 1962, The challenge of the Sacramento Valley, California: California Division of Mines and Geology Bulletin 181, p. 77-100.

Saper, E. K., 1932, Limitations of ground water as an aid in determination of hidden geologic structure (Buttonwillow and Semitropic Ridges, and Bakersfield area): American Association of Petroleum Geologists Bulletin, v. 16, no. 4, p. 335-360.

Schiff, Leonard, 1960, Ground-water recharge--need, progress, and research in California: Irrigation Association Conference, Fresno, Calif., 1960, Proceedings, p. 63-70.

Schmidt, K. D., 1969, The distribution of boron in the ground water of the Arvin-Caliente Creek area, Kern County, California: University of Arizona unpublished Master's thesis, Tucson, Ariz.

_____1971, The distribution of nitrate in ground water in the Fresno-Clovis metropolitan area, San Joaquin Valley, California [abs.]: Dissertation Abstracts International, v. 32, no. 3, p. 1690B-1691B.

_____1971, The use of chemical hydrographs in ground water quality studies in Hydrology and Water Resources in Arizona and the southwest: American Water Resources Association, v. 1, p. 211-223, Tucson, Ariz.

_____1974, Nitrates and ground-water management in the Fresno urban area: American Water Works Association, v. 66, no. 3, p. 146-148.

_____1975, Regional sewer and ground water quality in the southern San Joaquin Valley: Water Resources Bulletin, v. 11, no. 3, p. 515-525.

Schoellhamer, J. E., and Kinney, D. M., 1953, Geology of portions of Tumey and Panoche Hills, Fresno County, Calif.: U.S. Geological Survey Oil and Gas Investigations Map OM-128.

Scott, J. B., 1964, State Water Project, North San Joaquin Division, East margin of Diablo Range, California: Geological Society of Sacramento Guidebook, annual field trip, p. 97-98.

Scott, K. M., 1971, Geomorphic effects in the Kern River Basin, in Floods of December 1966 in the Kern-Kaweah area, Kern and Tulare Counties, California, by W. W. Dean: U.S. Geological Survey Water-Supply Paper 1870-C, p. 28-30.

Seckler, David, 1971, California water, a study in resource management: University of California Press, p. 344.

Seiden, Hy, 1964, Kettleman Hills area, California: San Joaquin Geological Society, Selected Papers, v. 2, p. 46-53.

Showen, C. R., and Stuthman, N. G., 1973, Index to U.S. Geological Survey computer files containing daily values for water parameters to September 20, 1971--Western Region: U.S. Geological Survey Water-Resources Investigations 28-73, 391 p.

Showen, C. R., and Williams, O. O., 1973, Index to water-quality data available from the U.S. Geological Survey in machine-readable form to December 31, 1972--Western Region: U.S. Geological Survey Water-Resources Investigations 24-73, 520 p.

Signor, D. C., Growitz, D. J., and Kam, William, 1970, Annotated bibliography on artificial recharge of ground water 1955-67: U.S. Geological Survey Water-Supply Paper 1990, 141 p.

Silvey, W. D., 1967, Occurrence of selected minor elements in the waters of California: U.S. Geological Survey Water-Supply Paper 1535-L, 25 p.

Simpson, R. G., 1972, Determination of channel capacity of the Mokelumne River downstream from Camanche Dam, San Joaquin and Sacramento Counties, California: U.S. Geological Survey open-file report, 64 p.

_____1976, Determination of channel capacity of the Sacramento River between Ordbend and Glenn, Butte and Glenn Counties, California: U.S. Geological Survey Open-File Report 76-526, 51 p.

Simpson, R. G., and Blodgett, J. C., 1974, Determination of channel capacity of the San Joaquin River downstream from the Merced River, Merced, Stanislaus, and San Joaquin Counties, California: U.S. Geological Survey open-file report, 97 p.

Simpson, T. R., 1951, Utilization of ground water in California: American Society of Civil Engineers Proceedings, v. 77, p. 1-8.

Sims, J. D., Fox, K. F., Jr., Bartow, J. A., and Helley, E. J., 1973, Preliminary geologic map of Solano County and parts of Napa, Contra Costa, Marin, and Yolo Counties, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-484, scale 1:62,500.

Small, J. B., 1973, Settlement studies by means of precision leveling, in Reports on geodetic measurements of crustal movement, 1906-71: National Oceanic and Atmospheric Administration, National Geodetic Survey, Rockville, Md.

Smith, M. B., 1960, List of basement wells in California and Nevada: U.S. Geological Survey open-file report, 129 p.

_____1964, Map showing distribution and configuration of basement rocks in California: U.S. Geological Survey Oil and Gas Investigations Map OM-215, scale 1:500,000.

Smith, Winchell, 1969, Feasibility study of the use of the acoustic velocity meter for measurement of net outflow from the Sacramento-San Joaquin delta in California: U.S. Geological Survey Water-Supply Paper 1877, 54 p.

Snyder, C. T., 1977, Reconnaissance examination of the biology, chemistry, and physical characteristics of selected streams in California and Nevada: U.S. Geological Survey Open-File Report 77-220.

Stearns, H. T., Robinson, T. W., and Taylor, G. H., 1930, Geology and water resources of the Mokelumne area, California: U.S. Geological Survey Water-Supply Paper 619, 402 p.

Stearns, H. T., Taylor, G. H., and Robinson, T. W., 1930, Ground water in the Stockton area, California: U.S. Geological Survey open-file report, 15 p.

Stevens, J. B., 1943, Kern River area of the Kern River oil field, in Geologic formations and economic development of the oil and gas fields of California: California Division of Mines Bulletin 118, p. 575.

Stewart, Ralph, 1949, Lower Tertiary stratigraphy of Mount Diablo, Marysville Buttes, and west border of lower Central Valley of California: U.S. Geological Survey Oil and Gas Investigations Preliminary Chart 34.

Stone, Robert, 1955, Ground water geologic, geochemistry, and hydrology of the southeastern San Joaquin Valley (Kern County), California: University of California, Los Angeles, Department of Geology Ph.D. thesis.

Storie, R. E., Owen, B. C., Carpenter, E. J., and others, 1940, Soil survey of the Visalia area, California: U.S. Department of Agriculture, ser. 1935, no. 16, 95 p.

Storie, R. E., Owen, B. C., Layton, M. H., and others, 1942, Soil survey of the Pixley area, California: U.S. Department of Agriculture, ser. 1935, no. 23, 113 p.

Strahorn A. T., Nelson, J. W., Holmes, L. C., and Eckmann, E. C., 1914, Soil survey of the Fresno area, California: U.S. Department of Agriculture, Bureau of Soils Field Operations 1912, 82 p.

Strahorn, A. T., Westover, H. L., Holmes, L. C., and others, 1911, Soil survey of the Madera area, California (Bureau of Soils, 1910): U.S. Department of Agriculture, Bureau of Soils Field Operations 1910.

Sweet, A. T., Warner, J. F., and Holmes, L. C., 1909, Soil survey of the Modesto-Turlock area: U.S. Department of Agriculture, Bureau of Soils Field Operations 1908, 70 p.

Taff, J. A., and Hanna, G. D., 1927, A geologic section in the center of the San Joaquin Valley, California: California Academy of Science Proceedings, 4th series, v. 16, p. 509-515.

Thomas, H. E., 1963, The Central Valley of California, in Aridity and man--the challenge of the arid lands of the United States: American Association for the Advancement of Science, Publication 74, p. 529-538.

____1976, Summary appraisal of the nation's ground-water resources, California region: U.S. Geological Survey Professional Paper 813-E, 51 p.

Thomas, H. E., and others, 1963, Effects of drought along Pacific Coast in California: U.S. Geological Survey Professional Paper 372-G, 25 p.

Thomasson, H. G., Jr., Olmsted, F. H., and LeRoux, E. F., 1960, Geology, water resources, and usable ground-water storage capacity of part of Solano County, California: U.S. Geological Survey Water-Supply Paper 1464.

Tillman, R. W., and Groshong, R. H., Jr., 1977, Sedimentology of fluvial to bathyal sandstones of Cretaceous Great Valley sequence, California: American Association of Petroleum Geologists Bulletin, v. 61, no. 5, p. 835.

Todd, D. K., 1959, Annotated bibliography on artificial recharge of ground water through 1954: U.S. Geological Survey Water-Supply Paper 1477, 115 p.

Trauger, G. W., and Trauger, F. D., 1962, Description of an early experiment in ground-water recharge through wells at Lindsay, California [abs.]: Journal of Geophysical Research, v. 67, no. 9, p. 3534.

U.S. Bureau of Reclamation, 1947, Yolo-Solano development of the comprehensive plan for Central Valley basin, California: U.S. Bureau of Reclamation mimeographed report, 174 p.

_____1948, Water-supply study of the Lindmore Irrigation District, California: U.S. Bureau of Reclamation open-file report, 35 p.

_____1949, Central Valley basin: U.S. 81st Congress, Document 113, 431 p.

_____1950, Ground water investigations in the Central Valley: U.S. Bureau of Reclamation, 172 p.

_____1952, Progress report on ground water investigations and related hydrologic data (Delta District): U.S. Bureau of Reclamation open-file report.

_____1976, Environmental baseline, ground-water studies, total water management study of the Central Valley basin, California: U.S. Bureau of Reclamation Working Document 3E, 16 p.

U.S. Census of Agriculture, 1952, Irrigation of agricultural lands California: U.S. Census of Agriculture, v. 3, pt. 3, 71 p.

U.S. Department of Agriculture, 1977, Summary of crop statistics, 1976 California: Statistical Reporting Service, unnumbered pamphlet, Sacramento, 10 p.

_____Soil Conservation Service, 1972, Reviewing 1972--Soil Conservation Service progress report, California: U.S. Department of Agriculture, Soil Conservation Service, 17 p.

U.S. Department of Commerce, 1972, Climatological data, California, Annual Summary 1972: National Oceanic and Atmospheric Administration, Environmental Data Service, v. 76, no. 13, 13 p.

U.S. Geological Survey, 1935-74, Ground-water levels in the United States, Southwestern states: U.S. Geological Survey water-supply papers.

_____1897-1970, Surface-water of the United States, Parts 9, 10, and 11: U.S. Geological Survey water-supply papers.

_____1947-70, Quality of surface waters of the United States, Parts 9-11, Colorado River Basin to Pacific Slope Basins in California: U.S. Geological Survey water-supply papers.

_____1951-65, Quality of surface waters for irrigation, western states: U.S. Geological Survey water-supply papers.

_____1953, Floods of November-December 1950 in the Central Valley basin, California: U.S. Geological Survey Water-Supply Paper 1137-F, p. 505-789.

_____1964, Suspended-sediment records of California, 1961: U.S. Geological Survey open-file report, 75 p.

_____1970, Water resources data for California, Part 3, Ground-water records, 1966-68: U.S. Geological Survey open-file report, 271 p.

_____1971, Index of surface-water records to September 30, 1970, Part 11, Pacific Slope Basins in California: U.S. Geological Survey Circular 661, 53 p.

_____1971-74, Water resources data for California: U.S. Geological Survey Annual Reports, Part 1, Surface water; Part 2, Water quality: U.S. Geological Survey, Menlo Park, Calif.

_____1974, Quality of surface waters of the United States, 1969--Part 11, Pacific Slope Basins in California: U.S. Geological Survey Water-Supply Paper 2149, 349 p.

U.S. Geological Survey, Office of Water Data Coordination, 1975, Catalog of information on water data, Water Resources Region 18 (California), Part A--Streamflow and stage; Part B--Quality of surface water; Part C--Quality of ground water, Edition 1974: U.S. Geological Survey, Office of Water Data Coordination unnumbered publication, pt A, 163 p., pt. B, 69 p., pt. C, 49 p.

U.S. Geological Survey, 1976, Surface water supply of the United States, 1966-70 --Part 11, Pacific slope basins in California, Volume 3, Southern Central Valley Basins: U.S. Geological Survey Water-Supply Paper 2130, 670 p.

_____1976, Surface water supply of the United States, 1966-70, Part 11, Pacific slope basins in California, Volume 4, Northern Central Valley basins: U.S. Geological Survey Water-Supply Paper 2131, 747 p.

U.S. Geological Survey and California Division of Mines and Geology, 1966, Geologic map of California: U.S. Geological Survey Miscellaneous Geologic Investigations Map 1-512, scale 1:2,500,000.

Vaughan, F. W., 1943, Geophysical studies in California: California Division of Mines Bulletin 118, p. 67-70.

Waring, G. A., 1915, Springs of California: U.S. Geological Survey Water-Supply Paper 338, 410 p.

Warne, W. H., 1965, The White Wolf fault, in Geology of southeastern San Joaquin Valley, California: American Association of Petroleum Geologists, Society of Economic Geologists, Society of Economic Paleontologists and Mineralogists, Pacific Section, Guidebook, p. 8-9.

Water Project Authority of the State of California, 1956, Ground water geology, Report No. 1 of investigation of the Sacramento-San Joaquin delta: Water Project Authority, v. 4, 20 p.

Watson, E. B., and others, 1916, Soil survey of the Merced area, California: U.S. Department of Agriculture, Bureau of Soils Field Operations 1914, 70 p.

Watts, W. L., 1892, Yuba County: California State Mineralogist, 11th report, p. 515-516.

Weir, W. W., 1941, Drainage in the San Joaquin Valley as it may be affected by the Central Valley Project: American Geophysical Union Transactions, 1941, pt. 1, p. 45-49.

_____1950, Soils of Sacramento County, California: California University, College of Agriculture, Division of Soils, Soil Survey 6.

_____1950, Subsidence of peat lands of the Sacramento-San Joaquin delta: California University Agricultural Experiment Station, Hilgardia, v. 20, no. 3, p. 37-56.

Weld, B. A., Iseri, K. T., and Brett, G. W., 1972, Reports and maps of the Geological Survey released only in open files, 1971: U.S. Geological Survey Circular 648, 26 p.

Weld, B. A., Iseri, K. T., and Horton, G. W., 1975, Reports and maps of the Geological Survey released only in open files, January through April, 1974: U.S. Geological Survey Circular 706, 10 p.

Weld, B. A., Iseri, K. T., and Millgate, M. L., 1974, Reports and maps of the Geological Survey released only in the open files, 1973: U.S. Geological Survey Circular 696, 25 p.

West, S. W., 1974, The role of ground water in resources planning in the Western United States: U.S. Geological Survey Open-File Report 74-125, 248 p.

White, C. A., 1885, On the Mesozoic and Cenozoic paleontology of California: U.S. Geological Survey Bulletin 15, 33 p.

White, D. E., and Williams, D. L., 1975, Assessment of geothermal resources of the United States--1975: U.S. Geological Survey Circular 726, 155 p.

Williams, Howel, 1929, Geology of the Marysville Buttes, California: California University, Department of Geological Science, Bulletin 18, p. 103-220.

Williams, Howel, and Curtis, G. H., 1953, Sutter Buttes restudied [abs.]: American Mineralogists, v. 38, nos. 3-4, p. 364-365.

Willis, R., 1975, Identification of groundwater quality parameters in unsaturated porous media using mathematical programming [abs.]: American Geophysical Union Transactions, EOS, v. 56, no. 12, p. 979.

Wood, B. D., 1912, Gazetteer of surface waters of California, Part I, Sacramento River basin, prepared under the direction of J. C. Hoyt: U.S. Geological Survey Water-Supply Paper 295, 99 p.

_____1912, Gazetteer of surface waters of California, Part II, San Joaquin River Basin, prepared under the direction of J. C. Hoyt: U.S. Geological Survey Water-Supply Paper 296, 102 p.

Wood, P. R., and Dale, R. H., 1959, Data for wells, springs, and streams in the Edison-Maricopa area, Kern County, California: U.S. Geological Survey open-file report, 245 p.

_____1964, Geology and ground-water features of the Edison-Maricopa area, Kern County, California: U.S. Geological Survey Water-Supply Paper 1656, 108 p.

Wood, P. R., and Davis, G. H., 1959, Ground-water conditions in the Avenal-McKittrick area, Kings and Kern Counties, California: U.S. Geological Survey Water-Supply Paper 1457, 141 p.

Woodring, W. P., Stewart, Ralph, and Richards, R. W., 1940, Geology of the Kettleman Hills oil field, California: U.S. Geological Survey Professional Paper 195.

Wright, D. R., chairman, 1978, Final report of the Governor's Commission to Review California Water Rights Law: Sacramento, Calif., 264 p.

Youd, T. L., 1973, Liquefaction, flow, and associated ground failure: U.S. Geological Survey Circular 688, 12 p.

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