TEXAS
WATER
DEVELOPMENT
BOARD

Report 199

ANNOTATED BIBLIOGRAPHY OF TEXAS WATER RESOURCES REPORTS

OF THE TEXAS WATER DEVELOPMENT BOARD AND UNITED STATES GEOLOGICAL SURVEY THROUGH AUGUST 1974

February 1976

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and United States Geological Survey
Through August 1974

By

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February 1976

TEXAS WATER DEVELOPMENT BOARD

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Through August 1974

INTRODUCTION

The purpose of this report is to present, in summarized form, the results of basic hydrologic investigations and studies related to the development of water resources in Texas and the resulting basic data and interpretive reports written by the Texas Water Development Board and the U.S. Geological Survey. It brings up to date two earlier bibliographies, Texas Water Commission Circulars 63-04 and 64-02, and covers a period from 1888 through August 1974. Annotations are included for each publication unless the title is considered self-explanatory.

PROCEDURE FOR OBTAINING INFORMATION

Some of the publications and reports listed herein are available for inspection only at the appropriate offices, some can be reproduced, and others are available in limited quantities for distribution. Persons wishing to obtain more information concerning any reference should apply directly to the agency under which the reference is listed. Further inquiries may be addressed to:

Texas Water Development Board
Water Resources Library
P. O. Box 13087
Austin, Texas 78711

or

District Chief
U.S. Geological Survey
Federal Building
300 East 8th Street
Austin, Texas 78701

SCOPE OF WORK

This bibliography has been divided into two major categories: (1) Texas Water Development Board publications, and (2) U.S. Geological Survey publications.

Included in the Texas Water Development Board publications are the publications of two former State agencies, the Texas Water Commission and its predecessor the Texas Board of Water Engineers. On September 1, 1965, the 59th Legislature of Texas directed the realignment of functions previously performed by the Texas Water Commission (formerly, before February 1962, the Texas Board of Water Engineers). The investigative, planning, development, research, and supporting functions, including publication functions, were transferred to the Texas Water Development Board and combined with the Board's financial responsibilities.

Publications of the Water Development Board (and the two former State agencies) are divided into nine series: (1) Biennial Reports to the Governor of Texas, (2) Planning Series, (3) Bulletins, (4) Reports, (5) Circulars, (6) Memorandum Reports, (7) Limited Distribution Reports, (8) Unnumbered Publications, and (9) File Reports. Also available is a brochure, *Texas Water Development Board and Water for Texans* (April 1974), not otherwise listed herein, which describes landmarks in the history of water in Texas, the various State and Federal water agencies, and the Texas Water Development. Board's organization and work programs.

The U.S. Geological Survey publications are divided into 10 series: (1) Annual Reports of the Director of the U.S. Geological Survey, (2) Bulletins, (3) Water-Supply Papers, (4) Professional Papers, (5) Circulars, (6) Folios of the Geologic Atlas of the United States, (7) Hydrologic Investigations Atlases, (8) Water Resources Investigations, (9) Special Publications, and (10) Open-File Reports.

Information in publications by one agency, in a few cases, has been repeated in publications by the other agency. Both reports are listed herein. Also, some publications that were superseded by a later publication have been included. All reports are included to better show the development of hydrologic information in Texas. Water Development Board Unnumbered Publications and File Reports and Geological Survey Open-File Reports, which are listed alphabetically by authors, have been assigned arbitrary numbers, for purposes of coding to the index. These numbers bear no subjective relationship to the individual reports, and do not correspond with numbers assigned for indexing purposes in other lists of publications.

An index is provided at the end of this publication as an aid to finding those reports that apply specifically to ground water, surface water, water quality or other water-related topics and to certain counties, river basins, or other areas or districts of the State. For convenience to the user, a county and river basin location map is shown in the index.

This report covers items in report form as of August 31, 1974. Voluminous material that was not in report form is available in files of the U.S. Geological Survey and Texas Water Development Board, and considerable material on various water-related subjects has been published in technical journal articles and nowhere else. Those interested in the possible availability of information not listed herein are invited to correspond with either the Texas Water Development Board or the U.S. Geological Survey or both for additional information.

TEXAS WATER DEVELOPMENT BOARD PUBLICATIONS

Biennial Reports to the Governor of Texas

First Report of the Texas Board of Water Engineers (1913-14), J. C. Nagle, Chairman.

Includes such items as efforts to secure records of appropriations made prior to July 1, 1913, and records of hearings on applications; presents, in table form, the Certified Filings of all appropriations; presents rainfall data in the form of rainfall tables and mean annual rainfall map; and contains a brief section concerning irrigation from wells and recommendations for modification to the General Irrigation Law of 1913 to give the Board more authority over water development from wells.

Second Report of the Texas Board of Water Engineers (1914-16), J. C. Nagle, Chairman.

Includes Certified Filings of all appropriations for water, data on rainfall and evaporation, a report on stream measurements which describes the stream-gaging program, and a brief discussion on the need for more authority in order to obtain much needed information concerning ground water.

Third Report of the Texas Board of Water Engineers (1916-18), W. T. Potter, Chairman.

Includes reports on district irrigation law; conservation of flood flow, stream measurement, gaging stations and observers in Texas; determination of duty of water and of water rights; delivery of stored water; recommendation for appropriations; and a tabulated statement of Permits granted during the two years.

Fourth Report of the Texas Board of Water Engineers (1918-20), W. T. Potter, Chairman.

This unpublished manuscript covering the biennium 1918-20 includes reports on stream measurement; determination of duty of water; examination and survey of "reservoir sites and of lands suitable for irrigation development" which consisted of a study of a reservoir site for the town of San Saba; adjudication of water rights; rate controversies; water service reports; recommendations for appropriations; and a tabulated statement of Permits granted during the two years.

Fifth Report of the Texas Board of Water Engineers (1920-22), W. T. Potter, Chairman.

This unpublished manuscript covering the biennium 1920-22 includes reports on stream measurement; investigations of duty of water; administrative activities; a resume of court decisions affecting the Board of Water Engineers; and a tabulated statement of Applications and Permits granted during the two years.

Sixth Report of the Texas Board of Water Engineers (1922-24), John A. Norris, Chairman.

Includes reports on streamflow-gaging stations maintained in Texas, methods and equipment for streamflow-gaging stations, and cooperative topographic work in Texas between the State Board of Water Engineers and the U.S. Geological Survey.

Seventh Report of the Texas Board of Water Engineers (1924-26), John A. Norris, Chairman.

Includes reports on work accomplished, gaging stations maintained in Texas, methods and equipment at gaging stations, and topographic work done in Texas.

Eighth Report of the Texas Board of Water Engineers (1926-28), John A. Norris, Chairman.

Includes reports on work accomplished, gaging stations maintained in Texas, methods and equipment at gaging stations, and silt investigation.

Ninth Report of the Texas Board of Water Engineers (1928-30), John A. Norris, Chairman.

Includes reports on work accomplished, gaging stations maintained in Texas, methods and equipment essential at the gaging station, and a brief report of the silt investigation. A short section on ground water describes the need for ground-water surveys, cooperative programs, and areas where projects are being conducted.

Tenth Report of the Texas Board of Water Engineers (1930-32), John A. Norris, Chairman.

Includes statements on ground-water legislation (House Bill 16) passed by the 41st Legislature, status of Federal-State cooperative programs, results of ground-water investigations in southwestern Texas, and a summary of ground-water conditions of the Toyah Basin in West Texas. It also lists the personnel of the Board of Water Engineers and the U.S. Geological

Survey, the work accomplished during the biennium, the stream-gaging stations operated, the methods and equipment used, and the need and value of streamflow records.

Eleventh Report of the Texas Board of Water Engineers (1932-34), John A. Norris, Chairman.

Includes reports on expenditures for surface-water work accomplished for gaging stations in operation, methods and equipment used for this work, and a report on the need and value of streamflow records. Summarizes work completed under the Federal-State cooperative program and lists available ground-water publications and reports to be published. Also includes summaries of ground-water data in southern Texas, Atascosa and Frio Counties, Duval County, Houston-Galveston area, Dimmit and Zavala Counties, Webb County, and the Toyah Basin of West Texas.

Twelfth Report of the Texas Board of Water Engineers (1934-36), C. S. Clark, Chairman.

Duties of the State Board of Water Engineers are listed in this report. Included in the ground-water section are areas of study, personnel conducting investigations, list of available reports, outstanding conclusions of recent studies, discussion of need for adequate laws to protect ground-water supplies, summaries of ground water in the El Paso, Houston, and San Antonio areas and in Brooks, Calhoun, Hidalgo, Jim Wells, and Kenedy Counties. Includes a report of the U.S. Geological Survey in cooperation with the Board of Water Engineers: expenditures; work accomplished; methods and equipment; and the need for and value of streamflow records. Lists and describes each basin according to the greatest flood on record and gives a short history of the floods in each basin.

Thirteenth Report of the Texas Board of Water Engineers (1936-38), C. S. Clark, Chairman.

Includes a summary report of stream measurements in Texas by the U.S. Geological Survey. Summary includes the work accomplished: stations discontinued; stations established; total number of discharge measurements made; and a description of floods. Lists the need for and value of streamflow records. Lists and describes each basin according to the greatest flood on record and gives a short history of the floods in each basin. Ground-water section contains lists of counties covered by detailed investigations, water-level-observation programs, and Works Progress Administration water-well inventories. Also included are lists of publications, conclusions of recent studies, and summaries of ground-water conditions in the High Plains, Balcones fault zone, El Paso area, Houston district, Lufkin area, and Gulf Coast Area. In addition there are discussions on waste and contamination of ground water and the need for more adequate ground-water legislation.

Fourteenth Report of the Texas Board of Water Engineers (1938-40), C. S. Clark, Chairman.

Includes a summary report of the Surface Water Branch of the U.S. Geological Survey. This summary includes the work accomplished, the methods and equipment used, and a statement on the need for and value of streamflow records. Ground-water data include lists of investigations in progress, published reports, and reports awaiting publication. Also included are discussions of the High Plains region, El Paso area, Winter Garden district, Houston district, Galveston district, Lufkin area, Balcones fault zone, Balmorhea area, Big Spring area, East Texas oil field, Pecos River Joint Investigation project, Gulf Coast area, equipment for exploring leaking wells, water-level-observation program, and statewide water-well inventories.

Fifteenth Report of the Texas Board of Water Engineers (1940-42), C. S. Clark, Chairman.

Includes a summary of work of Board of Water Engineers and the Surface Water Branch of the U.S. Geological Survey: the need for and the value of streamflow records; work accomplished; a general description of the work; a map showing locations of streamflow stations; and a list of streamflow stations in operation. Contains lists of ground-water investigations in progress, published reports, and reports awaiting publication. Includes summaries of ground-water conditions in the High Plains region, El Paso area, Pecos River basin, Winter Garden district, Houston district, Galveston-Texas City-Baytown district, Lufkin area, Balcones fault zone, and Big Spring area. Also there are discussions of exploration equipment for finding salt-water leaks in water wells, measurements of water levels, chemical analyses of water, and ground water for war activities.

Sixteenth Report of the Texas Board of Water Engineers (1942-44), C. S. Clark, Chairman.

Includes a report on Surface Water Branch of the U.S. Geological Survey. Describes the need for and value of streamflow records, large floods in Texas, and the work accomplished: stations established;

the list of the streamflow stations in operation; list of publications and reports; and a map showing location of the streamflow stations. Also includes lists of published and unpublished ground-water reports and summaries of ground-water conditions in the High Plains region, El Paso area, Pecos River basin, Winter Garden district, Houston district, Galveston-Texas City-Baytown district, Lufkin area, Balcones fault zone, Big Spring area, and East Texas area. Discussions of the water-level-observation program, ground water for war activities, and quality of water are also included.

Seventeenth Report of the Texas Board of Water Engineers (1944-46), C. S. Clark, Chairman.

Includes a section on water resources which describes the actions of the Board of Water Engineers. Section on surface water includes the need for and value of streamflow records; stations established; stations discontinued; list of stations in operation; methods and equipment; cooperating agency; and a list of publications. Ground-water section includes discussions of the increase in use of ground water in Texas, summary of ground-water conditions in areas under study in Texas, and a list of publications. Also included is a section on quality of water describing current investigations and deficiencies in present program.

Eighteenth Report of the Texas Board of Water Engineers (1946-48), E. V. Spence, Chairman.

Report is divided into five sections: administrative; surface water; ground water; quality of water; and a section concerning silt, irrigation, evaporation, and drainage. The administrative section describes the actions of the Board. The surface-water section describes work accomplished. Section on ground water includes discussions of the history of ground-water investigations in Texas, the occurrence, source, and movement of ground water, purpose of ground-water investigations, principal aquifers in Texas, public water supplies, and the water-level-observation program. Quality-of-water section discusses quality and treatment of surface and ground waters. List of ground-water publications included at end of report.

Nineteenth Report of the Texas Board of Water Engineers (1948-50), H. A. Beckwith, Chairman.

Report is divided into six sections: administrative; river-basin development; surface water; ground water; quality of water; and a section on silt, evaporation, and irrigation. The administrative section describes the actions of the Board of Water Engineers. The surface-water section includes a résumé of stream-gaging activities, a report on rainfall and runoff, stream-gaging stations in operation, methods and equipment, future program cooperation, and surface-water publications. Ground-water section includes a history of ground-water investigations in Texas, conditions governing the occurrence, recharge, and movement of ground water, principal aquifers in Texas, summary of ground-water studies in progress, and reports issued during biennium. Quality-of-water section includes composition of typical ground waters in Texas.

Twentieth Report of the Texas Board of Water Engineers (1950-52), H. A. Beckwith, Chairman.

Includes sections on how water comes to the land; rainfall in Texas; an organization chart of the State Board of Water Engineers; and actions of the Board. Includes reports of work of cooperating agencies on surface water; ground water; quality of water; and irrigation, silt, and evaporation investigation and research. Shows average annual rainfall in Texas; also river basin development, giving total runoff of Texas streams and the average annual runoff of rivers in Texas. Summarizes ground-water investigations and research and discusses the present use of ground water, quality of ground water available, work accomplished during the biennium, and proposed work during the coming biennium. Included in appendix is procedure for State Board of Water Engineers to make designation of underground-water reservoirs.

Twenty-first Report of the Texas Board of Water Engineers (1952-54), H. A. Beckwith, Chairman.

Includes sections on the analysis of hydrologic data by electronic data processing; model spillway studies; water of the Rio Grande; Sabine River flood of April to June 1953; surface-water resources investigation and research; and Texas streamflow-gaging stations. Includes sections on ground water; quality of water; and irrigation, silt, and evaporation investigation and research. Lists ground-water investigations completed or in progress during the biennium and discusses need for intelligent development of ground-water resources in Texas. Also included is a history of the ground-water studies in Texas.

Twenty-second Report of the Texas Board of Water Engineers (1954-56), R. M. Dixon, Chairman.

Includes sections on surface water; ground water; quality of water; irrigation, silt, and evaporation studies in Texas; and topographic mapping.

Summarizes stream measurement activities, dam and reservoir site evaluations, evaporation studies, ground-water investigations, specific duties of the Ground Water Division, list of ground-water projects and status of progress, cooperative studies, and the activities of the Permits and Appropriations Sections. Gives an explanation of water quality and the status of the water quality sampling network in the State.

Twenty-fifth Report of the Texas Water Commission (1960-62), Joe D. Carter, Chairman.

Includes sections on agency organization, surface water permits, waste-injection permits, water districts, Texas Water Development Board applications, State Reclamation Engineer functions, basic data, ground-water investigations, surface-water investigations, and water-resource planning.

Twenty-sixth Report of the Texas Water Commission (1962-64), Joe D. Carter, Chairman.

Summarizes water-resources activities for the biennium. Includes sections on administration, planning, surface water, and ground water.

First Report of the Texas Water Development Board (1964-66), Mills Cox, Chairman.

Describes agency functions, direction, and organization. Water-resources activities are summarized under agency organizational units.

Second Report of the Texas Water Development Board (1966-68), Mills Cox, Chairman.

Agency functions, direction, and organization are described. Also summarizes all work completed and activities of the Board related to water resources.

Third Report of the Texas Water Development Board (1968-70), Marvin Shurbet, Chairman.

Water-resources activities are summarized under organizational units. Includes a separate section on planning and an appendix of geographical information on studies and programs.

Fourth Report of the Texas Water Development Board (1970-72), W. E. Tinsley, Chairman.

Summarizes Board functions, water development issues, Board organization, and Board programs. Also includes illustrations and tables pertaining to water-resources activities.

Fifth Report of the Texas Water Development Board (1972-74), John H. McCoy, Chairman.

Describes Board functions, organization, and technical programs. Also, presents Board policy recommendations for consideration by the Legislature, and summarizes the Board's activities during the biennium.

Texas Board of Water Engineers and others, 1958, Water developments and potentialities of the State of Texas, published and submitted by Governor Price Daniel to Senator Lyndon B. Johnson, who caused it to be reproduced as Senate Document 111, Eighty-fifth Congress, Second Session.

A joint report prepared by the Texas Board of Water Engineers, U.S. Corps of Engineers, U.S. Soil Conservation Service, and U.S. Bureau of Reclamation. The general purpose is to present available information on water-resource developments in Texas, summarize the status of planning, and provide guideposts which will be useful in achieving future progress.

Texas Board of Water Engineers, 1958, Texas water resources planning at the end of the year 1958, A progress report to the Fifty-sixth Legislature.

Treats in broad outline availability, development, and use of ground and surface water resources, with projections of probable water needs and a preliminary review of the planning for the development of the surface waters of the State by river authorities, federal agencies, and other authorized governmental agencies.

Texas Board of Water Engineers, 1961, A plan for meeting the 1980 water requirements of Texas.

Proposes development programs for each of the State's 14 principal river basins and adjoining coastal areas, with special attention to the needs of large population and industrial centers. The plan also proposes construction by 1980 of 45 new reservoirs and enlargement of 2 others to supplement the 73 existing reservoirs and 14 under construction, in order to meet a projected annual water requirement of 6,547,500 acre-feet.

Texas Water Development Board, 1966, Water for Texas—a plan for the future.

A discussion of the nature and benefits of a comprehensive water plan, containing a statewide summary of tentative water-development proposals as of May 1966. [The Preliminary Texas Water Plan]

Texas Water Development Board, 1966, Summaries of proposed water resources development in the 23 major river and coastal basins of Texas.

Reports were published from June to August 1966 summarizing regional hydrology, water use, projected water needs, and the water-development projects tentatively proposed in the respective 23 major river and coastal basins of Texas. These reports were widely distributed in preparation for 27 public hearings on the proposed plan held during the summer of 1966.

Texas Water Development Board, 1968, The Texas water plan.

Presents in detail the Texas Water Plan, proposing means of meeting the water needs in Texas to and beyond the year 2020. The Texas Water Plan reflects numerous changes made in the earlier planning proposals, as a result of re-evaluations following 27 public hearings. The document contains evaluations of water resources, projections of future water needs, and descriptions of the physical works required such as reservoirs and conveyance facilities. Also contained are proposals for implementing the Texas Water Plan, including administration, financing, and a controlling time schedule of governmental actions that must be met if the water supplies are to be available when needed.

Texas Water Development Board, 1968, The Texas water plan—summary.

Summarizes the most essential features of the Texas Water Plan.

Bulletins

(Index Code WdB)

WdB 5001. Geology and ground-water resources of the Houston district, Texas: 1950, by J. W. Lang, A. G. Winslow, and W. N. White.

Gives information about the geology in relation to ground water. Summarizes the results of previous investigations, gives the results of deep-well exploration, and brings up to 1950 information about pumpage, fluctuations of water levels, pumping tests, and quality of water.

WdB 5003. Geology and ground-water resources of Walker County, Texas: 1950, by A. G. Winslow.

Gives information about the geology and occurrence of ground water and the development and use. Also given are records of wells, logs, and chemical analyses of ground water.

WdB 5004. Development of ground water for irrigation in the Dell City area, Hudspeth County, Texas: 1950, by R. A. Scalapino.

Gives information about the geology and occurrence of ground water, development, and fluctuations of water levels. Also gives records of wells, logs, water levels, and chemical analyses of ground water.

WdB 5101. Water supply of the Houston Gulf Coast region: 1951, by W. H. Goies, A. G. Winslow, and J. R. Barnes.

Summarizes the development and use of water from both surface and underground sources. Shows that greater development is possible.

WdB 5102. Summary of the development of ground water for irrigation in the Lobo Flats area, Culberson and Jeff Davis Counties, Texas: 1951, by J. W. Hood and R. A. Scalapino.

Summarizes the geology in relation to the occurrence of ground water. Gives information about the development and fluctuations of water levels, also gives records of wells, logs, and chemical analyses of ground water.

WdB 5103. Ground-water resources of Parker County, Texas: 1951, by G. J. Stramel.

Gives information about the geologic formations and their water-bearing properties and ground-water development and use; also gives records of wells, logs, and chemical analyses of ground water.

WdB 5104. Development of wells for irrigation and fluctuation of water levels in the High Plains of Texas to January 1951: 1951, by E. R. Leggat.

WdB 5201. The Houston district, Texas, Pumpage and decline of artesian pressure during 1950-51: 1952, by A. G. Winslow and T. R. Fluellen, Jr.

Reviews and brings up to 1950 the pumpage and fluctuations of water levels; also gives tables of pumpage and declines of artesian pressures in wells.

WdB 5202. Summary of ground-water development in the Pecos area, Reeves and Ward Counties, Texas, 1947-51: 1952, by J. W. Hood and D. B. Knowles.

Gives information about the use of ground water and changes in water levels.

WdB 5203. Records of wells, drillers' logs, water analyses, and map showing location of wells in Winter Garden district, Dimmit and Zavala Counties and eastern Maverick County, Texas: 1952, by D. E. Outlaw and others.

WdB 5204. Ground-water resources in the vicinity of Kenmore Farms, Kendall County, Texas: 1952, by W. O. George and W. W. Doyel.

Gives information about the geology and occurrence of ground water and the movement of ground water; also gives records of wells, logs, and chemical analyses of ground water.

WdB 5205. Texas index of surface water records, 1882-1951, Discharge, sediment, chemical quality, water temperature: 1952, by Texas Board of Water Engineers and U.S. Geological Survey.

WdB 5206. Results of artificial recharge of the ground-water reservoir at El Paso, Texas: 1952, by R. W. Sundstrom and J. W. Hood.

Gives the results of a recharge test in the Montana well field and evaluates the feasibility of artificial recharge at the Montana and Mesa well fields.

WdB 5207. Geology and ground-water resources of Lynn County, Texas: 1952, by E. R. Leggat.

Gives information about the geologic formations and their water-bearing properties and the development and use of ground water. Also gives water levels in wells, records of wells, logs, and chemical analyses of ground water.

WdB 5208. Water resources of Waller County, Texas: 1952, by T. R. Fluellen and W. H. Goines.

Gives information about the relation of geology to the occurrence of ground water and the utilization of ground water. Information about surface-water supply is also given along with records of wells, logs, and chemical analyses of ground water.

WdB 5209. Ground-water resources of Starr County, Texas: 1952, by O. C. Dale.

Gives information about the occurrence of ground water; also gives records of wells, logs, and chemical analyses of ground water.

WdB 5210. Ground-water resources of Ector County, Texas: 1952, by D. B. Knowles.

Gives information about the geologic formations and their water-bearing properties and the development and use of water from wells. Also gives records of wells, drillers' logs, and chemical analyses of water from wells.

WdB 5301. Ground-water resources of the Odell sand hills, Wilbarger County, Texas: 1953, by G. W. Willis and D. B. Knowles.

Gives the results of test drilling, indicates areas favorable for additional development of ground water, and gives the results of pumping test and theoretical drawdowns and pumping levels for assumed spacing of production wells. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5302. Records of water-level measurements in Hale County, Texas, 1910-1953: 1953, by C. R. Follett.

WdB 5303. Records of water-level measurements in Lubbock County, Texas, 1936-1953: 1953, by C. R. Follett.

WdB 5304. Records of water-level measurements in Floyd County, Texas, 1913-1953: 1953, by C. R. Follett.

WdB 5305. Records of water-level measurements in Deaf Smith County, Texas, 1914-1953: 1953, by C. R. Follett.

WdB 5306. Records of water-level measurements in Lamb County, Texas, 1914-1953: 1953, by C. R. Follett.

WdB 5307. Records of water-level measurements in Swisher County, Texas, 1914-1953: 1953, by C. R. Follett.

WdB 5401. Pumpage of ground water and decline of artesian pressure in the Houston district, Texas, during 1951 and 1952: 1954, by W. W. Doyel, A. G. Winslow, and W. L. Naftel.

WdB 5402. Summary of ground-water development in the Southern High Plains, Texas: 1954, by E. R. Leggat.

Brings up to 1954 information about the use of ground water, the fluctuations of water levels, and summarizes the effects of ground-water development on the pumping levels and discharges of wells.

WdB 5403. Ground-water resources of Cameron County, Texas: 1954, by O. C. Dale and W. O. George.

Gives information about the water-bearing formations and the use of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5404. Records of water-level measurements in Dallam, Hansford, Hartley, Hutchinson, Moore, Ochiltree, and Sherman Counties, Texas: 1954, by C. R. Follett.

WdB 5405. Records of water-level measurements in Martin County, Texas, 1936-1953: 1954, by C. R. Follett.

WdB 5406. Records of water-level measurements in Bailey, Briscoe, Castro, Parmer, Potter, and Randall Counties, Texas: 1954, by C. R. Follett.

WdB 5407. Records of water-level measurements in Cochran, Crosby, Gaines, Hockley, Lynn, and Terry Counties, Texas: 1954, by C. R. Follett.

WdB 5408. Records of water-level measurements in Loving and Ward Counties, Texas: 1954, by C. R. Follett.

WdB 5409. Salt water and its relation to fresh ground water in Harris County, Texas: 1954, by A. G. Winslow and W. W. Doyel.

Gives a summary of the relation between fresh and salt water in aquifers; considers the possible means of natural discharge from the aquifer, the probable occurrence of fresh and salt water prior to ground-water withdrawals, and the present occurrence of salt water. Also shows the effect of ground-water withdrawals and considers the possible sources of salt-water contamination.

WdB 5410. Ground-water development in the Southern High Plains of Texas, 1953: 1954, by E. R. Leggat.

Summarizes the ground-water development, use, and fluctuations of water levels to 1954. Shows the decline in water levels from January 1953 to January 1954.

WdB 5411. Ground-water resources of Tom Green County, Texas: 1954, by G. W. Willis.

Gives information about the geology and relation to the ground water and the occurrence, quality, and development of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5412. Ground-water resources of the San Antonio area, Texas, A progress report of current studies: 1954, by J. W. Lang.

Gives a summary of the geology and the occurrence of ground water. Also gives information about the hydrology and an estimate of the perenial yield of the Edwards Limestone aquifer. Also discusses water-supply problems.

WdB 5413. Records of wells in Bastrop County, Texas: 1954, by G. M. Austin.

Gives records of wells, logs, and chemical analyses of ground water.

WdB 5414. Records of water-level measurements in Reeves County, Texas: 1954, by C. R. Follett.

WdB 5415. Records of water-level measurements in Culberson, Hudspeth, and Jeff Davis Counties, Texas: 1954, by C. R. Follett.

WdB 5416. Records of water-level measurements in Atascosa and Frio Counties, Texas: 1954, by B. W. Swartz.

WdB 5417. Records of water-level measurements in El Paso County, Texas: 1954, by C. R. Follett.

WdB 5418. Ground-water resources of Jones County, Texas: 1954, by A. G. Winslow, W. W. Doyel, and C. H. Gaum.

Gives information about the geologic formations and their relation to the occurrence of ground water, utilization, quality and possibilities for future development. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5501. Records of wells in Hays County, Texas: 1955, by K. J. DeCook and W. W. Doyel.

Gives logs of wells, water levels, and chemical analyses of ground water.

WdB 5502. Geology and ground-water resources of Galveston County, Texas: 1955, by B. M. Petitt, Jr., and A. G. Winslow.

Gives information about the geologic formations and their water-bearing properties, the history of water supplies, the ground-water hydrology, and the quality of water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5503. Records of water-level measurements in Haskell and Knox Counties, Texas: 1955, by C. R. Follett.

WdB 5601. Geology and ground-water resources of Medina County, Texas: 1956, by C. L. R. Holt, Jr.

Describes the rock units and their water-bearing properties. Gives information about the occurrence, recharge, movement, discharge, and quality of ground water, and fluctuations of water levels. Also gives records of wells and springs, logs, water levels, and chemical analyses of ground water.

WdB 5602. Pumpage of ground water and changes in artesian pressure in the Houston district and Baytown-La Porte area, Texas, 1953-55: 1956, by L. A. Wood.

WdB 5603. Ground-water resources of the El Paso district, Texas, Progress Report No. 7: 1956, by R. E. Smith.

Brings up to 1956 information about pumpage and the fluctuation of water levels. Also gives information about the removal of water from storage in the Hueco bolson and about salt-water encroachment. Gives water levels in wells and chemical analyses of ground water.

WdB 5604. Ground-water resources of the Crane sandhills, Crane County, Texas: 1956, by G. H. Shafer.

Gives information about the geologic formations and their water-bearing properties, the development of water from wells, and the quality of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5605. Basic data and summary of ground-water resources of Chambers County, Texas: 1956, by W. W. Doyel.

Gives information about the occurrence of ground water and the decline in water levels. Also gives records of wells, logs, water levels in wells, and chemical analyses of ground water.

WdB 5606. Records of water-level measurements in Bexar County, Texas: 1956, by C. R. Follett.

WdB 5607. Water-level decline maps of 17 counties in the Southern High Plains, Texas, January 1955 to January 1956: 1956, by C. R. Follett.

WdB 5608. Ground-water resources of the San Antonio area, Texas: 1956, by B. M. Petitt, Jr. and W. O. George.

Volume I: Gives information about the water-bearing formations and structure. For the Edwards and associated limestones, gives information about the recharge by basins, the yields of wells, fluctuations of water levels, the movement of water in the Balcones fault zone, the relation of water levels to spring flow, the relation of reservoir storage to

water levels in wells, and the temperature of the water.

Volume II, Part 1: Gives the records of wells and springs.

Volume II, Part 2: Gives records of drillers' logs.

Volume II, Part 3: Gives the water levels in wells, chemical analyses of ground water, records of streamflow and reservoir contents, discharge measurements, and precipitation.

WdB 5609. Records of water-level measurements in Medina County, Texas, 1930 to March 1956: 1956, by C. R. Follett.

WdB 5610. Records of water-level measurements in Comal and Guadalupe Counties, Texas, 1933 to March 1956: 1956, by C. R. Follett.

WdB 5611. Records of water-level measurements in Kinney, Uvalde, and Val Verde Counties, Texas, 1929 to March 1956: 1956, by C. R. Follett.

WdB 5612. Records of water-level measurements in Hays, Travis, Williamson Counties, Texas, 1937 to May 1956: 1956, by C. R. Follett.

WdB 5613. Records of water-level measurements in Childress, Cottle, Hardeman, and King Counties, Texas, 1940 to January 1956: 1956, by C. R. Follett.

WdB 5614. Records of water-level measurements in Foard and Wilbarger Counties, Texas, 1936 to January 1956: 1956, by C. R. Follett.

WdB 5615. Ground-water resources of the Hueco bolson, northeast of El Paso, Texas: 1956, by D. B. Knowles and R. A. Kennedy.

Gives information about the occurrence of ground water and the ground-water reservoirs, ground-water development and fluctuations of water levels, pumping tests and application of the results, and the ground water in storage.

WdB 5617. Records of water-level measurements in Dimmit, Maverick, and Zavala Counties, Texas, 1920, 1928 to September 1956: 1956, by C. R. Follett.

WdB 5701. Artificial-recharge experiments at McDonald well field, Amarillo, Texas: 1957, by E. A. Moulder and D. R. Frazor.

Describes a recharge test made to determine the practicability of recharge through wells, the recharge-head relationship of injection wells, the storage and transmitting properties of the aquifer, the effect on water levels, and the percentage of water that can be recovered by pumping, and gives the test data.

WdB 5702. Records of water levels in Bastrop and Caldwell Counties, Texas, 1937 through December 1956: 1957, by B. W. Swartz.

WdB 5703. Records of water levels in Aransas and San Patricio Counties, Texas, 1938 through December 1956: 1957, by B. W. Swartz.

WdB 5704. Geology and ground-water resources of Lamb County, Texas: 1957, by E. R. Leggat.

Describes the geologic formations and their water-bearing properties and gives information about the occurrence, recharge, discharge, development and quality of ground water, and the fluctuations of water levels. Also gives records of wells, logs, water levels, and chemical analyses of ground water.

WdB 5705. Water level decline maps, 1956 to 1957, and water levels in observation wells in 20 counties in the Southern High Plains, Texas: 1957, by C. R. Follett.

WdB 5706. The use of ground water for irrigation in Childress County, Texas: 1957, by G. H. Shafer.

Gives information about the occurrence, use, and quality of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5707. Water level maps and water levels in observation wells in the North High Plains, Texas: 1957, by C. R. Follett.

WdB 5708. Records of wells in Travis County, Texas: 1957, by Ted Arnow.

Gives records of wells, logs, and chemical analyses of ground water.

WdB 5709. Geology and ground-water resources of Tarrant County, Texas: 1957, by E. R. Leggat.

Gives information about the geologic units and their water-bearing properties; occurrence, development, and use of ground water; and fluctuations of water levels. For the principal ground-water reservoirs, gives information about the yields and specific capacities of wells, the results and application of results of pumping tests, the potential for future development, and the quality of the water. Also gives records of wells, logs, water levels, and chemical analyses of ground water.

WdB 5710. Ground-water geology of Wilson County, Texas: 1957, by R. B. Anders.

Gives information about the geology and water-bearing properties of the formations, development of ground water, pumping tests, and quality of water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5711. Ground-water resources of Goliad County, Texas: 1957, by O. C. Dale, E. A. Moulder, and Ted Arnow.

Gives information about the rock formations and their water-bearing properties. Also, gives the occurrence of ground water, pumping tests, present and potential development, relationship between ground water and surface water, and quality of water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5712. Ground-water geology of the Alpine area, Brewster, Jeff Davis, and Presidio Counties, Texas: 1957, by R. T. Littleton and G. L. Audsley.

Gives information about the geologic formations and their water-bearing properties, geologic structure, occurrence and movement of ground water, and the quality of water. Gives information about ground-water exploration, and indicates areas of possible additional development. Also gives records of wells, logs, water levels, and chemical analyses of ground water.

WdB 5801. Ground-water geology in the vicinity of Dove and Croton Creeks, Stonewall, Kent, Dickens, and King Counties, Texas, with special reference to salt-water seepage: 1958, by L. G. McMillion.

Gives information about the geology, including the stratigraphy of the salt-producing areas and geologic structure, and about topography and the water table, ground water in northeast Kent County, and the artesian system of the Childress Dolomite. Also contains records of wells and exploration holes and logs.

WdB 5802. Ground-water conditions in Carson County, Texas: 1958, by Chris Gard.

Gives information about the geologic formations and water supply; the source, movement, chemical quality, and utilization of ground water; and well performance. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 5803. Ground-water geology of Real County, Texas: 1958, by A. T. Long, Jr.

Gives information about the rock formations and their water-bearing properties, the occurrence and movement of ground water and the

relation to streamflow and development, and quality of water. Also gives records of wells, logs, water levels, and analyses of ground water.

WdB 5804. Records of water-level measurements in Jackson, Matagorda, and Wharton Counties, Texas, 1934 to April 1958: 1958, by F. A. Rayner.

WdB 5805. Pumpage of ground water and fluctuations of water levels in the Houston district and Baytown-La Porte area, Texas, 1955-57: 1958, by L. A. Wood.

Also gives information about the changes in chemical quality of the water.

WdB 5806. Records of water-level measurements in Collingsworth, Hemphill, Roberts, and Wheeler Counties, Texas, 1937 through July 1958: 1958, by F. A. Rayner.

WdB 5807-A. Compilation of surface-water records in Texas through September 1957: 1958, by Texas Board of Water Engineers and U.S. Geological Survey.

Data presented for most of the gaging stations comprise a description of the station, tables of monthly discharge and runoff, and a yearly summary table. Supersedes U.S. Geological Survey Water-Supply Paper 850.

WdB 5807-B. Texas index of surface-water records, 1882-1957, Discharge, sediment chemical quality, and water temperature: 1958, by Texas Board of Water Engineers and U.S. Geological Survey.

Provides a convenient index of basic data for Texas streams and reservoirs. Includes records of flow, stage, contents, temperatures, chemical quality, and sediment load. Supersedes Bulletin 5205.

WdB 5807-C. Summary of peak flood-flow measurements and other measurements of stream discharge in Texas at points other than gaging stations: 1959, by Texas Board of Water Engineers and U.S. Geological Survey.

Summarizes in one volume all streamflow measurements made in Texas prior to September 30, 1957.

WdB 5807-D. Channel gain and loss investigations, Texas streams, 1918-1958: 1960, by Texas Board of Water Engineers and U.S. Geological Survey.

Presents two sections: (1) low-flow investigations, including tabulation of measurements, text, and substantiating information; and (2) delivery of water investigations, including discussion of purpose and scope, summary of results, and presentation of results in hydrographs and time-of-travel curves.

WdB 5807-E. Texas stream-gaging program, Evaluation and recommendations: 1960, by Texas Board of Water Engineers and U.S. Geological Survey.

Sets forth the procedures, problems, and findings in an analytical review and evaluation of the current stream-gaging program in Texas with recommendations as to the number and locations of new stations required to develop a balanced stream-gaging program.

WdB 5808. Pumpage of ground water and changes in water levels in Galveston County, Texas, 1952-57: 1958, by L. A. Wood.

Also gives information about subsidence of the land surface and changes in chemical quality of the ground water.

WdB 5901. Records of water-level measurements in Chambers, Liberty, and Montgomery Counties, Texas, 1931 through April 1958: 1959, by F. A. Rayner.

WdB 5902. Records of water-level measurements in Bell, McLennan, and Somervell Counties, Texas, 1930 through 1957: 1959, by F. A. Rayner.

WdB 5903. Records of water-level measurements in Crockett, Glasscock, Reagan, Upton, and Terrell Counties, Texas, 1937 through 1957: 1959, by F. A. Rayner.

WdB 5904. Records of water-level measurements in Brazoria, Fort Bend, and Waller Counties, Texas, 1931 through June 1958: 1959, by F. A. Rayner.

WdB 5905. Chemical composition of Texas surface waters: 1956, by Texas Board of Water Engineers and U.S. Geological Survey.

Provides in table form the results of chemical analysis of water obtained daily from selected points throughout the State, and gives the results from a number of miscellaneous samples obtained at various points.

WdB 5906. Records of water-level measurements in Crane and Midland Counties, Texas, 1937 through 1957: 1959, by F. A. Rayner.

WdB 5907. Records of water-level measurements in Mitchell, Nolan, Sterling, and Tom Green Counties, Texas, 1938 through 1957: 1959, by F. A. Rayner.

WdB 5908. Water-level measurements and maps, Southern High Plains, Texas, 1958 and 1959: 1959, by F. A. Rayner.

WdB 5909. Water-level measurements and maps, Northern High Plains, Texas, 1958 and 1959: 1959, by F. A. Rayner.

WdB 5910. Water requirements survey for Texas: 1959, by the Bureau of Business Research, The University of Texas.

Presents water requirements for all the river basins in Texas. These requirements are broken down into industrial, nonindustrial, and total requirements. Includes the water requirements and the population of all Texas cities of 5,000 persons or over, and projections.

WdB 5911. Ground-water geology of Bexar County, Texas: 1959, by Ted Arnow.

Gives information about the geology and water-bearing properties of the formations, and, for the Edwards and associated limestones, the recharge, discharge, movement of water, fluctuations of water levels, and quality of the water.

WdB 5912. Inventory and use of sedimentation data in Texas: 1959, by U.S. Soil Conservation Service.

Brings together all available pertinent data on sedimentation records in order to furnish the best possible estimate of average annual sediment rates for the watersheds larger than 100 square miles throughout the State. Curves are shown indicating average annual rates of sediment production by land resource areas for watersheds ranging from 100 to 10,000 square miles in size. Sediment problems in the 17 major river basins of the State are discussed, as are various types of sediment damage including sedimentation of reservoirs.

WdB 5913. Texas index of meteorological data, 1885-1959: 1959, by Texas Board of Water Engineers.

Lists the meteorological stations and shows graphically the periods for which records of meteorological data are available for the period 1885 to 1959.

WdB 5914. A study of droughts in Texas: 1959, by R. L. Lowry, Jr.

Includes information on the variation in annual rainfall, extent and severity of droughts, description of historical droughts beginning in 1891 to 1956, summary of 11 droughts since 1889, severity of the climates during the droughts, effects of drought on the Texas economy, effects of drought on water supplies, consideration of past droughts and the design of supply projects, what can be done about future droughts, and background of the economic distress in the Great Plains.

WdB 5915. Chemical composition of Texas surface waters, 1957: 1959, by L. S. Hughes.

Contains the same type of information as Bulletin 5905.

WdB 5916. Geology and ground-water resources of Winkler County, Texas: 1959, by Sergio Garza and J. B. Wesselman.

Gives information about the geologic formations and their water-bearing properties; information about the occurrence, movement, use, and quality of ground water; and the results of pumping tests. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 6001. Surface runoff from Texas watersheds and sub-basins: 1960, by Lockwood, Andrews and Newnam.

Presents an inventory and analysis of data regarding drainage areas, surface runoff, consumptive uses, and reservoir storage for the State.

WdB 6002. Brine production and disposal on the lower watershed of Chambers and Richland Creeks, Navarro County, Texas: 1960, by F. L. Osborne, Jr., and V. M. Shamburger.

Gives information about the history of oil development, geology, brine production and disposal, and the chemical quality of produced water.

WdB 6003. Geology and ground-water resources of Dimmit County, Texas: 1960, by C. C. Mason.

Gives information about the rock formations and their water-bearing properties. For the Carrizo Sand, gives information about the occurrence and withdrawals of ground water, changes in water levels, and recharge. Also gives information about the quality of water, records of wells, logs, water levels, and chemical analyses of ground water.

WdB 6004. Geology and ground-water resources of Hays County, Texas: 1960, by K. J. DeCook.

Gives information about the geology and water-bearing properties of the rock units and structural geology; gives information about the occurrence, recharge, movement, discharge, quality, and utilization of ground water. Also gives records of wells and springs, water levels, logs, and chemical analyses of ground water.

WdB 6005. Water-level measurements in Culberson, Hudspeth, and Jeff Davis Counties, Texas: 1960, by Jack Stearman.

WdB 6006. Monthly reservoir evaporation rates for Texas, 1940-1957: 1960, by R. L. Lowry, Jr.

Presents tables and charts from which monthly rates of evaporation can be obtained for water-supply analysis. Explains procedures used, development of data, and the proper use of results obtained.

WdB 6007. Ground-water geology of Karnes County, Texas: 1960, by R. B. Anders.

Gives information about the geologic formations and occurrence of ground water, ground-water development, changes in water levels, and potential development. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 6008. Water levels in observation wells in Cameron, Hidalgo, and Starr Counties, Texas, 1950-1959: 1960, by Jack Stearman.

WdB 6009. Water levels in observation wells in Haskell and Knox Counties, Texas, 1956-1960: 1960, by Jack Stearman.

WdB 6010. Geology and ground-water resources of Hale County, Texas: 1960, by J. G. Cronin and L. C. Wells.

Gives information about the geologic formations and their water-bearing properties; the occurrence of ground water; the hydraulic properties of the aquifer; recharge, movement, and discharge of water; and the water in storage. Also gives records of wells, logs, water levels, and chemical analyses of ground water.

WdB 6011. Water levels in observation wells, Southern High Plains, Texas, 1959 and 1960: 1960, by Jack Stearman.

WdB 6012. Water levels in observation wells, Northern High Plains, Texas, 1958-1960: 1960, by Jack Stearman.

WdB 6013. Geology and ground-water resources of Grayson County, Texas: 1960, by E. T. Baker, Jr.

Gives information about the rock units and their water-bearing properties; the occurrence and movement of ground water; and for the water-bearing formations, the fluctuations of water levels, the hydraulic characteristics, future development, use, and quality of water. Also gives records of wells and springs, water levels, logs, and chemical analyses of ground water.

WdB 6014. Ground-water resources of the Lower Rio Grande Valley area, Texas: 1961, by R. C. Baker and O. C. Dale.

Volume I: Gives information about the sources of ground water and the principal ground-water reservoirs; gives information about the development of ground water, fluctuations of water levels, quality of water, hydraulic characteristics, and hydrology.

Volume II: Gives records of wells, logs, water levels, and chemical analyses of ground water.

WdB 6015. Water levels in observation wells in Atascosa and Frio Counties, Texas, 1955-1960: 1960, by Jack Stearman.

WdB 6016. Reconnaissance investigation of the ground-water resources of the Canadian River Basin, Texas: 1960, by Texas Board of Water Engineers.

Gives information about the geology and the occurrence of ground water by geologic units, the quality and development of ground water, and ground water available for future development.

WdB 6017. Ground-water geology of the Hickory Sandstone Member of the Riley Formation, McCulloch County, Texas: 1961, by C. C. Mason.

Gives information about the stratigraphic units and their water-bearing properties in McCulloch County. For the Hickory Sandstone Member, gives information about the hydrologic characteristics, use of water, recharge, movement and discharge, water in storage, fluctuations of water levels, and quality of water. Also gives records of wells, logs, water levels, and chemical analyses of ground water.

WdB 6018. Irrigation in Texas in 1958: 1960, by the U.S. Soil Conservation Service, State Soil Conservation Board, and Texas Board of Water Engineers.

Contains for the 1958 crop year: (1) total acreage irrigated; (2) total acreage irrigated from surface water; (3) total acreage irrigated from underground water; (4) total acreage irrigated from combined supplies of surface and underground water; (5) number of acres irrigated by sprinkler systems; (6) number of sprinkler systems; (7) number of irrigation wells; (8) total acreage of dry land soils similar to those presently irrigated which could be irrigated if water were provided; and (9) tabulation of crop acreage and amount of water applied on various crops. Total area of land irrigated prior to 1958 was also compiled.

WdB 6019. Consumptive use of water by major crops in Texas: 1960, by L. L. McDaniels.

Gives estimates of average consumptive use amounts for 12 major crops and crop groupings. The estimates are tabulated by months for the respective months of growing season for each crop for each of the 24 areas of major production in the State.

WdB 6101. Water levels in observation wells, Southern High Plains, Texas, 1960 and 1961: 1961, by D. C. Draper.

WdB 6102. Geology and ground-water resources of Carson County and part of Gray County, Texas, Progress Report No. 1: 1961, by A. T. Long, Jr.

Gives information about the geologic formations and their water-bearing properties; the occurrence, use, availability, and quality of ground water; and the

fluctuations of water levels. Also gives tables of water levels and chemical analyses of ground water.

WdB 6103. Annual water-level measurements in observation wells, Northern High Plains, Texas, 1960 and 1961: 1961, by R. C. Lucas.

WdB 6104. Chemical composition of Texas surface waters, 1958: 1961, by L. S. Hughes and Wanda Jones.

Contains information similar to Bulletin 5905.

WdB 6105. Ground-water geology of Live Oak County, Texas: 1961, by R. B. Anders and E. T. Baker, Jr.

Gives information about the geology and occurrence of ground water, pumping tests, changes in water levels, development and potential development, and quality of water. Also gives records of wells, drillers' logs, and chemical analyses of ground water.

WdB 6106. Geology and ground-water resources of Pecos County, Texas: 1961, by C. A. Armstrong and L. G. McMillion.

Volume I: Gives information about the geologic formations and their water-bearing properties. Describes the Pecos aquifer, including development, movement, recharge and discharge, and quality of water. Gives detailed descriptions of the areas of ground-water development. Also gives records of wells.

Volume II: Gives drillers' logs, water levels in wells, and chemical analyses of water.

WdB 6107. A summary of the occurrence and development of ground water in the Southern High Plains of Texas: 1961, by J. G. Cronin.

Gives information about the geologic units and their water supply. For the Ogallala Formation, gives information about the occurrence, use, recharge and movement of ground water, hydraulic properties, fluctuations of water levels, water in storage, and quality of water. Also gives the outlook for the future.

WdB 6108. Silt load of Texas streams, Compilation report for the period June 1889-September 1959: 1961, compiled by I. M. Stout, L. C. Bentz, and H. W. Ingram.

Contains monthly records from silt-sampling stations in Texas.

WdB 6109. Geology and ground-water resources of the Northern High Plains of Texas, Progress Report No. 1: 1961, by W. H. Alexander, Jr.

Gives information about the geologic formations and their water-bearing properties; gives the occurrence, use, availability, and quality of ground water, together with fluctuations of water levels. Also gives chemical analyses of water from selected wells.

WdB 6110. Ground-water reconnaissance of the Marfa area, Presidio County, Texas: 1961, by M. E. Davis.

Gives information about the geologic formations and their water-bearing properties; gives information about the occurrence, movement, recharge, and quality of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 6111. A reconnaissance of the ground-water resources of the Marathon area, Brewster County, Texas: 1961, by K. J. DeCook.

Gives information about the geologic formations and their water-bearing properties; gives information about the occurrence, movement, recharge, discharge, and quality of ground water, together with the fluctuations of water levels. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 6201. Recharge, discharge, and changes in ground-water storage in the Edwards and associated limestones, San Antonio area, Texas, A progress report on studies, 1955-59: 1962, by Sergio Garza.

WdB 6202. Ground-water resources of Victoria and Calhoun Counties, Texas: 1962, by R. F. Marvin, G. H. Shafer, and O. C. Dale.

Gives information about the occurrence, movement, and quality of ground water; pumping tests; fluctuations of water levels; and present and potential development.

WdB 6203. Ground-water resources of the lower Mesilla Valley, Texas and New Mexico: 1962, by E. R. Leggat, M. E. Lowry, and J. W. Hood.

Gives information about the geology pertinent to the occurrence of ground water; recharge, movement, and discharge of ground water; fluctuations of water levels; water in storage; and quality of water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 6204. Development of ground water in the El Paso district, Texas, 1955-60, Progress Report No. 8: 1962, by E. R. Leggat.

Gives information about the development and pumpage of ground water, fluctuations of water levels, results of pumping tests, quality of water, and artificial recharge. Also gives records of wells and chemical analyses of ground water.

WdB 6205. Chemical composition of Texas surface waters, 1959: 1962, by L. S. Hughes and Wanda Shelby.

Contains information similar to Bulletin 5905.

WdB 6206. Research in the problem of scaling of electrodialysis demineralizers: 1962, by D. A. Cowan.

Describes the results of experiments in which electrodialysis demineralizers were used for desalinization. Presents conclusions and recommendations concerning the problem of scaling of electrodialysis demineralizers.

WdB 6207. Water-level measurements through 1962 in selected observation wells, Southern High Plains, Texas: 1962, by Texas Water Commission.

WdB 6208. Ground-water geology of Edwards County, Texas: 1962, by A. T. Long, Jr.

Gives information about the rock formations and their water-bearing properties; also gives the occurrence and movement of ground water, relation to streamflow, present and potential development, and quality of water. Also gives records of wells, logs, and chemical analyses of ground water.

WdB 6209. Ground-water resources of Haskell and Knox Counties, Texas: 1962, by William Ogilbee and F. L. Osborne, Jr.

Gives information about the geologic formations and their water-bearing properties. For the Seymour Formation, gives the extent, source, occurrence, recharge, movement, discharge, utilization, and the fluctuations of water levels. Also gives records of wells, logs, water levels, and chemical analyses of ground water.

WdB 6210. Ground-water geology of Bandera County, Texas: 1962, by R. D. Reeves and F. C. Lee.

Gives information about the stratigraphy and water-bearing properties of the rock units; gives information about the occurrence and movement, development, and quality of ground water. Also gives records of wells and springs, logs, and analyses of water.

WdB 6211. Pumpage of ground water and fluctuation of water levels in the Houston district and the Baytown-La Porte area, Texas, 1957-61: 1962, by R. B. Anders and W. L. Naftel.

WdB 6212. Geology and ground-water resources of Uvalde County, Texas: 1962, by F. A. Welder and R. D. Reeves.

Gives information about the rock units and their water-bearing properties and information about the occurrence, recharge, discharge, movement, and quality of ground water, and the fluctuations of water levels. Also gives information on the potential development of ground water, together with records of wells and springs, water levels, logs, and chemical analyses of ground water.

WdB 6213. Annual water-level measurements in observation wells, Northern High Plains, Texas, 1961 and 1962: 1962, by Texas Water Commission.

WdB 6214. Geology and ground-water resources of Reeves County, Texas: 1962, by William Ogilbee and J. B. Wesselman, with section on quality of water by Burdge Irelan.

Volume I: Gives information about the stratigraphic units and their water-bearing properties, and for the minor aquifers gives information about the occurrence, development, and use of ground water. For the Cenozoic alluvium, the principal aquifer, gives information about the movement, recharge, discharge, storage, hydraulic properties, utilization of ground water, fluctuations of water levels, and well construction. Also gives information about quality of water, potential development of ground water, and records of wells and springs.

Volume II: Gives logs, water levels and chemical analyses of ground water.

WdB 6215. Chemical composition of Texas surface waters, 1960: 1962, by L. S. Hughes and Wanda Shelby.

Contains information similar to Bulletin 5905.

WdB 6216. Geology and ground-water resources of Kinney County, Texas: 1962, by R. R. Bennett and A. N. Sayre.

Gives information about the rock formations and their water-bearing properties. For the Edwards and associated limestones, gives information about the occurrence, recharge, movement, and discharge of ground water and also fluctuations of water levels and spring discharge; gives quality of water for the different aquifers. Also gives records of wells and springs, water levels, logs, and chemical analyses of ground water.

WdB 6301. Availability of ground water from the Goliad Sand in the Alice area, Texas: 1963, by C. C. Mason.

Gives information about the geology in relation to ground water; the occurrence, quality, and development of ground water; pumping tests; changes in water levels; problems of well construction; and future development. Also gives records of wells, water levels, logs, and chemical analyses of ground water.

WdB 6302. Availability and quality of ground water in Smith County, Texas: 1963, by J. W. Dillard.

For the principal aquifers, gives information about the geology and structure, source and movement of water, water levels, water-bearing characteristics, chemical quality of water, utilization and present development, well construction and yields, ground water available for development, and physical factors affecting future development.

WdB 6303. Pumpage of ground water and changes in water levels in Galveston County, Texas, 1958-62: 1963, by R. B. Anders and W. L. Naftel.

Also gives information about the subsidence of the land surface and changes in chemical quality of the ground water.

WdB 6304. Chemical composition of Texas surface waters, 1961: 1963, by L. S. Hughes and Wanda Shelby.

Contains the same type of information as Bulletin 5905.

WdB 6305. Reconnaissance investigation of the ground-water resources of the Gulf Coast region, Texas: 1963, by L. A. Wood, R. K. Gabrysch, and Richard Marvin.

Gives information about the geology and aquifers in the region; gives the occurrence, chemical quality, and utilization of ground water, changes in water levels, and problems by subregions. Also gives a quantitative estimate of the availability of ground water in the region.

WdB 6306. Reconnaissance investigation of the ground-water resources of the Red River, Sulphur River, and Cypress Creek Basins, Texas: 1963, by E. T. Baker, Jr., A. T. Long, Jr., R. D. Reeves, and L. A. Wood.

Gives information about the general geology of the basins. By subdivisions of the area, gives for the primary aquifers a physical description; recharge, movement, and discharge of ground water; chemical quality; utilization and present development; changes in water levels; availability and potential development; and problems. Also describes the secondary aquifers.

WdB 6307. Reconnaissance investigation of the ground-water resources of the Sabine River Basin, Texas: 1963, by B. B. Baker, J. W. Dillard, V. L. Souders, and R. C. Peckham.

Contains the same type of information as Bulletin 6306.

WdB 6308. Reconnaissance investigation of the ground-water resources of the Neches River Basin, Texas: 1963, by B. B. Baker, R. C. Peckham, J. W. Dillard, and V. L. Souders.

Contains the same type of information as Bulletin 6306.

WdB 6309. Reconnaissance investigation of the ground-water resources of the Trinity River Basin, Texas: 1963, by R. C. Peckham, V. L. Souders, J. W. Dillard, and B. B. Baker.

Contains the same type of information as Bulletin 6306.

WdB 6310. Reconnaissance investigation of the ground-water resources of the Brazos River Basin, Texas: 1963, by J. G. Cronin, C. R. Follett, G. H. Shafer, and P. L. Rettman.

Contains the same type of information as Bulletin 6306.

WdB 6311. Floods in Texas, Magnitude and frequency of peak flows: 1963, by J. L. Patterson.

Outlines methods by which the magnitude and frequency of expected floods for most streams in Texas may be predicted; large streams receive special treatment, since they do not lend themselves well to regional analysis. Tabulations of peak gage heights and discharges for most stations are included.

WdB 6312. Ground-water resources of Refugio County, Texas: 1963, by C. C. Mason.

Discusses principal aquifers and presents data on water pumped and transmissibility. Presents records of wells, drillers' logs where available, and chemical analyses of well water.

WdB 6401. Research on evaporation retardation in small reservoirs, 1958-63: 1964, by W. W. Meinke and W. J. Waldrip.

Studies show that evaporation losses from small farm and ranch ponds can be retarded effectively by use of a chemical film on the surface of the water, and that the cost of the water saved ranges from $1.02 to $2.45 per 1,000 gallons.

Describes the theory and historical development of the chemical-film technique and the methods and problems of film-chemical addition as related to small farm and ranch ponds.

WdB 6402. Geology and ground-water resources of Carson County and part of Gray County, Texas, Progress Report No. 2: 1964, by G. D. McAdoo, E. R. Leggat, and A. T. Long.

Presents data on wells drilled, water pumped, and water-level declines during the period 1960-62. Discusses possible contamination of ground water from surface disposal of oil-field brines.

WdB 6403. Fifty years of water development in Texas: 1964, by S. D. Breeding, P. B. Jones, R. W. Harden, H. M. Cook, and J. P. Dougherty.

Summarizes the last fifty years of water development in Texas under three main programs: surface water, ground water, and topographic mapping. Emphasizes the need to expand these programs to meet water demands of the future.

WdB 6404. Conservation storage reservoirs in Texas, Some aspects and chronology of surface-water resources development: 1964, by L. L. McDaniels.

Provides information on the development of water resources in Texas by the construction of conservation storage reservoirs. Discusses, in a general sense, some of the natural and man-made conditions that may affect conservation storage reservoirs in the State such as droughts; floods; sedimentation; and water needs for industry, irrigation, recreation, and municipalities. Also gives pertinent data, in tabulated form, on all reservoirs with 5,000 acre-feet or more capacity.

WdB 6405. Reconnaissance of the chemical quality of surface waters of the Sabine River Basin, Texas and Louisiana: 1964, by L. S. Hughes and D. K. Liefeste.

Discusses the generally excellent quality of surface water, with tables of chemical analyses and illustrations showing dissolved solids, hardness, and chloride content.

WdB 6406. Geology and ground-water resources of Hardin County, Texas: 1964, by E. T. Baker, Jr.

Presents the geology of water-bearing formations and gives tables of well records, chemical analyses, and drillers' logs where available. Discusses possibility of saline water contamination and land subsidence resulting from ground-water withdrawals.

WdB 6407. Base-flow studies, Pedernales River, Texas, Quantity and quality, April-May 1962: 1964, by P. H. Holland and L. S. Hughes.

Presents an evaluation of quality of water and interchange of surface and ground waters during a period when evaporation and transpiration losses were significant; compares results with similar study in 1956.

WdB 6408. Dams and reservoirs in Texas, Historical and descriptive information: 1964, by C. L. Dowell.

Presents in narrative form the location, ownership and history of development, physical description, and pertinent data of all dams and reservoirs with 5,000 acre-feet or more storage capacity. Photographs of typical dams in the State are included. Also a complete alphabetical index gives all current and obsolete names of major dams and reservoirs.

WdB 6409. Reconnaissance investigation of the ground-water resources of the Guadalupe, San Antonio, and Nueces River Basins, Texas: 1964, by W. H. Alexander, Jr., B. N. Myers, and O. C. Dale.

Contains the same type of information as Bulletin 6306.

WdB 6410. Suspended-sediment load of Texas streams, Compilation report, October

1959-September 1961: 1964, by E. A. Adey and H. M. Cook.

Presents, in tabular form, monthly records of suspended-sediment loads from sampling stations. Also, shows locations of sampling stations.

WdB 6411. Chemical quality of surface waters in the Hubbard Creek watershed, Texas Progress report, September 1963: 1964, by C. H. Hembree and J. F. Blakey.

Presents data collected in a study to determine chemical quality of water, source areas and extent of rapidly increasing dissolved solids, especially chloride, and stratification patterns; to analyze effects of bottom-withdrawals on stratification patterns; and to determine optimum rate at which saline water can be released from the bottom of the reservoir without withdrawal of better quality water in the upper layers.

WdB 6412. Occurrence and quality of ground water in Stephens County, Texas: 1964, by D. C. Bayha.

Gives information on ground-water occurrence in the major geologic formations, variation in chemical quality of the water, oil-field brine production and disposal, and alteration of native chemical quality of water. General hydrologic principles are discussed in the Appendix.

WdB 6413. Water-supply limitations on irrigation from the Rio Grande in Starr, Hidalgo, Cameron, and Willacy Counties, Texas: 1964, by J. J. Vandertulip, L. L. McDaniels, and C. O. Rucker.

Summarizes the results of a study to determine the amount of water necessary to satisfy domestic, municipal, and industrial requirements in order to project the total number of acres of land which could be irrigated each year from the available water supply of the Rio Grande.

WdB 6413-A. Appendices to Bulletin 6413, Water-supply limitations on irrigation from the Rio Grande in Starr, Hidalgo, Cameron, and Willacy Counties, Texas: 1965, by J. T. Carr, I. G. Janca, R. T. Warzecha, R. B. Hendricks, A. E. Richardson, H. H. Porterfield, Jr., and P. T. Gillett.

Supplements Bulletin 6413 by providing detailed supporting data. Presents separate reports on climate, soils, cropping pattern, water transmission losses to irrigators, hydrology of the Rio Grande from 1900-56, computational procedures and irrigation diversion requirements, and economic evaluation of agricultural water use.

WdB 6414. Analysis of unit hydrographs for small water sheds in Texas: 1964, by W. L. Meier, Jr.

Provides a detailed mathematical and and graphical analysis of the use of hydrographs—curves of flood runoff commonly used in design predictions—in three small watersheds in the Trinity and Colorado River Basins.

WdB 6415. Occurrence and quality of ground water in Young County, Texas: 1964, by D. E. Morris.

Discusses each geologic formation in the county, the occurrence and quality of water found in the formations, and the need for protecting the water-bearing formations from oil-field brine contamination. A section on general hydrologic principles is given in the Appendix.

WdB 6501. Chemical composition of Texas surface waters, 1962: 1965, by L. S. Hughes and J. F. Blakey.

Contains the same type of information as Bulletin 5905.

WdB 6502. Reconnaissance investigations of the ground-water resources of the Rio Grande Basin, Texas: 1965, Part 1, Upper Rio Grande Basin, by M. E.

Davis and E. R. Leggat; Part 2, Middle Rio Grande Basin, by J. B. Brown, L. T. Rogers, and B. B. Baker; Part 3, Lower Rio Grande Basin, by R. C. Baker.

Presents estimates of ground-water supplies potentially available from principal water-bearing formations, as part of statewide reconnaissance; includes descriptions of geography, geology, water quality, and ground-water utilization.

WdB 6503. Base-flow studies, Guadalupe River, Comal County, Texas, Quantity, March 1962: 1965, by P. H. Holland.

Studies the interchange of surface and ground waters in the Guadalupe River Basin in Comal County, to determine whether significant changes have occurred since the drought of 1955.

WdB 6504. The current status of weather modification, A summary—1964: 1965, by J. T. Carr, Jr.

Summarizes the brief history of weather modification experiments and reviews literature of more current experiments and investigations. Discusses various cloud-seeding agents, how they are dispensed, and their actions on common cloud types. Analyzes some salient features of existing weather control, generally rain-making, in other states. Also describes the history of proposed Federal legislation.

WdB 6505. Base-flow studies, Llano River, Texas, Quantity and quality: 1965, by P. H. Holland and H. B. Mendieta.

Presents the results of a study to determine the quality of water and interchange of surface and ground water in the Llano River below Junction when evaporation and transpiration were not significant; and to compare with results of earlier investigations.

WdB 6506. Base-flow studies, Lampasas River, Texas, Quantity and quality, June 3-6, 1963: 1965, by W. B. Mills and Jack Rawson.

Gives the results of a study to determine the quantity and quality of water, including suitability for use, and the interchange of surface and ground water.

WdB 6507. Water-level data from observation wells in Pecos and Reeves Counties, Texas: 1965, by W. R. Muse.

Presents selected water-level records and supplements previous detailed ground-water studies in Pecos County (Bulletin 6106) and Reeves County (Bulletin 6214).

WdB 6508. Analog model study of ground water in the Houston district, Texas: 1965, by L. A. Wood, R. K. Gabrysch, and E. P. Patten, Jr.

Describes the use of available aquifer data to construct an electrical analog model of the aquifer, useful in determining the order of magnitude of future water levels. Contains a section on design, construction, and use of electric analog models.

WdB 6509. Water-delivery study, Nueces River, Texas, Quantity and quality, August 1963: 1965, by S. P. Sauer and J. F. Blakey.

Studies the gains or losses of flow and changes in chemical quality of water in the Nueces River channel reach from Lake Corpus Christi to Calallen Dam.

WdB 6510. Base-flow studies, San Gabriel River, Texas, Quantity and quality, March 16-18, 1964: 1965, by D. K. Leifeste and J. T. Smith.

Presents the results of a study to determine the apparent gains or losses in the channel reach; effects of geology, cultural influences, and vegetation on the quantity and quality of the base flow; and an evaluation of water for municipal, irrigation, and industrial uses.

WdB 6511. Base-flow studies, Cibolo Creek, Texas, Quantity and quality, March 5-7, 1963: 1965, by P. T. Holland and C. T. Welborn.

Describes the results of an investigation to determine the gains or losses of flow, changes in chemical quality, and suitability for use during a period when flow was sustained by sewage effluent and ground-water discharge.

WdB 6512. Symposium on consideration of droughts in water planning: 1965 [A series of technical papers presented at the April 28-30, 1965 meeting, Texas Section, American Society of Civil Engineers].

Presents eight discussions concerning droughts and their relationship to reservoir planning.

WdB 6513. Availability and quality of ground water in Leon County, Texas: 1965, by R. C. Peckham.

Discusses the location and extent of the county's underground water supplies, the potential for development of the three major aquifers in the county, and the quality of water in the aquifers. Appendices contain tables of basic data and descriptive plates.

WdB 6514. Development of ground water in the El Paso district, Texas, 1960-63, Progress Report No. 9: 1965, by M. E. Davis.

Brings up to date information on ground-water development and pumpage, fluctuation of water levels, changes in chemical quality, and related information. Includes tables of well records and chemical quality.

WdB 6515. Inventory of Texas irrigation, 1958 and 1964: 1965, by P. T. Gillett and I. G. Janca.

Contains essentially the same type information as Bulletin 6018, with 1964 irrigation data added for comparative purposes.

WdB 6516. Geology and ground-water resources of Orange County, Texas: 1965, by J. B. Wesselman.

Describes the occurrence, availability, dependability, quality, and quantity of ground water, particularly with reference to sources of water suitable for public supply, industrial, and irrigation uses.

WdB 6517. Ground-water resources of Camp, Franklin, Morris, and Titus Counties, Texas: 1965, by M. E. Broom, W. H. Alexander, Jr., and B. N. Myers.

Describes the ground-water resources of the four counties, including an analytical discussion of the occurrence and availability of ground water. Includes tabulations of basic data.

WdB 6518. Ground-water resources of De Witt County, Texas: 1965, by C. R. Follett and R. K Gabrysch.

Describes the ground-water resources of De Witt County, and includes tables of well records, electric logs, drillers' logs, chemical analyses, climatological data, and results of eight pumping tests.

WdB 6519. Ground-water conditions in Menard County, Texas: 1965, by R. C. Baker, O. C. Dale, and G. H. Baum.

Presents the results of an investigation of ground-water conditions to serve as a basis for the protection and conservation of fresh-water supplies, and to determine any changes in chemical quality as a result of possible pollution from increasing oil production and exploration.

WdB 6520. Ground-water resourecs of La Salle and McMullen Counties, Texas: 1965, by H. B. Harris.

Presents an analytical discussion of the occurrence and availability of ground water, and tabulations of basic data including well records and chemical analyses.

WdB 6521. Investigation of ground-water contamination, Rhineland area, Knox County, Texas: 1965, by H. D. Holloway.

Describes the general geology and occurrence of ground water in the area. Presents evidence of a general contamination of ground water in

the report area, and points out that about 70 percent of the shallow water-supply wells contained coliform bacteria. Includes recommendations for improving the quality of domestic water supplies.

Reports

(Index code WdR)

WdR 1. Ground-water resources of Jackson County, Texas: 1965, by E. T. Baker, Jr.

Describes the occurrence, quantity, quality, availability, and dependability of the ground-water supply, including a determination of the location and extent of fresh water-bearing sands, chemical quality of the water they contain, chemical quality of the water being pumped, and the effects of this pumping on water levels and water quality. Lists well records, drillers' logs, water levels, and chemical analyses.

WdR 2. Base-flow studies, Nueces River, Texas, Quantity and quality, November 23-25, 1964: 1965, by W. E. Reeves, P. B. Rohne, J. F. Blakey, and C. R. Gilbert.

Examines the changes in quantity and chemical quality of base flow in a 52.2-mile reach from U.S. Highway 290 to Farm Road 1025 north of Crystal City.

WdR 3. Hydrologic studies of small watersheds, Deep Creek, Colorado River Basin, Texas, 1951-61: 1965, by W. B. Mills, H. N. McGill, and M. W. Flugrath.

Presents an interpretive report on a small-watershed investigation, part of an 11-area program to determine the effects of floodwater-retarding structures on the regimen of flow at downstream points.

WdR 4. Ground-water resources of Gonzales County, Texas: 1965, by G. H. Shafer.

Presents information and data that can be used as a guide to the development of the available ground-water supplies in the county. Includes records of wells, drillers' logs, and chemical analyses.

WdR 5. Reconnaissance of the chemical quality of surface waters of the Neches River Basin, Texas: 1965, by L. S. Hughes and D. K. Leifeste.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 6. Hydrologic studies of small watersheds, Mukewater Creek, Colorado River Basin, Texas, 1952-60: 1965, by S. P. Sauer.

Presents an interpretive report on a small-watershed investigation, similar to Report 3.

WdR 7. Chemical composition of Texas surface waters, 1963: 1965, by L. S. Hughes and D. K. Leifeste.

Presents data similar to Bulletin 5905.

WdR 8. Re-use of effluent in the future, with an annotated bibliography: 1965, by G. A. Whetstone.

Cites two major forces responsible for increased use of effluent in the future. One is water economics—a constant supply and an increase in demand lead to re-use. The other is the improvement in sewage treatment. Also includes an extensive annotated bibliography literature on water re-use.

WdR 9. Use of sewage effluent for production of agricultural crops: 1965, by Clark Harvey and Ronald Cantrell.

Presents the results of a statewide survey of the use of sewage effluent for agricultural and recreational purposes. Concludes that a resource of great economic value is not being used and that crop irrigation with effluent can contribute to the economy of the area and solve satisfactorily the sewage disposal problem.

WdR 10. Studies of playa lakes in the High Plains of Texas: 1965, by staff members of Texas Technological College.

This report contains two sections, "Playa Lake Use and Modification in the High Plains" by W. F. Schwiesow and "Public Health Aspects of High Plains Water" by E. W. Huddleston and V. C. Riggs. These studies point out that proper modification of playas not only reduces the health hazards caused by mosquitos but also permits irrigators to salvage much of the water trapped by the playas to augment their well-water supplies.

WdR 11. The importance of irrigation to the economy of the Texas High Plains: 1966, by H. W. Grubb.

Analyzes the economic importance of irrigation in the area. Emphasizes that while ground water is abundant, it is also exhaustible, and predicts declining irrigation beginning about 1980.

WdR 12. Ground-water resources of Caldwell County, Texas: 1966, by C. R. Follett.

Gives the results of a study to determine ground-water resources of the county, and includes pumping tests, well records, drillers' logs, and chemical analyses.

WdR 13. Reconnaissance of the chemical quality of surface waters of the San Jacinto River Basin, Texas: 1966, by L. S. Hughes and Jack Rawson.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 14. Hydrologic studies of small watersheds, Little Elm Creek, Trinity River Basin, Texas. 1956-62: 1966, by E. E. Schroeder.

Presents an interpretive report on a small-watershed investigation, similar to Report 3.

WdR 15. Ground-water resources of Gaines County, Texas: 1966, by P. L. Rettman and E. R. Leggat.

Summarizes and evaluates ground-water resources of the county and includes a discussion of contamination of ground water; records of wells; location of oil-field brine disposal pits; electric, radioactivity, and drillers' logs of wells; and chemical analyses.

WdR 16. Water-level data from observation wells in Culberson, Jeff Davis, Presidio, and Brewster Counties, Texas: 1966, by W. R. Muse.

WdR 17. Ground-water resources of Bee County, Texas: 1966, by B. N. Myers and O. C. Dale.

Presents data on quantity, quality, occurrence, availability, and dependability of ground water, including a delineation of the location and extent of fresh to slightly saline water-bearing sands. Includes well records, drillers' logs, pumping tests, and chemical analyses.

WdR 18. Ground-water resources of Houston County, Texas: 1966, by G. R. Tarver.

Describes the occurrence, availability, and quantity of ground water in the county, including well records and chemical analyses.

WdR 19. Ground-water resources of Guadalupe County, Texas: 1966, by G. H. Shafer.

Presents a discussion of occurrence and availability of ground water, location and extent of water-bearing formations, and possible problems resulting from oil-field brine disposal. Includes well records and chemical analyses.

WdR 20. Ground-water resources of Lee County, Texas: 1966, by G. L. Thompson.

Gives an estimate of available ground water and a consideration of ground-water problems, and includes well records, drillers' logs, and chemical analyses.

WdR 21. Water-level data from observation wells in the southern High Plains of Texas: 1966, by S. W. Gammon and W. R. Muse.

WdR 22. Water delivery and low-flow studies, Pecos River, Texas, Quantity and quality, 1964 and 1965: 1966, by

R. U. Grozier, H. W. Albert, J. F. Blakey, and C. H. Hembree.

Reports on two studies made to determine changes in quantity and quality of flow along the stream reach from Red Bluff Reservoir to Girvin, Texas. One study was made during a period of uniform flow of water from Red Bluff Reservoir, the other when no water was being released from the reservoir.

WdR 23. A study of some effects of urbanization on storm runoff from a small watershed: 1966, by W. H. Espey, Jr., C. W. Morgan, and F. D. Masch.

Evaluates the effects of urbanization on the hydrologic characteristics of Waller Creek, a small urban watershed within Austin, Texas. Results indicate that urban development in the watershed has caused extensive changes in the discharge hydrograph and runoff yield. The effects of future development are predicted to follow the same trends toward shorter time sequence of the discharge hydrograph, greater peak discharge, and greater unit yield.

WdR 24. Effect of an increased heat load on the thermal structure and evaporation of Lake Colorado City, Texas: by G. E. Harbeck, Jr., J. S. Meyers, and G. H. Hughes.

Presents the results of a follow-up study to determine the effects of increased powerplant cooling-water disposal to the reservoir.

WdR 25. Base-flow studies, Little Cypress Creek, Upshur, Gregg, and Harrison Counties, Texas, Quantity and quality, January and June 1964: 1966, by J. T. Smith, J. H. Montgomery, and J. F. Blakey.

Describes the source, quantity, and quality of low flow; evaluates effects of geology, vegetation, and human activity; and presents tables of discharge measurements and chemical analyses.

WdR 26. Base-flow studies, Big Elkhart and Little Elkhart Creeks, Trinity River Basin, Texas, Quantity and quality, September 15-16, 1965: 1966, by W. B. Mills.

Presents data on quantity and quality of streamflow, with evaluation of surface and ground water relationships, and suitability of streamflow for domestic, municipal, irrigation, and industrial uses.

WdR 27. Ground-water resources of Harrison County, Texas: 1966, by M. E. Broom and B. N. Myers.

Describes the source, distribution, availability, quality, and quantity of ground water suitable for public supply, industrial, and irrigation uses. Includes records of wells, drillers' logs, and chemical analyses.

WdR 28. Analog model study of the Hueco Bolson near El Paso, Texas: 1966, by E. R. Leggat and M. E. Davis.

Presents the results obtained from analyses of available hydrologic data by means of an electrical-analog model, and summarizes a few facts regarding the geohydrology of the district and development of ground-water supplies.

WdR 29. Base-flow studies, upper Guadalupe River Basin, Texas, Quantity and quality, March 1965: 1966, by H. L. Kunze, and J. T. Smith.

Determines the interchange of ground and surface waters, evaluates effects of geology and environmental changes on quantity and quality; and evaluates suitability of the water for use when flow is sustained entirely by ground-water effluent, and evaporation and transpiration are at a minimum.

WdR 30. Texas droughts, causes, classification, and prediction: 1966, by J. T. Carr, Jr.

Summarizes drought forecasting research carried out over much of the world. Presents the two

different views on causes of drought—some believe drought occurs randomly while others think it comes in definite cycles and is caused by extra-terrestrial influences. However, the report concludes that the literature reviewed reflects no method by which droughts have been consistently forecast in the past.

WdR 31. Technical papers on selected aspects of the preliminary Texas Water Plan: 1966 [Three technical papers presented at the October 1, 1966 meeting, Texas Section, American Society of Civil Engineers.]

Presents the following discussions: The Preliminary Texas Water Plan, The Proposed State Water Project, and Water Quality Aspects of the Preliminary Texas Water Plan.

WdR 32. Ground-water resources of Atascosa and Frio Counties, Texas: 1966, by W. H. Alexander, Jr., and D. E. White.

Presents information and data as a guide to the development of the available ground-water supplies; includes records of wells and chemical analyses.

WdR 33. Symposium on consideration of some aspects of storms and floods in water planning: 1966 [Technical papers presented at the October 7-9, 1965 meeting, Texas Section, American Society of Civil Engineers.]

Presents eight papers on water-related fields such as hydrometeorology, climatology, and hydraulic engineering.

WdR 34. Ground-water resources of the San Antonio area, Texas, A progress report on studies, 1960-64: 1966, by Sergio Garza.

Supplements previously published reports on geology and hydrology of the Edwards and associated limestones in the San Antonio area, with hydrologic data through 1964. Estimates recharge to and discharge from the aquifer and summarizes quality of water in the zone of transition.

WdR 35. Quality of water of Big Mineral Arm and tributaries, Lake Texoma, Texas, January 18-20 and February 10-11, 1966: 1966, by H. B. Mendieta and P. W. Skinner.

Presents the results of a survey to determine suitability of water for municipal supply and indicates possible sources of good water as well as problem areas and possible sources of contamination.

WdR 36. Comparative results of sediment sampling with the Texas sampler and the depth-integration samplers, and specific weight of fluvial sediment deposits in Texas: 1967, by C. T. Welborn.

Presents the results of an effort to determine coefficients to correlate results of sediment sampling by Texas sampler (surface sampler) and depth-integrating sampler.

WdR 37. Ground-water resources of Sabine and San Augustine Counties, Texas: 1967, by R. B. Anders.

Gives information on occurrence, quality, availability, quantity, use, and dependability of ground-water resources; contains well records and chemical analyses.

WdR 38. Additional technical papers on selected aspects of the preliminary Texas Water Plan: 1967 [Four technical papers presented at the February 6-9, 1967 American Society of Civil Engineers Environmental Engineering Conference.]

Includes discussions on the following topics: The Role of Ground Water in the Texas Water Plan, Irrigation Under the Texas Water Plan, Water Quality Aspects of the Texas Water Plan, and Tidal Inlets for Preservation of Estuaries.

WdR 39. Hydrologic studies of small watersheds, Escondido Creek, San Antonio River Basin, Texas, 1955-63: 1967, by F. W. Kennon, J. T. Smith, and C. T. Welborn.

Presents an interpretive report on a small watershed investigation, similar to Report 3.

WdR 40. The progress of topographic mapping in Texas, 1958-1966: 1967, by G. E. Blomquist.

Includes sections on definitions of technical terms, the historical progress of topographic mapping, work of the Texas Mapping Advisory Committee, and an explanation of the Texas Code Index. Tables and illustrations show the extent of completed and needed mapping throughout Texas, expenditures for the State-Federal cooperative mapping program, a diagrammatic explanation of the Code Index system, and other aspects of topographic mapping in the State.

WdR 41. Ground water in the flood-plain alluvium of the Brazos River, Whitney Dam to vicinity of Richmond, Texas: 1967, by J. G. Cronin and C. A. Wilson.

Describes the results of an investigation of the Brazos River alluvium, including extent, thickness, and physical and hydrological properties; amount and areal extent of withdrawals and recharge; quantity and quality of ground water available; and hydrologic relationships between the alluvium and the underlying or adjoining bedrock, and the ground and surface water relations.

WdR 42. Cost of transporting water by pipeline: 1967, by Lockwood, Andrews and Newnam, Inc.

Provides cost data developed for use in planning water resource development. Cost estimates are made for different pipe diameters and for moving various quantities of water different distances and through a range of elevation differences.

WdR 43. A new concept—water for preservation of bays and estuaries: 1967, by Lockwood, Andrews and Newnam, Inc.

Discusses new ways of permitting both reasonable maximum river development and preservation, plus enhancement, of the Texas coastal bays and estuaries. The basic concept is that increased and improved distribution of gulf water inflow into the estuaries may be a good substitute for some of the apparent large fresh water needs.

WdR 44. Future water requirements for the production of oil in Texas: 1967, by P. D. Torrey.

Projects future water requirements for the production of oil in Texas to the year 2020. Also, emphasizes the hazards associated with projections for such an extended period of time. Calculations and estimations are presented in tabular form at the end of the report.

WdR 45. Suspended-sediment load of Texas streams, Compilation report, October 1961-September 1963: 1967, by H. M. Cook.

Contains essentially the same type of information as Bulletin 6410.

WdR 46. Occurrence and quality of ground water in Brown County, Texas: 1967, by D. R. Thompson.

Gives information on the rock units that are found at or below the surface in Brown County, the occurrence and quality of water in the rock units, oil-field brine production and disposal, and alteration of water quality. Supplementary discussions of quality of water, geology, and hydrology are given in the Appendix.

WdR 47. Occurrence and quality of ground water in Crockett County, Texas: 1967, by H. H. Iglehart.

Discusses the geology, ground-water hydrology, and quality of ground water. Tables and maps present basic data which include records of 1,107 wells and chemical analyses of 879 water samples.

WdR 48. Dams and reservoirs in Texas, Historical and descriptive information, December 31, 1966: 1967, by C. L. Dowell and S. D. Breeding.

Revises and updates to December 31, 1966, Bulletin 6408. Provides the name, location, ownership, authorization, purpose, history of development, availability of record of contents, information on sedimentation surveys, and physical description of 152 major reservoirs in Texas.

WdR 49. Hurricanes affecting the Texas Gulf Coast: 1967, by J. T. Carr, Jr.

Discusses the recurring hurricane problem, tells what causes hurricanes and tropical storms, gives statistics on past hurricanes, and tells what is being done to modify them. Also, describes a master plan for protecting the Texas Coast from tidal flooding through the use of a levee system.

WdR 50. Ground-water resources of Mitchell and western Nolan Counties, Texas: 1967, by V. M. Shamburger, Jr.

Presents the results of a detailed study of ground-water occurrence and development in the two counties. Includes a compilation, review, and analysis of all previously collected data, and correlation thereof with data collected during this study.

WdR 51. Reconnaissance investigation of the ground-water resources of the Colorado River Basin, Texas: 1967, by J. R. Mount, F. A. Rayner, V. M. Shamburger, Jr., R. C. Peckham, and F. L. Osborne, Jr.

Contains the same type of information as Bulletin 6306.

WdR 52. Occurrence and quality of ground water in Archer County, Texas: 1967, by D. E. Morris.

Gives information on the occurrence and chemical quality of ground water. Cites examples of possible alteration of native quality ground water by improper oil-field brine disposal.

WdR 53. The climate and physiography of Texas: 1967, by J. T. Carr, Jr.

Emphasizes that the two most important elements affecting climate are precipitation and temperature and that regional physiography, or surface configuration of the earth, strongly affects both. Tables and illustrations are used to present data and show climatic patterns.

WdR 54. Hydrologic studies of small watersheds, Pin Oak Creek, Trinity River Basin, Texas 1956-62: 1967, by J. T. Smith and C. T. Welborn.

Presents an interpretive report on a small-watershed investigation, similar to Report 3.

WdR 55. Study and interpretation of chemical quality of surface waters in the Brazos River Basin, Texas: 1967, by Jack Rawson.

Gives the results to date of a continuing program to determine the nature and concentrations of mineral constituents; the geologic, hydrologic, and cultural factors that influence the chemical quality; the suitability of waters for various uses; and provides data and interpretations to aid in the management of existing and proposed reservoirs.

WdR 56. Availability and quality of ground water in Fayette County, Texas: 1967, by L. T. Rogers.

Describes the physical characteristics and water-bearing properties of geologic units, ground-water hydrology, and chemical quality and availability of ground water. Points out that the water-bearing formations are capable of yielding many times the present production of fresh to slightly saline water that is suitable for most purposes.

WdR 57. Occurrence and quality of ground water in Coleman County, Texas: 1967, by L. E. Walker.

Describes the rock units and the availability and quality of ground water in the rock units. The report

reveals that water-well development is concentrated mainly in the northwest part of the county.

WdR 58. Occurrence and quality of ground water in Montague County, Texas: 1967, by D. C. Bayha.

Gives information on the amount and quality of ground water in the rock formations, and points out that most areas of the county have water of usable quality.

WdR 59. Ground-water resources of Jasper and Newton Counties, Texas: 1967, by J. B. Wesselman.

Describes the occurrence, availability, dependability, quality, and quantity of ground-water resources, with particular emphasis on evaluating sources of water for public supply, industry, and irrigation. Includes well records, drillers' logs, and chemical analyses.

WdR 60. Ground-water resources of Kendall County, Texas: 1967, by R. D. Reeves.

Presents the results of a study to determine the occurrence, quality, availability, and dependability of the county's ground-water resources, and includes records of wells, drillers' logs, and chemical analyses.

WdR 61. Ground-water resources of Brooks County, Texas: 1967, by B. N. Myers and O. C. Dale.

Determines the occurrence, availability, dependability, quality, and quantity of ground water, particularly those sources suitable for public supply, irrigation, and industrial use. Includes records of wells, drillers' logs, and chemical analyses.

WdR 62. Ground-water resources of Ellis County, Texas: 1967, by G. L. Thompson.

Presents the location and extent of important fresh water-bearing formations, chemical quality, pumpage, and estimate of ground water available, and a consideration of significant ground-water problems. Includes well records, drillers' logs, and chemical analyses.

WdR 63. Development of ground water in the Houston District, Texas, 1961-65: 1967, by R. K. Gabrysch.

Brings up to date records on pumpage, water-level changes, land-surface subsidence, and ground-water development in the district which includes Harris and Galveston Counties, and parts of Chambers, Liberty, Montgomery, Waller, Fort Bend and Brazoria Counties.

WdR 64. Monthly reservoir evaporation rates for Texas, 1940 through 1965: 1967, by J. W. Kane.

Revised edition of Bulletin 6006, with evaporation rates for 1958 through 1965 added.

WdR 65. Temperature of Texas streams: 1967, by W. H. Goines.

Presents in tabular form, stream temperature data collected through September 30, 1966.

WdR 66. Low-flow studies Sabine and Old Rivers near Orange, Texas, Quantity and quality, April 12, October 31-November 4, 1966: 1967, by Jack Rawson, D. R. Reddy, and R. E. Smith.

Studies the distribution of flow in the main stem and anabranches of the Sabine River, the quantity and quality of tributary inflow, fresh-water inflow to downstream sites in the tidal reach, and the effects of tide on water quality.

WdR 67. Reconnaissance of the chemical quality of surface waters of the Trinity River Basin, Texas: 1967, by D. K. Leifeste and L. S. Hughes.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 68. Ground-water resources of Austin and Waller Counties, Texas: 1967, by C. A. Wilson.

Presents data on the occurrence, availability, dependability, and quality of ground-water resources. Includes well records, drillers' logs, water levels, and chemical analyses.

WdR 69. Characteristics of tide-affected flow in the Brazos River near Freeport, Texas, March 29-30, 1965: 1967, by S. L. Johnson, Jack Rawson, and R. E. Smith.

Presents the results of a study that includes measurements of flow and salinity during a complete tidal cycle, in an effort to determine flow characteristics; determination of the presence, character, and changes of salinity stratification; and investigation of the stratified flow regimen and alternate methods of determining a continuous record of discharge.

WdR 70. Water-level data from observation wells in the northwestern Gulf Coastal Plain of Texas: 1968, by J. W. Howard.

WdR 71. Reconnaissance of the chemical quality of surface waters of the Colorado River Basin, Texas: 1968, by D. K. Leifeste and M. W. Lansford.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 72. Ground-water resources of Liberty County, Texas: 1968, by R. B. Anders, G. D. McAdoo, and W. H. Alexander, Jr.

Determines the occurrence, availability, dependability, quality, and quantity of the ground-water resources. Includes an analytical discussion of the hydrology as it relates to the availability of ground water. Also includes records of wells, drillers' logs, water levels, and chemical analyses.

WdR 73. Ground-water resources of Nueces and San Patricio Counties, Texas: 1968, by G. H. Shafer.

Presents a study to determine the occurrence, availability, dependability, quality, and quantity of ground-water resources, as a guide for developing, protecting, and obtaining maximum benefits from available supplies. Records of wells, water levels, drillers' logs, and chemical analyses are also included.

WdR 74. Ground-water resources of Tyler County, Texas: 1968, By G. R. Tarver.

Describes a study to determine occurrence, availability, dependability, quality, and quantity of ground water suitable for development. Includes records of wells, drillers' logs, and chemical analyses.

WdR 75. Water-delivery study, Lower Nueces River valley, Texas: 1968, by Sergio Garza.

Presents the results of an investigation to determine causes of losses or gains of water along the lower Nueces River and the causes of changes in mineralization of water.

WdR 76. Water-delivery study, Pecos River, Texas, Quantity and quality, 1967: 1968, by R. U. Grozier, H. R. Hejl, Jr., and C. H. Hembree.

Describes a study to determine changes in quantity and quality of a uniform release of water, between Red Bluff Reservoir and Girvin, Texas.

WdR 77. Evaporation from brine solutions under controlled laboratory conditions: 1968, by Jaroy Moore and J. R. Runkles.

Provides information on evaporation rates from water of various concentrations of minerals under different air and water temperatures, humidities, and wind speeds. Controlled laboratory experiments with sodium chloride solutions showed that at a constant water temperature, increases in either air temperature, relative humidity, or salt concentration slowed evaporation. However, higher wind speed increased evaporation.

WdR 78. Ground-water resources of Upton County, Texas: 1968, by D. E. White.

Presents the results of an investigation to determine and evaluate the county's ground-water resources, and includes records of wells and chemical analyses.

WdR 79. Ground-water resources of Wood County, Texas: 1968, by M. E. Broom.

Gives an appraisal of the ground-water resources for future planning and development. The report includes records of wells, drillers' logs, and chemical analyses.

WdR 80. Ground-water resources of San Jacinto County, Texas: 1968, by W. M. Sandeen.

Presents information and data on occurrence, availability, dependability, quality, and quantity of ground-water resources. Includes records of wells, drillers' logs, and chemical analyses.

WdR 81. Major hydroelectric powerplants in Texas, Historical and descriptive information: 1968, by F. A. Godfrey and C. L. Dowell.

Provides historical information and specific details about generators, turbines, and other equipment at 25 of the State's largest hydroelectric powerplants. The report also describes plant development and gives records of power generation at each plant, where available.

WdR 82. Ground-water resources of Polk County, Texas: 1968, by G. R. Tarver.

Describes an investigation of the ground-water resources and suitability for development. Also includes records of wells, drillers' logs, and chemical analyses.

WdR 83. Floods from hurricane Beulah in south Texas and northeastern Mexico, September-October 1967: 1968, by R. U. Grozier, D. C. Hahl, A. E. Hulme, and E. E. Schroeder.

Includes all the documented flood data: a discussion of the storm, tabulations of rainfall data, description of the floods, a damage report, a section on the effect of fresh-water inflow on water quality in the bays, ground-water recharge, and ponded water on the Coastal Plain.

WdR 84. Economic evaluation of water-oriented recreation in the preliminary Texas Water Plan: 1968, by H. W. Grubb and J. T. Goodwin.

Presents a recreation visitation prediction equation to measure the dollar value of recreation at various reservoir sites that were proposed for inclusion in the preliminary Texas Water Plan. Recreation demand curves for each decade between 1970 and 2020 were made from the visitation equation for 54 proposed reservoirs.

WdR 85. Quality of water and stratification of Possum Kingdom, Whitney, Hubbard Creek, Proctor, and Belton Reservoirs: 1968, by D. K. Leifeste and Barney Popkin.

Describes the results of a study to define the seasonal changes in quality of water in the reservoirs and to determine the major factors controlling mixing and stratification.

WdR 86. Reconnaissance of the chemical quality of surface waters of the Canadian River Basin, Texas: 1968, by H. L. Kunze and J. N. Lee.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 87. Reconnaissance of the chemical quality of surface waters of the Sulphur River and Cypress Creek Basins, Texas: 1968, by D. K. Leifeste.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 88. Reconnaissance of the chemical quality of surface waters of the Guadalupe River Basin, Texas: 1968, by Jack Rawson.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 89. Laws and programs pertaining to water and related land resources: 1968, compiled by D. B. Yarbrough.

Introduces the reader to the history of the State's water laws and their present development; describes the different State agencies concerned with Texas water; and discusses the roles of districts, local agencies, and interstate compacts in coordinating the State's water laws and programs.

WdR 90. Quantity and quality of low flow in Sabine and Old Rivers near Orange, Texas, September 12-15, 1967: 1969, by Jack Rawson, S. L. Johnson, and R. E. Smith.

Continues a study of distribution of flow in the main stem and anabranches of the Sabine River; earlier investigations are presented in Report 66.

WdR 91. Ground-water resources of Matagorda County, Texas: 1969, by W. W. Hammond, Jr.

Describes the occurrence, chemical quality, quantity, and availability of ground water in Matagorda County. Recommends that any future intensive development be limited to the central and northern areas of the county to avoid contamination of fresh ground water by salt-water encroachment from the Gulf of Mexico.

WdR 92. Reconnaissance of the chemical quality of surface waters of the Lavaca River Basin, Texas: 1969, by H. L. Kunze.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 93. Reconnaissance of the chemical quality of surface waters of the San Antonio River Basin, Texas: 1969, by Jack Rawson.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 94. Ground-water resources of Johnson County, Texas: 1969, by G. L. Thompson.

Gives the location and extent of important aquifers, water quality, quantity of ground water withdrawn, an estimate of water available for development, and consideration of significant ground-water problems. Includes records of wells, drillers' logs, and chemical analyses.

WdR 95. Ground-water resources of Kimble County, Texas: 1969, by W. H. Alexander, Jr., and J. H. Patman.

Gives the results of a study to determine occurrence, availability, dependability, quality, and quantity of ground-water resources. Records of wells, drillers' logs, and chemical analyses are included.

WdR 96. A statistical study of the depth of precipitable water in western Texas and eastern New Mexico: 1969, by S. E. Baker.

Provides frequency distributions which describe the depth of precipitable water (the total amount of water vapor in the atmosphere at a given time) for Amarillo, Big Spring, El Paso, and San Antonio, Texas and Albuquerque, New Mexico. From these, the probability that a given depth of precipitable water will exist at any time during the year can be computed.

WdR 97. Base-flow studies, Leon and Lampasas Rivers, Texas, Quantity and quality, January 16-17, 1968: by Jack Rawson and G. K. Schultz.

Presents the results of an investigation to determine quantity of tributary inflow, interchange of surface and ground water, and relation of water quality to geology and activities of man, and to evaluate the water supply.

WdR 98. Compilation of results of aquifer tests in Texas: 1969, by B. N. Myers.

Presents in graph form results of approximately 480 aquifer tests. Also includes a section on methods of analyzing aquifer tests and a table of transmissibilities estimated

from one drawdown measurement for wells on the Southern High Plains.

WdR 99. Hydrologic studies of small watersheds, Cow Bayou, Brazos River Basin, Texas, 1955-64: 1969, by W. B. Mills.

Presents an interpretive report on a small-watershed investigation similar to Report 3.

WdR 100. Occurrence and quality of ground water in Shackelford County, Texas: 1969, by R. D. Preston.

Presents information on the location and extent of fresh water-bearing strata; the chemical quality of the ground water; the geology and its relationship to the depth and occurrence of ground water; and the effects on water quality that may be caused by surface or subsurface disposal of oil-field brines, inadequate surface casing, or improperly plugged wells in the county.

WdR 101. Ground-water resources of Gregg and Upshur Counties, Texas: 1969, by M. E. Broom.

Provides a guide for the optimum development of available ground water in the report area and includes tables of geologic units, pumpage and use of ground water, records of wells, drillers' logs, and chemical analyses.

WdR 102. Ground-water resources of Kerr County, Texas: 1969, by R. D. Reeves.

Determines the occurrence, availability, dependability, and quality of ground-water resources and includes records of wells, drillers' logs, and chemical analyses.

WdR 103. Records of water-level measurements in observation wells in Harris County, Texas: 1969, by R. K. Gabrysch, W. L. Naftel, and Gene McAdoo.

WdR 104. Water-loss studies of Lake Corpus Christi, Nueces River Basin, Texas, 1949-65: 1970, by C. R. Gilbert.

Shows the magnitude of surface-water losses which can occur from impoundment of water in a new reservoir. Percolation into underground formations was found to be significant and greater than evaporative losses during several of the years of initial reservoir filling.

WdR 105. Reconnaissance of water temperature of selected streams in southeastern Texas: 1970, by Jack Rawson.

Presents tables of temperature data at selected cross sections of Texas streams.

WdR 106. Suspended-sediment load of Texas streams, Compilation report, October 1963-September 1965: 1970, by H. M. Cook.

Contains the same type of information as Bulletin 6410 and Report 45.

WdR 107. Quantity and quality of low flow in the Pecos River below Girvin, Texas, February 6-9, 1968: 1970, by V. L. Spiers and H. R. Hejl, Jr.

Describes a study to determine the changes in quantity and quality of flow between Girvin, Texas and mouth of Pecos River. (See Reports 22 and 76.)

WdR 108. Biochemical oxygen demand, dissolved oxygen, selected nutrients, and pesticide records of Texas surface waters, 1968: 1970, by A. J. Dupuy, D. B. Manigold, and J. A. Schulze.

Presents data collected as part of a continuing statewide water-quality investigation established in 1968 to provide additional base-line information on quality of surface waters of the State.

WdR 109. Ground-water resources of Bastrop County, Texas: 1970, by C. R. Follett.

Gives the results of an investigation to determine ground-water resources, and includes well records, drillers' logs, pumping tests, and chemical analyses.

WdR 110. Ground-water conditions in Angelina and Nacogdoches Counties, Texas:

1970, by William F. Guyton & Associates.

Describes the occurrence, availability, and quality of the ground-water resources of Angelina and Nacogdoches Counties. In particular, the report determines the sources of moderate to large supplies of water suitable for public supply, industrial, and irrigation uses. The Carrizo Sand is the most productive aquifer in the two counties, although numerous other formations produce some fresh water of usable quality.

WdR 111. In investigation of clouds and precipitation for the Texas High Plains: 1970, by D. R. Haragan.

Considers the relationship between cloudiness, precipitable water vapor, water vapor flux, stability, and precipitation, information which is useful in weather modification experimentation and research. A cloud census gives the annual and diurnal variations of cloud types and amounts. The most common cloud types are altocumulus and cirrus, and total cloud cover is greatest during winter and least during fall.

WdR 112. Quantity and chemical quality of low flow in Cibolo Creek, Texas, March 4-8, 1968: 1970, by W. E. Reeves and H. L. Kunze.

Defines the changes in quantity and inorganic chemical quality of base flow, and compares results with the investigation described in Bulletin 6511.

WdR 113. Occurrence and quality of ground water in Throckmorton County, Texas: 1970, by R. D. Preston.

Provides information on the surface and subsurface geology as it relates to the depth and occurrence of ground water, and the amount and chemical quality of ground water in the producing formations. More than 87 percent of the wells in the county are completed in the Lueders Formation and the Quaternary alluvial deposits.

WdR 114. Records of water levels and chemical analyses from selected wells in parts of the Trans-Pecos Region, Texas, 1965-68: 1970, by M. E. Davis and J. D. Gordon.

WdR 115. Time of travel of translatory waves on the Brazos, Leon, and Little Rivers, Texas: 1970, by W. B. Mills.

Determines the time required for translatory waves to travel through the reach of the Brazos River from Whitney Reservoir to Richmond, and through the Leon, Little, and Brazos Rivers from Belton Reservoir to Bryan.

WdR 116. Quantity and chemical quality of low flow in the Prairie Dog Town Fork Red River near Wayside, Texas, February 6-9, 1968: 1970, by J. N. Lee and M. L. Maderak.

Determines changes in quantity and chemical quality of low flow from one mile below Lake Tanglewood to Wayside.

WdR 117. Chemical and physical characteristics of water in estuaries of Texas, September 1967-September 1968: 1970, by D. C. Hahl and K. W. Ratzlaff.

Presents the first annual basic data report in a study to determine occurrence, source, and distribution of nutrients; current patterns, directions, and rates of movements; physical, organic, and inorganic water quality and variations; occurrence, quantity, and dispersion of land drainage; and chemical and physical characteristics of Gulf water that enters the estuaries.

WdR 118. Systems simulation for management of a total water resource, A completion report: 1970, by Texas Water Development Board and Water Resources Engineers, Inc.

Summarizes research that represents a first step towards developing a computer-oriented methodology for use in the planning, design, and long-range operation and management of a

system of interconnected reservoirs and canals involving many river basins such as envisioned in the Texas Water Plan.

WdR 119. Ground-water resources of Collingsworth County, Texas: 1970, by J. T. Smith.

Gives data on the occurrence, location, and quality of ground-water resources, with particular reference to the sources of water supply. The report also includes records of wells and chemical analyses.

WdR 120. Biochemical-oxygen-demand, dissolved-oxygen, selected-nutrients, and pesticide records of Texas surface waters, 1969 water year: 1970, by J. A. Schulze, A. J. Dupuy, and D. B. Manigold.

Continues data collection as presented in Report 108.

WdR 121. Water-level data from observation wells in the southern High Plains of Texas, 1965-70: 1970, by A. W. Wyatt and others.

WdR 122. Records of water-level measurements in wells in Harris County, Texas, 1966-69: 1970, by R. K. Gabrysch, C. W. Bonnet, and W. L. Naftel.

WdR 123. Records of water-level measurements in wells in Galveston County, Texas, 1894-1969: 1970, by R. K. Gabrysch, G. D. McAdoo, and C. W. Bonnet.

WdR 124. Ground-water resources of Aransas County, Texas: 1970, by G. H. Shafer.

Presents the results of a study to determine the occurrence, availability, dependability, quality, and quantity of ground water as a guide for developing, protecting, and obtaining maximum benefits. Includes records of wells, drillers' logs, and chemical analyses.

WdR 125. Water resources of Ward County, Texas: 1971, by D. E. White.

Gives the results of an investigation to determine the occurrence and availability of ground water and surface water supplies. Includes records of wells, chemical analyses, and uses of water.

WdR 126. Engineering data on dams and reservoirs in Texas: Three volumes, compiled by C. L. Dowell and R. G. Petty.

Provides engineering documentation on all dams and reservoirs in Texas of 5,000 acre-feet or more capacity. Includes structural details, hydraulic characteristics, and photographs.

Part I: Projects in the Canadian, Red, Sulphur, Cypress, Sabine, and Neches Basins, and the Neches-Trinity coastal basin, 1974.

Part II: Projects in the Trinity, San Jacinto and Brazos Basins, 1973.

Part III: Projects in the Colorado, Lavaca, Guadalupe, San Antonio, Nueces, and Rio Grande Basins and intervening coastal basins, 1971.

WdR 127. Inventories of irrigation in Texas, 1958, 1964, and 1969: 1971, by Texas Water Development Board.

Contains essentially the same type information as Bulletins 6018 and 6515, with 1969 irrigation data added for comparative purposes.

WdR 128. Simulation of water quality in streams and canals, Theory and description of the QUAL-1 mathematical modeling system: 1971, by Frank D. Masch and Associates and Texas Water Development Board.

Describes the development of a digital computer model that can simulate the following parameters through a one-dimensional, fully mixed, branching stream system: (1) temperature, (2) biochemical oxygen demand and dissolved oxygen, and (3) conservative materials.

WdR 129. Reconnaissance of the chemical quality of surface waters of the Red

River Basin, Texas: 1971, by D. K. Leifeste, J. F. Blakey, and L. S. Hughes.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 130. Reconnaissance of the chemical quality of surface waters of the Coastal Basins of Texas: 1971, by J. F. Blakey and H. L. Kunze.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 131. Stochastic optimization and simulation techniques for management of regional water resource systems, A completion report: 1971, by Texas Water Development Board and Water Resources Engineers, Inc.

Demonstrates how modern-day computers can be used to thoroughly evaluate complex river basins that have a host of possible combinations of streams, reservoirs, canals, and water uses in order to show the least costly methods of obtaining water supplies.

WdR 132. Water well and ground-water chemical analysis data, Schleicher County, Texas: 1971, by D. A. Muller and H. E. Couch.

WdR 133. Ground-water resources of Chambers and Jefferson Counties, Texas: 1971, by J. B. Wesselman, with a section on Quaternary geology by Saul Aronow.

Presents the results of an investigation to determine the occurrence, availability, dependability, quality, and quantity of ground water suitable for public supply, industrial use, and irrigation. Contains a previously unpublished section on Quaternary geology of the area.

WdR 134. Reconnaissance of the chemical quality of surface waters of the Nueces River Basin, Texas: 1971, by H. L. Kunze.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 135. Ground-water resources of Cass and Marion Counties, Texas: 1971, by M. E. Broom

Presents the results of an investigation to determine and describe the ground-water resources of the two counties. The report includes records of wells, drillers' logs, and chemical analyses.

WdR 136. Ground-water resources of Montgomery County, Texas: 1971, by B. P. Popkin.

Describes an investigation to determine the occurrence, quality, and quantity of ground-water resources, and the availability and dependability of water sources, as well as areas of present or potential pollution. Also includes records of wells, drillers' logs, and chemical analyses.

WdR 137. Water-level data from observation wells in the northern Panhandle of Texas: 1971, by A. W. Wyatt and others.

WdR 138. Relation of ponded floodwater from Hurricane Beulah to ground water in Kleberg, Kenedy, and Willacy Counties, Texas: 1971, by E. T. Baker, Jr.

Presents the results of an investigation to determine the relationship of the water table to ponded water resulting from Hurricane Beulah; the changes in the quality of the water; the approximate amount of recharge to shallow ground water; and the rate of return of the hydrologic system to pre-hurricane conditions.

WdR 139. Records of wells, drillers' logs, and chemical analyses of ground water in Galveston County, Texas, 1952-1970: 1971, by R. K. Gabrysch, G. D. McAdoo, and W. L. Naftel.

WdR 140. Water-quality records for selected reservoirs in Texas and adjoining areas, April 1965-September 1969: 1972, by H. L. Kunze and Jack Rawson.

Continuation of data in Report 85, with addition of Lake Texoma,

Sam Rayburn Reservoir, and Red Bluff Reservoir.

WdR 141. A comparison of mass-transfer and climatic-index evaporation computations from small reservoirs in Texas: 1972, by R. O. Hawkinson.

Provides the results of a study to evaluate methodology for estimating evaporation from small reservoirs.

WdR 142. Reconnaissance of the oxygen balance and the variation of selected nutrients in the San Antonio River during low flow: 1972, by Jack Rawson.

Describes the progress of waste assimilation, delineates the critical reach of the river, and determines the concentrations of selected nutrients in the river during the low-flow period, June 16-19.

WdR 143. Water well and ground-water chemical analysis data, Glasscock County, Texas: 1972, by H. E. Couch and D. A. Muller.

WdR 144. Chemical and physical characteristics of water in estuaries of Texas, October 1968-September 1969: 1972, by D. C. Hahl and K. W. Ratzlaff.

Continuation of data as presented in Report 117.

WdR 145. Water well and ground-water chemical analysis data, Reagan County, Texas: 1972, by D. A. Muller and H. E. Couch.

WdR 146. Water well and ground-water chemical analysis data, Irion County, Texas: 1972, by J. R. Pool.

WdR 147 Water well and ground-water chemical analysis data, Sutton County, Texas: 1972, by D. A. Muller and J. R. Pool.

WdR 148. Water well and ground-water chemical analysis data, Sterling County, Texas: 1972, by J. R. Pool.

WdR 149. Selected water-quality records for Texas surface waters, 1970 water year: 1972, by A. J. Dupuy and J. A. Schulze.

Continuation of data as presented in Reports 108 and 120.

WdR 150. Ground-water conditions in Anderson, Cherokee, Freestone, and Henderson Counties, Texas: 1972, by William F. Guyton & Associates.

Describes the occurrence, availability, and quality of the ground-water resources in the counties and particularly the sources of moderate to large supplies of water suitable for public supply, industrial, and irrigation uses. The report points out that the four counties have plenty of fresh ground water for most of their future needs.

WdR 151. Water budget and quality of water studies of Hubbard Creek Reservoir, Texas, 1963-67 water years: 1972, by B. N. Myers.

WdR 152. Development of ground water in the Houston district, Texas, 1966-69: 1972, by R. K. Gabrysch.

Continuation of an investigation described in Report 63.

WdR 153. Development of ground water in the El Paso District, Texas, 1963-70: 1972, by W. R. Meyer and J. D. Gordon.

Continuation of a study presented in Bulletin 6514.

WdR 154. Hydrologic studies of small watersheds, Calaveras Creek, San Antonio River Basin, Texas, 1955-68: 1972, by J. T. Smith and W. B. Mills.

Presents an interpretive report on a small-watershed investigation similiar to Report 3.

WdR 155. Ground-water resources of Fort Bend County, Texas: 1972, by J. B. Wesselman.

Gives the results of an investigation to determine and evaluate the ground-water resources of the county and includes records of wells, drillers' logs, and chemical analyses.

WdR 156. Development of ground-water resources in the Orange County area, Texas and Louisiana, 1963-71: 1972, by R. K. Gabrysch and G. D. McAdoo.

Presents the latest data in a continuing ground-water study and includes an inventory of pumpage, determination of land-surface subsidence, and correlates data with previously collected data.

WdR 157. A survey of the subsurface saline water of Texas, Eight volumes: 1972, by Core Laboratories, Inc.

Provides information on the occurrence, availability, and quality of saline and brackish ground-water resources within the State. The report gives the depth, thickness, and areal extent of aquifers, along with their salt content and ideal producing capacities.

Volume 1 - General information on the scope of the project, how results are presented, and general geology and hydrology along with over 100 tables, figures, maps, and cross sections.

Volume 2 - Chemical analyses of saline water

Volume 3 - Aquifer rock properties (porosities, permeabilities, ideal specific flow rates)

Volume 4 - Geologic well data—West Texas (formation depths in wells, thickness, lithologies)

Volume 5 - Geologic well data—Panhandle

Volume 6 - Geologic well data—Central Texas

Volume 7 - Geologic well data—East Texas

Volume 8 - Geologic well data—Gulf Coast

WdR 158. Ground water in Dickens and Kent Counties, Texas: 1972, by J. G. Cronin.

Describes an investigation to obtain basic data on occurrence, location, and quality of ground water, with emphasis on evaluation of aquifers providing water supply, and of other aquifers from which additional supplies might be obtained. Includes records of wells, drillers' logs, and chemical analyses.

WdR 159. Hydrologic studies of small watersheds, Green Creek, Brazos River Basin, Texas, 1955-66: 1972, by B. B. Hampton.

Presents an interpretive report on a small-watershed investigation as described in Report 3.

WdR 160. Ground-water resources of Navarro County, Texas: 1972, by G. L. Thompson.

Describes a study of the ground-water resources of the county and the methods of deriving maximum benefits from the available supplies. Also includes records of wells, drillers' logs, and chemical analyses.

WdR 161. Ground-water resources of Hardeman County, Texas: 1972, by M. L. Maderak.

Presents the results of an investigation to obtain data on the county's ground-water resources, with emphasis on sources suitable for public supply, industrial use, and irrigation. Records of wells, water levels, and chemical analyses are included.

WdR 162. Ground-water resources of Washington County, Texas: 1972, by W. M. Sandeen.

Provides information on the occurrence, availability, dependability, quality, and quantity of ground water, with emphasis on sources of water suitable for public supply, industrial use, and irrigation. Includes records of wells, drillers' logs, and chemical analyses.

WdR 163. Ground-water resources of Brazoria County, Texas: 1973, by W. M. Sandeen and J. B. Wesselman.

Gives the results of an investigation to determine the occurrence,

availability, dependability, quality, and quantity of ground-water resources, to be used as a guide in developing the available supplies. Also includes records of wells, pumpage, drillers' logs, and chemical analyses.

WdR 164. Ground-water resources of Donley County, Texas: 1973, by B. P. Popkin.

Presents the results of a study to obtain and interpret basic data concerning the occurrence, location, and quality of ground water in the county. The report includes records of wells, drillers' logs, tolerance of crops to slightly saline water, and chemical analyses.

WdR 165. Ground-water resources of Motley and northeastern Floyd Counties, Texas: 1973, by J. T. Smith.

Describes an investigation of the occurrence, location, and quality of ground-water resources, with emphasis on those aquifers supplying water for municipal and industrial use, and irrigation. Includes records of wells, drillers' logs, and chemical analyses.

WdR 166. Ground-water resources of Coke County, Texas: 1973, by C. A. Wilson.

Presents an evaluation of ground-water resources, with particular emphasis on the source, occurrence, quality, and availability of ground water suitable for municipal supply, industrial use, and irrigation. Includes records of wells, pumpage, production and disposal of oil-field brine, and chemical analyses.

WdR 167. Ground-water resources of Hall and eastern Briscoe Counties, Texas: 1973, by B. P. Popkin.

Gives the results of an investigation to obtain data on the occurrence, location, and quality of ground water; recommends more detailed future investigation. Records of wells and chemical analyses are also included.

WdR 168. Woody phreatophytes along the Brazos River and selected tributaries above Possum Kingdom Lake: 1973, by F. E. Busby, Jr., and J. L. Schuster.

Provides an inventory of phreatophytes along the Brazos River. Gives the kinds, amounts, distribution, history of spread, and volume density of phreatophytes along with their relation to flood-plain location.

Part I - Brazos River from Possum Kingdom Lake to the confluence of the Salt and Double Mountain Forks.

Part II - Salt and Double Mountain Forks from their confluence to the headwaters.

WdR 169. Ground-water resources of Rains and Van Zandt Counties, Texas: 1973, by D. E. White.

Presents a determination and an evaluation of ground-water resources of the two counties and an analytical discussion of the occurrence and availability of supply. Also includes records of wells, use of water, and chemical analyses.

WdR 170. Ground-water resources of Wheeler and eastern Gray Counties, Texas: 1973, by M. L. Maderak.

Presents data on the occurrence, location, and quality of ground water in the two counties, with emphasis on the source and suitability of water for public supply, industrial use, and irrigation. Includes records of wells, use of water, production and disposal of oil-field brine, and chemical analyses.

WdR 171. Chemical and physical characteristics of water in estuaries of Texas, October 1969-September 1970: 1973, by D. C. Hahl and K. W. Ratzlaff.

Continuation of data presented in Reports 117 and 144.

WdR 172. Ground-water resources of Val Verde County, Texas: 1973, by R. D. Reeves and T. A. Small.

Describes the results of an investigation to determine the occurrence, availability, dependability, and quality of ground-water resources. Includes records of wells, drillers' logs, water-level measurements, and chemical analyses.

WdR 173. Ground-water resources of Kleberg, Kenedy, and southern Jim Wells Counties, Texas: 1973, by G. H. Shafer and E. T. Baker, Jr.

Presents data on the occurrence, availability, dependability, quality, and quantity of ground-water resources, with particular reference to sources of water suitable for public supply, industrial use, and irrigation, and identifies areas of potential or present ground-water problems. Records of wells, water levels, drillers' logs, and chemical analyses are included.

WdR 174. Ground-water resources of Blanco County, Texas: 1973, by C. R. Follett.

Describes an investigation to determine the occurrence, quality, availability, and dependability of ground-water resources and includes records of wells, drillers' logs, and chemical analyses.

WdR 175. Weather modification activities in Texas, 1970-72: 1973, by Texas Water Development Board.

Describes weather modification projects conducted in Texas during the 3-year period, 1970-72. The report shows who sponsored the project, who carried it out, and the details of the project activities. Includes number of cloud cells seeded, amount of chemicals used, methods of application, and other relevant statistics.

WdR176. Selected water-quality records for Texas surface waters, 1971 water year: 1973, by J. A. Schulze, A. J. Dupuy, and Emma McPherson.

Continuation of data presented in Reports 108, 120, and 149.

WdR 177. Water-quality records for selected reservoirs in Texas, 1970-71 water years: 1973, by Jack Rawson, H. L. Kunze, and H. J. Davidson.

Continuation of data presented in Reports 85 and 140.

WdR 178. Ground-water data for Harris County, Texas: 1973.

Volume I. Drillers' logs of wells, 1905-72, compiled by R. K. Gabrysch, G. D. McAdoo, and C. W. Bonnet.

Volume II. Records of wells, 1892-1972, compiled by R. K. Gabrysch, W. L. Naftel, G. D. McAdoo, and C. W. Bonnet.

Volume III. Chemical analyses of water from wells, 1922-71, compiled by R. K. Gabrysch, W. L. Naftel, and G. D. McAdoo.

WdR 179. Economic optimization and simulation techniques for management of regional water resource systems, A completion report: 1974, by Texas Water Development Board and Water Resources Engineers, Inc.

Describes computer programs and procedures necessary for determining the number of dollars that any particular amount of new irrigation water can bring to an agricultural region. The report is primarily helpful to water resource planners and administrators interested in developing and managing large-scale water resource programs with the aid of computers.

WdR 180. Reconnaissance of the chemical quality of surface waters of the Rio Grande Basin, Texas: 1974, by H. B. Mendieta.

Gives data similar to Bulletin 6405, as part of a statewide chemical-quality reconnaissance.

WdR 181. Ground-water resources of Duval County, Texas: 1974, by G. H. Shafer.

Presents the results of an investigation to determine the occurrence, availability, dependability, quality, and quantity of ground-water resources as guides for developing, protecting, and obtaining maximum benefits from available supplies. Includes records of wells, water levels, drillers' logs, and chemical analyses.

WdR 182. Woody phreatophytes along the Colorado River from southeast Runnels County to the headwaters in Borden County, Texas: 1974, by D. C. Larner, R. M. Marshall, A. E. Pfluger, and S. C. Burnitt.

Discusses the historical change in vegetation from native grasses to dense growths of phreatophytes along the upper Colorado River. Determines the kinds, amounts, density, and distribution of woody phreatophytes in the floodplain.

WdR 183. Analytical techniques for planning complex water resource systems, A summary report: 1974, by Texas Water Development Board.

Describes the uses of a comprehensive set of computer programs that simulate streamflows, surface-water storage and transfer systems, ground water, the demands for water by agriculture, water qualities, and the behavior of estuaries.

WdR 184. Suspended-sediment load of Texas streams, Compilation report, October 1965-September 1971: 1974, by James Mirabal.

Contains essentially the same type of information as Bulletin 6410 and Reports 45 and 106.

WdR 185. Ground-water resources of Brazos and Burleson Counties, Texas: 1974, by C. R. Follett.

Presents an evaluation of ground-water resources of the two counties with emphasis on determination of the source, occurrence, quantity, and quality of ground water. Also includes records of wells, drillers' logs, water levels, and pesticide and chemical analyses.

Circulars

(Index code WdC)

WdC 62-01. The present reconnaissance study program of the chemical quality of streams in Texas, 1962.

Describes a part of the cooperative program of the Texas Water Commission and the U.S. Geological Survey which is directed toward obtaining necessary data, the appropriate analyses of this data, and the preparation of individual reports on the chemical quality of the surface-water resources of each river basin.

WdC 62-02. Drainage areas of Texas streams, Sabine River Basin and Sabine-Neches Coastal area: 1962.

WdC 62-03. Drainage areas of Texas streams, Neches River Basin and Neches-Trinity Coastal area: 1962.

WdC 62-04. Texas index of surface water records, 1882-1961, Discharge, sediment, chemical quality, and water temperature: 1962.

WdC 62-05. Drainage areas of Texas streams, San Jacinto River Basin and San Jacinto-Brazos Coastal area: 1962.

WdC 63-01. Drainage areas of Texas streams, Trinity River Basin and Trinity-San Jacinto Coastal area: 1963.

WdC 63-02. Texas Gulf Coast industrial water survey: 1963, by Wilbur Meier and the Water Supply and Conservation Committee of the Houston Chamber of Commerce.

Presents data on the quantity, quality, and cost of water used by industries in the Texas Gulf Coast industrial complex.

WdC 63-03. The development of the science of hydrology: 1963, by P. B. Jones, G. D. Walker, R. W. Harden, and L. L. McDaniels.

Summarizes the historical development of surface-water and ground-water hydrology as a science. Ground-water hydrology section contains discussions of the historical development before 1900 and during the 20th century. Also included is a section on the professional status of the hydrologist in the United States and a glossary of selected hydrologic terms.

WdC 63-05. Summary of the ground-water aquifers in the Rio Grande Basin: 1963, by R. C. Peckham.

Condensation of data concerning primary and secondary aquifers from reconnaissance reports of the Rio Grande Basin. Includes water level, pumpage, quality, recharge, and availability data.

WdC 63-07. Drainage areas of Texas streams, San Antonio River Basin: 1963.

WdC 64-01. Water levels and chemical analyses from observation wells in the Dell City area, Hudspeth and Culberson Counties, Texas, 1948 through January 1964: 1964, by J. W. Dillard and W. R. Muse.

WdC 65-01. Drainage areas of Texas streams, Coastal areas between the Brazos River and the Rio Grande: 1965.

Memorandum Reports

(Index Code WdM)

WdM 62-01. Ground-water conditions in the vicinity of Burnet, Texas: 1962, by J. R. Mount.

Includes discussions on the general geology, principal water-bearing units, pumping tests, and streamflow in the Burnet area. Included in tables are records of wells and springs, chemical analyses, logs of wells, water levels in selected wells, pumpage records, streamflow observations, and pumping-test data.

WdM 62-02. Reconnaissance survey of salt water disposal in the Mexia, Negro Creek, and Cedar Creek oil fields, Limestone County, Texas: 1962, by S. C. Burnitt, H. D. Holloway, and J. T. Thornhill.

Discusses the surface and shallow subsurface geology of the Mexia, Negro Creek, and Cedar Creek oil-field areas and the method of brine disposal. Also included are tabulations of the amount of brine produced, chemical analyses of water collected from stream-sampling points during 1957-61, geologic map showing chloride concentrations in streams and location of water samples obtained, and two generalized geologic cross sections showing shallow subsurface relationships.

WdM 63-01. Brazos River reservoir studies, Progress report, May 1962, Chemical quality and stratification of Belton, Whitney, and Possum Kingdom Reservoirs: 1963, by H. B. Mendieta and J. F. Blakey.

Gives information on the dissolved-solids concentration at various locations and depths in the reservoirs. Relates dissolved-solids concentration and depth to seasonal changes and variations in stage, inflow, and discharge, in order to better understand how density currents affect stratification and mixing of reservoir water.

WdM 63-02. Reconnaissance of soil damage and ground-water quality, Fisher County, Texas: 1963, by S. C. Burnitt.

Investigates the problems of soil damage and ground and surface water quality. Results indicate that these problems are related to elevated ground-water tables and in some places perhaps "perched" soil-water zones which have resulted in surface seepage of ground water where geologic and topographic conditions are favorable.

WdM 63-03. Investigation of ground-water resources near Fredericksburg, Texas: 1963, by J. R. Mount.

Discusses ground-water conditions and makes recommendations to assist the city of Fredericksburg in locating future water wells and in determining the adequacy of ground-water resources available to them.

Limited Distribution Reports

(Index code WdL)

WdL 0162-MR. City of Hawkins, Wood County, Texas, investigation of ground-water contamination: 1962, revised March 1963, by S. C. Burnitt.

Presents data concerning general geology and ground water in the Hawkins area, Hawkins municipal water supply, development of oil production in the area, production and disposal of brine, area of contamination and possible sources of the contaminants, and recommendations for necessary action required to correct the situation.

WdL 0262-MR. Henderson oil field area, Rusk County, Texas, investigation of ground-water contamination: 1962, by S. C. Burnitt.

Reports on general geologic and ground-water conditions surrounding contaminated water well in Rusk County. Includes a general discussion on use of open, unlined surface pits as a means of brine disposal, probable source of contaminants of the subject well, and recommendations for alleviating further salt-water contamination of ground and surface water in the area.

WdL 0362-MR. City of Valera, Coleman County, Texas, investigation of ground-water contamination: 1962, by H. D. Holloway.

This report pertains to an investigation of six water wells in Valera, Texas, which were contaminated by gasoline. A brief discussion of the general geology of the area, a summary of the current investigation, and recommendations to correct the situation are included.

WdL 0163-MR. Bacteriological pollution of ground water in the Big Spring area, Howard County, Texas: 1963, by H. D. Holloway.

Reports on an investigation of polluted water well north of Big Spring, Texas. Includes a discussion of the probable source of contamination and gives recommendations to alleviate the problem. Included in the text are discussions on the local geology, occurrence and quality of ground water, and effects of using unlined surface pits as a means of waste disposal.

WdL 0263-MR. Ground-water availability at Whitney, Hill County, Texas: 1963, by J. R. Mount.

Presents a compilation of basic data pertaining to the ground-water resources and a brief discussion of the ground water available in the vicinity of Whitney, Texas.

WdL 0164-MR. Definitions and use of the terms "flood," "floodflow," and "baseflow," and use of discharge hydrographic analyses to separate these components of streamflow: 1964, by L. L. McDaniels, G. D. Walker, and J. J. Vandertulip.

WdL 0264-MR. A summary of recreation facilities at major reservoirs in Texas, prepared for Governor's Statewide Water Recreation Committee: 1964, by L. B. Seward.

Describes information from 106 questionnaires returned of those sent to 134 existing or under-construction major reservoirs. The report includes tabulated data on public recreational facilities, safety facilities, charges to the public, and present public use of the facilities.

WdL 0364-MR. Investigation of ground-water contamination in the Juliana and West Jud oil fields, Haskell and Stonewall Counties, Texas: 1964, by R. L. Crouch.

Presents the results of an investigation to determine evidence of water-quality deterioration in northwestern Haskell and eastern Stonewall County and to locate the source of contamination.

WdL 0464-MR. Investigation of alleged ground-water contamination, Tri-rue and Ride oil fields, Scurry County, Texas: 1964, by R. L. Crouch.

Gives the findings of an investigation of possible ground-water contamination by oil-field brines in an area about 11 miles southwest of Snyder in Scurry County.

WdL 0564-MR. Investigation of ground-water contamination, Coleto Creek oil field, Victoria County, Texas: 1964, by J. T. Thornhill.

Presents the results of an investigation of alleged ground-water contamination in the Coleto Creek oil field about 7 miles southwest of Victoria.

WdL 0664. Investigation of alleged ground-water contamination near Kilgore, Gregg County, Texas: 1964, by H. D. Holloway.

Gives the results of an investigation of alleged ground-water contamination near the west city limits of Kilgore.

WdL 0165. Manual of computing and modeling techniques and their application to hydrologic studies: 1965, by J. R. Mount.

Explains the basic principles of digital computers and analog computers to the layman. Also presents hydrologic applications of advanced mathematics.

WdL 0265. Investigation of ground-water contamination in the Vealmoor oil field, Howard and Borden Counties, Texas: 1965, by R. L. Crouch and S. C. Burnitt, with a design criterion for lined surface evaporation pits, High Plains region of Texas, by H. H. Porterfield.

Investigates ground-water contamination in the Vealmoor oil field encompassing parts of Howard and Bordern Counties, about 20 miles north-northeast of Big Spring.

WdL 0365. Investigation of ground- and surface-water contamination near Harrold, Wilbarger County, Texas: 1965, by B. E. Fink.

Gives the results of an investigation of ground- and surface-water contamination east of Harrold, a small community in northeastern Wilbarger County.

WdL 0764. Investigation of ground-water contamination, P.H.D., Hackberry, and Storie oil fields, Garza County, Texas: 1964, by S. C. Burnitt and R. L. Crouch, with a hydrologic study of salt-water disposal by use of surface pits, northwestern Garza County, by H. H. Porterfield.

Investigates ground-water contamination in northwestern Garza County and concludes that surface-pit disposal is primarily responsible for the contamination problem.

WdL 0864. Investigation of ground-water contamination by cotton seed delinting acid waste, Terry County, Texas: 1964, by B. E. Fink.

Presents the results of an investigation of possible ground-water contamination by surface disposal of acid in unlined pits one mile south of Brownfield in Terry County.

Unnumbered Publications

Index code and number (WdU 1, etc.) correspond *only* to the index at the end of this bibliography.

WdU 1. Adair, S. W., 1939, Records of wells, drillers' logs, water analyses, and map showing location of wells and springs in Carson County, Texas.

WdU 2. Alexander, W. H., Jr., 1946, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Deaf Smith County, Texas.

WdU 3. _____1947, Ground-water resources of San Jacinto County, Texas.
Gives information on the geologic formations and their water-bearing properties and the development of water supplies from wells. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 4. Alexander, W. H., Jr., and Breeding, S. D., 1945, Ground-water resources of Liberty County, Texas.
Gives information about the geology, ground-water development, withdrawals, and temperature. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 5. Alexander, W. H., Jr., Broadhurst, W. L., and Lang, J. W., 1945, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Lubbock County, Texas.

WdU 6. Alexander, W. H., Jr., Broadhurst, W. L., and White, W. N., 1942, Progress report on ground water in the High Plains in Texas.
Brings up to 1942 information about the development and use of ground water for irrigation and the fluctuations of water levels.

WdU 7. _____1943, Progress report on ground water in the High Plains in Texas.
Brings up to 1943 information about the fluctuations of water levels and gives estimates of the change in amount of water in storage.

WdU 8. Alexander, W. H., Jr., and Dante, J. H., 1946, Ground-water resources of the area southwest of Amarillo.
Gives information about pumpage and fluctuations of water levels; also records of wells, logs, and chemical analyses of ground water.

WdU 9. Alexander, W. H., Jr., and Lang, J. W., 1945, Ground water in the High Plains of Texas, Progress Report No. 5.
Brings up to 1945 information about the irrigation development and fluctuations of water levels.

WdU 10. Altgelt, E. S., and Michal, E. J., 1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Guadalupe County, Texas.

WdU 11. Austin, A. M., 1959, Occurrence of ground water in the Palangana brine field, Duval County, Texas.
This report summarizes ground-water conditions in east-central Duval County. Included are interpretations of electric logs, water analyses, drillers' logs, and available geologic data.

WdU 12. Barnes, B. A., 1938, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells in Hays County, Texas.

WdU 13. _____1941, Records of wells, drillers' and electrical logs, water-level measurements, and map showing location of wells in Galveston County, Texas.

WdU 14. Barnes, B. A., and Cumley, J. C., 1942, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Blanco County, Texas.

WdU 15. Barnes, B. A., Follett, C. R., and Sundstrom, R. W., 1944, Ground-water supply of Bryan, Texas.
Gives the results of pumping tests on the wells used for municipal supply and recommends locations for additional development.

WdU 16. Barnes, J. R., 1948, Ground-water resources of Wharton County, Texas.
Gives information on the geology and occurrence of ground water, withdrawals, development for irrigation, and quality of water. Also tabulates records of wells, logs of wells, water levels, and chemical analyses of ground water.

WdU 17. Barnes, J. R., Ellis, W. C., Leggat, E. R., Scalapino, R. A., George, W. O., and Irelan, Burdge, 1949, Geology and ground water in the irrigation region of the Southern High Plains of Texas, Progress Report No. 7.
Gives information about the geology, precipitation, recharge and natural discharge, development, fluctuations of water levels, interference between wells, quantity of water available, and quality of water.

WdU 18. Bennett, R. R., and Cromack, G. H., 1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in Kinney County, Texas.

WdU 19. Bradshaw, E. L., and Follett, C. R., 1938, Records of wells, drillers' logs, water analyses, cross sections, and map showing location of wells in Parmer County, Texas.

WdU 20. Bridges, T. W., and Cromack, G. H., 1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in Wharton County, Texas.

WdU 21. Broadhurst, W. L., 1936, Records of wells, drillers' logs, water analyses, and map showing location of wells in Hansford County, Texas.

WdU 22. Broadhurst, W. L., 1937, Records of wells, drillers' logs, water-level measurements, water analyses, and map showing location of wells in Bailey County, Texas.

WdU 23. ____1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Lamb County, Texas.

WdU 24. ____1942, Records of wells and springs, drillers' logs, water analyses, and map showing locations of wells and springs in Harrison County, Texas.

WdU 25. ____1942, Records of wells, drillers' logs, water analyses, and map showing location of wells in Upshur County, Texas.

WdU 26. ____1943, Records of wells, springs, drillers' logs, water analyses, and map showing locations of wells and springs in Camp, Franklin, and Titus Counties, Texas.

WdU 27. ____1943, Records of wells, drillers' logs, water analyses, and map showing location of wells in Gregg County, Texas.

WdU 28. ____1943, Records of wells, springs, drillers' logs, water analyses, and map showing locations of wells and springs in Hopkins County, Texas.

WdU 29. ____1943, Records of wells, drillers' logs, water analyses, and map showing location of wells in Marion County, Texas.

WdU 30. ____1943, Records of wells, springs, drillers' logs, water analyses, and map showing location of wells and springs in Rains County, Texas.

WdU 31. ____1944, Results of pumping tests of municipal wells at Tyler, Texas.

WdU 32. ____1947, Ground water in High Plains of Texas, Progress Report No. 6.
Brings up to 1947 information about the development of irrigation and the fluctuations of water levels. Also gives information about the

losses and gains of water in storage and the declines in pumping levels.

WdU 33. Broadhurst, W. L., and Alexander, W. H., Jr., 1944, Progress report on ground water in the High Plains in Texas.

Brings up to 1944 information about the pumpage and the fluctuations of water levels.

WdU 34. Broadhurst, W. L., and Breeding, S. D., 1943, Water resources of Harrison County, Texas.

Contains runoff records of Sabine River near Gladewater and Longview for the period of record. Gives information about the geology and development of water supplies. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 35. _____1943, Water resources of Marion County, Texas.

Contains a chapter on the supply of surface water available in the county from Cypress and Black Cypress Creeks, which consists essentially of analysis of runoff based on measurements of the discharge at Cypress Creek made in cooperation with the U.S. Geological Survey at a gaging station about 8 miles west of Jefferson, from 1925 to 1941, inclusive. Describes the geology and ground-water development. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 36. _____1945, Water resources of Gregg County, Texas.

Contains a summary of the runoff at Sabine River near Gladewater and Longview. Gives information about the geology and the development of water supplies from wells. Also tabulates well records, logs of wells, and chemical analyses of ground water.

WdU 37. Broadhurst, W. L., and Follett, C. R., 1944, Ground-water resources of Nocona, Montague County, Texas.

Reviews ground-water occurrence and use at and near Nocona. Makes recommendations for distribution of pumping and area for future development. Gives records of wells, logs, and chemical analyses of ground water.

WdU 38. Broadhurst, W. L., Follett, C. R., Lang, J. W., Brigance, B. G., and Shafer, G. H., 1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Hale County, Texas.

WdU 39. Broadhurst, W. L., Lang, J. W., and Shafer, G. H., 1938, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Floyd County, Texas.

WdU 40. Broadhurst, W. L., Sundstrom, R. W., and Rowley, J. H., 1946, Public water supplies in southern Texas.

Gives, in condensed form, the available data for each municipality as follows: population of community; name of official from whom the information was obtained; ownership of the waterworks; source of supply, whether ground water or surface water; the amount of water consumed; facilities for storage; the number of customers served; the character of the chemical and sanitary treatment of the water; and chemical analyses of the water. The following is given for ground-water supplies: record of wells including drillers' logs, character of pumping equipment, yields of the wells, and water-level records where available.

WdU 41. Broadhurst, W. L., Sundstrom, R. W., and Weaver, D. E., 1949, Public water supplies in western Texas.

Gives, in condensed form, the available data for each municipality

as follows: population of community; name of official from whom the information was obtained; ownership of the waterworks; source of supply, whether ground water or surface water; the amount of water consumed; facilities for storage; the number of customers served; the character of the chemical and sanitary treatment of the water; and chemical analysis of the water. The following is given for ground-water supplies: record of wells including drillers' logs, character of pumping equipment, yields of the wells, and water-level records where available.

WdU 42. Broadhurst, W. L., and Twichell, Trigg, 1942, Water supply in the sandflat area and adjacent territory in Rusk, Nacogdoches, and Shelby Counties, Texas.

Discusses the ground and surface water resources in an area of East Texas that extends from Cushing in Nacogdoches County northeastward to Tenaha in Shelby County, and from Mount Enterprise in Rusk County southward to Appleby in Nacogdoches County.

WdU 43. Chenault, H. L., 1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Freestone County, Texas.

WdU 44. Christian, W. G., 1942, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Donley County, Texas.

WdU 45. Christian, W. G., and Smyers, L. C., 1938, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Randall County, Texas.

WdU 46. Clark, W. I., Jr., 1937, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Burleson County, Texas.

WdU 47. Clark, W. I., 1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Lee County, Texas.

WdU 48. _____1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Milam County, Texas.

WdU 49. Cromack, G. H., 1936, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Cherokee County, Texas.

WdU 50. _____1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Nacogdoches County, Texas.

WdU 51. _____1942, Records of wells, drillers' logs, water analyses, and map showing location of wells in Hardin County, Texas.

WdU 52. _____1942, Records of wells, drillers' logs, water analyses, and map showing location of wells in Jasper and Newton Counties, Texas.

WdU 53. _____1943, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Fayette County, Texas.

WdU 54. _____1943, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Grimes County, Texas.

WdU 55. _____1944, Ground-water conditions in Premont-LaGloria-Falfurias district, Texas.

Reports on the cause of water-level declines in the area and points out that as water levels decline more, the cost of pumping will increase.

WdU 56. _____1944, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Terry County, Texas.

WdU 57. _____1945, Records of wells, drillers' logs, water analyses, and map showing

location of wells in Yoakum County, Texas.

WdU 58. Cromack, G. H., 1946, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Gaines County, Texas.

WdU 59. Cromack, G. H., and Bridges, T. W., 1944, Records of wells, drillers' logs, water analyses, and map showing location of wells in Matagorda County, Texas.

WdU 60. Cumley, J. C., 1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Dawson County, Texas.

WdU 61. _____1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in northern part of Jim Hogg County, Texas.

WdU 62. _____1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in Victoria County, Texas.

WdU 63. _____1943, Records of wells and springs, drillers' logs, water analyses, and map showing locations of wells and springs in Dallas County, Texas.

WdU 64. Cumley, J. C., Cromack, G. H., and Follett, C. R., 1942, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Williamson County, Texas.

WdU 65. Dalgarn, J. C., 1941, Records of wells and springs, drillers' logs, water analyses, and map showing locations of wells and springs in Tom Green County, Texas.

WdU 66. Dalgarn, J. C., Broadhurst, W. L., and Follett, C. R., 1940, Records of wells and springs, drillers' logs, water analyses, and map showing locations of wells and springs in Armstrong County, Texas.

WdU 67. Dante, J. H., 1946, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Briscoe County, Texas.

WdU 68. Dante, J. H., 1946, Records of wells, drillers' logs, water analyses, and map showing location of wells in Swisher County, Texas.

WdU 69. _____1947, Records of wells and springs in northern Pecos County, Texas.
Gives records of wells, logs of wells, and chemical analyses of ground water.

WdU 70. Davis, D. A., 1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Ector County, Texas.

WdU 71. _____1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Brown County, Texas.

WdU 72. _____1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Midland County, Texas.

WdU 73. Davis, L. G., 1939, Records of wells, drillers' logs, water analyses, and map showing location of wells in Ochiltree County, Texas.

WdU 74. _____1942, Records of wells, drillers' logs, water analyses, and map showing locations of wells and test holes in Chambers County, Texas.

WdU 75. _____1942, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Robertson County, Texas.

WdU 76. Dennis, P. E. and Lang, J. W., 1941, Records of wells and springs and analyses of water in Loving, Ward, Reeves, and northern Pecos Counties, Pecos River Basin, Texas.

WdU 77. _____1941, Records of auger holes, including logs, records of fluctuations of water levels, water analyses, and map showing locations of wells, Pecos River Basin, Texas.

WdU 78. Dillard, J. W., 1960, Memorandum report of preliminary ground-water investigation of Shelby County, Texas.
Brief report discussing available geologic and ground-water data in Shelby County.

WdU 79. Draper, D. C., 1960, Investigation of contamination complaint in south-central Knox County, Texas.
Report on alleged contamination of ground water south of Salt Fork Brazos River in Knox County.

WdU 80. Elledge, G. A., 1937, Records of wells, drillers' logs, water analyses, and maps showing location of wells in Fort Bend County (west of Brazos River), Texas.

WdU 81. Ellis, W. C., 1947, Ground-water resources of Borden County, Texas.
Gives information about ground-water reservoirs and use. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 82. Follett, C. R., 1937, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Dallam County, Texas.

WdU 83. _____1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Swisher County, Texas.

WdU 84. _____1942, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Morris County, Texas.

WdU 85. _____1942, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Wood County, Texas.

WdU 86. _____1943, Records of wells, drillers' logs, water analyses, and map showing location of wells in Rusk County (northwestern part), Texas.

WdU 87. _____1943, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Sabine and San Augustine Counties, Texas.

WdU 88. Follett, C. R., 1943, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Washington County, Texas.

WdU 89. _____1947, Ground-water resources of Brazoria County, Texas.
Gives information about ground-water reservoirs, development of water supplies, water levels and artesian pressures, and quality of water. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 90. Follett, C. R., and Cumley, J. C., 1943, Records of wells, drillers' logs, water analyses, and map showing location of wells in Jackson County, Texas.

WdU 91. Follett, C. R., and Dante, J. H., 1946, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Floyd County, Texas.

WdU 92. Follett, C. R., and Foster, C. V., 1940, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Roberts County, Texas.

WdU 93. Follett, C. R., and Harrison, J. H., 1938, Records of wells, springs, drillers' logs, representative earthen tanks, and water analyses, and map showing location of wells, springs, and tanks in Hartley County, Texas.

WdU 94. Follett, C. R., Sundstrom, R. W., and White, W. N., 1944, Ground-water resources in the vicinity of Vernon, Texas.
Gives information about the occurrence and use of ground water and the fluctuation of water levels near Vernon. Includes a description of the ground-water reservoir, the movement of water in it, and an estimate of the amount of water in storage. Indicates area favorable for additional supplies. Also includes records of wells and springs, logs, and analyses of ground water.

WdU 95. Follett, C. R., and White, W. N., 1942, Records of wells and springs, drillers'

logs, water analyses, and map showing locations of wells and springs in Cass County, Texas.

WdU 96. Follett, C. R., White, W. N., and Irelan, Burdge, 1949, Occurrence and development of ground water in the Linn-Faysville area, Hidalgo County, Texas.

Gives information about irrigation development and extent, the sprinkler method as used, the duty of water, rock formations, ground-water recharge, fluctuations of water levels, and quality of water. Also includes records of wells, acres irrigated, logs of wells, chemical analyses, and measurements of water levels.

WdU 97. Follett, C. R., and Wilson Bruce, 1939, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Collingsworth County, Texas.

WdU 98. Forbes, H. M., and Lance, J. F., 1941, Records of wells, drillers' logs, water analyses, and map showing location of wells in Winkler County, Texas.

WdU 99. Foster, C. V., 1942, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Childress County, Texas.

WdU 100. Frazier, J. M., Jr., 1939, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Edwards County, Texas.

WdU 101. _____1939, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Gonzales County, Texas.

WdU 102. _____1940, Records of wells, test wells, drillers' logs, chemical analyses of water, and map showing location of wells in Bee County, Texas.

WdU 103. _____1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in Kendall County, Texas.

WdU 104. Frazier, J. M., Jr., 1940, Val Verde County, Texas.

Gives records of wells and springs, logs of wells, and chemical analyses of ground water.

WdU 105. _____1941, Records of wells and springs, drillers' logs, water analyses, and map showing locations of wells and springs in Irion County, Texas.

WdU 106. Frazier, J. M., Jr., Dalgarn, J. C., and Follett, C. R., 1941, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Tom Green County, Texas.

WdU 107. Gard, Chris, 1957, Records of wells producing water from the Travis Peak Formation in the Dallas area, Texas.

Report contains records of water wells producing from the Travis Peak Formation in the Dallas area. The Dallas area, as used in this report, includes all of Dallas County and adjacent parts of Collin, Denton, and Tarrant Counties.

WdU 108. Garrett, R. C., 1951, Water requirements for certain irrigated crops in Texas.

Presents duty of irrigation water for rice, cotton, alfalfa, pasture, and vegetable crops. Includes tables showing irrigation period, total water received, rainfall during season, irrigation water applied, water source, soil type, and yield.

WdU 109. Garrett, R. C., and Woolverson, A. H., 1951, The unit hydrograph—Its construction and uses.

Gives the step-by-step procedure for constructing a unit hydrograph and explains the uses of unit hydrographs as aids in engineering studies in the field of hydrology.

WdU 110. George, W. O., 1936, Records of wells, drillers' logs, water analyses, and map showing location of wells in Lavaca County, Texas.

WdU 111. _____1944, Water supply for the city of San Saba, Texas.

Investigates the geology and ground-water conditions near San Saba and makes recommendations for development of a supply of good water.

WdU 112. George, W. O., 1947, Geology and ground-water resources of Comal County, Texas.

Gives information about the geology of the county, discharge and source of Comal Springs, chemical quality of the water, and surface-water supplies. Also tabulates records of wells, logs of wells, water levels, and chemical analyses of ground water.

WdU 113. _____1947, Ground water in the Linn district, North-central Hidalgo County, Texas.

Gives a brief description of the shallow and deep wells used for irrigation in the Linn district. Includes tables of well data.

WdU 114. George, W. O., Cumley, J. C., and Follett, C. R., 1941, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Travis County, Texas.

WdU 115. George, W. O., and Dalgarn, J. C., 1942, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Sterling County, Texas.

WdU 116. George, W. O., and Johnson, C. E., 1941, Memorandum on ground-water resources in the vicinity of Crowell, Texas.

Reports on the possibility of developing a ground-water supply that would be adequate for the needs of Crowell either as a permanent or as an auxiliary supply when the surface supply is inadequate.

WdU 117. George, W. O., and Rose, N. A., 1942, Ground-water resources of Fort Worth and vicinity, Texas.

Gives information about the geology in relation to ground water, ground-water development and pumpage, and changes in water levels. Also records of wells, logs, and chemical analyses of ground water.

WdU 118. Harden, R. W., 1960, Preliminary investigation of the occurrence of ground water in the Trinity Group near Gainesville, Cooke County, Texas.

Summarizes the occurrence and development of ground water in and around the city of Gainesville and includes data on major wells in the area, brief geologic and hydrologic explanations, a projection of future water needs of the area, and maps showing the position of the water-bearing sands.

WdU 119. Hastings, W. W., and Irelan, Burdge, 1947, Chemical composition of Texas surface waters, 1946.

WdU 120. Hastings, W. W., and Rowley, J. H., 1945, Chemical composition of Texas surface waters, 1938-1944.

WdU 121. _____1946, Chemical composition of Texas surface waters, 1938-1945.

WdU 122. Hemphill, R. G., 1920, Duty of water on the Lower Rio Grande Valley, Season 1914-1920.

Determines the duty of water for the common crops in the valley on two types of soils. Also, explains the meaning of duty of water.

WdU 123. Heuser, J. F., 1937, Records of wells, drillers' logs, and water analyses, and map showing location of wells west of the Brazos River, Brazoria County, Texas.

WdU 124. Hinson, H. H., and Baldwin, Ben, 1936, Records of wells, drillers' logs, water analyses, and map showing location of wells in Bailey County, Texas.

WdU 125. Huggins, L. P., 1936, Records of wells, drillers' logs, water analyses, and maps showing location of wells in Foard County, Texas.

WdU 126. Huggins, L. P., 1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Knox County, Texas.

WdU 127. Hughes, W. F., 1951, Cost of pumping water for irrigation, Texas High Plains, Field investigations—1947 irrigation season.

Reports on a study to determine the cost of pumping water with existing equipment operating under the wide range of conditions found in the High Plains.

WdU 128. _____1955, Pumping costs, Selected pumping plants in Moore and Hansford Counties, Texas.

Presents the operating costs, pump and power unit repair costs, and attendance costs which were determined for 26 deep wells in Moore and Hansford Counties.

WdU 129. Hughett, M. G., and Brigance, B. G., 1937, Records of wells, drillers' logs, water analyses, and maps showing location of wells in Lubbock County, Texas.

WdU 130. Hutchins, W. A., 1961, The Texas law of water rights: The Texas Legislature and Texas Board of Water Engineers in cooperation with the Farm Economics Division, Economic Research Service, U.S. Department of Agriculture.

A general textual treatise on the salient portions of Texas statutory, case, and administrative law.

WdU 131. Irelan, Burdge, and Avrett, J. R., 1948, Chemical composition of Texas surface waters, 1947.

WdU 132. Irelan, Burdge, Weaver, D. E., and Avrett, J. R., 1949, Chemical composition of Texas surface waters, 1948.

WdU 133. Johnson, C. E., 1939, Records of wells, drillers' logs, water analyses, and map showing location of wells in San Patricio County, Texas.

WdU 134. _____1940, Records of wells and springs, drillers' logs, water analyses, cross sections, and map showing location of wells and springs in Aransas County, Texas.

WdU 135. Knowles, D. B., 1946, Ground water in parts of Scurry County, Records of wells, drillers' logs, water analyses, and map showing location of wells in Scurry County, Texas.

WdU 136. _____1947, Ground water in northwestern Nolan County, Texas, Records of wells, drillers' logs, water analyses, and map showing location of wells.

WdU 137. Knowles, D. B., and Lang, J. W., 1947, Preliminary report on the geology and ground-water resources of Reeves County, Texas.

Describes the geologic formations and their water-bearing properties, development from springs and wells, and the quality of water. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 138. Lang, J. W., 1936, Records of wells, drillers' logs, water analyses, and map showing location of wells in Martin County, Texas.

WdU 139. _____1937, Records of wells, test wells and drillers' logs, water analyses, and map showing location of wells in Andrews County (south half), Texas.

WdU 140. _____1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Glasscock County, Texas.

WdU 141. _____1943, Ground-water conditions in the Memphis area, Texas.

Reports on a study to determine the possibility of developing an additional water supply for a proposed government hospital at Memphis, Texas.

WdU 142. Lang, J. W., Broadhurst, W. L., and Ryman, L. J., 1939, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Castro County, Texas.

WdU 143. Lang, J. W., and Davis, L. G., 1940, Records of wells, test wells, drillers' logs, chemical analyses of water, and map showing locations of wells in Andrews County, Texas.

WdU 144. Lang, J. W., and Follett, C. R., 1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Deaf Smith County, Texas.

WdU 145. Lang, J. W., and Sundstrom, R. W., 1946, Ground-water resources of the Houston district, Texas, progress report for 1946, with section on results of pumping tests at new southwest pumping plant.

Brings up to 1946 the information about the development of ground water, the pumpage and change in water levels in the Houston, Pasadena, and Katy areas, the fluctuations of water levels in the outcrop area of the water-bearing sands, the water levels in the Bammel gas field area, and the chemical quality of the ground water. Also gives the results of pumping tests at southwest pumping plant and computed water levels for assumed conditions.

WdU 146. Lang, J. W., and Twichell, Trigg, 1945, Water resources of the Lubbock District, Texas.

Contains a summary of discharge records collected at streamflow stations Double Mountain Fork Brazos River at Lubbock, Double Mountain Fork Brazos River near Aspermont, and White River at Plainview, Texas. Describes the occurrence of ground water, test drilling and results, and computed drawdowns for an assumed well field. Also well records, logs, and analyses of ground water.

WdU 147. Littleton, R. T., 1956, Contamination of surface and ground water in southeast Young County, Texas.

Report on alleged ground-water contamination in alluvium of the Clear Fork Brazos River near its confluence with the Brazos River in southeast Young County. Contains a section on quality of surface water.

WdU 148. Livingston, Penn, 1939, Records of wells, drillers' logs, water analyses, and map showing location of wells in Montgomery County, Texas.

[This report is contained also in a compilation volume, WdU 258.]

WdU 149. _____1945, Ground-water resources at Sherman, Texas.

Gives information about the municipal wells, pumping tests, and computed drawdowns and pumping levels with assumed additional wells.

WdU 150. _____1947, Ground-water resources of Bexar County, Texas.

Reviews geology of and recharge to the Edwards Limestone reservoir. Gives discharge from the Edwards Limestone reservoir at different places in Bexar County to 1946 and estimated average discharge from the reservoir in 1934 and 1946. Also, tabulates records of wells, logs of wells, water levels in wells, and chemical analyses of ground water.

WdU 151. _____1947, Relationship of ground water to the discharge of the Leona River in Uvalde and Zavala Counties, Texas.

Gives information about wells and springs in the valley, discharge of the Leona River, chemical character of the water, and the relation of ground water to the flow of the Leona River. Also tabulates records of wells, water levels, and the altitude of points along the Leona River.

WdU 152. Livingston, Penn, and Cromack, G. H., 1942, Water-well data, Jefferson County, Texas.

Gives records of wells, logs of wells, and chemical analyses of ground water.

WdU 153. _____1942, Water-well data in Orange County, Texas.

Gives records of wells, logs of wells, and chemical analyses of ground water.

WdU 154. Livingston, Penn, and Turner, S. F., 1939, Records of wells, drillers' logs, water analyses, and map showing location of wells in Fort Bend County (east of Brazos River), Texas.

[This report is contained also in a compilation volume, WdU 258.]

WdU 155. _____1939, Records of wells, drillers' logs, water analyses, and map showing location of wells in Galveston County, Texas.

[This report is contained also in a compilation volume, WdU 258.]

WdU 156. _____1939, Records of wells, drillers' logs, water analyses, and map showing location of wells in Harris County, Texas.

[This report is contained also in a compilation volume, WdU 258.]

WdU 157. Lonsdale, J. T., Johnson, C. E., and Cumley, J. C., 1941, Records of wells, drillers' logs, water analyses, and map showing locations of wells in Calhoun County, Texas.

WdU 158. Lonsdale, J. T., and Nye, S. S., 1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Hidalgo County, Texas.

WdU 159. _____1941, Records of wells, drillers' logs, water analyses, and map showing location of wells in Hidalgo County, Texas.

WdU 160. Lowry, R. L., 1956, An inventory of the surface-water resources of Texas.

Contains topography and drainage areas of Texas, geographic provinces of Texas (which include Gulf Coastal Plains, Central Texas, Trans-Pecos Texas, and High Plains), average annual rainfall, watershed uses, evaporation, runoff in Texas, general runoff, inflow from adjoining states and outflow to adjacent states, flow into Gulf of Mexico, charts of monthly runoff of selected rivers, runoff in Brazos and Colorado River Basins, and also reservoirs.

WdU 161. Lyle, W. M., 1936, Records of wells, drillers' logs, water analyses, and map showing location of wells in Henderson County, Texas.

WdU 162. _____1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Rusk County, Texas.

WdU 163. _____1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Smith County, Texas.

WdU 164. _____1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Panola County, Texas.

WdU 165. _____1938, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Shelby County, Texas.

WdU 166. _____1940, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Mason County, Texas.

WdU 167. Lynch, W. A., 1934, Records of wells, drillers' logs, and water analyses in Nueces County, Texas.

WdU 168. _____1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in Live Oak County, Texas.

WdU 169. Mapp, H. M., 1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in DeWitt County, Texas.

WdU 170. Marek, E. L., 1936, Records of wells, drillers' logs, water analyses, and map showing location of wells in Wilson County, Texas.

WdU 171. May, R. E., 1938, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Austin County, Texas.

WdU 172. May, R. E., 1938, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Colorado County, Texas.

WdU 173. McMillion, L. G., 1956, Artesian water in the Elkhart area, southern Anderson County, Texas.

The occurrence of artesian water in the Queen City Formation and related ground-water conditions are described in this report.

WdU 174. Merritt, R. B., and Follett, C. R., 1946, Records of wells, drillers' logs, water analyses, and map showing location of wells in Hale County, Texas.

WdU 175. Michal, E. J., 1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Comal County, Texas.

WdU 176. Mueller, C. B., 1939, Records of wells and springs, drillers' logs, water analyses, and map showing locations of wells and springs in Crosby County, Texas.

WdU 177. _____1940, Records of wells and springs, drillers' logs, water analyses, and map showing locations of wells and springs in Callahan County, Texas.

WdU 178. Mueller, C. B., Lang, J. W., and Broadhurst, W. L., 1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in Hockley County, Texas.

WdU 179. Muenster, R. A., 1936, Records of wells, drillers' logs, water analyses, and maps showing location of wells in Refugio County, Texas.

WdU 180. Muenster, R. A., and Michal, E. J., 1938, Records of wells, drillers' logs, water analyses, and map showing location of wells in Refugio County and part of Goliad County, Texas.

WdU 181. Peckham, R. C., 1960, Investigation of contamination complaint, Clemens Prison Farm, Brazoria County, Texas.

Report presents data that indicates deterioration in quality of water in southwestern Brazoria County, which appears to have resulted from completing the subject well through the fresh and salt water interface.

WdU 182. Rayner, F. A., 1960, Memorandum report of mathematical method of comparing chemical analyses.

Mathematical method of comparing chemical analyses using chloride concentration as the control element.

WdU 183. Rayner, F. A., and McMillion, L. G., 1960, Underground water conservation districts in Texas.

Contains general information on creation, authority, management, and operation of underground water conservation districts in Texas.

WdU 184. Rasmussen, W. C., 1947, Geology and ground-water resources of Caldwell County, Texas.

Gives information about the geology and development of water supplies. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 185. Rockwell, W. L., 1948, A study of the movement of moisture in soils.

Reports on the rate of lateral and vertical movement of applied moisture, the limits of these movements, the extent of losses from soils by evaporation, and the quantity retained by the soils.

WdU 186. Root, E. L., and Harrison, J. W., 1937, WPA Project 1759—Water table survey in the Lower Rio Grande Valley, 9 Parts.

Gives depths to water, logs of test holes, and altitude of water levels in some test holes.

Part 1 - Willacy County.

Part 2 - Cameron County Water Improvement District No. 2.

Part 3 - Donna Irrigation District, Hidalgo County No. 1.

Part 4 - LaFeria Water Control and Improvement District Cameron County No. 3.

Part 5 - Hidalgo County Water Improvement District No. 2.

Part 6 - Cameron County Water Control and Improvement District No. 5.

Part 7, Section 1 - Hidalgo and Cameron Counties Water Control and Improvement District No. 9.

Part 7, Section 2 - Hidalgo and Cameron Counties Water Control and Improvement District No. 9.

Part 8 - Cameron County Water Improvement District No. 1 and Cameron County Water Improvement District 15.

Part 9, Section 1 - Cameron County Water Improvement District No. 6.

WdU 187. Rose, N. A., 1943, Records of wells, drillers' logs, water analyses, and map showing location of wells in Montgomery County, Texas.

WdU 188. Rose, N. A., and Alexander, W. H. Jr., 1944, Progress report on the ground-water resources of the Houston district, Texas.

Brings up to 1944 information about development, pumpage, and changes in water levels in the Houston, Pasadena, and Katy areas; the fluctuations of water levels in the outcrop area of the water-bearing sands; and the chemical character of the ground water. Also gives information about the temperature of ground water and the rise of water levels in the Bammel gas field.

WdU 189. Rose, N. A., and Stuart, W. T., 1943, Pump settings and pumping levels in the Houston district, Texas.

Also gives the decline of water levels in wells screened opposite the heavily pumped sands in the Houston, Pasadena, and adjacent localities.

WdU 190. Rose, N. A., White, W. N., and Livingston, Penn, 1943, Exploratory water-well drilling in the Houston district, Texas.

Describes equipment and methods used in drilling exploration holes, coring, drill-stem tests, electrical logging, and drilling mud. Also describes laboratory studies including mechanical analyses, permeability tests, porosity determinations, and microscopic examinations of cuttings. Gives comparison and correlations of electrical logs with drillers logs, core samples, and salinity of the water.

WdU 191. Russell, F. E., and Huggins, L. P., 1936, Records of wells, drillers' logs, water analyses, and map showing location of wells in Hardeman County, Texas.

WdU 192. Samuell, J. H., 1937, Records of wells, drillers' logs, water-level measurements, analyses of water from wells, streams, and lakes, and map showing locations in Eastland County, Texas.

WdU 193. _____1937, Records of wells, drillers' logs, water-level measurements, water analyses, and map showing location of wells in Howard County, Texas.

WdU 194. _____1937, Records of wells, and drillers' logs, water analyses from wells, streams, and tanks, and map showing location of wells, streams, and tanks in Stephens County,Texas.

WdU 195. Samuell, J. H., and Davis, D. A., 1938, Records of wells and springs, drillers' logs, test well logs, records of streams and lakes, analyses of water from wells, springs, streams, and lakes, and map showing locations in Coleman County, Texas.

WdU 196. Scalapino, R. A., 1949, Ground-water resources of the El Paso area, Texas, Progress Report No. 6.

Gives information about the amount of water pumped, fluctuations of water levels and water removed from storage in 1936-48. Also information about salt-water encroachment, the feasibility of artificial recharge, and quality of water. Also gives analyses of ground water.

WdU 197. Shafer, G. H., 1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Karnes County, Texas.

WdU 198. _____1937, Records of wells, drillers' logs, water analyses, and map showing location of wells in Leon County, Texas.

WdU 199. _____1939, Records of wells and springs, drillers' logs, water analyses and map showing location of wells and springs in San Saba County, Texas.

WdU 200. Shafer, G.H., and Follett, C. R., 1938, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Oldham County, Texas.

WdU 201. Shafer, G. H., and Lyle, W. M., 1937, Records of wells , drillers' logs, water analyses, and map showing location of wells in Gregg County, Texas.

WdU 202. Shamburger, V. M., Jr., 1958, Reconnaissance report on alleged contamination of California Creek near Avoca, Jones County, Texas.

Report concludes that the brine flowing from springs on California Creek is probably the result of leakage from oil wells and improperly plugged holes which allow highly mineralized water under artesian head to move upward and contaminate shallow strata.

WdU 203. _____1958, Reconnaissance of water-well contamination in the city of Victoria and at Placedo Junction, Victoria County, Texas.

Includes chemical analyses of well water which indicate the contaminated area and points out apparent source of contaminants.

WdU 204. Shamburger, V. M., Jr., 1958, Reconnaissance report on the Bishki-Meyers well near Pierce, Wharton County, Texas.

Report presents results of investigation of alleged contamination of a newly completed irrigation well.

WdU 205. _____1958, Memorandum report on water well contamination in the Saspamco area, Wilson County, Texas.

Report includes chemical analyses of well waters and discussion of probable sources of contaminants in the area.

WdU 206. _____1959, Reconnaissance of water well pollution and the occurrence of shallow ground water, Runnels County, Texas.

This report summarizes water well pollution complaints, possible sources of water well contaminants, chemical analyses of water from allegedly contaminated wells, and steps needed to alleviate the problem.

WdU 207. _____1960, A reconnaissance of alleged salt-contamination of soils near Stamford, Jones County, Texas.

Report on soil contamination resulting from rising water table.

WdU 208. Shields, Elgean, 1937, Records of wells, drillers' logs, water analyses, and maps showing location of wells in Gillespie County, Texas.

WdU 209. Smith, H. A., 1940, Records of wells and springs, drillers' logs, water analyses, and map showing location of wells and springs in Taylor County, Texas.

WdU 210. Smyers, L. G., 1938, Records of wells, springs, and representative earthen tanks, drillers' logs, water analyses, and map showing location of wells and tanks in Potter County, Texas.

WdU 211. Stearman, J. W., 1960, A reconnaissance investigation of alleged

contamination of irrigation wells near Lockett, Wilbarger County, Texas.

Reports on ground-water contamination in the Seymour Formation in western Wilbarger County near the Foard County line.

WdU 212. Sturrock, J. E., 1938, Brief of State Board of Water Engineers of Texas, in the matter of: Treaty between the United States of America and the Republic of Mexico respecting the division and diversion of the waters of the lower Rio Grande between the two countries.

WdU 213. Sundstrom, R. W., 1948, Results of pumping test at Waxahachie, Texas.

Gives the results of pumping tests in the city wells and the computed lowering of the pumping levels by increasing the pumpage from the city wells and by adding a new well.

WdU 214. Sundstrom, R. W., Cromack, G. H., and West, N. N., 1949, Ground-water resources of Matagorda County, Texas.

Discusses ground-water reservoirs, development, fluctuations of artesian pressures, and quality of water. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 215. Sundstrom, R. W., Broadhurst, W. L., and Dwyer, Mrs. B. C., 1947, Public water supplies in central and north-central Texas.

Gives, in condensed form, the available data for each municipality as follows: population of community; name of official from whom the information was obtained; ownership of the waterworks; source of supply, whether ground water or surface water; the amount of water consumed; facilities for storage; the number of customers served; the character of the chemical and sanitary treatment of the water; and chemical analysis of the water. The following is given for ground-water supplies: record of wells including drillers' logs, character of pumping equipment, yields of the wells, and water-level records where available.

WdU 216. Sundstrom, R. W., and Follett, C. R., 1945, Ground-water resources of Atascosa County, Texas, Progress report.

Gives development of ground water by aquifers, use, water levels, and potential for additional development. Also tabulates records of wells, logs of wells, and chemical analyses of ground water.

WdU 217. Sundstrom, R. W., Hastings, W. W., and Broadhurst, W. L., 1945, Public water supplies in eastern Texas, v. 1 and 2.

Gives, in condenses form, the available data for each municipality as follows: population of community; name of official from whom the information was obtained; ownership of the waterworks; source of supply, whether ground water or surface water; the amount of water consumed; facilities for storage; the number of customers served; the character of the chemical and sanitary treatment of the water; and chemical analysis of the water. The following is given for ground-water supplies: record of wells including drillers' logs, character of pumping equipment, yields of the wells, and water-level records where available.

WdU 218. Texas Agricultural Experiment Station, Texas Agricultural Extension Service, in cooperation with Texas Board of Water Engineers and the U.S. Department of Agriculture, 1954, Water evaporation studies in Texas.

Contains a complete compilation of all known data on water evaporation in Texas. Describes the proper installation and operation of evaporation stations and discusses procedures and coefficients to use in converting pan-evaporation losses to natural lake or reservoir losses.

WdU 219. Texas Board of Water Engineers, 1946, Seepage losses from canals in Texas.

Contains the following reports: (1) Estimate of seepage loss from proposed main channel of Starr County Water Control and Improvement District No. 1, by R. G. Hemphill; (2) Leakage of

water from irrigation channels in concrete-lined canals in the Lower Rio Grande Valley of Texas, by O. A. Faris; (3) Canal losses on San Benito irrigation project (Cameron County Water Improvement District No. 2), by O. A. Faris; (4) Miscellaneous data on seepage losses from canals in Texas for 1921 (Bexar, Medina, Atascosa Counties Water Improvement District No. 1), by H. C. Pritchett; and (5) Miscellaneous data on seepage losses from canals in Texas for 1922 (United Irrigation District, Hidalgo County Water Control and Improvement District No. 7), by H. C. Pritchett.

WdU 220. Texas Board of Water Engineers [compilers], 1948, Central Texas water conference at Waco, Texas.

Papers presented at the conference report on available supplies and resources, present and future demands and problems confronting the present and future water supply of the Central Texas area.

WdU 221. _____1948, Coastal area water conference at Houston, Texas.

A compilation of papers pertaining to water supply problems in the industrialized areas of the Gulf Coast from Orange to Brownsville, Texas. Discussions of the source of water supply, disposal of industrial waste, and problems involved in preventing pollution are included.

WdU 222. _____1948, East Texas water conference at Tyler, Texas.

Compilation of reports, papers, and comments on the water supply of East Texas counties; the present consumption and use; how long the present supply will last; how the water supply can be increased; and how to best conserve the water supply to meet future needs of East Texas.

WdU 223. _____1948, South Texas water conference at Corpus Christi, Texas.

A compilation of reports and papers on available water resources, present and future demands, and problems confronting the present and future water supply in the South Texas area.

WdU 224. Texas Board of Water Engineers [compilers], 1948, West Texas water conference at Big Spring, Texas.

Sixteen reports and papers are presented on water supply needs, problems, and possible solutions in West Texas.

WdU 225. Texas Board of Water Engineers, 1950, Chemical composition of Texas surface waters, 1949.

WdU 226. _____1951, The influence of natural depletion of river flow upon the quantity of water available for diversion.

This report discusses the ways and means of depletion in the river, and it gives, for example, data on Paluxy Creek at Glen Rose; Clear Fork Brazos River at Crystal Falls; and Brazos River at Seymour, South Bend, Palo Pinto, Glen Rose, and Whitney.

WdU 227. _____1952, Chemical composition of Texas surface waters, 1950.

WdU 228. _____1954, A report on model spillway studies.

A report on three model spillway studies. The first model was the Hicks project which is located upstream from Lake Bridgeport in the watershed of the West Fork Trinity River, about 13 miles northeast of Jacksboro. The second model was from the Pure Oil Company project and is located on Spring Creek, a tributary of the Neches River, in Van Zandt County, about 3 miles southwest of Van. The third model was for the Lucy Mae Kuhn Dam project which is located on the Colorado River approximately 6 miles west of Ballinger. Test were made on each model to determine the hydraulic characteristics of each.

WdU 229. Texas Board of Water Engineers, 1954, Chemical composition of Texas surface waters, 1951.

WdU 230. _____1954, Report to Water Resources Committee.
Describes the organization and functions of the Texas Board of Water Engineers. Includes numerous maps and tables.

WdU 231. _____1956, Chemical composition of Texas surface waters, 1952.

WdU 232. _____1956, Chemical composition of Texas surface waters, 1953.

WdU 233. _____1956, Chemical composition of Texas surface waters, 1954.

WdU 234. _____1956, Chemical quality standards for irrigation waters.
Gives relative tolerance of crop plants to salt and boron, and discusses effects of other chemicals on irrigated plants.

WdU 235. _____1956, Surface water reservoirs of Texas.
Contains watershed, year dam was completed, name of reservoir, name of owner, stream, county, location, storage capacity in acre-feet, and use of stored water.

WdU 236. _____1957, Chemical composition of Texas surface waters, 1955.

WdU 237. _____1958, Water use reported by municipalities and industries in Texas.
Report presents a compilation of the quantity of municipal and industrial water used in 1957 and estimates of the water demands for the years 1975 and 2000.

WdU 238. _____1961, A review of the proposed Sunday Canyon Reservoir project, Palo Duro Canyon State Park, Texas.
Gives a structural review of the proposed project; also includes rainfall, runoff, and geology of the project area.

WdU 239. Texas Board of Water Engineers, 1961, Historical ground-water uses by municipalities for the years 1955 through 1959 for selected areas in Texas.
This report presents the amounts of ground water used by municipalities in the area studied by the U.S. Study Commission—Texas. The aquifer yielding the water are noted as well as past changes in the sources of supply.

WdU 240. _____1961, Review of chemical quality of water data-collection program in the Brazos River Basin.
Includes existing chemical-quality records, discussion of data need, and a suggested program for collection of chemical-quality data.

WdU 241. Texas Board of Water Engineers and U.S. Geological Survey, 1957, Estimated use of ground water in watersheds of Texas.
Report presents tabulation of quantity of ground water used in 1955 in the various watersheds of the State. Included are discussions of the interrelationship of surface water and ground water and general aspects of ground-water occurrence in Texas.

WdU 242. _____1957, Texas floods, April-May-June 1957.
Brings into proper perspective conditions of rainfall and the resulting streamflow which occurred in Texas during the months of April, May, and June 1957.

WdU 243. Turner, S. F., 1938, Ground water in the vicinity of Bryan and College Station, Texas.
Gives information about ground-water conditions and development near Bryan and College Station and recommends area for exploration for future supplies.

WdU 244. _____1939, Records of wells, drillers' logs, water analyses, and map showing

location of wells in Grimes County, Texas.

WdU 245. Turner, S. F., and Cumley, J. C., 1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in Brooks County, Texas.

WdU 246. _____1940, Records of wells, drillers' logs, water analyses, and map showing location of wells in Kenedy County, Texas.

WdU 247. Turner, S. F., and Livingston, Penn, 1939, Records of wells, drillers' logs, water analyses, and map showing location of wells east of the Brazos River, Brazoria County, Texas.

[This report is contained also in a compilation volume, WdU 258.]

WdU 248. _____1939, Records of wells, drillers' logs, water analyses, and map showing location of wells in Waller County, Texas.

[This report is contained also in a compilation volume, WdU 258.]

WdU 249. Turner, S. F., Lynch, W. A., and Cumley, J. C., 1940, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Jim Wells County, Texas.

WdU 250. Turner, S. F., Robinson, T. W., and Cromack, G. H., 1940, Records of wells, drillers' logs, water analyses, and maps showing location of wells in Winter Garden district in Dimmit and Zavala Counties and eastern Maverick County, Texas.

WdU 251. White, J. W., 1961, Investigation of salt water contamination in a Woodbine well near Sherman, Grayson County, Texas.

Contains data relating to local contamination of the Woodbine Formation as a result of improper well construction.

WdU 252. White, W. N., 1938, Progress report on the ground-water resources of the Houston district, Texas.

[This report is contained also in a compilation volume, WdU 258.]

Brings up to 1938 information about the fluctuations of the water levels and pumpage.

WdU 253. White, W. N., 1939, Progress report on the ground-water resources of the Houston district, Texas.

Brings through 1938 information about the fluctuations of water levels.

WdU 254. _____1939, Progress report on the ground-water resources of the Houston district, Texas.

[This report is contained also in a compilation volume, WdU 258.]

Gives information on fluctuations of water levels in 1937, 1938, and early part of 1939.

WdU 255. White, W. N., Broadhurst, W. L., and Lang, J. W., 1938, Ground water in the High Plains in Texas.

Gives information about the pumpage and fluctuation of water levels.

WdU 256. _____1940, Ground water in the High Plains in Texas.

Gives information about the recharge and discharge of ground water and brings up to 1940 the development, pumpage, and fluctuations of water levels. Gives tables of water levels in wells.

WdU 257. White, W. N., Gale, H. S., and Nye, S. S., 1938, Ground-water resources of the Balmorhea area in western Texas.

Principal purposes of the investigation were to determine if increased withdrawals of water from wells would result in a material reduction in the discharge of the springs and to compile a long-time record of the flow of springs to serve as a basis for protecting the owners rights. Gives information about the geology and its relation to springs and wells and the occurrence, intake, and discharge of ground water. Also gives chemical analyses of water from wells and springs and discharge measurements of springs and streams.

WdU 258. White, W. N., Livingston, Penn, and Turner, S. F., 1939, Ground-water resources of the Houston-Galveston area and adjacent region, Texas, 1939. [This volume contains the following nine reports which are also annotated elsewhere herein: Texas Water Development Board Unnumbered Publications (WdU) 148, 154, 155, 156, 247, 248, 252, 254, and 264.]

This compilation volume gives records of wells, drillers' logs, water analyses, and maps showing location of wells in the following six counties: Montgomery, Fort Bend (east of Brazos River), Galveston, Harris, Brazoria (east of Brazos River), and Waller. Also contained is information on fluctuations of water levels, pumpage, and chemical character of the public-water supply.

WdU 259. White, W. N. and Meinzer, O. E., 1931, Ground water in the Winter Garden and adjacent district in southwestern Texas.

Gives information about the geology, recharge to the Carrizo Sand, fluctuations of water levels, and salt-water contamination.

WdU 260. _____1931, Survey of the underground waters of Texas.

Gives information on the underground waters in southwestern Texas, Glen Rose area, western Texas area—the Toyah basin, eastern Texas area, and the Lower Rio Grande Valley. Describes the extent of ground water use, primarily for irrigation, and the most important water-bearing formations.

WdU 261. White, W. N., Rose, N. A., and Guyton, W. F., 1940, Progress report on the ground-water resources of the Houston district.

Gives a description of the geology, and brings up to the latter part of 1940 information about the pumpage and fluctuations of water levels in the Houston, Pasadena, and Katy areas. Also gives information about the fluctuations of water levels along the Hempstead and Conroe highways, the chemical quality of the ground water, the results of exploratory well drilling, and the results of pumping tests.

WdU 262. White, W. N., Rose, N. A., and Guyton, W. F., 1942, Ground-water resources of the Houston district, Texas, progress report with records of wells, pumpage, water-level fluctuations in wells, and well analyses, Harris County and adjoining parts of Fort Bend and Waller Counties, Texas.

WdU 263. _____1942, Progress report on the ground-water resources of the Houston district, Texas.

Gives up to 1942 the pumpage and fluctuations of water levels in wells in the Houston, Pasadena, and adjacent areas and the Katy area.

WdU 264. White, W. N., Turner, S. F., and Livingston, Penn, 1937, Progress report on the ground-water resources of the Houston district, Texas.

[This report is contained also in a compilation volume, WdU 258.] Brings up to 1937 the fluctuations of water levels in relation to pumpage for different parts of the Houston district. Estimates the probable effect of additional pumping near Pasadena and evaluates areas for the development of additional supplies. Also, gives water-level fluctuations in wells and chemical analyses of ground water.

File Reports

The following unpublished reports are in the files of the Texas Water Development Board and are available for reference. Index code and number (WdF 1, etc.) correspond *only* to the index at the end of the bibliography.

WdF 1. Alvarez, H. J., 1973, A summary of the results of previous investigations on the fresh and saline ground-water resources of the Hueco Bolson and Rio Grande Alluvium aquifers, El Paso County, Texas.

Gives information on the quantity and quality of fresh and saline ground water available from the various aquifers in the El Paso area. The desalting plant of El Paso Natural Gas Company is discussed. Numerous maps and cross-sections are reproduced to show the extent and thickness of the various ground water quality zones.

WdF 2. Baker, B. B., 1971, Occurrence and availability of ground water in the vicinity of Commerce, Texas.

Includes a discussion of the availability of water from the Paluxy and Nacatoch Sands, water quality, and areas favorable for additional development.

WdF 3. Bayha, D. C., 1966, Investigation of alleged ground-water contamination, Carlton area, Hamilton County, Texas.

The results of the investigation indicate that a shallow water sand in the area is contaminated with hydrocarbons. The apparent source appears to be underground fuel storage tanks at any of the nearby gasoline service stations. Report also warns of a potential hazard to ground-water quality from cesspools, septic tanks, and leaching fields.

WdF 4. _____1967, Investigation of possible ground-water pollution from the operation of a dump near the city limits of Humble in Harris County, Texas.

Report concludes that the area is underlain by porous and permeable strata and that a potential hazard exists of contamination to ground water by seepage and underground movement of water from the dump sites.

WdF 5. Bayha, D. C., 1967, Investigation of the presence of natural gas in a ground-water aquifer, Menefee Field area, Wharton County, Texas.

Fresh water bearing strata apparently below a subsurface depth of 130 feet is charged with natural gas similar to that produced from the Frio. The source of the natural gas is believed to be from a producing gas well in the area or from an improperly plugged and abandoned oil or gas test well in the area.

WdF 6. _____1969, Investigation of a water well reportedly contaminated by salt water in the area of the Howard-Glasscock Oil Field, Glasscock County, Texas.

Investigation indicates that shallow water-bearing strata in this area have become contaminated with saline water, apparently as a result of produced oil-field brine disposed of into unlined pits.

WdF 7. _____1969, Quality of ground water occurring in the San Andres Limestone in northern Pecos County, and suitability of using the San Andres for disposal of produced oil-field brine in this and adjacent areas.

The investigation indicates that some of the permeable zones in the San Andres contain water of suitable quality for beneficial use. The San Andres in the subject area should not be used as the receiving formation for injection of produced brine. Some recommendations given.

WdF 8. Bayha, D. C., and Morin, G. C. A., 1969, Investigation of alleged ground-water contamination in the

Glen Cove area, Coleman County, Texas.

The investigation indicates the presence of ground-water contamination in the area, principally high nitrate concentrations as an apparent result of domestic and livestock wastes; and high salinity, presumed to be the result of oil-field operations in the area.

WdF 9. Beffort, J. D., 1969, Nitrate contamination study near Ballinger, Runnels County, Texas.

Report concludes that the water table in the study area lies from 0 to 49 feet below the land surface. Above average precipitation in the area since 1967 can account for the rise of the water table. The nitrate concentration in the ground water of the study area ranges from 0 to 2,310 parts per million. The most probable sources of the nitrates are cesspools, septic-tank systems, privies, and livestock pens.

WdF 10. _____1970, Contamination of Danny R. Thomas water well in Andrews County, Texas.

Report concludes that the use of a brine-storage pit is the most likely source of sodium-chloride water produced by water wells and that an improperly completed brine-supply well may be allowing salt water to contaminate usable water supplies in Triassic strata.

WdF 11. _____1970, Investigation of ground-water contamination hazards in the vicinity of the Tanner Road garbage dumps, Harris County, Texas.

Report concludes that the water level in the garbage dumps and a nearby sand pit is approximately at the same elevation as the water-table surface of the aquifer. The source of ammonia nitrogen in water from the sand pit and in some wells could be the water in the garbage dumps or septic tank effluent.

WdF 12. Beffort, J. D., 1970, Ricardo Water Supply Corporation contamination complaint, Kleberg County, Texas.

Chemical analyses of the water samples indicate that there is no widespread contamination of the fresh-water aquifer in the Ricardo area. Seepage of salt waters through the confining clay beds overlying and underlying the aquifer is not the source of contamination. Recommendations are given for recompletion of existing wells.

WdF 13. _____1970, Rudolph Knappick contamination complaint, Harris County, Texas.

Report indicates that none of 12 abandoned water wells inventoried were capped with a water-tight seal to prevent the entrance of flood waters and of extraneous materials, objects, or animals into the casing and, therefore, present a potential hazard to the quality of ground water in the area.

WdF 14. _____1971, Contamination of B. R. White's water wells in central Howard County, Texas.

Report summarizes several investigations in this area. Unlined refinery effluent holding ponds and evaporative spray system at an oil and chemical company are the most probable sources of phenols and hydrocarbons in the ground water.

WdF 15. Bluntzer, R. L., 1971, Basic ground-water data for the Carrizo-Wilcox aquifer in the Winter Garden area of Texas—A progress report.

Describes the geology and ground-water hydrology of the Carrizo-Wilcox aquifer. Pumpage, water levels, and chemical quality of ground water are discussed in detail. Numerous maps showing water-level changes and graphs of historical pumpage are included. Tables in the appendix provide the results of power-yield tests, water-level measurements, and chemical analyses of ground water by counties.

WdF 16. Brune, Gunnar, 1974, Ground-water resources of Travis County, Texas.

The geology, occurrence of ground water, recharge and discharge, hydraulic characteristics, wells and springs, water levels, chemical quality, and use of ground water are discussed for each of the more important aquifers. Well construction and completion, ground-water contamination, and favorable areas for additional development are also treated.

WdF 17. _____1974, Major and historical springs of Texas.

Discusses the historical significance of many Texas springs, their classification by size, aquifers, quality of spring waters, decline of spring flow, and Texas water law relating to springs. Detailed information on individual springs is given by counties.

WdF 18. Brune, Gunnar, and Wyatt, A. W., 1971, A study of artificial recharge in Texas.

Discusses the various methods of ground-water recharge including holes, shafts, wells, basins, pits, trenches, canals, deep percolation from irrigation, water spreading, and surface reservoirs. Recharge experiments and problems encountered are described for various aquifers throughout Texas.

WdF 19. Buckner, A. W., 1973, Availability and quality of ground water in the Edwards-Trinity aquifer in the Trans-Pecos region of Texas.

This report is an update of previous detailed ground-water reports in this area, with additional field study. It emphasizes water quality and outlines areas suitable for future development.

WdF 20. Burnitt, S. C., 1964, Meeting with Eugene Higgins, City Manager of Fort Stockton; Reconnaissance of current development of Rustler aquifer within the Comanche reservoir and the possible future effect of such development on Fort Stockton's ground-water supply.

Reports on the recent development of the Rustler Formation, the chemical character of Rustler water in the Comanche reservoir area, the existing and potential contamination problems, and conclusions enumerating significant factors concerning the matter.

WdF 21. Burnitt, S. C., 1965, Preliminary summary report of an investigation of chemical and biological contamination of ground water in the Brazos River alluvium in an area near Waco, McLennan County, Texas.

Reports on the events leading to current investigation, location, and extent of problem area. Presents data concerning general geology and ground water in the Waco area, chemical and biological indicators of contamination, methods of waste discharge in area, results of investigation, and summary of remedial action and recommendations required to improve the situation.

WdF 22. Clark, R. A., and Shih, Chia Shun, 1974, Final report on hydrologic evaluation studies of the San Angelo cumulus project.

Describes the studies concerned with hydrologic evaluation of the cumulus cloud modification for the San Angelo area, and includes a description of the generalized procedure developed for objective precipitation analysis, and objective forecasting procedure for estimation of convective precipitation, the results of statistical analyses of precipitation and streamflow data, and a Bayesian decision analysis model for cloud-seeding operations.

WdF 23. Cooper, Wallace, 1967, Field investigation of ground-water contamination in the Bowie area, Montague County, Texas.

Ground-water contamination in the area of investigation is considered

to be from oil-field brines disposed of into surface pits. Saltwater leakage around a heater-treater on one lease is probably a continuing source of contamination to ground-water resources in the area.

WdF 24. Cooper, Wallace, 1967, Potential ground-water contamination near Wellington, Collingsworth County, Texas.

Report concludes that the proposed construction of a reservoir for irrigation near the city of Wellington municipal supply wells would present a ground-water contamination hazard in the area of the water supply well field.

WdF 25. _____1968, Ground-water contamination at Union Texas Petroleum Corporation's Bowie District gasoline plant, Montague County, Texas.

Report concludes that electrolysis and corrosion may have created holes in nearby buried gasoline pipelines allowing gasoline to migrate down the dip of shallow beds to well 3 owned by the gasoline plant. Also, commingling of waters from the Wichita and overlying Trinity aquifers may be occurring either behind the casing or through a hole in the casing of another water well.

WdF 26. _____1970, Cass County nitrogen problem, Cass County, Texas.

Reports on the occurrence of nitrogen gas in water wells. Conclusions are that nitrogen as an inert gas has not created a water-quality problem by its occurrence. The probable source of the nitrogen gas appears to be denitrification of organic matter in shallow sands. Some recommendations are given regarding safety when encountering nitrogen or other gases while drilling water wells.

WdF 27. _____1970, Investigation of reported ground-water contamination, Novice area, Coleman County, Texas.

Report indicates the possibility that saline reservoir fluids or injected fluids may be contaminating strata containing usable-quality water as a result of water flood secondary oil recovery operations. Injected fluids or fluids from underlying brine aquifers may be rising in oil test wells that have short surface casing and may not be properly plugged.

WdF 28. Cooper, Wallace, 1970, Possible ground-water contamination in the Rolling Hills Addition, Potter County, Texas.

Sewage disposal wells in the Rolling Hills Addition present a severe hazard to the quality of ground water in the local area. At least one water well shows strong evidence of contamination with sewage, and it should only be a matter of time until other wells become contaminated.

WdF 29. Couch, H. E., 1970, Quality of ground water in the vicinity of Kermit, Winkler County, Texas.

Gives information about chemical quality of ground water in water-bearing zones in the area of Kermit. Also gives records of wells and chemical analyses of water.

WdF 30. _____1974, Study of the lower Cretaceous and associated aquifers in the Balmorhea district of Trans-Pecos, Texas.

Gives information about the geology as related to the ground-water aquifers in the district; gives the chemical quality, the use of water, changes in water wells and spring flows, and estimated water available for development. Also gives records of wells and springs and chemical analyses of water.

WdF 31. Davis, E. M., 1971, Development of methodology for evaluation and prediction of the limnological aspects of Matagorda and San Antonio Bays.

The report describes and evaluates limnological data collected from the San Antonio and Matagorda

Bay systems during and prior to fiscal year 1971.

WdF 32. Davis, E. M., 1972, Assessment of the primary ecological interaction in four Texas estuarine systems.

This report describes the methodology necessary for correlating nutrient levels and salinity with primary and secondary productivity for the Matagorda, San Antonio, Copano-Aransas, and Corpus Christi Bay systems.

WdF 33. Dougherty, J. P., 1974, Evaporation data in Texas, Compilation report, January 1907-December 1970.

Contains tabulations of pan evaporation data for all stations in Texas.

WdF 34. Diniz, E. V., 1973, Program BURDAT, a digital computer model for the computation of runoff depletion.

A program documentation for a digital computer model for computing runoff from a watershed for various conditions of land use and land treatment. The model duplicates the U.S. Bureau of Reclamation method for computing runoff for varying conditions as used for the U.S. Study Commission-Texas.

WdF 35. _____1974, A hydrologic study of the floods of September 26-27, 1973, for several watershed areas in and around the city of Seguin, Texas.

Analyzes various hydrologic factors that may have caused Geronimo Creek, Walnut Branch, Cottonwood Creek, and Krams Creek to reach above flood stage on September 26 and 27, 1973. The report provides information on the probabilities of flood recurrences along the tributaries of the Guadalupe River in the Seguin area.

WdF 36. _____1974, Computation of runoff data for varying levels of land use in the Brazos River Basin.

This study developed runoff data for the Brazos River Basin compatible to that computed by the U.S. Bureau of Reclamation, U.S. Department of the Interior, for the U.S. Study Commission-Texas in 1960 and subsequent updates. Data were computed for various conditions of land use and land treatment specified by the Brazos River Authority, representing natural conditions and the conditions in 1970, 1980, 1990, and 2000.

WdF 37. Duffin, Gail, 1974, Subsurface saline water resources in the San Antonio area.

Discusses the availability of saline water in the various aquifers in the San Antonio area. Special emphasis is placed on moderately saline water (containing 3,000 to 10,000 milligrams per liter of dissolved solids). Maps showing depth and thickness of the aquifers and ground-water quality are included.

WdF 38. Evans, D. S., 1970, Contamination of the Curry Spence water well (presently owned by L. T. Andrews) north of Fort Stockton, Pecos County, Texas.

Report summarizes conclusions of two previous investigations. Possible sources of the chloride contamination suggested by these investigations were: the development of the Fort Stockton oil field two miles west and brine evaporation pits about five miles southwest of the Spence well; natural salts in the alluvium; and pockets of naturally occurring saline water in the Pecos aquifer. The 1970 investigation in the area indicated that salt deposits leached from oil field mud pits may have contributed to the contamination of ground water in the area.

WdF 39. _____1971, Ground-water contamination in the vicinity of Pierce Junction salt dome (Stevenson, M. T.), Harris County, Texas.

Report summarizes data collected from three previous investigations in this area. The 1971 investigation indicates that unlined salt water disposal pits were used extensively

by oil companies in the development of the Pierce Junction oil field. Although the pits are no longer being used, the effects of past seepage of salt water probably will be noticed for several years.

WdF 40. Evans, D. S., 1971, John Young water-well problem (Lockhart) in the vicinity of the Luling-Branyon Field, Caldwell County, Texas.

The results of the investigation indicate that the source of hydrogen sulfide gas in water from the Young well is probably an oil well in the immediate vicinity. It is doubtful that ground-water contamination is presently occurring because of reduced bottom-hole pressures in the oil reservoirs. In addition, uncontaminated water generally occurs in sands less than approximately 100 feet deep near the Young well.

WdF 41. _____1972, Alleged contamination of ground water in the vicinity of Pecan Acres mobile home park, Ellis County, Texas.

Reports on the alleged contamination of water in wells by oil and wastewater disposed of into earthen pits. The results of the investigation did not indicate that ground water in the vicinity of the water wells was being contaminated. High concentrations of phenols found in wastewater from the pits were not found in water from wells. Some recommendations are given.

WdF 42. _____1972, Alleged ground-water contamination in the vicinity of Braeburn Gardens Subdivision, Harris and Fort Bend Counties, Texas.

Investigation indicates that a drainage ditch containing treated industrial wastewater from an electronics manufacturing plant is not the source of ground-water contamination in the area. The report also concludes that a nearby sanitary landfill appears to be no significant hazard to ground water in the area.

WdF 43. Evans, D. S., 1972, Contamination in the Eunice Daniel water well in the city of Fairy, Hamilton County, Texas.

Report concludes that a well that yields distasteful water after periods of heavy rainfall possibly is contaminated by precipitation mixing with surface contaminants that seeps into the subsurface and enters the uncemented borehole in the well.

WdF 44. _____1973, Alleged ground-water contamination in the vicinity of the Gottschalt Field, Goliad County, Texas.

Investigation indicates that the past disposal of produced oil-field brines into earthern pits probably is responsible for salt water contaminating ground water in the vicinity of Weesatche; however, water in some wells also is contaminated with nitrate presumably due to infiltration of septic-tank effluent.

WdF 45. _____1973, Gas in water from Mr. Jesse Bruton's water well east of Fayetteville, Fayette County, Texas.

Report concludes that methane and ethane gas occur naturally in sediments greater than approximately 300 feet in depth in the vicinity of the complainants property. Some recommendations for recompleting the well are given.

WdF 46. _____1974, Gasoline in water from Mrs. Robert E. Ward's water well near Cedar Park, Williamson County, Texas.

The most probable source of the gasoline is the Exxon station operated by the complainant. A seven foot test hole augered between the contaminated wells and the gasoline storage tanks contained gasoline-range hydrocarbon vapors. Pumping may eventually purge most of the contaminated water from the water-bearing zone.

WdF 47. Evans, D. S., 1974, Ground water contamination complaint by Mr. Dudley J. Magill, water-well driller, Concho County, Texas.

Reports on the deterioration of ground-water quality in the area. Evaporation greater than precipitation has caused salt buildup in shallow, slowly permeable sediments. Increased percolation caused by terracing and several years of above normal rainfall has leached the salts resulting in a more mineralized ground water.

WdF 48. Fink, B. E., 1965, Investigation of ground-water contamination in the Magnet Withers, Withers North oil fields, Wharton County, Texas.

Salt water disposal pits and salt water disposal wells are indicated as possible sources for contaminants in shallow water wells. Also, area sands may be yielding naturally occurring mineralized water to wells in some localities.

WdF 49. _____1965, Investigation of ground-water quality in the area of the Mauritz; Mauritz, East; Mauritz, West; Little Kentucky; and Harmon, South oil fields, Jackson County, Texas.

Evidence of seepage of oil-field brine from earthen pits in the Mauritz oil field and saturation of shallow permeable beds lying above the zone of ground-water saturation is shown by contamination of a shallow water well and by samples collected from two shallow test holes. Degradation of water in shallow permeable zones contributing to the yield of an irrigation well approximately 1,700 feet south of brine pits is strongly suspected.

WdF 50. Fink, B. E., and White, D. J., 1966, Investigation of salt-water contamination near Fort Stockton, Pecos County, Texas.

Report concludes that ground-water contamination in the area of the investigation is from any or all of three potential sources: brine-evaporation ponds operated by Stockton Salt Corporation; produced oil-field water disposed of into unlined surface pits in the Leon Valley oil field; and inadequately cased or cemented oil wells in the Leon Valley oil field.

WdF 51. Gard, Chris, 1955, Water resources of southern Hemphill, Wheeler, Collingsworth, and northern Childress Counties.

Preliminary investigation that includes discussions of geology, development of ground water, chemical character of ground water, surface-water conditions, and recommendations.

WdF 52. _____1956, Proposed city of Lubbock well fields in Bailey and Lamb Counties.

This report includes discussions of geology, ground-water conditions, utilization of ground water, and relationship of ground-water withdrawals from proposed city well fields and irrigated areas in the northern half of Bailey County and the northwestern corner of Lamb County.

WdF 53. _____1956, Report on proposed bond issue, Yoakum County Water Control and Improvement District Number 1.

This report includes discussions of geology, utilization of ground water, chemical character of ground water, quantitative analysis of ground-water supply, and well construction in the southwestern part of Yoakum County.

WdF 54. _____1956, Report on proposed bond issue, Yoakum County Water Control and Improvement District Number 2.

This report contains discussions of geology, ground-water conditions, chemical character of ground water, utilization of ground water, and quantitative analysis of ground-water supply in northwestern Yoakum County.

WdF 55. Ginn, R. F., 1971, Contamination of the Edwin A. Keely water well north-northeast of Houston, Harris County, Texas.

Report indicates that a salt water disposal pit is the most likely source of contaminated water produced from the Keely well. Some recommendations are given.

WdF 56. _____1971, Ground-water contamination (Paul Krueger) from hydrogen sulfide gas near San Marcos, Hays County, Texas.

Past records of well development reveal that highly mineralized water and water that contains hydrogen sulfide exists in the water-bearing formation in the immediate vicinity of contaminated wells.

WdF 57. _____1971, Ground-water contamination from salt water, L. L. Krenek farm south of Louise, Wharton and Jackson Counties, Texas.

Unlined earthen pits into which oil-field brine formerly was disposed of and from which brine could have seeped into shallow permeable sediments are possible sources of contaminated water in some wells. Other potential sources of contamination and recommendations for water-well construction are given.

WdF 58. _____1971, Salt-water contamination of water wells owned by Mr. R. P. Mullins near Boling, Wharton County, Texas.

The contamination of water wells in the area of investigation is believed to have been caused by the seepage of salt water from former unlined disposal pits or from the migration of salt water through inadequately cased or cemented oil and gas wells.

WdF 59. _____1971, San Angelo gasoline problem (D. C., Cunningham), Tom Green County, Texas.

Data obtained during a field investigation in the area indicate that leakage of ethyl-grade gasoline at the San Angelo city shop has occurred and may be the source of contamination in the Cunningham well and others.

WdF 60. Ginn, R. F., 1972, Goldsmith Community Park, Ector County, Texas.

Report indicates that contamination of a water well by hydrocarbons most likely has been caused by past spillage or pit disposal at an adjacent gasoline plant. The occurrence of highly mineralized water in a municipal well has been caused by the migration of highly mineralized water through inadequately cased or cemented oil wells, or by the seepage of salt water from former oil field disposal pits.

WdF 61. _____1972, Ground-water contamination from salt water (W. C. Praytor) south of Hillje, Wharton County, Texas.

Very saline water occurs in the sediments above a subsurface depth of 95 feet at a domestic well site. Nearby wells were not found to be contaminated. Unlined, salt water disposal pits used in the past in an area of oil and gas exploration and production are believed to be the most likely source of saline water.

WdF 62. _____1972, Possible ground-water contamination from the Wallace Waste Control Company's sanitary-landfill operation near the East Haven area of Houston, Harris County, Texas.

Report concludes that preparation of half of pit A for a landfill site by lining its bottom and sides with bentonite as proposed will not effectively seal the ground water from the pit because of the hydrostatic-pressure difference between the pit bottom and the natural water table. Landfill operations are not recommended in any nearby abandoned sand pit that extends below the water table.

WdF 63. _____1973, Alleged contamination of B. E. Faist's water well from uranium test holes near Burton, Washington County, Texas.

No evidence was collected during the investigation that indicates drilling of the uranium test holes has affected the quality of water pumped from the Faist well or any other well in the area of investigation. Results of chemical analyses of water samples indicate that naturally high concentrations of total iron and manganese occur in the ground water.

WdF 64. Ginn, R. F., 1973, Carrizo Formation well-completion investigation in Atascosa, Bexar, and Wilson Counties, Texas.

Reports on the commingling of undesirable water in shallower formations with water in the underlying Carrizo in well bores as a result of the use of a gravel pack around the casing from the top of the Carrizo to the land surface rather than cement.

WdF 65. _____1973, Ground-water contamination from natural gas, W. H. Bauer ranch near Carancahua Bay, Jackson County, Texas.

Results of investigation indicate that the water-bearing sand in which Mr. Bauer's well is completed has been charged by natural gas as the result of two blowouts of a gas well in the Moody Ranch Field.

WdF 66. _____1973, Salt-water contamination of the Keith Taylor well near Anson, Jones County, Texas.

Investigation indicates that the quality of water from the Taylor well has improved since previous samples were obtained. Salt seeps that have killed vegetation in the area are considered natural phenomena caused by local geohydrologic conditions.

WdF 67. _____1973, Salt water well at the Senn Gravel Company near Jayton, Kent County, Texas.

Reports on the use of a salt water well completed in a shallow aquifer at shallow depth. The produced water is confined to pits and is used to wash gravel. The salt water is not a hazard to the quality of ground water because any water that seeps from the pits to the water table returns to the aquifer from which it was obtained.

WdF 68. Ginn, R. F., 1973, Woodbine Formation water-quality investigation, northern Denton County, Texas.

Reports on alleged contamination of ground water from commingling of water from upper and lower stratas in the formation through improperly cased and cemented irrigation wells. The investigation did not reveal evidence of a significant ground-water quality difference in the upper and lower strata which would create a potential hazard to ground water by well completion practices.

WdF 69. _____1974, Father L. H. Kelly—Possible ground-water contamination in Skidmore, Bee County, Texas.

Data in the report indicate that water from some wells in Skidmore, which has no public water supply system, is contaminated by nitrate or bacteria. The probable sources of these contaminants are the individually-owned septic tanks and drainfields throughout the community.

WdF 70. Hill, Robert, 1966, Investigation of ground-water contamination by diesel fuel, Williamson County, Texas.

The source of the diesel fuel appeared to have been a leak in a nearby storage tank. Conclusions were that the fuel migrated downward through the surface marl, entered the Austin Chalk aquifer, and spread laterally and down the slope of the water table to the well.

WdF 71. _____1967, Ground-water contamination from gasoline, Childress, Childress County, Texas.

Reports on the occurrence of large quantities of refined gasoline in several water wells in Childress. The most logical source of the gasoline

was a nearby independent service station. Recommendations include gasoline storage tank pressure tests and periodic monitoring of contaminated wells.

WdF 72. Hill, Robert, 1968, Investigation of the presence of coliform organisms in ground water in Walnut Creek area, Travis County, Texas.

The investigation indicates that liquid waste in the oxidation pond of the Walnut Creek sewage treatment plant is infiltrating into the ground water of the area. Recommends lining the oxidation pond with a relatively impermeable material.

WdF 73. _____1968, Nitrate content in ground water of the Seymour Formation, in Pease River Valley, Wilbarger County, Texas.

All evidence indicates that the nitrate content is from natural causes; however, a potential health hazard exists due to the frequency of septic tank construction near domestic water wells.

WdF 74. _____1969, The influence of the city of Canyon's sanitary landfill operation on ground water, Randall County, Texas.

Report concludes that ground water in the Dockum Group in the area occurs at a depth of 100 feet or more below the top of the strata. The top 100 feet contains 20 or more feet of clay that prevents downward migration of liquids into the ground-water aquifer.

WdF 75. _____1970, The effect of the Victoria County Navigation Channel on the quality of water in Green Lake and on the ground water in Victoria and Calhoun Counties.

The water table of the shallow ground-water aquifers in Calhoun and Victoria Counties is generally above sea level. No hazard exists to ground water when the water table is at a higher elevation than the water level of the navigation channel except in local areas where pumping results in the drawdown of the water table below sea level.

WdF 76. Hill, Robert, and White, D. J., 1969, Investigation of ground-water contamination in northeastern Stephens County, Texas.

The high nitrate concentrations in ground water from a water well indicates that contamination could be from domestic and animal wastes; however, oil-field activities may in part be responsible for the increase in other constituents.

WdF 77. Holloway, H. D., 1963, Investigation of alleged salt-water seepage, George B. Taack farm, Young County, Texas.

The source of the water responsible for local soil salinization on the Taack farm is not definitely known. The natural shallow ground water apparently is variable in quality, and the soil in a localized area appears to have increased substantially in soluble salt content. Some possible natural processes and sources resulting from mans activities are given for the mineralized water.

WdF 78. Ivey, W. L., 1973, Potentials for a near-term alternative water supply for Brownsville, Texas.

This report was prepared as a planning tool to define the potential shortage of water in a specific locality, the Brownsville metropolitan area, and to recommend a near-term solution to alleviate this deficiency.

WdF 79. Jones, D. C., 1973, The cause of nitrate contamination of ground water in Runnels County, Texas.

Reports that the ground waters of Runnels County, Texas, are highly contaminated with nitrate and that the contamination is caused by the following: dryland farming since 1900 has oxidized organic nitrogen in the soil to nitrate; during the period 1900-1950, nitrate was leached below the root zone but not to the water table; extensive terracing in the early 1950's raised

the water table and leached the nitrate into the ground water.

WdF 80. Jorgensen, D. M., 1972, Contamination of Mrs. Noble Mean's and other water wells near East Bernard, Wharton County, Texas.

Report summarizes conclusions of two previous investigations. The earlier investigations and the current investigation conclude that the major source of the chlorides that have contaminated the shallow sands probably is brine formerly disposed of in unlined surface pits prior to 1967. Inadequately cased and cemented or plugged oil and gas tests also may be causing some contamination.

WdF 81. _____1972, Contamination of the Roland Bloomquist and other water wells at Ford Oaks, Travis County, Texas.

The presence of coliform organisms in all of the water samples collected during the investigation indicates the possibility of bacteriological contamination apparently by effluent from septic-tank drainfields at homes and businesses in the area.

WdF 82. _____1972, Investigation of ground-water quality deterioration resulting from alleged improperly completed city of Monahans water wells.

Report concludes that a buildup of precipitates in sediments around the wellbores in the lower artesian sand in some of the wells in the area probably was caused by leakage of inferior-quality water from overlying water sands into the area of influence of the wells. Other conclusions as well as recommendations given.

WdF 83. _____1973, Alleged hydroxide contamination of the Silvester Sausedo water well in the El Rancho Addition near Odessa, Ector County, Texas.

Report concludes that the presence of hydroxide ions in natural water in amounts sufficient to affect the alkalinity determination is very rare unless artificial contamination has occurred, and that any significant quantities of the contaminant would be expected to occur in ground water near the sources of contamination.

WdF 84. Jorgensen, D. M., 1973, Contamination of Ira C. Hart's water well near Post Oak, Jack County, Texas.

Report concludes that low chloride content and absence of hydrocarbons in a sample of water from the complainant's water well do not indicate that the water is contaminated by a salt water disposal well or by other oil-field activities. Evidence of bacteriological contamination of area wells was found.

WdF 85. _____1973, Contamination of the Jimmy L. Layne water wells near Ira, Scurry County, Texas.

Reports on the contamination of the Layne wells by chlorides, the most likely source being salt water that flowed to the surface while drilling on oil test on Mr. Layne's property in 1967. Another probable source of the salt water is a brine disposal well approximately three miles to the north.

WdF 86. _____1973, Contamination of the Willard H. Jones water well near Midland, Midland County, Texas.

Seepage of wastewater from unlined holding structures used to retain discharges of wash water from a tank-truck terminal was believed to be responsible for the deterioration of the quality of ground water from a nearby well. Some recommendations are given.

WdF 87. _____1973, Nitrate contamination of the H. D. Barnett water well and other water wells in the Stoneburg area, Montague County, Texas.

The sewage disposal system, which is up the hydraulic gradient from the Barnett well, is a potential source of high nitrate and chloride

concentrations that may be entering the well through the uncemented wellbore. Septic-tank effluent is a possible source for the nitrate.

WdF 88. Jorgensen, D. M., 1973, The Jerome Dziuk contamination complaint, southwest of Falls City, Wilson and Karnes Counties, Texas.

Reports on the source of a ground seepage problem occurring on the Dziuk's property allegedly from uranium mining and milling activities. Report concludes that a nearby uranium mining facility is not believed to be responsible for the seepage. The head differential between the water surface of a nearby stock pond and the seeps is believed to be responsible for the ground seepage.

WdF 89. _____1974, The Daingerfield Manufacturing Company contamination complaint, northeast of Daingerfield, Morris County, Texas.

The results of the investigation indicate that a mound of wastewater has contaminated ground water in the immediate vicinity of an unlined retention pond, and a small amount of seepage has reached an auger hole approximately 200 feet southeast of the pond. However, this did not adversely affect the quality of ground water in the vicinity of the auger hole at the time.

WdF 90. _____1974, The H. M. May contamination complaint, northeast of May, Brown County, Texas.

Report concludes that the most likely source of salt water in the complainant's water wells is a nearby abandoned oil test. The report also gives a possible natural origin for the increased dissolved-solids content in water from the complainant's wells and others.

WdF 91. _____1974, The Marshall S. Croft contamination complaint, northwest of Maydelle, Cherokee County, Texas.

Report concludes that the probable source of salt water that has contaminated a spring complex is a nearby abandoned gas well. The well was re-entered and replugged seven months prior to the investigation. Another possible source may be an abandonded gas well approximately 3,200 feet from the springs.

WdF 92. Klemt, W. B., Duffin, G. L., and Elder, G. R., 1974, Ground-water resources of the Carrizo Aquifer in the Winter Garden area of Texas.

Includes a detailed description of each aquifer in the area in regard to source and occurrence of ground water; recharge, movement, and discharge; hydrologic characteristics; chemical quality; utilization and development; and water-level changes. The Winter Garden area includes all or parts of Atascosa, Bexar, Caldwell, Dimmit, Frio, Gonzales, Karnes, La Salle, Live Oak, McMullen, Maverick, Medina, Uvalde, Webb, Wilson, and Zavala Counties. A digital computer model of the Carrizo aquifer is used to predict water levels and areas most favorable for future development. The feasibility of artificial recharge is also discussed.

WdF 93. Klemt, W. B., Perkins, R. D., and Alvarez, H. J., 1974, Ground-water resources of part of central Texas with emphasis on the Antlers-Travis Peak Formations.

Describes the geology of the area as it relates to ground water; the stratigraphy of the water-bearing formations; the occurrence and availability of ground water in the principal aquifers; areas most favorable for development; and recommendations for future development. The report area includes all or parts of Bell, Bosque, Brown, Burnet, Callahan, Comanche, Coryell, Eastland, Ellis, Erath, Falls, Hamilton, Hill, Hood, Johnson, Lampasas, Limestone, McLennan, Milam, Mills, Navarro, Somervell, Travis, and Williamson Counties. A digital computer model

of the Travis Peak Formation was developed and used to predict water-level declines and areas most favorable for future development.

WdF 94. Laneman, G. D., 1972, Regional environmental study: Guadalupe, San Antonio, and Nueces River Basins—Report of flood-plain studies.

This report contains a survey of all available data pertaining to existing and planned studies and to under-construction, existing, and planned flood-control projects in the study area. Also contains recommendations which should be initiated on the future use of flood plains.

WdF 95. Masch, F. D., and Associates, 1972, Tidal hydrodynamic and salinity models for coastal bays: Evaporation considerations.

Determines the most practical method for describing evaporation effects in estuarine hydrodynamic and salinity transport models. The evaporation methodology developed in this study has been incorporated into existing Water Development Board estuarine hydrodynamic and salinity transport models.

WdF 96. _____1972, Tidal hydrodynamic models for Corpus Christi and Aransas Bays, Texas.

Describes the development and calibration of tidal hydrodynamic and salinity mathematical simulation models for the Corpus Christi and Aransas-Copano Bay systems. These models have been calibrated and verified to the extent possible with data collected up through mid-1971 in the Texas Water Development Board and U.S. Geological Survey collection program in these two bay systems.

WdF 97. _____1972, Tidal hydrodynamic models for San Antonio and Matagorda Bays, Texas.

Describes the development and calibration of numerical tidal hydrodynamic and salinity transport models for the San Antonio and Matagorda Bay systems. As developed, the models may be used to predict tidal amplitudes, tidally generated currents, physical exchange and salinity patterns for prescribed Gulf excitation tides, tributary inflows, withdrawals, winds, net evaporation rates, and source salinities.

WdF 98. McMillion, L. G., 1958, Report on bond issue, Reagan County Water Control and Improvement District, with special reference to ground water.

This report contains discussions of the chemical character of ground water, geology of water-bearing rocks, utilization of ground water, and quantitative analysis of ground-water supply in northern Reagan County.

WdF 99. Miller, W. D., 1972, Ground-water quality in Ogallala aquifer, southern High Plains of Texas.

Gives information about the geology, soil texture, occurrence, and quality of ground water in all or parts of 27 southern High Plains counties; gives distribution and regional sources of nitrate, chloride, and total dissolved solids. Also discusses water-quality problems.

WdF 100. Mirabal, James, 1971, Cypress Creek watershed—Plans for operation of reservoirs above Lake O' the Pines.

This study is the result of an engineering committee directed to develop an acceptable operating procedure for all reservoirs involved in the upper reach of Cypress Creek. Two proposals were developed that simulated the operation of reservoirs in the Cypress Creek Basin above Lake O' the Pines.

WdF 101. _____1974, Monthly reservoir evaporation rates in Texas, 1940 through 1970.

Presents tables and maps from which monthly rates of evaporation can be obtained for water-supply

analysis. Updates Report 64 by including evaporation rates for 1966 through 1970.

WdF 102. Morin, G. C. A., 1970, Investigation of a potential ground-water contamination resulting from the burial of empty metal containers that formerly held the systemic insecticide Di-Syston at Munday, Knox County, Texas.

Report concludes that there was no evidence of contamination of ground water having resulted from the burial of the leaking Di-Syston containers at the time of the investigation.

WdF 103. Morin, George, and Cooper, Wallace, 1968, Investigation of alleged contamination of the city of Kingsville's municipal water-supply wells, Kingsville, Kleberg County, Texas.

Report concluded that seepage of inferior-quality water through the confining clay beds overlying and underlying the aquifer was not the primary source of contamination. Casing leaks allowing inferior-quality water to enter the well bore are the chief cause of contamination in the city's water wells. Some recommendations are given.

WdF 104. Morris, Don, 1965, Investigation of salt-water contamination complaint by Morris Miller, Shackelford County, Texas.

The disposal and injection of salt water on oil leases in the vicinity of Mr. Miller's spring constitute possible hazards to the usable ground water in the area.

WdF 105. Nordstrom, P. L., 1974, Ground-water resources of the Antlers-Travis Peak Formation in its outcrop area of west-central Texas.

Gives information about the geology as related to ground-water aquifers in the area; gives the chemical quality, the use of ground water, changes in water levels, well construction, and development. Also gives records of wells, drillers' logs, water levels, and chemical analyses of water.

WdF 106. Nordstrom, P. L., 1974, Water-level and water-quality data from observation wells in the District 12 area of central Texas.

Gives information about the geology as related to ground water in the area. Includes data on ground-water use and development, changes in water levels, and chemical quality of ground water. Also includes records of wells and chemical analyses of water.

WdF 107. Perkins, R. D., Buckner, A. W., and Henry, J. M., 1972, Availability and quality of ground water in the Cenozoic Alluvium aquifer in Reeves, Pecos, Loving, and Ward Counties, Texas.

Includes a discussion of chemical quality, water levels, and ground water available for development. Finds that large amounts of fresh and slightly saline ground water can be recovered from storage. States that the quality of ground water in central Reeves County has deteriorated.

WdF 108. Preston, R. D., 1972, The occurrence and quality of ground water in Baylor County, Texas.

Gives information about the geology, occurrence, and quality of ground water in surface or near-surface rocks. For the Seymour Formation, gives information about the occurrence, movement, quantity of water available, recharge and discharge of water, and quality of water. Also gives records of wells and springs, drillers' logs, water levels, and chemical analyses of water.

WdF 109. ____1974, Occurrence and quality of ground water in the vicinity of Brownsville, Texas.

Gives information about the occurrence, quality, and availability of ground water in the Lower Rio Grande Valley aquifer in the area.

Includes data on ground-water recharge, movement, and discharge; well construction and development; changes in water levels; and the distribution of poor quality ground water. Also includes records of wells, drillers' logs, water levels, and chemical analyses of water.

WdF 110. Price, R. D., 1971, Occurrence, quality, and availability of ground water in Jones County, Texas.

Gives information about the geologic formations and their water-bearing properties. Reports that the major area of development of the Seymour Formation, the primary aquifer, is just to the southeast of the city of Anson.

WdF 111. _____1973, Occurrence, quality, and quantity of ground water in Wilbarger County, Texas.

Gives information about the geologic formations and their water-bearing properties. For the Seymour Formation, gives information about the occurrence, movement, quantity, and quality of water. Also gives records of wells and springs, drillers' logs, water levels, and chemical analyses of water.

WdF 112. Sabine River Authority of Texas, 1972, Preplanning study for the upper Sabine river reservoir project (Mineola, Lake Fork, and Big Sandy).

A report of an in-depth study for preplanning, land acquisition, relocations, financing, and construction of three closely located reservoirs for the purpose of developing procedures and techniques which should be applicable to any other reservoirs contemplated.

WdF 113. Shamburger, V. M., Jr., 1958, Alleged well contamination in relation to brine disposal Clemville, Matagorda County.

This report includes discussions of geology and occurrence of ground water, brine movement in relation to ground water, quality of water in wells, and brine disposal methods in the area.

WdF 114. Shamburger, V. M., Jr., 1959, Reconnaissance of alleged water well contamination in the Garwood-Nada area, Colorado County.

Report includes discussions of general geology and occurrence of ground water, quality of well water, brine disposal and brine quality, and conclusions and recommendations.

WdF 115. Shelby, Cader, 1972, Regional environmental study: Guadalupe, San Antonio, and Nueces River Basins—Mineral resources.

This report details the reserves, rates of depletion, future production needs, and trends of the mineral resources, except for oil and gas, of the San Antonio, Guadalupe, and Nueces River Basins. Information on the lack of a particular resource and to what extent it would hamper manufacturing activity along with the environmental effects of mineral production is also included.

WdF 116. Shelby, C. A., and Sansom, J. W., 1968, Geologic reconnaissance of potential reservoir sites in canyons of the Texas High Plains.

A preliminary geologic report of potential reservoir sites in five canyons along the eastern edge of the Texas High Plains.

WdF 117. Shurbet, D. H., 1974, Determination of seismicity in areas of The Texas Water Plan, September 1, 1973 through August 31, 1974.

This report consists of the findings of microseismic surveys conducted to determine the natural seismicity in northeast and south central Texas.

WdF 118. Sieh, T. W., 1974, Edwards (Balcones Fault Zone) aquifer test-well drilling investigation.

Summarizes the results of a detailed core-drilling program in the Edwards (Balcones Fault Zone) aquifer in the San Antonio area, and correlates physical description and laboratory testing of cores with numerous geophysical logs and tests. The percent porosity and

coefficient of storage were determined for each portion of the aquifer.

WdF 119. Smith, T. B., and Weinstein, A. I., 1971, San Angelo cumulus project, Interim Report No. 1, January 1-September 30, 1971.

Reports on the initial accomplishments of the project which were design and setup, initial field effort, and public relations. The project is designed as a research and engineering study of precipitation in West Texas.

WdF 120. Stevens, J. C., 1957, Ground-water geology of Hovey area, Brewster and Pecos Counties, Texas.

This report contains descriptive discussions of stratigraphy and structure in the Hovey area. Also included are discussions on the occurrence, recharge, and quality of ground water and grouping and correlation of ground waters on the basis of chemical analysis.

WdF 121. Taylor, H. D., 1973, The occurrence and quality of ground water in Taylor County, Texas.

Gives information about the geologic units and their water-bearing properties in the county; gives the chemical quality, the use of ground water, changes in water levels, well construction, and yields. For the Holocene (Recent) alluvium, gives information on the occurrence and distribution, movement, quantity, and chemical quality of water. Also gives records of wells and springs, drillers' logs, water levels, and chemical analyses of water.

WdF 122. _____1974, Water-level and water-quality data from observation wells in northeast Texas.

Gives information about the geology as related to ground-water aquifers in the area; gives information on changes of water levels and chemical quality of water. Also gives records of wells and chemical analyses of water.

WdF 123. Tetra Tech, Inc., 1974, Estuarine migratory organism model.

Documents development and application of an estuarine migratory organism model. The report also describes many of the hydrological-biological relationships that exist in Texas estuarine systems. For the purpose of demonstrating the methodology, San Antonio Bay and an indicator organism (white shrimp) were selected for prototype analyses.

WdF 124. Texas Board of Water Engineers, 1938, Report of Colorado River flood of July and August 1938.

A report of the State Board of Water Engineers to the Senate Investigating Committee of the 45th Legislature. Presents all rainfall-runoff data collected within the area. Presents studies necessary to assist the Committee in arriving at correct conclusions as to: the cause of the flood; its volume; maximum rate of flow; and what regulation, if any, could have been affected that would have lessened the resulting flood heights.

WdF 125. Texas Parks and Wildlife Department, 1973, A plankton and benthos survey of the San Antonio Bay system: Preliminary report on methods, species compositions, and standing crops for the period March-August 1972.

The report describes expanded ecological studies on the San Antonio Bay system that evaluate estuarine productivity of phytoplankton, zooplankton, and benthos under varying seasonal conditions. Major emphasis was placed on evaluating standing crops of these organisms and the water conditions associated with them.

WdF 126. _____1974, An ecological study of benthic macro-invertebrates in Lavaca Bay, Texas.

This study was designed to determine for the Lavaca Bay system (1) the species composition of the benthic fauna, (2) the standing crop of benthic

marco-invertebrates, and (3) how these organisms are affected by variations in freshwater inflow into the estuary.

WdF 127. Texas Parks and Wildlife Department, 1974, A plankton and benthos survey of the San Antonio Bay system, Second annual report, August 1972-July 1973.

Describes many of the effects of river influx on the diversity and abundance of the planktonic and benthic assemblages of the estuarine system.

WdF 128. Texas Water Development Board, 1971, A summary of capabilities for analysis of water resource planning problems.

A brochure that presents the computer-oriented planning capabilities that the Board has available, and provides brief descriptions of these capabilities and the various system simulation and optimization computer programs that support them. Descriptions also include a listing of data requirements and example results.

WdF 129. _____1972, Discharge measurements, Medina Canal.

This report discusses the seepage investigations made on the canal and how efficient the canal is in transporting irrigation water from Lake Medina to the Bexar-Medina-Atascosa counties Water Improvement District No. 1

WdF 130. _____1973, An environmental study of several streams which appear to recharge the Edwards aquifer.

This study on four streams in the San Antonio River Basin containing low-flow and geologic information as well as chemical quality points up certain considerations when assessing the land-carrying capabilities for urban development.

WdF 131. _____1973, Gain-and-loss investigations across Tertiary formations on the Gulf coastal plains.

Some 51 sites were investigated for streamflow discharge in the Gulf coastal plains of the Guadalupe, San Antonio, and Nueces River Basins in order to understand their gain and loss characteristics more fully.

WdF 132. Texas Water Development Board, 1973, Hydrology and geology of Cibolo Creek Basin.

This report points up the sensitivity of the Edwards aquifer to surface features and urban development and how the movement, quality, and quantity of water, which is recharged, can be vitally affected.

WdF 133. _____1973, Texas Water Oriented Data Bank, System capabilities.

A brochure that describes the capabilities of the Texas Water Oriented Data Bank and a brief summary of the types of stored data.

WdF 134. _____1974, Preliminary evaluation of water consumption by the steam-electric generating industry in Texas, 1970-2000.

Evaluates the future consumptive water needs of the steam-electric power industry in Texas. Projections are presented by coastal zones and river basins, by decade, from 1970 through 2000. Also shown is what effect implementation of the proposed (1974) Environmental Protection Agency effluent guidelines, requiring wet cooling towers at all plants, would have on water consumption in Texas.

WdF 135. _____1974, Supplemental studies: Environmental assessment of Stage I, Palmetto Bend Reservoir project.

Evaluates the environmental aspects of Stage I, Palmetto Bend Reservoir project on the Lavaca-Navidad River system and Lavaca-Matagorda Bay system. This report also describes alternatives to the project (ground-water resources) and presents a progress report on application of estuarine

hydrodynamic and transport (salinity) models as related to the reservoir project.

WdF 136. Texas Water Development Board, 1974, Techniques for identifying and evaluating market and non-market benefits and costs of water-resources systems.

Presents the techniques developed to measure the economic, environmental, and social impacts of water-policy alternatives and describes the application of these techniques to three existing reservoirs to determine the method's effectiveness.

WdF 137. _____1974, Texas Water Oriented Data Bank, File description report.

Provides an inventory and comprehensive descriptions of water-oriented data which exist in computer processable form as part of the Texas Water Oriented Data Bank.

WdF 138. Threadgill, J. R., 1974, San Antonio-Lavaca Bay recreation study, 1973, Survey results and analysis.

Provides information on the size and economic impact of the sport-fishing industry and its relationship to fresh-water inflows. The survey is part of the overall bay and estuary study program.

WdF 139. Tuck, C. A., Jr., 1974, Rice irrigation return flow study, Brookshire and Garwood projects, Texas, Interim report, 1969-73.

Provides data on the quantity and quality of rice irrigation return flows. The report covers the first four years of a continuing study being conducted at Brookshire in Fort Ben County and Garwood in Colorado County.

WdF 140. University of Texas at Houston School of Public Health, 1973, An investigation of tertiary estuary productivity and nutrient optimization in Texas Coastal waters.

This report presents data and analysis of field and laboratory research which was conducted over a period of time extending from September 1972 through August 1973 for the Matagorda, San Antonio, Copano-Aransas, and Corpus Christi Bay systems. Specific sampling emphasis is described in the report for Lavaca Bay and Lavaca River delta system.

WdF 141. U.S. Bureau of Reclamation, 1973, Water resources of El Paso County, Texas.

Contains a description of the geology of the basin; the history of irrigation development; the Rio Grande Compact; surface-water resources, quality, and uses; and ground-water resources of the river alluvium and La Mesa and Hueco Bolsons.

WdF 142. Walker, L. E., 1974, The occurrence, availability, and chemical quality of ground water in the Edwards Plateau region, Texas.

Gives information about the geologic units and their water-bearing properties; the occurrence, use, availability, and quality of ground water; and fluctuations of water levels. Also gives records of wells and springs, drillers' and electrical logs, and chemical analyses of water. The report area includes all or parts of the following counties: Andrews, Bandera, Coke, Concho, Crockett, Ector, Edwards, Gillespie, Glasscock, Howard, Irion, Kerr, Kimble, Kinney, McCulloch, Mason, Menard, Midland, Reagan, Real, Schleicher, Sterling, Sutton, Tom Green, Upton, Uvalde, Val Verde and Winkler.

WdF 143. Water Resources Engineers, Inc., 1974, Extension and refinement of the RIVTID model.

The report documents operation of a two-dimensional flood-routing model specifically applicable to situations with tidally influenced downstream conditions, and discusses streamflow behavior under flood conditions of specified frequencies in the lower reach of the Lavaca-Navidad River System.

WdF 144. Webster, R. N., 1971, Ground-water contamination (Grady Woods) from nitrate, near Newton, Newton County, Texas.

Report concludes that water collected from the Woods' well is contaminated with nitrate from nearby sources. Bacteriological analyses of water samples indicate that sewage treatment effluent from a septic-tank drainpipe is migrating to the Woods well.

WdF 145. _____1971, Investigation of Catarina well problem (Hughes, Dimmit County, Texas.

Salt water bearing beds above the chief water-producing aquifer were not sealed off properly. The salt water corroded holes in the casing and leaked into the well. Also, cracks in lead seals used to join casing strings may have allowed entry of salt water into wells.

WdF 146. _____1972, Investigation of brine seeps on the H. A. Talbot farm, Baylor County, Texas.

Report concludes that the source of the brine seeps probably was salt water that was discharged into unlined surface pits prior to 1963. Above normal rainfall probably flushed the salt water from the pits through shallow gravel in the area to form the seeps.

WdF 147. _____1973, Investigation of ground-water contamination on the T. L. Martin Farm, Scurry County, Texas.

Evidence is inconclusive to determine whether the Martin irrigation well was contaminated by brine from a nearby salt water disposal pit or because the well was drilled to a depth that is in or near the top of the lower Santa Rosa Formation which is known to contain mineralized ground water.

WdF 148. _____1973, Contamination of the George R. Whitworth water well, Calhoun County, Texas.

Reports on the alleged contamination of a water well by a nearby oil-separation facility. Data developed during the investigation did not indicate that contamination was occurring at the time. Some recommendations are given.

WdF 149. Webster, R. N., 1974, Harle, J. B., M.D. - Investigation of ground-water contamination in the Mattie Frieda well, Austin County, Texas.

Report concludes that formation brine disposed of in an unlined earthen pit has contaminated water in nearby wells. Data obtained from an 8-hour pumping test of a water well indicates that salt water enters the well above the principal water-bearing sand.

WdF 150. _____1974, Investigation of ground-water contamination in the Andrew F. Fasken water well, Red River County, Texas.

Reports on well completion of the Fasken well, which reportedly was allowing mineralized water from the Paluxy Formation to flow into alluvium at the land surface; however, at the time of the investigation the flowing water had been contained. An oil test was found that is considered to be a hazard to ground-water quality in the area.

WdF 151. Wermund, E. G., Cepeda, J. C., and Bell, A. E., 1974, Fracture patterns in the southern Edwards Plateau, Texas.

Explains the technique of mapping regional fracture patterns by machine digitizing, computing, and plotting of aerial photographic interpretations of fracture zones in the Edwards Limestone aquifer.

WdF 152. White, D. J., 1966, Investigation of alleged ground-water contamination in the La Gloria (Santa Elena) area, Starr County, Texas.

Reports on the past occurrence of gasoline in a water sample from the well in 1965. In 1966, insufficient contaminant was present to be identified by gas chromotography. The source of the gasoline has apparently been removed.

WdF 153. White, D. J., 1966, Investigation of waste-disposal operations at Culligan Soft Water Service northeast of Harlingen, Cameron County, Texas.

Report concludes that contamination of the reservoir is probably occurring and is caused by (1) effluent from a water softening regeneration unit being discharged into surface-drainage ditches and (2) the shallow depth of the ground-water reservoir.

WdF 154. _____1967, Investigation of contamination of ground water in wells in the 1300 block of East Sixth and Seventh Streets, Odessa, Ector County, Texas.

Report concludes that the water wells have been contaminated by fluids leaking from a sewer line. These conclusions are based on the proximity of wells to the sewer, higher concentrations of dissolved solids, specific ions in water from affected wells different than those in water samples from other wells, presence of *E. coli* in water samples, and the high concentrations of ammonia nitrogen in water from one well.

WdF 155. _____1968, Investigation of the increase in salinity of ground water in wells in Hall and Childress Counties near Newlin, Texas.

Report concludes that direct influence of ground-water conditions by the suppression of Estelline Spring since 1964 has not been demonstrated. Other probable sources for the water-quality change are given.

WdF 156. _____1969, Investigation of potential ground-water contamination from a landfill proposed to be operated by the city of Pasadena in a sand pit in the southern part of Pasadena, Harris County, Texas.

Report concludes that because the landfill material eventually will be continuously in contact with ground water, the use of the pit will contaminate water in the upper part of the aquifer in the vicinity of the pits. Report contains an appendix describing some effects of sanitary landfills on ground water.

WdF 157. White, D. J., 1970, Ground-water contamination from gasoline at Leon Valley, Bexar County, Texas (2nd report).

Reports on ground-water contamination from gasoline at the city of Leon Valley in at least five area water wells. Gasoline storage tanks at two nearby service stations are possible sources of the gasoline. Procedures are outlined to determine if these storage tanks are, or have been the sources of the gasoline. Methods to pump away mounds of gasoline, remove odor of gasoline from wells, plug contaminated wells, and drill and complete new wells are given.

WdF 158. _____1970, Ground-water contamination from gasoline at Leon Valley, Bexar County, Texas (3rd report).

Reports on tank tightness tests and other investigations conducted in the vicinity of the gasoline contamination problem in Leon Valley. No leaks were indicated by tightness tests on gasoline storage tanks presently in use 1-1/4 miles from the area. A leak was detected in a gasoline storage tank at an abandoned service station which was operating when gasoline was first reported in water pumped from one well. Two wells have been cleaned and are producing water suitable for domestic use. Recommendations for further investigation are given.

WdF 159. _____1970, Improperly completed and plugged water wells, Duval County, Texas.

The results of this investigation and historical data indicate that ground water in sands less than 100 feet deep in south-eastern Duval County is highly mineralized. Ground water of good quality in some wells 200 feet or greater in depth has been contaminated by water from

the shallow sands because the shallow sands have not been sealed off, or leaks have developed in well casings.

WdF 160. White, D. J., 1970, Investigation of ground-water contamination in northern Comanche County, Texas.

Reports on investigation of six contamination complaints. Results obtained by Railroad Commission personnel indicate that water-bearing strata in areas near the Smith-Morgan, Amity, Kirk, and Desdemona oil fields are being charged with natural gas and brine. The source of these contaminants could be inadequately completed or plugged oil or gas wells.

WdF 161. _____1970, Investigation of potential contamination of water resources resulting from Western Oil Transport Company's cathodic protection well in the Rocker "A", NW Oil Field, Garza County, Texas.

Report concludes that a cathodic protection well, which functions to minimize corrosion due to electric currents in the earth's surface, present a hazard to surface and ground-water resources in the area. Recommendations are that the well be properly plugged and a properly reconstructed replacement well be drilled.

WdF 162. _____1970, R. R. Ellis ground-water contamination complaint, east of Menard in Menard County.

Results of this investigation indicate that ground water in alluvium in the area is being contaminated by upward migration of saline water within boreholes of improperly completed and plugged wells. Other conclusions, as well as recommendations for completion and plugging of wells containing saline water, are given.

WdF 163. _____1971, Investigation of ground-water contamination in the Hutchens-Kubela and Pickett Ridge oil fields, Wharton County, Texas.

Report concludes that contamination of ground water in Hutchins-Kubela and Pickett Ridge fields apparently resulted from past use of unlined pits for disposal of produced brine, inadequate completion of area water wells, and from the completion method for oil wells in the area.

WdF 164. White, D. J., 1972, An investigation of potential ground-water contamination near Fashing, southeastern Atascosa County, Texas.

Reports on the contamination of a water well by septic-tank effluent from a nearby septic tank that is discharged directly onto a cultivated field without distribution by any type of absorption system.

WdF 165. _____1972, Contamination complaint, Odessa city sanitary landfill, Ector County, Texas.

Report indicates that the dissolved-solids content of a sample of water from the waste oil and septic tank sludge disposal area in the pit is much greater than that in ground water from wells in the area.

WdF 166. _____1972, Contamination of the W. W. Osborn water wells in the vicinity of the Hilbig Oil Field, Bastrop County, Texas.

Reports on the contamination of ground water with natural gas in two wells on the complainant's property. The ground-water contamination was alleviated by plugging two oil tests that were the nearest potential sources of the gas.

WdF 167. _____1972, Ground-water contamination from gasoline southeast of Loop 410 at Leon Valley, Bexar County, Texas.

Report concludes that the source of gasoline in a water well was the leakage, spillage, and discharge of automotive fuels onto the land surface.

WdF 168. _____1972, Investigation of contamination by gasoline of water

wells in Valera, Coleman County, Texas.

Report summarizes the results of two previous investigations of gasoline contaminated water wells in Valera. The report concludes that two area service stations have been potential sources of gasoline that has contaminated wellbores prior to and since 1962; however, remedial measures performed in 1962 and 1968 probably have eliminated all leaks at these stations.

WdF 169. White, D. J., 1972, Investigation of exploratory drill holes for uranium in the Flatonia area, Fayette County, Texas.

The results of this investigation indicate that the Whitsett Formation is developed in conjunction with the overlying Catahoula Tuff in some wells on the outcrop. Water from the Whitsett is slightly more mineralized than water from the Catahoula. The possibility of water from the two formations commingling exists in water wells and also in uranium test holes. Recommendation for plugging test holes are given.

WdF 170. _____1973, Contamination of the Charles Powell water wells in the vicinity of Morgans Creek Oil Field, Polk County, Texas.

Report indicates that contamination of fresh-water sands may have resulted from the upward migration of underlying slightly saline water under artesian pressure, or from pressure buildup due to injection of salt water into oil wells with insufficient lengths of cemented surface casing.

WdF 171. _____1973, Ground-water contamination from hydrocarbons at San Angelo, Tom Green County, Texas.

A service station is the nearest source of gasoline up the slope of the land surface from the contaminated well. It is very likely that the source of gasoline entering the well has been eliminated.

WdF 172. White, D. J., and Hill, Robert, 1970, Investigation of ground-water contamination in southeast Andrews, Andrews County, Texas.

Report presents data indicating deterioration of ground-water quality from the former use of unlined and inadequately lined brine-storage pits, and evidence of infiltration of sewage effluent from city of Andrews oxidation ponds into the subsurface strata.

WdF 173. White, D. J., and Morin, George, 1970, Investigation of ground-water contamination, Marathon area, Brewster County, Texas.

Reports on the contamination of water wells by crude oil and by domestic sewage or animal wastes. Recommendations are that sewage and waste products not be disposed of into abandoned wellbores, that all abandoned water wells be adequately plugged and sealed, and that existing water wells be recompleted.

WdF 174. White, Robert, 1972, Literature review of hydrogeologic data on the proposed Applewhite or Bexar County Reservoir.

A complete review of all hydrogeologic aspects associated with the proposed Applewhite or Bexar County Reservoir on the Medina River.

WdF 175. Young, W. C., Whiteside, B. G., Longley, Glenn, and Carter, N. E., 1973, The Guadalupe-San Antonio-Nueces River Basins project, Phase I: Review of existing biological data.

This report presents an inventory of all available ecological data on the Guadalupe, San Antonio, and Nueces River Basins. Evaluation of these data is described in the report along with definitions of many aquatic ecosystems in the three river basins.

U.S. GEOLOGICAL SURVEY PUBLICATIONS

Annual Reports of the Director of the U.S. Geological Survey

(Index code GsA)

GsA 1. Tenth Report (1888-89), Part 2, Irrigation

The first annual report by the Irrigation Survey, includes a description of flow of the Rio Grande and possibilities for irrigation below El Paso.

GsA 2. Eleventh Report (1889-90), Part 2, Irrigation

Describes the possibility of constructing dams on the Rio Grande.

GsA 3. Twelfth Report (1890-91), Part 2, Irrigation

Under the section, Hydrography of Arid Regions, daily discharge of the Rio Grande at El Paso is given in hydrograph form.

GsA 4. Thirteenth Report (1891-92)

Part 2. Describes the harbors of Texas.

Part 3. Describes two available sites for El Paso Reservoir, with comparisons of flood water storage capacity; describes the site selected, dam design, and estimated cost.

GsA 5. Fourteenth Report (1892-93), Part II

Gives stream measurements of the Rio Grande at El Paso, and discharge of the Rio Grande at El Paso for 1889-93; lists mineral springs of Texas.

GsA 6. Sixteenth Report (1894-95)

Part II. Contains a very short description of state water supplies.

GsA 7. Eighteenth Report (1896-97)

Part II-B. Geology of the Edwards Plateau and the Rio Grande plain adjacent to Austin and San Antonio, Texas, with reference to the occurrence of underground waters, by R. T. Hill and T. W. Vaughan.

Describes the geology and water-bearing properties of the geologic units, the occurrence of ground water in the Edwards Plateau, and the occurrence, quality, development, and discharge of ground water in the adjacent Coastal Plain area.

Part IV. Hydrography

Presents measurements made in Texas, November and December 1896, and annual report for Rio Grande near El Paso gaging station.

GsA 8. Nineteenth Report (1897-98)

Part II. Contains the report, Principles and conditions of the movement of ground water, by F. H. King.

Part IV. Report of stream measurements for calendar year 1897, including Rio Grande at El Paso gaging station.

GsA 9. Twentieth Report (1898-99)

Part IV. Contains records of measurements at the gaging station Rio Grande at El Paso and describes stream-gaging program on other Texas rivers.

GsA 10. Twenty-first Report (1899-1900)

Part IV. Hydrography—Contains a description of the Trinity, Brazos, and Colorado Rivers in Texas, and estimated discharge of the Rio Grande.

Part VII. Texas—Provides an extensive geologic description of Black and Grand Prairies and Cross Timbers, including detailed information on wells.

GsA 11. Twenty-second Report (1900-1901)

Part IV. Hydrography—Contains discharge records for Rio Grande stations in Texas.

GsA 12. Twenty-fourth Report (1902-1903)

Lists surface-water gaging stations in Texas, and describes investigations for possible ground water in El Paso County.

GsA 13. Twenty-fifth Report (1903-1904)

Lists surface-water gaging stations in Texas.

GsA 14. Twenty-sixth Report (1904-1905)

Lists surface-water gaging stations in Texas.

Bulletins

(Index code GsB)

GsB 131. Report of progress of the division of hydrography for the calendar years 1893 and 1894: 1895, by F. H. Newell.
Contains a rating table and a daily gage-height table for the Rio Grande at El Paso.

GsB 140. Report of progress of the division of hydrography for the calendar year 1895: 1896, by F. H. Newell.
Contains a report on the Colorado River at Austin, Comal River, Sabinal, and Leona Rivers, and the El Paso gaging station on the Rio Grande. Describes San Marcos Springs, San Antonio and San Pedro Springs, and San Felipe Springs.

GsB 224. A gazetteer of Texas: 1904, by Henry Gannett.
Includes Texas stream names and locations.

GsB 264. Record of deep-well drilling for 1904: 1905, by M. L. Fuller.
Contains a list of wells drilled in Texas in 1904.

GsB 298. Record of deep-well drilling for 1905: 1906, by M. L. Fuller and Samuel Sanford.
Lists 273 wells drilled in Texas prior to and during 1905.

GsB 837. Tertiary and Quaternary geology of the lower Rio Grande region, Texas: 1932, by A. C. Trowbridge.
Gives a good description of the geology and a brief statement about ground water and ground-water conditions.

GsB 1298. Geology of the northern Franklin Mountains, Texas and New Mexico: 1972, by R. L. Harbour.
Contains brief section on ground water.

GsW 11. River heights for 1896: 1897, by A. P. Davis.
Contains gage heights for Rio Grande streamflow station at El Paso, Texas.

GsW 13. Irrigation systems in Texas: 1898, by W. F. Hutson.
Contains a description of irrigation works and projects in Texas, and a general statement concerning retardation of development, water use, and climatic conditions.

GsW 16. Operations at river stations, 1897, Part II: 1898.
Contains records of early gaging-station locations in Texas.

GsW 28. Operations at river stations, 1898, Part II: 1899.
Contains records of early gaging-station locations in Texas.

GsW 37. Operations at river stations, 1899, Part II: 1900.
Contains records of early gaging-station locations in Texas.

GsW 40. The Austin Dam: 1900, by T. U. Taylor.
Describes preliminary planning, construction of the dam, early problems including leak and silting, and details of the actual failure of the dam.

GsW 44. Profiles of rivers in the United States: 1901, by Henry Gannett.
Includes profiles of the Canadian, Red, Trinity, Brazos, Colorado, Nueces, Pecos Rivers and the Rio Grande.

GsW 50. Operations at river stations, 1900, Part IV: 1901.
Contains records of early gaging-station locations in Texas.

GsW 66. Operations at river stations, 1901, Part II, west of Mississippi River: 1902.
Contains records of early gaging-station locations in Texas.

GsW 71. Irrigation systems in Texas: 1902, by T. U. Taylor.
Describes location, cost, and benefits of principal irrigation systems. Includes a section on the irrigation of rice, and Texas laws on irrigation.

GsW 75. Report of progress of stream measurements for the calendar year 1901: 1903, by F. H. Newell.
Contains report on streamflow stations in Texas.

GsW 84. Report of progress of stream measurements for the calendar year 1902, Part III, Western Mississippi River and western Gulf drainage: 1903, by F. H. Newell.
Contains report on streamflow stations in Texas.

GsW 99. Report of progress of stream measurements for the calendar year 1903, Part III, Western Mississippi River and western Gulf of Mexico drainage: 1904, by J. C. Hoyt.
Contains report on streamflow stations in Texas.

GsW 103. A review of the laws forbidding pollution of inland waters in the United States: 1904, by E. B. Gudell.
Includes statutory restrictions on water pollution for Texas.

GsW 105. The water powers of Texas: 1904, by T. U. Taylor.
Describes major river basins, flow in each river, and powerplants that have been built on these rivers. Includes a brief description of Hackberry and Santa Rosa Springs.

GsW 120. Bibliograhic review and index of papers relating to underground waters, 1879-1904: 1905, by M. L. Fuller.
Reports on springs, analyses, deposits, measurements,

occurrence, quality, and use of springs in Texas.

GsW 132. Report of progress of stream measurements for the calendar year 1904, Part IX, western Gulf of Mexico and Rio Grande drainages: 1905, by T. U. Taylor and J. C. Hoyt.
Contains report on streamflow stations in Texas.

GsW 141. Observations on the ground waters of the Rio Grande Valley: 1905, by C. S. Slichter.
Describes ground-water conditions at the narrows of the Rio Grande and at the "Llanoria Mesa" near El Paso; gives a summary of tests of pumping plants in the region of Trans-Pecos Texas. Also gives analyses of water from wells and data concerning wells near El Paso.

GsW 147. Destructive floods in the United States in 1904: 1905, by F. S. Dobson.
Includes description of floods on the Pecos River and the Rio Grande.

GsW 149. Preliminary list of deep borings in the United States: 1905, by N. H. Darton.
Gives information about wells 400 feet or more in depth and a list of the principal publications relating to the underground waters of Texas.

GsW 154. The geology and water resources of the eastern portion of the Panhandle of Texas: 1906, by C. N. Gould.
Describes the geology and occurrence of ground water and surface water. Also gives a summary of water conditions by counties.

GsW 162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature: 1906, by E. C. Murphy and others.
Includes floods on the Pecos River and the Rio Grande.

GsW 174. Report of progress of stream measurements for the calendar year 1905, Part X, Western Gulf of Mexico and Rio Grande drainages: 1906, by T. U. Taylor and J. C. Hoyt.
Contains report on streamflow stations in Texas.

GsW 190. Underground waters of the Coastal Plain of Texas: 1907, by T. U. Taylor.
Gives information about wells and the ground-water resources by counties.

GsW 191. The geology and water resources of the western portion of the Panhandle of Texas: 1907, by C. N. Gould.
Gives information about the geology and occurrence of ground water and surface water. Also gives a summary of water conditions by counties.

GsW 209. Surface water supply of lower western Mississippi River drainage, 1906: 1907, by R. I. Meeker and J. M. Giles.
Includes streamflow records of Red River at Arthur City, Texas.

GsW 210. Surface water supply of western Gulf of Mexico and Rio Grande drainages, 1906: 1907, by T. U. Taylor and W. A. Lamb.

Listed in the following table are water-supply papers that present records of stage, discharge, and content of streams, lakes, and reservoirs in Texas. Part 7 includes records from the Arkansas and Red River basins; Part 8 includes records from all river basins in the State except the Arkansas and Red River basins.

YEAR	WSP NO. FOR PART 7	WSP NO. FOR PART 8
1907		
1908	—	248
1909	—	268
1910	287	288
1911	307	308
1912	—	328
1913	—	358
*1914	—	388
1915	—	408
1916	—	437
1917	—	458
1918	—	478
1919		
1920	—	508
1921	—	528
1922	—	548
1923	—	568
1924	587	588
1925	607	608
1926	627	628
1927	647	648
1928	667	668
1929	687	688

YEAR	WSP NO. FOR PART 7	WSP NO. FOR PART 8
1930	702	703
1931	717	718
1932	732	733
1933	747	748
1934	762	763
1935	787	788
1936	807	808
1937	827	828
1938	857	858
1939	877	878
1940	897	898
1941	927	928
1942	957	958
1943	977	978
1944	1007	1008
1945	1037	1038
1946	1057	1058
1947	1087	1088
1948	1117	1118
1949	1147	1148
1950	1177	1178
1951	1211	1212
1952	1241	1242
1953	1281	1283
1954	1341	1342
1955	1391	1392
1956	1441	1442
1957	1511	1512
1958	1561	1562
1959	1631	1632
1960	1711	1712

*Prior to 1914 the water-supply papers were published on a calendar-year basis; 1914 and subsequent reports are published on a water-year basis. The water year starts on October 1 and ends September 30.

For 1961 and subsequent annual records, see GsO 275.

GsW 236. The quality of surface waters in the United States, Part I, Analyses of waters east of the one hundredth meridian: 1909, by R. B. Dole.

Contains mineral analyses of water from the Brazos River near Waco, Colorado River at Austin, and Rio Grande at Laredo.

GsW 274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses: 1911, by Herman Stabler.

Contains analyses of water of the Rio Grande near El Paso. The section on Rio Grande sediment includes basic data, estimates, theoretical extension of extimates, rock matter, soil, and sediment.

GsW 276. Geology and underground waters of northeastern Texas: 1911, by C. H. Gordon.

Gives information about the geology and occurrence of ground water; gives a review of the geology and ground-water resources by counties; and contains a table of well data.

GsW 317. Geology and underground waters of the Wichita region, north-central Texas: 1913, by C. H. Gordon.

Gives information about the geologic formations and their water-bearing capacity and a description of the geology and ground-water conditions by counties.

GsW 335. Geology and underground waters of the southeastern part of the Texas Coastal Plain: 1914, by Alexander Deussen.

Describes the geology of the area and gives information about the geology and ground-water occurrence by counties.

GsW 340. Stream-gaging stations and publications relating to water resources, 1885-1913: 1916, by B. D. Wood.

Lists published reports of water-resources investigations.

GsW 375-G. Ground water in LaSalle and McMullen Counties, Texas: 1916, by Alexander Deussen and R. B. Dole.

Describes the geology and water-bearing formations, the chemical character of water, and irrigation with ground water. Also gives records of wells and chemical analyses.

GsW 448. Gazetteer of streams of Texas: 1919, by G. A. Gray.

Provides information on origin, flow, and ending of all streams in Texas.

GsW 488. The floods in central Texas in September 1921: 1923, by C. E. Ellsworth.

Describes floods in the Brazos, Colorado, and Guadalupe River Basins, especially on Little and San Antonio Rivers. Gives general features of the flood of 1913.

GsW 520-F. Temperature of water available for industrial use in the United States: 1925, by W. D. Collins.

Gives for the United States a map showing the approximate temperature of water from nonthermal wells at depths of 30 to 60 feet.

GsW 557. Large springs in the United States: 1927, by O. E. Meinzer.

Contains information about springs in Cretaceous limestone in Texas.

GsW 596-D. Quality of water of Pecos River in Texas: 1928, by W. D. Collins and H. B. Riffenburg.

Presents a study of water quality of the Pecos River, which, while variable, is used for irrigation. Includes tables of chemical analyses.

GsW 658. The industrial utility of public water supplies in the United States, 1932: 1934, by W. D. Collins, W. L. Lamar, and E. W. Lohr.

Gives descriptions of 20 public water supplies in Texas and chemical analyses of the water produced.

GsW 659-C. Index of analyses of natural waters in the United States 1926 to 1931: 1932, by W. D. Collins and C. S. Howard.

Gives reference to "Chemical analyses of Texas well waters," by Chester Cohen, 1931, Texas Department of Health, containing 1,168 analyses.

GsW 660. Artesian water in Somervell County, Texas: 1934, by A. G. Fiedler.

Describes the general geology, development and head of artesian water, area of artesian flow, quantity of water discharge, recharge, quality of water, construction and repair of wells, and gives recommendations for the conservation of artesian water. Also gives records of wells.

GsW 676. Geology and ground-water resources of Atascosa and Frio Counties, Texas: 1935, by J. T. Lonsdale.

Gives information about the geologic formations and their water-bearing properties, irrigation from wells, municipal supplies, availability of water for domestic and livestock use, well drilling and pumping methods, quality of water, and conservation of water. Also gives records of wells.

GsW 678. Geology and ground-water resources of Uvalde and Medina Counties, Texas: 1936, by A. N. Sayre.

Gives information about the rock formations and their water-bearing properties, ground-water intake, movement, discharge and utilization, and well-drilling methods. Also gives records of wells, water levels, and logs.

GsW 679-B. Thermal springs in the United States: 1937, by N. D. Stearns, H. T. Stearns, and G. A. Waring.

Gives information, including geology, temperature, and approximate discharge, for three thermal springs in Texas.

GsW 680. Droughts of 1930-34: 1936, by J. C. Hoyt.

Describes droughts of 1930, 1931, and 1934 and compares droughts during the period 1881 to 1934. Brazos River at Waco and Llano River at Junction were selected for comparisons.

GsW 773-B. Water resources of the Edwards Limestone in the San Antonio area, Texas: 1936, by Penn Livingston, A. N. Sayre, and W. N. White.

Gives information about the Edwards Limestone as a ground-water reservoir, including recharge, discharge, fluctuations in artesian pressure, artesian-pressure gradients, movement of water, safe yield, and quality of water.

GsW 773-D. Ground-water resources of Kleberg County, Texas: 1936, by Penn Livingston and T. W. Bridges.

Describes the geologic formations and their water-bearing properties, utilization, movement and chemical

character of ground water, fluctuations of water levels, defective wells, waste of water, and well-drilling methods. Also gives records of wells.

GsW 776. Geology and ground-water resources of Duval County, Texas: 1937, by A. N. Sayre.

Describes the geologic formations and their water-bearing properties, the development of ground-water supplies, and the possibilities for irrigation. Also gives records of wells and logs.

GsW 777. Water levels and artesian pressure in observation wells in the United States in 1935.

Gives information on water levels and artesian pressure in observation wells in Texas.

The following table presents these data for subsequent years:

YEAR	WSP NO.	YEAR	WSP. NO.
1936	817	1947	1099
1937	840	1948	1129
1938	845	1949	1159
1939	886	1950	1168
1940	909	1951	1197
1941	939	1952	1224
1942	947	1953	1268
1943	989	1954	1324
1944	1019	1955	1407
1945	1026	1956-59	1549
1946	1074	1960-64	1824
		1965-69	1979

GsW 778. Geology and ground-water resources of Webb County, Texas: 1937, by J. T. Lonsdale and J. R. Day.

Describes the geologic formations and their water-bearing properties, and mineral resources. Also gives records of wells and chemical analyses of ground water.

GsW 796-A. Methods of locating salt-water leaks in water wells: 1937, by Penn Livingston and W. A. Lynch.

Describes the pumping, velocity, samples, and electrical conductivity methods for locating salt-water leaks in wells. Also gives suggestions for well construction to avoid leaks.

GsW 796-G. Major Texas floods of 1935: 1939, by Tate Dalrymple and others.

Describes exceptional floods on Seco Creek, Colorado and Nueces Rivers and their tributaries, and on Buffalo Bayou.

GsW 816. Major Texas floods of 1936: 1937, by Tate Dalrymple and others.

Describes floods on the lower Guadalupe River in June and July; on the Red, Trinity, Brazos, Colorado, Guadalupe, and Nueces River Basins in September 1936.

GsW 839. Quality of water of the Rio Grande Basin above Fort Quitman, Texas, analytical data; 1938, by C. S. Scofield.

Gives descriptions of stations at which samples were taken, and tables of analytical data of water quality.

GsW 846. Natural water loss in selected drainage basins: 1940, by G. R. Williams and others.

A statistical study presenting results of computation of annual water loss or annual rainfall minus annual runoff for river basins in the humid and semi-arid regions east of the Rocky Mountains, including the Neches, Trinity, San Jacinto, Colorado, Guadalupe, and Nueces River Basins.

GsW 847. Maximum discharges at stream-measurement stations through December 1, 1937: 1940, by G. R. Williams and L. C. Crawford, with a supplement including additions and changes through September 30, 1938, by W. S. Eisenlohr, Jr.

Compiles highest known discharges at most gaging stations in the United States and makes available a summary of record discharges; includes western Gulf of Mexico Basins.

GsW 849-A. Geology and ground-water resources of the Lufkin area, Texas: 1941, by W. N. White, A. N. Sayre, and J. F. Heuser.

Gives information about the rock formations and their water-bearing properties. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 849-C. Geology and ground-water resources of the Balmorhea area, western Texas: 1941, by W. N. White, H. S. Gale, and S. S. Nye.

Describes the general geology and the geologic structure and its relation to the occurrence of ground water, springs, intake of ground water, and records of discharge. Also gives records of wells and water levels.

GsW 889-C. Ground-water resources of the Houston district, Texas: 1944, by W. N. White, N. A. Rose, and W. F. Guyton.

Gives information about the general geology, pumpage, decline of water levels, chemical character of the ground water, results of exploratory well drilling, and the transmissibility and storage capacity of the water-bearing beds. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 889-D. Exploratory water-well drilling in the Houston district, Texas: 1944, by N. A. Rose, W. N. White, and Penn Livingston.

Describes the equipment and methods used in drilling wells and making tests; gives the results of laboratory determinations and gives comparisions and correlations.

GsW 889-F. Ground water in the High Plains of Texas: 1946, by W. N. White, W. L. Broadhurst, and J. W. Lang.

Gives information about the source, recharge, and natural discharge of ground water, the development and use of ground water for irrigation, the fluctuations of water levels, and the effects of pumping on ground-water supply. Also gives records of water-level measurements.

GsW 913. Geology and ground-water resources of the Big Spring area, Texas: 1944, by Penn Livingston and R. R. Bennett.

Describes the general geology and occurrence of ground water, the source and movement of ground water, pumpage and its effect on the water table, well-drilling methods, and the chemical character of the water. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 914. Texas floods of 1938 and 1939: 1944, by S. D. Breeding and Tate Dalrymple.

Describes floods in January, June, and July 1938, and July 1939.

GsW 919. Ground-water resources of the El Paso area: 1945, by A. N. Sayre and Penn Livingston.

Describes the general geology, occurrence and quality of ground water, quantity pumped from wells, changes in water levels, and recharge to the water-bearing formations; gives estimates of the potable ground water in storage and information about the mineral contamination of water in wells, and well construction. Gives records of wells, logs, water levels, and chemical analyses of ground water, together with the results of well exploration and contamination tests in 1939.

GsW 942. Quality of surface waters of the United States 1941: 1943, by W. D. Collins, C. S. Howard, and S. K. Love.

Presents chemical analyses, suspended sediment and temperature for surface waters of the United States; includes the Rio Grande and Pecos River Basins.

The following table lists a series of water-supply papers that present records of chemical analyses, suspended sediment, and temperature for surface water in Texas.

YEAR	WSP. NO.	YEAR	WSP. NO.
1941	942	1945	1030
1942	950	1946	1050
1943	970	1947	1102
1944	1022	1948	1133

YEAR	WSP. NO.	YEAR	WSP. NO.
1949	1163	1959	1644
1950	1188	1960	1744
1951	1199	1961	1884
1952	1252	1962	1944
1953	1292	1963	1950
1954	1352	*1964	1957
1955	1402	1965	1964
1956	1452	1966	1994
1957	1522	1967	2014
1958	1573	1968	2096 and 2097

*Starting in 1964, annual reports of water quality were also published as individual State reports. See GsO 276.

GsW 1046. Texas floods of 1940: 1948, by S. D. Breeding.

Presents records of rainfall for the June-July storm and the November storm; record of peak stages and discharges; records of other floods at places where maximum discharges were measured during the June-July storm; results of studies of rainfall and runoff of the June-July storm for selected areas; comparative records of sediment transport; and other data pertinent to the floods in Texas.

GsW 1047. Public water supplies in eastern Texas: 1948, by R. W. Sundstrom, W. W. Hastings, and W. L. Broadhurst.

Gives a summarized description of the public water supplies in eastern Texas. For the public supplies using ground water, gives the probable water-bearing formation. The description of each supply using ground water is given as follows: population, name and ownership of supply, source of supply (number of wells), pumpage, storage, number of customers served, treatment, analyses of water, and for some supplies, drillers' logs of wells.

GsW 1069. Public water supplies in central and north-central Texas: 1949, by R. W. Sundstrom, W. L. Broadhurst, and B. C. Dwyer.

Gives a summarized description of the public supplies in central and north-central Texas. For the public supplies using ground water, gives the probable water-bearing formation. The description of each supply using ground water is given as follows: population, name and ownership of supply, source of supply (number of wells), pumpage, storage, number of customers served, treatment, analyses of water, and for some supplies, drillers' logs of wells.

GsW 1070. Public water supplies in southern Texas: 1950, by W. L. Broadhurst, R. W. Sundstrom, and J. H. Rowley.

Gives a summarized description of the public supplies in southern Texas. For the public supplies using ground water, gives the probable water-bearing formation. The description of each supply using ground water is given as follows: population, name and ownership of supply, source of supply (number of wells), pumpage, storage, number of customers served, treatment, analyses of water, and for some supplies, drillers' logs of wells.

GsW 1079-A. Ground-water resources of Liberty County, Texas: 1950, by W. H. Alexander, Jr., with a section on stream runoff by S. D. Breeding.

Describes the geologic formations and their water-bearing properties, the development of water supplies from wells, estimated withdrawal, and temperature of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 1079-B. Ground-water resources of Gregg County, Texas: 1950, by W. L. Broadhurst, with a section on stream runoff by S. D. Breeding.

Gives information about the geologic formations and their water-bearing properties and the development of water supplies from wells. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 1079-C. Ground-water resources of Atascosa County, Texas: 1950, by R. W. Sundstrom and C. R. Follett.

Describes the development and use of ground water from the different water-bearing formations. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 1106. Public water supplies in western Texas: 1951, by W. L. Broadhurst, R. W. Sundstrom, and D. E. Weaver.

Gives a summarized description of the public supplies in western Texas. For the public supplies using ground water, gives the probable water-bearing formation. The description of each supply using ground water is given as follows: population, name and ownership of supply, source of supply (number of wells), pumpage, storage, number of customers served, treatment, analyses of water, and for some supplies, drillers' logs of wells.

GsW 1138. Geology and ground-water resources of Comal County, Texas: 1952, by W. O. George, with sections on surface-water runoff, by S. D. Breeding, and chemical character of the water, by W. H. Hastings.

Describes the geologic formations and their water-bearing properties, structural geology, methods of well construction, and the occurrence of ground water with special reference to the discharge and source of Comal Springs. Gives information about surface water and the chemical charcter of the water. Also gives records of wells and springs, logs, and chemical analyses of ground water.

GsW 1227-B. Floods of May 1951 in western Oklahoma and northwestern Texas: 1954.

Contains records for stage and discharge for 43 gaging stations, reservoir-content for 7 reservoirs, isohyetal maps, and other data related to the May 13-19 flood.

GsW 1227-D. Summary of floods in the United States during 1951: 1954.

Contains a section on Texas in which floods of May, June, and September are briefly described.

GsW 1260-A. Floods of September 1952 in the Colorado and Guadalupe River Basins, central Texas: 1954, by S. D. Breeding and J. H. Montgomery.

Presents records of stage and discharge for the flood period at 22 gaging stations and records of contents at 3 major reservoirs and a summary of peak discharges at 64 points in the flood area.

GsW 1264. Quality of surface waters for irrigation, western United States 1951: 1954.

Compiles data for irrigation network stations west of the Mississippi River, including chemical analyses, other physical measurement, and discharge.

The following table lists a series of water-supply papers that present quality of surface waters for irrigation in the United States west of the Mississippi River.

YEAR	WSP NO.	YEAR	WSP NO.
1951	1264	1959	1699
1952	1362	1960	1746
1953	1380	1961	1886
1954	1430	1962	1946
1955	1465	1963	1952
1956	1485	1964	1960
1957	1524	1965	1967
1958	1575		

GsW 1300. The industrial utility of public water supplies in the United States 1952, Part 2, States west of the Mississippi River: 1954, by E. W. Lohr and S. K. Love.

Gives information about the ownership, source and treatment of water, and the storage for public water supplies in Texas, together with chemical analyses of water produced.

GsW 1311. Compilation of records of surface waters of the United States through September 1950, Part 7, Lower Mississippi River basin: 1955.

Presents monthly and yearly summaries of streamflow and reservoir data from station establishment to September 30, 1950; includes Arkansas and Red River Basins.

GsW 1312. Compilation of records of surface waters of the United States through September 1950, Part 8, Western Gulf of Mexico basins: 1960.

Contains data similar to GsW 1311 for all rivers in Texas except Arkansas and Red Rivers.

GsW 1360-F. Salt water and its relation to fresh ground water in Harris County, Texas: 1957, by A. G. Winslow, W. W. Doyel, and L. A. Wood.

Gives information about the relation between fresh and salt water in aquifers, the natural flushing of connate water from the aquifer, the probable occurrence of fresh and salt water before ground-water withdrawals, and the present occurrence of salt water. Describes the effect of ground-water withdrawals and the possible sources of salt-water contamination.

GsW 1365. Saline-water resources of Texas: 1956, by A. G. Winslow and L. R. Kister.

Gives information about the general geology and saline-water aquifers. Also gives information on saline surface water, records of saline water wells and springs, chemical analyses, and related physical measurements of saline ground water.

GsW 1370-C. Summary of floods in the United States during 1954: 1959.

Describes floods of April 12-13 in Bull Creek (upper Colorado) Basin, floods of June 9-10 on the Red River, and floods of June 27-July 1 in the Rio Grande Basin.

GsW 1374. Preliminary survey of the saline water resources of the United States: 1957, by R. A. Krieger, J. L. Hatchett, and J. L. Poole.

Gives records of wells and springs producing saline water and chemical analyses of the water.

GsW 1416. Geology and ground-water resources of Galveston County, Texas: 1957, by B. M. Petitte, Jr., and A. G. Winslow.

Describes the geologic formations and their water-bearing properties, history of water supplies, ground-water hydrology, and quality of water. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 1422. Geology and ground-water resources of Medina County, Texas: 1959, by C. L. R. Holt, Jr.

Gives information about the rock formations and their water-bearing properties, structure, and the occurrence, movement, and quality of ground water. Also gives records of wells and springs, logs, water levels, and chemical analyses of ground water.

GsW 1426. Ground-water resources of the Hueco bolson, northeast of El Paso, Texas: 1958, by D. B. Knowles and R. A. Kennedy.

Describes the general geology and the hydrology, including ground-water reservoirs, development and occurrence of ground water, water levels, pumping tests, recharge to the Hueco bolson, and ground water in storage. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 1455-B. Summary of floods in the United States during 1955: 1962.

Describes floods of September 24-25 in the Nueces River Basin, floods of September 25-28 in the upper Brazos River Basin, and floods of October 2-4 in the Pecos River Basin.

GsW 1481. Geology and ground-water resources of the Winter Garden district, Texas: 1948, by S. F. Turner, T. W. Robinson, and W. N. White, revised by D. E. Outlaw, W. O. George, and others, 1960.

Describes the rock formations and their water-bearing properties and the principal aquifers, including withdrawals, fluctuations of water levels, hydraulic properties,

interference between wells, depletion, salt-water leaks in wells, and quality of water. Also gives records of wells, logs, water levels, and chemical analyses of ground water.

GsW 1539-G. Ground-water geology of Karnes County, Texas: 1962, by R. B. Anders.

Describes the geologic formations and the occurrence of ground water. Includes aquifer tests, development, and quality of water.

GsW 1539-U. Geology and ground-water resources of Hale County, Texas: 1963, by J. G. Cronin and L. C. Wells.

Describes the geologic formations and their water-bearing properties and the ground water, including hydraulic properties of the aquifer, movement, recharge, natural discharge, withdrawals from wells, water in storage, and the quality of the water. Also discusses the outlook for the future.

GsW 1582. Geology and ground-water resources of Winkler County, Texas: 1963, by Sergio Garza and J. B. Wesselman.

Gives information about the geologic formations and their water-bearing properties and ground water, including source and occurrence, movement, recharge, discharge, storage, utilization, pumping tests, and quality. Also gives records of wells, logs, and chemical analyses of ground water.

GsW 1584. Geology and ground-water resources of Uvalde County, Texas: 1964, by F. A. Welder and R. D. Reeves.

Presents geologic information on the character, thickness, depth below land surface, and extent of water-bearing formations; shows locations of wells and springs.

GsW 1588. Ground-water geology of Bexar County, Texas: 1963, by Ted Arnow.

Gives information about the geology and water-bearing properties of the formations, geologic structure, recharge, discharge, movement, and quality of water in the Edwards Limestone, together with fluctuations of water levels.

GsW 1612. Geology and ground-water resources of Hays County, Texas: 1963, by K. J. DeCook.

Describes the stratigraphy and water-bearing properties of the rock units, structural geology, ground-water resources, including recharge, movement and discharge, and the quality and utilization of ground water.

GsW 1619-J. Ground-water geology of Edwards County, Texas: 1963, by A. T. Long, Jr.

Describes the rock formations and their water-bearing properties, the occurrence, movement, development and quality of ground water, and the relation between ground water and streamflow.

GsW 1646. Ground-water geology of Grayson County, Texas: 1963, by E. T. Baker, Jr.

Describes the rock units and their water-bearing properties, and the recharge, discharge, use and quality of ground water, hydraulic characteristics, and future development of the water-bearing formations.

GsW 1652-B. Floods of April-June 1957 in Texas and adjacent states: 1963, by I. D. Yost.

Describes tremendous volume of flood runoff produced by heavy rainfall which brought an end to several years of severe drought; presents general descriptions of floods, information concerning rainfall, and detailed streamflow records at selected gaging stations.

GsW 1653. Ground-water resources of the Lower Rio Grande Valley area, Texas: 1964, by R. C. Baker and O. C. Dale.

Describes four prinicipal ground-water reservoirs of the area and the quality and use of ground water in Cameron, Hidalgo, Starr, and Willacy Counties.

GsW 1669-AA. Ground-water resources of the lower Mesilla Valley, Texas and New Mexico: 1963, by E. R. Leggat, M. E. Lowry, and J. W. Hood.

Describes the geology of the area, and presents information on quantity and quality of water available.

GsW 1669-CC. Natural sources of salinity in the Brazos River, Texas, with particular reference to the Croton and Salt Croton Creek basins: 1964, by R. C. Baker, L. S. Hughes, and I. D. Yost.

Discusses natural salt inflow to Possum Kingdom Reservoir and potential methods of reducing salt load.

GsW 1681. Magnitude and frequency of floods in the United States—Part 7, Lower Mississippi River Basin: 1964, by J. L. Patterson.

Describes methods by which the magnitude and frequency of expected floods for most streams in the lower Mississippi River Basin may be determined; includes peak stages and discharges for Canadian and Red River gaging-stations in Texas through September 1958.

GsW 1682. Magnitude and frequency of floods in the United States—Part 8, Western Gulf of Mexico Basins: 1965, by J. L. Patterson.

Contains similar methodology and data as GsW 1681 for river basins in Texas from the Sabine through the Rio Grande.

GsW 1693. A summary of the occurrence and development of ground water in the High Plains of Texas: 1964, by J. G. Cronin, with a section on artificial recharge studies, by B. N. Myers.

Evaluates and summarizes the ground-water resources of part of the southern High Plains, with a description of geology, movement of ground water, and a discussion of recent attempts at artificial recharge.

GsW 1731. Compilation of records of surface waters of the United States, October 1950 to September 1960—Part 7, Lower Mississippi River Basin: 1964.

Continues data compiled in GsW 1311, for the following ten-year period.

GsW 1732. Compilation of records of surface waters of the United States, October 1950 to September 1960—Part 8, Western Gulf of Mexico Basins: 1964.

Continues data compiled in GsW 1312, for the following ten-year period.

GsW 1779-F. Hydrologic studies of small watersheds, Honey Creek Basin, Collin and Grayson Counties, Texas, 1953-59: 1964, by C. R. Gilbert, G. G. Commons, G. E. Koberg, and F. W. Kennon.

Presents the results of an investigation into the effects of floodwater-retarding structures in the 39 square miles of the Honey Creek Basin above the stream-gaging station near McKinney.

GsW 1779-K. Chemical quality of surface waters in the Brazos River in Texas: 1964, by Burdge Irelan and H. B. Mendieta.

Discusses the quality of water by areas and stream reaches, and potential methods for improvement.

GsW 1804. Drought of the 1950's—with special reference to the midcontinent: 1965, by R. L. Nace and E. J. Pluhowski.

Describes the extent and severity of the extended drought period, with a section on results of the drought on water supplies in Texas.

GsW 1809-H. Reconnaissance of the chemical quality of surface waters of the Sabine River Basin, Texas and Louisiana: 1965, by L. S. Hughes and D. K. Leifeste.

Presents the results of a study of the chemical quality of water in the Sabine River and tributaries.

GsW 1810. Summary of floods in the United States during 1961: 1965 by J. O. Rostvedt.

Describes the June 25, 1961, flood on the Trinity River tributaries in the Fort Worth area.

GsW 1812. Public water supplies of the 100 largest cities in the United States, 1962: 1964, by C. N. Durfor and Edith Becker.

Gives data on water supplies for Amarillo, Austin, Corpus Christi, Dallas, El Paso, Fort Worth, Houston, Lubbock, and San Antonio.

GsW 1813. Flood peak runoff and associated precipitation in selected drainage basins in the United States: 1965, by Tate Dalrymple.

Presents a compilation of runoff and precipitation data from gaged drainage basins of 400 square miles or less, representing natural flow, with 5 or more years of record.

GsW 1820. Summary of floods in the United States during 1962: 1968, by J. O. Rostvedt and others.

Describes flood of July 27, September 7-8, and October 8, 1962, near Mineral Wells and Dallas.

GsW 1838. Reservoirs in the United States: 1966, by R. O. R. Martin and R. L. Hanson.

Lists the location, drainage area, and storage capacity data for 117 reservoirs in Texas.

GsW 1839-A. Reconnaissance of the chemical quality of surface waters of the Neches River Basin, Texas: 1967, by L. S. Hughes and D. K. Leifeste.

Presents the results of a study similar to GsW 1809-H.

GsW 1850-E. Summary of floods in the United States during 1965: 1970, by J. O. Rostvedt and others.

Contains a brief description of the flood of June 11, 1965, in Sanderson Canyon, Texas.

GsW 1870-B. Floods of April 28, 1966 in the northern part of Dallas, Texas: 1969, by W. B. Mills and E. E. Schroeder.

Describes heavy damage caused by a flood in a relatively small area, resulting from a 5-hour storm.

GsW 1871. Water data for metropolitan areas—A summary of data from 222 areas in the United States: 1968, by W. J. Schneider.

Gives the area and population figures, hydrologic background of water supply, index of data available, and references for 22 standard metropolitan statistical areas in Texas.

GsW 1880-C. Summary of floods in the United States during 1967: 1972, by J. O. Rostvedt and others.

Contains a short description of the floods created by the torrential rainfall accompanying Hurricane Beulah in southern Texas and northeastern Mexico.

GsW 1920. Surface water supply of the United States, 1961-65—Part 7, Lower Mississippi River Basin—Volume 1, Lower Mississippi River Basin except Arkansas River Basin: 1969.

Continuation of data presented in GsW 1311 and GsW 1731.

GsW 1921. Surface water supply of the United States, 1961-65—Part 7, Lower Mississippi River Basin—Volume 2, Arkansas River Basin: 1969.

Continuation of data presented in GsW 1311 and GsW 1731.

GsW 1922. Surface water supply of the United States, 1961-65—Part 8, Western Gulf of Mexico basins—Volume 1, Basins from Mermentau River to Colorado River: 1969.

Continuation of data presented in GsW 1312 and GsW 1732.

GsW 1923. Surface water supply of the United States, 1961-65—Part 8, Western Gulf of Mexico basins—Volume 2, Basins from Lavaca River to Rio Grande: 1970.

Continuation of data presented in GsW 1312 and GsW 1732.

GsW 1984. Hydrologic effects of floodwater-retarding structures on Garza-Little Elm Reservoir, Texas: 1970, by C. R. Gilbert and S. P. Sauer.

Analyzes hydrologic data collected in watersheds developed with floodwater-retarding structures, to define effects on downstream water and sediment yield.

GsW 1999-J. The water quality of Sam Rayburn Reservoir, eastern Texas: 1971, by Jack Rawson and M. W. Lansford.

Describes a study of the effect of municipal and industrial wastes in tributaries to the Angelina River on quality of water in Sam Rayburn Reservoir.

GsW 1999-L. Factors contributing to unusually low runoff during the period 1962-68 in the Concho River Basin, Texas: 1972, by S. P. Sauer.

Describes analyses of rainfall intensity and runoff data, changes in use of water for irrigation, and springflow to find the basic cause for relatively low runoff during the period.

Professional Papers

(Index Code GsP)

GsP 126. Geology of the Coastal Plain of Texas west of Brazos River: 1924, by Alexander Deussen.

Contains a section on drainage basins of Texas rivers from the Brazos to the Rio Grande.

GsP 187. Geology of the Marathon region, Texas: 1937, by P. B. King.

Contains short sections on streams and springs of the Marathon Basin.

GsP 272-B. The effect of the addition of heat from a power plant on the thermal structure and evaporation of Lake Colorado City, Texas: 1959, by G. E. Harbeck, Jr., G. E. Koberg, and G. H. Hughes.

Includes sections on instrumentation, energy-budget studies, water-budget studies, mass-transfer studies, effect on evaporation of adding heat to the reservoir, and effect of added heat on the thermal structure.

GsP 272-D. Evaporation from the 17 western states: 1960, by J. S. Meyers.

Estimates the amounts of water evaporated annually from reservoirs, lakes, ponds, streams, and enclosed coastal bays in the 17 western states, including Texas.

GsP 372. Drought in the Southwest, 1942-56: 1963, by H. E. Thomas, J. S. Gatewood, Alfonso Wilson, L. R. Kister, and others.

Presents a detailed description and discussion of the drought. Section C presents effects of drought in central and south Texas. Section D presents effects of drought in the Rio Grande Basin.

GsP 448. Water resources of the Mississippi Embayment: 1964-68.

Presents nine sections on water resources of the Mississippi Embayment which includes parts of Alabama, Arkansas, Illinois, Kentucky, Louisiana, Mississippi, Missouri, Tennessee, and Texas. Section A presents availability of water; Section C discusses Cretaceous aquifers; Section D, Tertiary aquifers; Section E, Quaternary aquifers; and Section G presents low-flow characteristics of streams including northeastern Texas.

GsP 450-B. Chemical quality of surface waters in the Brazos River basin, Texas: 1962, by Burdge Irelan and H. B. Mendieta in Short papers in Geology, hydrology, and topography, Article 54.

Describes variations in quality of water from tributaries to the main stream.

GsP 525-B. Growth of salt cedar (Tamarix gallica) in the Pecos River near the New Mexico-Texas boundary: 1965, by R. U. Grozier, *in* Geological Survey research 1965, Chapter B, p. B175-B176.

Presents photographs of growth of salt cedar from 1916 to 1961.

GsP 550-D. Interstate correlation of aquifers, southwestern Louisiana and southeastern Texas: 1966, by A. N. Turcan, Jr., J. B. Wesselman, and Chabot Kilburn in Geological Survey research 1966, Chapter D, p. D231-D236.

Establishes names for use in interstate correlation of the hydrologic units.

GsP 569-A. Hydrologic significance of the lithofacies of the Sparta Sand in Arkansas, Louisiana, Mississippi, and Texas: 1968, by J. N. Payne.

Presents study and analysis to aid in understanding relations between geologic and hydrologic factors, and to delineate the potential for ground-water development. (Part A of Geohydrology of the Claiborne Group.)

GsP 569-B. Geohydrologic significance of lithofacies of the Cockfield Formation of Louisiana and Mississippi and of the Yegua Formation of Texas: 1970, by J. N. Payne.

Part B of Geohydrology of the Claiborne Group.

GsP 569-C. Hydrologic significance of lithofacies of the Cane River Formation or equivalents of Arkansas, Louisiana, Mississippi, and Texas: 1972, by J. N. Payne.

Part C of Geohydrology of the Claiborne Group.

GsP 750-B. Geological Survey research 1971.

Chapter B, p. B236-B243, Preliminary consideration of movement of ground water from infiltration areas on the Llano Estacado, Texas and New Mexico: 1971, by C. V. Theis.

Presents theoretical consideration of infiltration canals for water storage in the Ogallala Formation.

Chapter B, p. B270-B277, The use of well logging in recharge studies of the Ogallala Formation in west Texas: 1971, by W. S. Keys and R. F. Brown.

Describes analysis of drive cores to provide better delineation of hydrologic characteristics of the Ogallala Formation.

GsP 809-A. Recognition of natural brine by electrical soundings near the Salt Fork of the Brazos River, Kent and Stonewall Counties, Texas: 1973, by A. A. R. Zohdy, and D. B. Jackson.

Describes the use of direct-current resistivity method in determining the depth of a fresh-water and salt-water interface in a geologic setting containing gypsum and anydrite layers. (Part A of Origin and management of salt springs and seeps in the upper Brazos River Basin, Texas.)

GsP 809-B. Location and characteristics of the interface between brine and fresh water from geophysical logs of boreholes in the upper Brazos River Basin, Texas: 1973, by W. S. Keys and L. M. MacCary.

Describes the use of borehole geophysics during a test-drilling program to determine the location, characteristics, and relation to lithology of an interface between brine and overlying fresh to slightly saline water. (Part B of Origin and management of salt springs and seeps in the upper Brazos River Basin, Texas.)

Circulars

(Index code GsC)

GsC 6. Mineral-water supply of the Mineral Wells area, Texas: 1934, by S. F. Turner.

Gives information about the availability and quality of ground water in the area. Also gives chemical analyses of ground water.

GsC 32. Flood of September 1946 at San Antonio, Texas: 1948, by S. D. Breeding.

Contains reports on floods of September 8-10 and 26-27, with sections on rainfall, Olmos Dam, peak discharges, rainfall-runoff, and damages.

GsC 99. Flood of August 1-6, 1950, at Wichita Falls, Texas: 1951, by I. D. Yost.

Contains sections on rainfall, general features of the flood, damages, stages, and discharges.

GsC 114. The water situation in the United States with special reference to ground water: 1951, by C. L. McGuinness.

Gives a general discussion of ground water in nature, the effect of land-use practices, ground water as affected by use, ground water and the National economy, the current situation (by regions), and the Federal concern in water resources. Also gives a summary of the current (1950) water situation by states.

GsC 149. Reports and maps of the Geological Survey released only in the open files, 1949-1950: 1952, by Anna Jespersen, L. E. Randall, and R. E. Spratt.

Lists reports and maps which have not been published, but which are available as open-file reports.

Similar reports for subsequent years are listed below:

YEAR	CIRCULAR NO.	YEAR	CIRCULAR NO.
1951	227	1955	379
1952	263	1956	401
1953	337	1957	403
1954	364	1958	412
1959	428	1967	548
1960	448	1968	568
1961	463	1969	618
1962	473	1970	638
1963	488	1971	648
1964	498	1972	668
1965	518	1973	696
1966	528		

GsC 347. Water rights in areas of ground-water mining: 1955, by H. E. Thomas.

Gives an evaluation of the systems of water rights, the basis of water rights, by states, and the water rights and problems in some areas of ground-water mining, which includes the High Plains area of Texas.

GsC 398. Estimated use of water in the United States, 1955: 1957, by K. A. MacKichan.

Gives the withdrawal of water by states and by different uses.

GsC 456. Estimated use of water in the United States, 1960: 1961, by K. A. MacKichan and J. C. Kammerer.

Evaluates use of water in broad categories, and by states and regions; includes public supplies, rural, irrigation, self-supplied industrial use, and water power.

GsC 556. Estimated use of water in the United States, 1965: 1968, by C. Richard Murray.

Presents data similar to GsC 456.

GsC 657. Index of surface-water records to September 30, 1970—Part 7, Lower Mississippi River Basin: 1972.

Lists streamflow and reservoir stations in the lower Mississippi River Basin from establishment and indicates type of data available and period of record.

GsC 658. Index of surface-water records to September 30, 1970—Part 8, Western Gulf of Mexico basins: 1971.

Presents data similar to GsC 657, for all rivers in Texas except the Red and Arkansas Rivers.

GsC 670. Fluvial-sediment discharge to the oceans from the conterminous United States: 1973, by W. F. Curtis, J. K. Culbertson, and E. B. Chase.

Presents fluvial-sediment discharge data, including tables for Texas rivers.

GsC 676. Estimated use of water in the United States in 1970: 1972, by C. Richard Murray and E. Bodette Reeves.

Presents data similar to GsC 456 and GsC 556.

GsC 685. Dissolved-solids discharge to the oceans from the conterminous United States: 1974, by D. K. Leifeste.

Presents dissolved-solids data from 54 river basins, including 9 Texas rivers.

Folios of the Geologic Atlas of the United States

(Index code GsF)

GsF 42. Nueces Folio, Texas: 1898, by R. T. Hill and T. W. Vaughan.
Indicates the water-bearing beds from which springs discharge in the area.

GsF 64. Uvalde Folio, Texas: 1900, by T. W. Vaughan.
Gives information about the occurrence and availability of ground water from the different formations.

GsF 76. Austin Folio, Texas: 1902, by R. T. Hill and T. W. Vaughan.
Gives general information about the availability of ground water near Austin.

GsF 166. El Paso Folio, Texas: 1909, by G. B. Richardson.
Gives general information about the occurrence, availability, and quality of ground water.

GsF 183. Llano-Burnet Folio, Texas: 1912, by Sidney Paige.
Gives a general statement about the availability of ground water.

GsF 194. Van Horn Folio, Texas: 1914, by G. B. Richardson.
Gives information about the sources and availability of ground water in the area.

Hydrologic Investigations Atlases

(Index code GsH)

GsH 190. Flood on Big Fossil Creek at Haltom City near Fort Worth, Texas in 1962: 1965, by J. H. Montgomery, F. H. Ruggles, Jr., and J. L. Patterson.

Presents, in map form, the area inundated during flood of September 7, 1962.

GsH 194. Generalized map showing annual runoff and productive aquifers in the conterminous United States: 1964, by C. L. McGuinness.

Presents, in map form, the areas underlain by one or more aquifers generally capable of yielding to a well at least 50 gpm of water containing not more than 2,000 ppm of dissolved solids.

GsH 199. Preliminary map of the conterminous United States showing depth to and quality of shallowest ground water containing more than 1,000 parts per million dissolved solids: 1965, by J. H. Feth and others.

Presents, in graphic form, the sources of mineralized ground water; with text.

GsH 200. Chemical quality of public water supplies of the United States and Puerto Rico, 1962: 1964, by C. N. Durfor and Edith Becker.

Presents, in graphic form, hardness, dissolved solids, sodium, and fluoride content of treated and untreated public water supplies.

GsH 235. Temperature of surface waters in the conterminous United States: 1966, by J. F. Blakey.

Contains three maps showing most prevalent temperature of surface waters; average number of days per year when surface-water temperatures are 80°F or greater; and average number of days per year when temperatures are at or near the freezing point; includes text.

GsH 238. Floods on White Rock Creek at Dallas, Texas in 1962 and 1964: 1967, by F. H. Ruggles, Jr., and C. R. Gilbert.

Presents, in map form, the extent of flooding on White Rock Creek in 1962 and 1964; includes explanatory text.

GsH 240. Flood of October 8, 1962, on Bachman Branch and Joes Creek at Dallas, Texas: 1966, by F. H. Ruggles, Jr.

Presents, in map form, the extent of flood inundation, with explanatory text.

GsH 282. River discharge to the sea from the shores of the conterminous United States: 1967, by Alfonso Wilson and others.

Presents, in map, table, and graph forms, the discharge to Atlantic and Pacific Oceans, and Gulf of Mexico; delineates major drainage boundaries, river basin boundaries, and closed basins.

GsH 330. Ground water in the Ogallala Formation in the southern High Plains of Texas and New Mexico: 1969, by J. G. Cronin.

Delineates, in map form, the approximate altitude of the water table, approximate decline of the water table since the beginning of large-scale withdrawals for irrigation, and saturated thickness. Illustrates the continuity of the principal ground-water reservoir between the two states; includes text.

Water Resources Investigations

(Index code GsI)

GsI 3-73. Effects of urbanization on floods in the Houston, Texas metropolitan area: 1973, by S. L. Johnson and D. M. Sayre.
Provides relationships for estimating the magnitudes of annual flood peaks having selected recurrence intervals ranging from 2 to 100 years on streams in the Houston metropolitan area. (National Technical Information Service Publication No. PB2-20751.)

GsI 10-73. Artificial-recharge experiments and operations on the southern High Plains of Texas and New Mexico: 1973, by R. F. Brown and D. C. Signor.
Presents data on the major artificial-recharge experiments and operations that have been undertaken on the southern High Plains prior to 1968. (National Technical Information Service Publication No. PB-222 921.)

GsI 18-73. Effects of ground-water development on the proposed Palmetto Bend Dam and Reservoir in southeast Texas: 1973, by E. T. Baker, Jr., and C. R. Follett.
Presents the results of an investigation to determine the effects of large-scale ground-water withdrawals on the proposed dam and reservoir. (National Technical Information Service Publication No. PB-232 683.)

GsI 60-73. Effects of urbanization on floods in the Dallas, Texas metropolitan area: 1974, by G. R. Dempster, Jr.
Presents the results of a study to determine the effects of urbanization on the magnitude and frequency of floods, to establish a regional flood-frequency relationship, and to determine the relative importance of physical characteristics on hydrology of an urban area. A digital model of the hydrologic system was used to simulate records. (National Technical Information Service Publication No. Pb-230 188.)

Special Publications

(Index code GsS)

GsS 1. Leopold, L. B., and Langbein, W. B., 1960, A primer on water.
Presents, in simple language, general information about water, including the hydrologic cycle, ground water, water in relation to soil, water use, and development.

GsS 2. Baldwin, H. L., and McGuinness, C. L., 1963, A primer on ground water.
Presents, in layman's language, the story of ground water.

GsS 3. Swenson, H. A., and Baldwin, H. L., 1965, A primer on water quality.
Tells what "water quality" means, the characteristics of water, and what affects its quality.

Open-File Reports

Index code and number (GsO 1, etc.) correspond *only* to the index at the end of this bibliography.

GsO 1. Alexander, W. H., Jr., 1946, Ground water in the vicinity of Lamesa, Dawson County, Texas.
Gives information about the municipal water supply and the effects of pumping. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 2. Audsley, G. L., 1956, Reconnaissance of ground-water development in the Fort Stockton area, Pecos County, Texas.
Gives information about the pumpage of ground water and the effects on artesian pressures, the water supply of Fort Stockton and the quality of water. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 3. ____1959, Records of wells and results of exploratory drilling in the El Paso Valley and Hueco bolson southeast of El Paso, Texas.
Gives records of wells, logs, and chemical analyses of ground water.

GsO 4. Austin, V.L., and George, W. O., 1952, Low flows on Neches River, September and October 1952, Dam B. Reservoir to mouth of Village Creek.
Includes table of daily discharge, September 1952, for 5 stream-gaging stations on the Neches River and tributaries.

GsO 5. Baker, E. T., Jr., and Rawson, Jack, 1972, Ground-water pollution in the vicinity of Toledo Bend Reservoir, Texas, Progress report 1972.
Presents data indicating that reservoir pollution is being caused by effluent from septic tanks reaching shallow ground water.

GsO 6. Baker, E. T., Jr., and Wall, J. R., 1974, Summary appraisals of the nation's ground-water resources—Texas-Gulf region.
Presents information on the importance of subsurface reservoirs in water-management and conservation plans in the Texas-Gulf Region, as part of a nation-wide survey of ground-water resources.

GsO 7. Baker, E. T., Jr., and Watson, J. A., 1971, Quantity of low flow in Barton Creek, Texas, July 6-8 and October 1-3, 1970.
Describes gains and losses in streamflow of Barton Creek, closely related to the geology of the area.

GsO 8. Baker, R. C., 1958, Water supply for Persimmon Gap and Santa Elena Ranger Stations, Big Bend National Park, Brewster County, Texas.
Indicates possible sources of ground water for the ranger stations.

GsO 9. Barnes, B. A., 1940, Memorandum on the public water supply of Alice, Jim Wells County, Texas.

GsO 10. ____1940, Memorandum on the public water supply of Falfurrias, Brooks County, Texas.

GsO 11. ____1940, Memorandum on the public water supply of Premont, Jim Wells County, Texas.

GsO 12. ____1941, Ground-water investigations in the vicinity of Galveston, Texas, with special reference to salt-water intrusion.
Gives information about the principal water-bearing beds, the decline in artesian pressures, the rise in chlorides, and the depth to salty water.

GsO 13. ____1941, Water supply in the vicinity of Texas City, Texas.
Briefly describes the increase in ground-water pumpage, the decline in artesian pressures, and the rise in chlorides.

GsO 14. ____1942, Results of test drilling by city of Galveston, November 1941 to June 1942.

Describes the test wells and gives a summary of conditions disclosed by the test-drilling program. Also gives logs of the test wells and chemical analyses of the water from different depths.

GsO 15. Barnes, B. A., 1946, Theoretical effect of increasing present withdrawals of ground water in the Lufkin area, Texas.

Gives information pertinent to the question of whether the Carrizo Sand and the sand (top Wilcox?) below the separating clay are separate aquifers and if they are separate, whether an additional supply of water could be developed from the lower sand.

GsO 16. Bennett, R. R., 1941, Ground water in the vicinity of Killeen, Texas.

Gives information about the general geology of the area with reference to the occurrences and availability of ground water.

GsO 17. _____1941, Marfa water supply.

Gives general information about the wells and use of ground water at Marfa.

GsO 18. _____1942, Memorandum on ground water in the area about 8 miles north of Belton, Texas.

Reviews the general occurrence, quantity, and quality of ground water in the area.

GsO 19. _____1942, Memorandum regarding occurrence of ground water in the area 6-1/2 miles east of Del Rio, Texas.

Gives general information about the availability of ground water in the area.

GsO 20. _____1942, Ground-water resources in the vicinity of Palestine, Texas.

Gives a survey of the rock formations and their water-bearing properties in the Palestine area. Also gives records of wells, drillers' logs, and chemical analyses of ground water.

GsO 21. Bennett, R. R., 1942, Memorandum on water supply from San Felipe Springs, Del Rio, Texas.

Gives information about the discharge and quality of water from the springs.

GsO 22. _____1942, Occurrence of ground water in terrace gravels along San Marcos River.

Gives general information about the occurrence of ground water in the area between San Marcos and Martindale, and also near Lockhart.

GsO 23. Bennett, R. R., and Livingston, Penn, 1942, Ground Water at the Bombardier School near Del Rio, Texas.

Gives information about test wells and analyses of water from the wells.

GsO 24. Blakey, J. F., Hawkinson, R. O., and Steele, T. D., 1972, An evaluation of water-quality records of Texas streams.

Presents the results of a study to analyze, by statistical techniques, historical records of inorganic chemical quality of water; to present results from computer-oriented analyses; and to determine the accuracy with which inorganic chemical constituents can be estimated.

GsO 25. Blakey, J. F., and Skinner, P. W., 1973, A network for continuous monitoring of water quality in the Sabine River Basin, Texas and Louisiana.

Recommends monitoring network for continuous transmission of water-quality data to the office of the river water manager.

GsO 26. _____1974, A network for continuous monitoring of water quality in the Trinity River Basin, Texas.

Contains information similar to GsO 25.

GsO 27. Breeding, S. D., 1934, Delivery of water stored by the Brown County

Water Improvement District No. 1 Reservoir on Pecan Bayou ten miles above Brownwood, Texas, to Bay City Water Company, Bay City, Texas.

Study of water loss due to jammed mechanism in reservoir gates.

GsO 28. Breeding, S. D., 1942, Flood of April 19-20, 1942, in Marine Creek at Fort Worth, Texas.

Presents rainfall-runoff data of the storm preceding the flood.

GsO 29. _____1942, Water supply available from streams in the vicinity of Palestine, Texas.

Gives runoff figures for streams in vicinity of Palestine.

GsO 30. _____1943, Surface-water supply of Camp, Franklin, and Titus Counties, Texas.

GsO 31. _____1943, Surface-water supply of Cass County, Texas.

GsO 32. _____1943, Surface-water supply in Gregg County, Texas.

GsO 33. _____1943, Surface-water supply of Harrison County, Texas.

Describes the drainage and type of record being obtained in Harrison County, with discharge at each gaging-station.

GsO 34. _____1943, Surface-water supply of Hopkins County, Texas.

GsO 35. _____1943, Surface-water supply of Marion County, Texas.

GsO 36. _____1943, Surface-water supply of Montgomery County, Texas.

GsO 37. _____1943, Surface-water supply of Rains County, Texas.

GsO 38. _____1943, Surface-water supplies in Upshur County, Texas.

GsO 39. _____1945, Surface-water supplies of Liberty County, Texas.

GsO 40. _____1948, Rainfall-runoff relations for Pecan Bayou basin above the gaging station at Brownwood, Texas.

Includes table on monthly rainfall for Abilene, Brownwood, Coleman, and Putnam 1934-39; monthly runoff at Pecan Bayou at Brownwood, and change in contents at Brownwood Reservoir.

GsO 41. Breeding, S. D., 1948, Surface-water supplies of Polk County, Texas.

GsO 42. _____1949, Flood of May 17, 1949, at Fort Worth, Texas.

Presents certain rainfall-runoff data in flood area in detail.

GsO 43. _____1953, Floods of September 1951 and September 1953 in southern Coastal Plains of Texas, a comparison.

Includes descriptions of floods at Alice, Kingsville, Falfurrias, and Robstown.

GsO 44. _____1954, Floods in Devils and Pecos River basins of Texas, June 27-28, 1954.

Includes descriptions of floods at Devils River at Bakers Crossing; Devils River above Johnson Draw; Johnson Draw at Ozona; Johnson Draw near Juno; Live Oak Creek at Highway 290; and Bakers River near Sheffield.

GsO 45. Breeding, S. D., and Holland, P. H., 1956, Delivery of water, Whitney Reservoir to Richmond, Texas via Brazos River channel 1954.

Determines percentage of water released from Whitney Reservoir that arrives at Richmond, and time of travel.

GsO 46. Bridges, T. W., 1935, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Matagorda County, Texas.

GsO 47. _____1935, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Wharton County, Texas.

GsO 48. Broadhurst, W. L., 1941, A few notes regarding ground water in Brownsville-San Benito-La Feria district, Texas.

Gives information about wells and the quality of ground water in the district.

GsO 49. Broadhurst, W. L., 1943, Ground water in the Corsicana-Angus area, Navarro County, Texas.

Gives general information about the occurrence of ground water. Also gives data about wells and chemical analyses of ground water.

GsO 50. _____1943, Results of pumping tests of a well (Ed Heuss No. 1) 3.7 miles northeast of Killeen, Bell County, Texas.

GsO 51. _____1944, Development of ground water for public supply at Commerce, Texas.

Gives general information about the occurrence and availability of ground water. Also gives records of wells, logs, and chemical analysis of ground water.

GsO 52. _____1944, Results of pumping test of municipal wells at Tyler, Texas.

Gives computed drawdowns from assumed numbers of wells, well spacing, and rates of pumping. Also gives records of wells, logs, and chemical analyses.

GsO 53. _____1945, Ground-water conditions at De Kalb, Bowie County, Texas.

Summarizes the occurrence and availability of ground water.

GsO 54. _____1951, Ground water in Texas for irrigation.

Gives information about irrigation from ground water in 1950 and considers the different meanings of "safe yield" by comparing the effects of using water for irrigation from the Carrizo Sand in the Winter Garden district and from the Ogallala Formation in the southern High Plains.

GsO 55. Broadhurst, W. L., and Ellsworth, C. E., 1950, Supplementary report on surface-water and ground-water surveys, Nueces River Basin, Texas.

Gives general information about surface water and the occurrence and availbility of ground water below the Balcones fault zone.

GsO 56. Broadhurst, W. L., and Follett, C. R., 1942, Ground water in the Gladewater-Big Sandy district, Texas.

Gives general information about the geology and about wells and the sources of water to the wells. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 57. _____1944, Preliminary report of ground-water resources near Stamford in Jones and Haskell Counties, Texas.

Gives information about the availability of ground water. Also gives records of wells and chemical analyses of ground water.

GsO 58. Broadhurst, W. L., George, W. O., and Sundstrom, R. W., 1946, Accuracy of pumping-test methods and nonequilibrium formula for computing future drawdowns in wells.

Gives a brief discussion of wells, aquifers, rates of withdrawal of water, and comparisons of computed and actual drawdowns for five areas.

GsO 59. Broadhurst, W. L., Sundstrom, R. W., and White, W. N., 1949, Ground water in the vicinity of Amarillo and Lubbock, Texas.

Gives general information about the availability, development and use of ground water, and changes in water levels for the Texas High Plains and information about the availability, development and use of ground water and changes in water levels in the vicinity of Amarillo and Lubbock.

GsO 60. Broadhurst, W. L., and White, W. N., 1939, Ground water in vicinity of site of the U.S. Veterans' Hospital, Amarillo, Texas.

Gives a description of water wells; also gives logs of wells and chemical analyses of ground water.

GsO 61. Broadhurst, W. L., 1942, Water supply near Woodall in southwestern corner of Harrison County, Texas.

Gives general information about the availability of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 62. Buckner, H. D., and Thompson, G. L., 1964, Base flow study, Blanco River, Texas, February-March 1963.

Determines interchange of surface and ground waters in the reach of the Blanco River that will be inundated by the proposed Cloptin Crossing Reservoir, and compares results with previous investigation by Holland and Irelan (1955).

GsO 63. Cady, R. C., 1937, Ground water in Wise County.

Gives information about the geologic formations and the availability of ground water. Also gives data about water wells.

GsO 64. Clark, C. S., and Sundstrom, R. W., 1940, Report of investigation made for an additional water supply for the city of Rusk, Texas.

Gives the results of an investigation of surface water and the availability of ground water.

GsO 65. Cromack, G. H., 1944, Midland city water supply.

Gives general information about the water supply. Also gives records of wells and logs.

GsO 66. _____1945, Water wells in Linn district, Hidalgo County, Texas.

Gives a brief history of ground water development. Also gives records of wells and chemical analyses of ground water.

GsO 67. Cromack, G. H., and White, W. N., 1942, Ground water in West Point-Flatonia area, Fayette County, Texas.

Describes the general availability of ground water in the area. Gives records of wells, logs, and chemical analyses of ground water.

GsO 68. Cronin, J. G., 1959, Notes on the availability of ground water in the South Plains of Texas.

Gives information about the ground-water supplies in the Ogallala Formation, including an estimate of the amount of water in storage. Also gives information about the limitations of artificial recharge.

GsO 69. _____1960, Approximate saturated thickness of the Ogallala Formation prior to large-scale development of ground water, southern High Plains of Texas.

The saturated thickness is shown on a map. Text explains how the map was prepared.

GsO 70. Cumley, J. C., 1935, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Jackson County, Texas.

GsO 71. _____1935, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Jim Hogg County, Texas.

GsO 72. Dale, O. C., and Broadhurst, W. L., 1953, Memorandum on ground-water irrigation in Mitchell County, Texas.

Gives general information about irrigation with water from wells. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 73. Dante, J. H., 1946, Progress report, ground water in the vicinity of Paducah, Cottle County, Texas.

Gives information about the occurrence and quality of ground water and recommends areas for test drilling. Also gives records of wells and chemical analyses.

GsO 74. Dante, J. H., and Follett, C. R., 1945, Ground water in the vicinity of Paducah, Cottle County, Texas.

Gives the results of a brief survey of ground-water occurrence and quality.

GsO 75. Davidson, H. J., 1968, Water-quality records for the Hubbard Creek watershed, Texas, October 1966-September 1967.

GsO 76. _____1972, Water-quality records for the Hubbard Creek watershed, Texas, October 1967-September 1969.

GsO 77. _____1973, Water-quality records for the Hubbard Creek watershed, Texas, October 1969-September 1972.

GsO 78. Davis, M. E., 1967, Memorandum on availability of water having less than 2,500 parts per million dissolved solids in alluvium of Rio Grande near El Paso, Texas.

Estimates the quantity of recoverable water in the alluvium of the Rio Grande Valley from Anthony to the El Paso-Hudspeth County line, and the quality of the water.

GsO 79. Ellis, W. C., and Scalapino, R. A., 1948, Memorandum to the Texas State Board of Water Engineers regarding the proposed development of water-supply wells for the city of Lubbock, in an area northwest of the city along Yellowhouse Draw.

Gives information about the availability and quality of ground water northwest of Lubbock.

GsO 80. Ellsworth, C. E., 1937, Flood flow of Texas rivers.

Presents in tabular form records of maximum stages and discharges, runoff in acre-feet for selected floods, and data regarding major storms.

GsO 81. Fisher, J. C., and Ramos, G., 1973, Quantity and chemical quality of low flow in the East Fork San Jacinto and West Fork San Jacinto Rivers near Houston, Texas, June 24, 26, 1969.

Presents results of study to determine the changes in quantity and chemical quality of low flow of the two rivers; includes discharge measurements and chemical analyses.

GsO 82. Flugrath, M. W., and Connell, H. J., 1967, Water-quality records for the Hubbard Creek watershed, Texas, April 1955-September 1966.

GsO 83. Follett, C. R., 1942, Ground-water resources in the Brenham-Gay Hill area, Washington County, Texas.

Gives information about water wells and the occurrence of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 84. Follett, C. R., and Dante, J. H., 1945, Ground water in the vicinity of Benjamin, Texas.

Gives information about the availability and quality of ground water near Benjamin.

GsO 85. Follett, C. R., and George, W. O., 1945, Ground-water resources in the vicinity of Kyle, Hays County, Texas.

Gives information about the occurrence and quality of ground water in the area. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 86. Gabrysch, R. K., 1969, Land-surface subsidence in the Houston-Galveston region, Texas.

Describes land-surface subsidence caused principally by withdrawal of water and oil from subsurface strata.

GsO 87. _____1973, Preliminary report on land-surface subsidence in the area of Burnett, Scott, and Crystal Bays near Baytown, Texas.

Describes present subsidence in the area, predicts future subsidence, and recommends remedies.

GsO 88. Gabrysch, R. K., and Bonnet, C. W., 1974, Land-surface subsidence in the Houston-Galveston region, Texas.

Describes land-subsidence in the region, due to heavy withdrawal of subsurface fluids, and presents data indicating slowing of subsidence where subsurface withdrawal has declined.

GsO 89. Gabrysch, R. K., and McAdoo, G. D., 1972, Development of ground-water resources in the Orange County area, Texas and Louisiana, 1963-71.

Gives an analysis of data collected since 1963 in a systematic monitoring and appraisal of the changing ground-water conditions; includes records of wells, drillers' logs, and chemical analyses.

GsO 90. George, W. O., 1940, Memorandum on the ground-water conditions in the vicinity of Baird, Texas.

Gives information about the water supply, the occurrence and quality of ground water in the area, and makes recommendations for additional development. Also gives records of wells, drillers' logs, and chemical analyses of ground water.

GsO 91. _____1941, Memorandum on ground-water supplies in the vicinity of the Seagoville Federal Reformatory for Women in Dallas County, Texas.

Gives information about the possible sources of ground water and makes recommendation in test drilling.

GsO 92. _____1942, Memorandum on test-well drilling at Seagoville Reformatory, Dallas County, Texas.

Gives the results of test drilling in the alluvium, with logs of test wells and chemical analyses of the water.

GsO 93. _____1943, Additional ground-water supplies for Big Spring, Texas.

Gives general information about the occurrence and quality of ground water in four areas. Suggests an area for test drilling.

GsO 94. _____1943, Kelly Field, Bexar County, Texas.

Gives the locations and some information about water wells near Kelly Field.

GsO 95. _____1943, Ground-water resources of Leon Springs Military Reservation and vicinity.

Describes the geologic formations and their water-bearing qualities. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 96. George, W. O., 1944, Memorandum on the water supply for the city of Denton, Texas.

Reviews information about the wells used for municipal supply and indicates the sources of the salty water.

GsO 97. _____1944, Memorandum on water well no. 2, Federal Reformatory for Women at Seagoville.

Gives a discussion of some questions relative to a second well (then) being constructed.

GsO 98. _____1945, Exploration for ground water at Childress, Texas.

Summarizes information about the occurrence of ground water and recommends areas for exploratory drilling.

GsO 99. _____1947, Ground-water conditions in the vicinity of Mason, Texas.

Gives general information about the availability of ground water near Mason. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 100. _____1952, Recharge of Texas underground water reservoirs.

Summarizes the methods of artificial recharge and indicates their applicability to ground-water reservoirs in Texas.

GsO 101 George, W. O., and Alexander, W. H., Jr., 1943, Ground-water resources at Goodfellow Auxiliary Field No. 4, U.S. Air Corps, San Angelo, Texas.

Gives information about the availability and quality of good water, well data, and logs.

GsO 102. George, W. O., and Barnes B. A., 1945, Results of tests on wells at Waco, Texas.

Gives the results of an investigation, including pumping tests and computed declines of water levels

for assumed pumping rates and well spacing, made to answer questions as to the feasibility of an additional well and the most economical spacing of wells.

GsO 103. George, W. O., Barnes, B. A., and Broadhurst, W. L., 1946, Exploration of the Michie sandhills area, Childress County, Texas.
Gives the results of test drilling, pumping tests, and chemical analyses of the ground water.

GsO 104. George, W. O., and Bennett, R. R., 1942, Ground-water resources in the area between Buda and San Marcos.
Describes the general occurrence of ground water and gives sites for three project test wells.

GsO 105. George, W. O., and Broadhurst, W. L., 1940, Ground-water resources at Grand Prairie, Texas and vicinity.
Presents availability of ground water and includes records of wells, drillers' logs, and chemical analyses.

GsO 106. _____1942, Water-well data in the Cotulla-Encinal-Gardendale area, LaSalle County, Texas.
Gives a brief description of 16 wells in the area. Also gives logs and chemical analyses of ground water.

GsO 107. George, W. O., and Follett, C. R., 1942, Ground-water resources in block C-6, west of Clarendon, Donley County, Texas.
Gives the available information about the source of ground water.

GsO 108. _____1942, Ground-water supplies for International Minerals and Chemical Company (Magnesium plant, Travis County, Texas).
Gives information about three wells and makes suggestions about additional wells.

GsO 109. George, W. O., and Livingston, Penn, 1942, Ground water at Bryan Airport, Brazos County, Texas.
Gives information about recently drilled wells in the area and makes suggestions for the improvement of the quality of water or for the location of a new well.

GsO 110. George, W. O., and Livingston, Penn, 1943, Ground water in the vicinity of Marfa Army Flying Field.
Gives well data, logs, and chemical analyses of ground water.

GsO 111. George, W. O., and Rose, N. A., 1941, Arlington water supply.
Gives a brief description of the occurrence and quality of ground water at Arlington.

GsO 112. George, W. O., and Turner, S. F., 1938, Memorandum on the ground-water resources of Seadrift, Texas.
Gives the results of an investigation made to find a new water supply for Seadrift.

GsO 113. George, W. O., and Welder, F. A., 1955, Geology of the Canyon Reservoir site on the Guadalupe River, Comal County, Texas.
Gives a description of the general geology of the reservoir site, including six measured sections and a geologic map.

GsO 114. George, W. O., and White, W. N., 1942, Ground water in the vicinity of Burnet and Bertram, Burnet County, Texas.
Gives information about the geology and water-bearing properties of the formations. Also gives records of wells, drillers' logs, and chemical analyses of ground water.

GsO 115. Getzendaner, F. M., 1938, Some ground-water problems of Uvalde, Medina, and Bexar Counties, Texas.
Gives estimates of recharge to and discharge from the Edwards underground reservoir west of San Antonio and information about the movement of ground water to San Antonio.

GsO 116. Gilbert, C. R., 1963, Floods on White Rock Creek above White Rock Lake at Dallas, Texas.

Gives information on floods of April 1942 and July 1962 along White Rock Creek, and the flood of October 1962 along Cottonwood Creek, Floyd Branch, and Jackson Branch.

GsO 117. Gilbert, C. R., Commons, G. G., Koberg, G. E., and Kennon, F. W., 1961, Hydrologic studies of small watersheds, Honey Creek Basin, Texas, 1953-59.

Presents interpretive study and hydrologic data on inflow, outflow, storage, and runoff to determine the effect of floodwater-retarding structures on streamflow at downstream points.

GsO 118. Gilbert, C. R., and Hawkinson, R. O., 1971, A proposed streamflow data program for Texas.

Evaluates streamflow data available in Texas, and makes recommendations for future modifications of the stream-gaging program.

GsO 119. Gilbert, C. R., Myers, B. N., Leggat, E. R., and Welborn, C. T., 1961, Hydrologic studies of small watersheds, Elm Fork Trinity River Basin, Texas.

Presents findings to date as they relate to streamflow depletion, ground-water movement, sediment yield, and trap efficiency.

GsO 120. Gilbert, C. R., and Sauer, S. P., 1969, Hydrologic effects of floodwater-retarding structures on Garza-Little Elm Reservoir, Texas.

Analyzes hydrologic data collected in watersheds developed with floodwater-retarding structures, develops methodology for synthesizing the effects on downstream water and sediment yield, and applies this methodology to illustrate effects of the structures.

GsO 121. Goines, W. H., 1965, Streamflow characteristics of the Brazos River Basin, Texas: Flow-duration, low-flow, and high-flow tables.

Presents statistical summaries of flow characteristics of selected streams in the Brazos River Basin.

GsO 122. Grozier, R. U., and Yost, I. D., 1959, Characteristics of tide-affected flow of Brazos River below Freeport, Texas, November 12-13, 1958.

Determines magnitude and direction of velocity and variations in flow through a complete tidal cycle at a time when the tide range was normal for the season and the fresh-water flow from upriver was between 1,000 and 2,000 cubic feet per second.

GsO 123. Guyton, W. F., 1942, Results of pumping test of wells at Camp Swift, Texas.

Gives an analysis of the results of pumping and the theoretical optimum rate of pumping from each well.

GsO 124. ____1942, Memorandum on the Carrizo water well supplying city of Lufkin.

Gives answers based on theoretical assumptions to the following questions: What the effect of increased pumping from the Southland Paper Mill wells will be on the city well; whether the supply from the Carrizo Sand is adequate for both city and paper mill; and whether a new well should be drilled into the Carrizo Sand, and if so, what the best location is for such a well.

GsO 125. Guyton, W. F., and George, W. O., 1943, Results of pumping test of wells at Camp Hood, Texas.

Describes the general geology, gives an analysis of the results of pumping tests, and computations of the effect of pumping in the water levels in the Camp Hood wells and Belton wells, also gives chemical analyses of the ground water.

GsO 126. Guyton, W. F., and Rose, N. A., 1943, Progress report on test drilling and pumping in the Sparta Sand in the Lufkin area, Texas.

Gives the results of test drilling and pumping tests, quality of water, and conclusions.

GsO 127. Hastings, W. W., 1944, Quality of water of Brazos River in vicinity of Possum Kingdom Dam, Texas.

Gives analyses of composit samples obtained daily from two stations on the Brazos River from January 1942 to September 1943.

GsO 128. Hastings, W. W., and Broadhurst, W. L., 1944, Contamination of surface streams from oil-field waste in the vicinity of Luling, Texas.

Gives information about the amounts of salt water produced and the methods of disposal.

GsO 129. Havelka, D. E., 1949, Delivery of water in the Brazos River from Possum Kingdom Reservoir to Richmond, Texas, during August and September 1948.

Presents discharge from the reservoir as measured at five stations from the reservoir to Richmond, and shows time of travel and reduction in peak discharges.

GsO 130. Havelka, D. E., and Parten, E. M., 1957, Delivery of water from Belton Reservoir to the Brazos River gaging station at Richmond, via the Leon, Little, and Brazos River channels, 1956.

Presents in table form, discharge measurements on streams contributing appreciable inflow to the released water; rainfall; and releases from Belton Reservoir that reached gaging stations.

GsO 131. Heinrich, C. A., and Ranzau, C. E., Jr., 1974, Data on fresh-water inflow April 14-July 28, 1973, for analog-model study of the Houston Ship Channel, Houston, Texas.

Presents additional data for study initiated in 1965; gives computations to determine total fresh-water inflow from surface channels and direct precipitation into the Houston Ship Channel and Galveston Bay.

GsO 132. Holland, P. H., 1951, Investigation of seepage gains and losses in the Atascosa, Frio, and Nueces Rivers from Poteet to Mikeska, Texas, during January, April, August, and September 1951.

Determines seepage gains or losses and losses in transmission from artesian wells near Camp Belton to Lake Corpus Christi through river channels and lists discharge measurements.

GsO 133. _____1953, Seepage investigation, lower Trinity River of Texas, October and November 1952.

Determines seepage gains or losses in the Trinity River through 133.5 river miles.

GsO 134. _____1954, Diversions from Red River to Lake Dallas, Texas, and related channel losses, February and March 1954.

Presents the result of an investigation of channel losses of water diverted from Red River to Lake Dallas during drought emergency.

GsO 135. _____1958, Delivery of water, Whitney Reservoir to Richmond, Texas, via Brazos River channel, 1956.

Determines losses and time-of-travel of water released from Whitney Reservoir to Richmond.

GsO 136. Holland, P. H., and Irelan, Burdge, 1955, Guadalupe and Blanco Rivers, Texas, seepage investigations, 1955.

Gives the results of intensive seepage investigations to determine the relation of ground and surface water between the West Nueces and Blanco Rivers; includes chemical analyses.

GsO 137. Holland, P. H., and Lee, F. C., 1956, Low-flow investigations of the Pedernales River, Texas, January 1956.

Shows the results of an intensive investigation of low-flow characteristics during a drought period.

GsO 138. Hood, J. W., 1950, Phenomenal increase in irrigation with ground water near Pecos, Texas, described.

Gives information about the changes in water levels.

GsO 139. Hughes, L. S., 1965, Effect of the partial control of natural salinity on water quality in Possum Kingdom Reservoir, Texas.

Presents an evaluation of the effect of control measures on water quality in the Brazos River Basin.

GsO 140. ____1966, Discharge-weighted averages of dissolved-solids concentrations of streams in Texas.

A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given station during the year, after thorough mixing in the reservoir.

GsO 141. Jacob, C. E., 1940, Summary of results of recovery and interference tests conducted by the Geological Survey in cooperation with the Water Department of the city of Houston, Texas, September and October 1939.

GsO 142. Joerns, J. O., 1955, Double Mountain Fork Brazos River between Lubbock and Buffalo Lakes, Texas.

Studies the quantity, quality, and possible sources of low-flow and spring inflow of the study area. Includes discharge measurements, seepage investigation, chemical analyses, temperatures and corresponding discharges, some runoff, precipitation, and evaporation data.

GsO 143. ____1961, Investigation of sources of natural pollution, Wichita River Basin above Lake Kemp, Texas 1951-1957.

Investigates sources and magnitude of natural pollution in the study area.

GsO 144. Jorgensen, D. G., 1973, Analog-model studies of the effects of recharge wells along the Houston Ship Channel on potentiometric surfaces of the Chicot and Evangeline aquifers, Houston, Texas.

Presents, through illustrations, a simulated model study of hydrologic conditions resulting from recharge through wells.

GsO 145. Land, L. F., 1970, Seepage investigation of Medina Canal, Bexar-Medina-Atascosa Counties, Texas, Water Improvement District No. 1 canal system.

Describes an investigation of possible water loss in a 24-mile reach of the canal.

GsO 146. Lang, J. W., 1941, Results of plugging a leaky artesian well at Pecos Junior High School, Pecos, Texas.

GsO 147. ____1942, Available supplies of ground water of low mineral content in vicinity of Fort Stockton, Texas.

Gives information about the occurrence, availability, and quality of ground water in the area.

GsO 148. ____1942, Ground water available for emergency landing fields near flying school at Pecos, Texas.

Gives the measured decline of water levels in test holes near the leaky well.

GsO 149. ____1943, Ground water resources of the Toyah area, Reeves, County, Texas.

Gives information about the geologic formations and the occurrence and quality of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 150. ____1943, Marfa Army Air Base, supplementary data on well 3.

Gives the results of pumping of the well.

GsO 151. ____1944, A few facts regarding ground-water supply of Fort Worth and vicinity, Texas.

Gives information about the increase in withdrawals of ground water and the changes in water levels.

GsO 152. Lang, J. W., 1944, Carbon black plant site near Odessa, Texas.
Gives information about the availability of ground water near the site.

GsO 153. _____1944, Ground water at Coleman, Texas.
Gives information about the availability and quality of ground water and about test wells.

GsO 154. _____1944, Ground water conditions in the Roby-Camp Springs area, Texas.
Gives the results of an investigation for ground water for a public supply; includes well records, drillers' logs, and chemical analyses.

GsO 155. _____1945, Progress report on water supply at Big Spring, Texas.
Gives information about the city water system and the estimated perennial yield of the well fields and reservoirs.

GsO 156. _____1949, Geology and ground-water resources of Houston-Galveston area, Texas.
Gives the geology of the water-bearing formations.

GsO 157. _____1949, Ground-water conditions in the vicinity of the South Houston oil field and need for protecting fresh-water sands from contamination.
Gives information about a gas fire, the occurrence of oil and gas, and the occurrence of ground water in the area.

GsO 158. _____1953, Ground water in the Trinity Group in the San Antonio area, Texas.
Summarizes information about the availability of water from the Trinity Group.

GsO 159. Lang, J. W., and others, 1946, Geology and ground-water supplies of Southwest Waterworks area.
Gives a brief description of the principal aquifers and the use of ground water.

GsO 160. Lee, Frank, 1954, Records of test holes along the Rio Grande in Terrell and Val Verde Counties.
Gives electric logs and descriptive logs of the test holes.

GsO 161. Leggat, E. R., 1957, Memo on ground-water conditions and suggestions for test drilling in the Logan Heights area, El Paso, Texas.

GsO 162. _____1957, Memo on the water-supply wells at Biggs Air Force Base, El Paso, Texas.
Gives information about the water supply and the causes for the decline performance of the wells.

GsO 163. _____1963, Water supply for the Castolon area, Big Bend National Park, Brewster County, Texas.
Gives information about the possible sources of water in the area.

GsO 164. Livingston, Penn, 1939, Test on flowing well of San Antonio Public Service Co. near Roosevelt Park in San Antonio, Texas.
Gives the results of the test, fluctuations of water levels in nearby observation wells, and conclusions about the underground reservoir.

GsO 165. _____1940, Ground-water conditions in vicinity of reservoir site on Cibolo Creek at Boerne, Texas.
Gives the results of an investigation of the water losses from the reservoir.

GsO 166. _____1941, Ground water in the vicinity of Sabine Pass, Texas.
Describes the availability and quality of ground water.

GsO 167. _____1942, A few interesting facts regarding the natural flow from artesian well 4 owned by the San Antonio Public Service Co., San Antonio, Texas.
Gives information about the natural flow and the changes in water levels in other wells.

GsO 168. Livingston, Penn, 1942, Ground water in the vicinity of Hondo, Medina County, Texas.

Gives information about the availability and quality of ground water and describes pumping tests.

GsO 169. _____1942, Relation of shallow ground water to Las Moras Spring at Brackettville, Texas.

Gives the results of an investigation of possible sources of pollution to the spring.

GsO 170. _____1942, Water supply of Big Spring, Texas.

Gives a computation of the amount of ground water in storage and the rate of recharge to the principal source of water supply for Big Spring.

GsO 171. _____1946, Office memorandum regarding the drilling of wells by Ward County Irrigation District No. 1 near Barstow, Texas.

Describes the method used and the difficulties met in drilling wells. Also gives logs and chemical analyses of ground water.

GsO 172. Livingston, Penn, and Bennett, R. R., 1940, Ground water in the vicinity of Sanderson, Texas.

Gives information about the general geology, the relation of geology to the occurrence of ground water, and a description of tests on the new city well. Also gives records of wells and logs.

GsO 173. _____1942, Ground water in the vicinity of McGregor, McLennan County, Texas.

Gives general information about the occurrence of ground water, well data, logs, and chemical analyses of ground water.

GsO 174. Livingston, Penn, and Birdsall, J. M., 1944, Progress report on the ground-water supply of the El Paso area, Texas.

Gives information about the development of water supplies, pumpage, water levels, and quantity and quality of water. Also gives chemical analyses and maps showing the water levels in wells yearly in January from 1936 to 1943 and the changes in water levels in January from 1936 to 1939 and 1936 to 1943.

GsO 175. Livingston, Penn, and Broadhurst, W. L., 1942, Exploration of salty wells on the King Ranch, Texas.

Describes briefly tests made on eight wells and gives conclusions.

GsO 176. Livingston, Penn, and George, W. O., 1942, Ground water in the vicinity of Godley, Texas.

Gives information about the rock formations and their water-bearing properties.

GsO 177. Livingston, Penn, and Hastings, W. W., 1942, Test well at proposed army camp 5 miles southeast of Gatesville, Texas.

Gives information about a test well, conclusions about the quality of water, and computations of drawdown to be expected for well field.

GsO 178. Livingston, Penn, and Lang, J. W., 1943, Ground water in the vicinity of the Army Flying School (Bombardier), Midland, Texas.

Gives information about the availability and use of ground water and recommends areas for additional development.

GsO 179. Livingston, Penn, Sundstrom, R. W., and George, W. O., 1940, A few facts concerning ground water in Texas.

For selected areas, gives a general description of the occurrence of ground water in relation to hydrologic principles. Also gives a list of published reports on Texas ground-water resources (to 1940).

GsO 180. Lonsdale, J. T., 1932, Underground water resources of Atascosa and Frio Counties, Texas. (USGS Press Release)

Summarizes information about the history of artesian well drilling, artesian conditions, and the water-bearing properties of the rock formations.

GsO 181. Lonsdale, J. T., and Day, J. R., 1933, Ground water resources of Webb County, Texas.
Gives information about the water-bearing properties of the rock formations.

GsO 182. Lynch, W. A., 1935, Records of wells in Live Oak County.

GsO 183. _____1935, Records of wells, water analyses, and map showing location of wells in Bee County, Texas.

GsO 184. _____1935, Results of ground-water investigation in Bee County, Texas.
Describes the general geology, well development, and ground water in individual areas.

GsO 185. McAdoo, G. D., 1970, Ground-water data for Orange County and vicinity, Texas and Louisiana, 1969.
Presents data collected from a continuing program on water-level measurements, chemical analyses, pumpage, well inventories, and pumping tests.

GsO 186. McDaniels, L. L., 1954, Peak discharges on Bull Creek and tributaries, Scurry and Borden Counties, Flood of April 12-13, 1954.
Contains a description of rainfall producing the flood; result of indirect determination of peak discharges; estimates of flow; and comparison of peak stage at Bull Creek near Ira with other floods on record.

GsO 187. Meinzer, O. E., and White, W. N., 1931, Survey of the underground waters of Texas. (USGS Press Release)
Gives summary results of investigations in the southwest Texas (Winter Garden), Glen Rose (Somervell County), and west Texas-Toyah basin areas; also gives more detailed results of the investigations in these areas.

GsO 188. Meyer, W. R., and Gordon, J. D., 1973, Water-budget studies of lower Mesilla Valley and El Paso Valley, El Paso County, Texas.
Presents data on inflow and use of water and ground-water recharge during 1970 and 1971.

GsO 189. Milliken, D. L., and Goines, W. H., 1956, Texas floods of September and October 1955.
Describes floods in the Nueces, Brazos, and Pecos River Basins.

GsO 190. Mills, W. B, 1972, Travel time for solutes, upper Sabine River Basin, Texas, April 16-30, 1972.
Presents the results of three time-of-travel dye studies on the Sabine River and two tributaries to provide data for construction of a hydrologic model of the basin.

GsO 191. Mills, W. B., and Schroeder, E. E., 1966, Floods of April 28, 1966 in the northern part of Dallas, Texas.
Describes the flood event for Joes Creek, Bachman Branch, Turtle Creek, Cottonwood Creek, and Floyd Branch in terms of rainfall, peak discharge, flood profiles, inundated areas, comparison with previous floods, effects of channel changes, and property damage and loss of life.

GsO 192. Moulder, E. A., 1957, Development of ground water from the Carrizo Sand and Wilcox Group in Dimmit, Zavala, Maverick, Frio, Atascosa, Medina, Bexar, Live Oak, McMullen, LaSalle, and Webb Counties, Texas.
Gives a brief history of irrigation, an inventory of ground-water withdrawals, and shows the relation of withdrawals to water levels.

GsO 193. Nye, S. S., 1927, Geology and water resources in the vicinity of Amarillo, Texas.
Gives information about the geologic formations, their importance as sources of ground water, and ground-water conditions at different parts of the area. Also gives well data and logs.

GsO 194. _____1930, Pumping test of well at site of proposed Federal Detention

Prison about 1 mile south of La Tuna, Texas.

Describes the procedure used in making the pumping test.

GsO 195. Nye, S. S., and Rupp, V. W., 1941, Partial records of wells in southeastern part of Reeves County, Texas.

Also gives logs and chemical analyses of ground water.

GsO 196. Ollman, R. H., 1969, Impervious surface area in the upper White Rock Creek watershed, Dallas and Collin Counties, Texas, 1962.

Determines the amount of impervious surface area within the watershed at the beginning of a continuing data-collection program, to be used as a "base" value for comparative purposes.

GsO 197. _____1973, Time of travel of solutes, field observations of water quality, and suspended-sediment data for stream reaches in the Trinity River basin, Texas, July 31 to August 14, 1972.

Presents, in tabular and graphic form, data collected in a time-of-travel study to be used for water management.

GsO 198. Petitt, B. M., Jr., 1956, Memorandum on irrigation by ground water from the Edwards and associated limestones in the San Antonio-Hondo-Uvalde area, Texas.

Gives information about the development of irrigation using water from wells and gives an estimate of the additional areas that could be irrigated with water from the Edwards and associated limestones.

GsO 199. Rawson, Jack, 1963, Quality of water from test wells in the Castolon area, Big Bend National Park, Brewster County, Texas.

Provides information on sources of water for a proposed ranger station and campground, including chemical analyses of water from test wells.

GsO 200. Rawson, Jack, 1973, Quantity and chemical quality of low flow in the upper Colorado River Basin, Texas, April 8, 1968.

Defines the changes in quantity and quality of flow during a period when most of the flow was sustained by ground-water effluent.

GsO 201. Rawson, Jack, Flugrath, M. W., and Hughes, L. S., 1968, Sources of saline water in the upper Brazos River Basin, Texas.

Describes sources of natural saline water in the Brazos River Basin and includes tables of chemical analyses.

GsO 202. Rawson, Jack, Maderak, M. L., and Hughes, L. S., 1974, Quality of surface waters in the Colorado River Basin, Texas, 1966-72 water years.

Provides data to aid the U.S. Army Corps of Engineers in developing a comprehensive study to identify the sources and magnitudes of saline inflow, and to formulate and evaluate alternative methods for control or reduction of salinity.

GsO 203. Rorabaugh, M. I., 1949, Memorandum on multiple-step drawdown test, Southwest well field, Houston, Texas.

Gives the partially successful results of multiple-step drawdown tests on two wells.

GsO 204. Rose, N. A., 1943, Progress report on ground-water resources of the Texas City area, Texas.

Describes the geologic formations and their water-bearing properties, the pumpage, the decline in artesian pressure, and the chemical character of the ground water. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 205. _____1943, Results of pumping test of wells at Tank Destroyer Center, North Camp Hood, near Gatesville, Texas.

Gives information about the wells and the results of pumping tests. Also gives the computed lowering of water levels in the well field and in

other wells from assumed pumping conditions.

GsO 206. Rose, N. A., 1945, Ground water in the Beaumont area, Texas, with special reference to southeastern Hardin and southwestern Jasper County, Texas.
Gives information about the occurrence and quality of ground water near Beaumont.

GsO 207. _____1945, Ground water in the Greenville area, Hunt County, Texas.
Gives general information about the occurrence and availability of ground water.

GsO 208. _____1945, Quantities of ground water used in Texas and the available supply.
Gives a general description of the important water-bearing formations, their development, and potential for additional development.

GsO 209. Rose, N. A., and George, W. O., 1942, Ground-water resources in selected areas in Erath, Hood, and Hamilton Counties, Texas.
Gives general information about the availability and quality of water at five areas.

GsO 210. Rose, N. A., and Stuart, W. T., 1943, Results of pumping test at the Abercrombie-Harrison Gasoline Plant, Sweeny, Texas.
Gives the results of a pumping test and computed drawdowns for three, four, and five wells at assumed spacing and varying rates of combined pumpage.

GsO 211. Rose, N. A., White, W. N., and Livingston, Penn, 1940, Test drilling in the San Jacinto flood plain, Texas.
Describes the test drilling and gives an estimate of the amount of underflow in the alluvium.

GsO 212. Ruggles, F. H., Jr., 1964, Floods on Bachman Branch and Joes Creek at Dallas, Texas.
Defines the areas susceptible to flooding and evaluates the flood hazard; includes flood profiles, areas subject to inundation, mean velocities of flow, and flood hydrographs.

GsO 213. Ruggles, F. H., Jr., 1964, Frequency and extent of flooding on lower White Rock Creek at Dallas, Texas.
Defines areas susceptible to flooding; evaluates flood hazard; and includes flood hydrographs, flood profiles, mean velocity of flow, and time of travel of flood peaks.

GsO 214. _____1966, Floods on small streams in Texas.
First of an annual series, in cooperation with the Texas Highway Department, presenting a summary of flood data for stream-gaging stations and partial-record stations, peak discharges for floods at miscellaneous sites, and summary of outstanding rainfall amounts.

GsO 215. Sauer, S. P., 1970, Factors contributing to unusually low runoff during the period 1962-68 in the Concho River Basin, Texas.
Determines the cause of below-average runoff by analyzing all available records on streamflow, precipitation, evaporation, and land and water use.

GsO 216. Sauer, S. P., and Rawson, Jack, 1964, Base flow studies: Sabine River, Texas and Louisiana, Quantity and quality, September 4-5 1963.
Defines the changes in quantity and quality of base flow during a period of negligible surface runoff and high evapotranspiration.

GsO 217. Sayre, A. N., 1933, Ground-water resources of Duval County, Texas. (USGS Press Release)
Gives general information about the geologic formations and their water-bearing properties and describes development of water supplies from wells by areas.

GsO 218. _____1938, Memorandum regarding the establishing of gaging stations on

streams and springs in the Balcones fault zone region of Texas.

Reviews information about the movement of water in the Balcones fault zone region and recommends a program of stream gaging for the region.

GsO 219. Sayre, A. N., 1940, Ground-water supplies of the El Paso area, Texas.

Reviews the availability, development, and use of ground water and gives computations of the amount of water in storage.

GsO 220. _____1942, Memorandum regarding the sites for additional wells for the municipal supply at Pecos, Texas.

Gives information about the availability and quality of ground water and recommends areas for test drilling. Also gives chemical analyses of water from selected wells.

GsO 221. Sayre, A. N., and Lang, J. W., 1942, Memorandum regarding water supplies at Pecos, Texas for a proposed basic training school of the U.S. Army Air Corps.

Gives information about the occurrence and quality of ground water and recommends an area for additional development. Also gives chemical analyses of water from selected wells.

GsO 222. Sayre, A. N., and Livingston, Penn, 1937, The ground-water resources of the El Paso, Texas area.

Consists of the conclusions and recommendations from a ground-water investigation of the area.

GsO 223. _____1940, Memorandum regarding the El Paso water supply.

Gives the results of testing some of the municipal wells to determine the sources of mineralized water. Also reviews the results of test drilling.

GsO 224. Schroeder, E. E., 1967, Flood stages and discharges for small streams in Texas.

Presents data similar to GsO 214 for the period September 1, 1964 through September 30, 1966.

GsO 225. Schroeder, E. E., 1969, Flood stages and discharges for small streams in Texas, Compilation of data through September 1967.

Presents data similar to GsO 214 for 1967 water year.

GsO 226. _____1971, Flood stages and discharges for small streams in Texas, Compilation of data through September 1968.

Presents data similar to GsO 214 for 1968 water year.

GsO 227. _____1971, Flood stages and discharges for small streams in Texas, Compilation of data through September 1969.

Presents data similar to GsO 214 for 1969 water year.

GsO 228. _____1972, Flood stages and discharges for small streams in Texas, Compilation of data through September 1970.

Presents data similar to GsO 214 for 1970 water year.

GsO 229. _____1973, Flood stages and discharges for small streams in Texas, Compilation of data through September 1971.

Presents data similar to GsO 214 for 1971 water year.

GsO 230. _____1974, Estimating the magnitude of peak discharges for selected flood frequencies of small streams in East Texas.

Uses peak-discharge data in multiple linear-regression procedures to obtain equations for estimating peak discharge of floods on small rural streams in East Texas. The relationships are also presented in nomographs.

GsO 231. Smith, R. E., and Kaminski, E. G., 1965, Fresh-water-inflow data for model study of Houston Ship Channel, Houston, Texas.

Presents computations to determine total fresh-water inflow from surface channels and direct precipitation into Houston Ship Channel and Galveston Bay.

GsO 232. Sundstrom, R. W., 1939, Ground water resources in the vicinity of Normangee, Leon County, Texas.

Gives information about the source and quality of water used for the Normangee water supply. Also gives information about other possible sources of ground water in the area.

GsO 233. _____1940, Memorandum regarding water supply of Palestine, Texas.

Gives a brief survey of the probable sources of ground water, the quality of water, and the yields of wells near Palestine, and makes recommendations for exploratory drilling.

GsO 234. _____1941, Beaumont water supply. Gives the possible sources of salt-water contamination to the Beaumont water supply on the Neches River.

GsO 235. _____1941, Freeport water supply.

Summarizes the availability and use of ground water near Freeport.

GsO 236. _____1941, Ground-water resources in the vicinity of Jasper, Jasper County, Texas.

Gives information about important wells and the quality of water in the area. Also gives records of wells, logs, chemical analyses of ground water, and discharge of streams near Jasper.

GsO 237. _____1941, Water supply in the vicinity of Hughes Springs, Cass County, Texas, and Daingerfield, Morris County, Texas.

Gives information about the availability and quality of ground water.

GsO 238. _____1941, Water supply in the vicinity of New Boston, Hooks, and Leary, Bowie County, Texas.

Summarizes the occurrence and availability of ground water in the area.

GsO 239. Sundstrom, R. W., 1941, Water supply of LaMarque, Galveston County, Texas.

Makes some recommendations for the development of a water supply for LaMarque.

GsO 240. _____1942, Ground water in the vicinities of Sunray and Etter, Moore County, Texas.

Gives information about the availability of ground water and logs of water wells.

GsO 241. _____1942, Ground-water resources in the vicinities of Sunray, Etter, and Dumas, Moore County, Texas, Supplementary memorandum.

Gives descriptions of 23 wells and drillers logs of 10 wells. Also gives a brief description of the ground-water reservoir and recommendations for additional development.

GsO 242. _____1942, Supplemental memorandum on additional deep wells to the Carrizo Sand in LaSalle County, Texas.

Gives a brief description of 10 wells, also chemical analyses of ground water.

GsO 243. _____1943, Ground water in the vicinity of Wichita Falls, Texas.

Gives information about the occurrence, availability, and quality of ground water.

GsO 244. _____1944, Results of the pumping test of wells to the 700 foot sands at the Celanese plant near Bishop, Texas.

Gives computed drawdowns for an assumed number of wells at assumed distances and rates of pumping.

GsO 245. _____1944, Results of pumping test of wells to the 900 foot sands at the Celanese plant near Bishop, Texas.

Gives computed drawdowns for an assumed number of wells, well spacing, and rate of pumping.

GsO 246. Sundstrom, R. W., 1945, Ground-water resources of the El Paso, Texas, area.
Gives information about the amount of water pumped in 1944, the change in water levels 1943 and 1944, and the removal of water from storage in the mesa during 1943 and 1944.

GsO 247. _____1945, Memorandum to the Texas State Board of Water Engineers regarding the new municipal water supply at Crowell, Texas.
Gives the results of an investigation of the city of Crowell water supply system to determine the cause of water shortage.

GsO 248. _____1947, Notes on the relationship of geology to the quality of ground water in Texas.
Gives brief statements about the geology and chemistry of ground water and some examples of the relationship of geology to the general character of ground water in Texas.

GsO 249. _____1949, Ground water in the vicinity of Amarillo and Lubbock, Texas.
Gives general information about the availability, development, and use of ground water and changes in water levels for the Texas High Plains and information about the availability, development, and use of ground water and changes in water levels in the vicinity of Amarillo and Lubbock.

GsO 250. _____1952, Ground water for irrigation at the Federal Correctional Institution, La Tuna, Texas.
Answers questions as to the availability and suitability of ground water for irrigation, the effect of pumping on other wells, and the type and construction of wells.

GsO 251. _____1954, The outlook for ground-water resources in Texas.
Gives information about ground-water use. For the High Plains, describes development and use of ground water, the decline of water levels, and lists the additional facts needed. Also discusses the development in the Houston, San Antonio, and El Paso areas.

GsO 252. Sundstrom, R. W., 1957, Our underground water.
Summarizes the use and importance of ground water in Texas.

GsO 253. Sundstrom, R. W., and Barnes, B. A., 1942, Ground-water resources in the vicinity of Gatesville, Texas.
Gives information about existing sources of ground water in the area and gives computations of the lowering of the artesian head for assumed conditions of additional pumping.

GsO 254. Sundstrom, R. W., and George, W. O., 1942, Water resources in the vicinity of Melvin, McCulloch County, and Menard, Menard County, Texas.
Gives information about the availability of water in the two areas.

GsO 255. Sundstrom, R. W., and Lohr, E. W., 1939, Memorandum on the ground-water supply of Somerville, Texas.
Gives information about the occurrence and quality of ground water near Somerville.

GsO 256. Sundstrom, R. W., and White, W. N., 1942, Ground-water resources in the vicinity of Amarillo, Texas.
Gives information about the availability, use, and quality of ground water in the vicinity of Amarillo and in Carson County. Also gives tables of pumpage, pumping tests, logs of wells, and analyses of ground water.

GsO 257. Surface Water Branch, Geological Survey, Texas District, 1954, Floods of April-June 1953 Sabine River Basin, Texas and Louisiana, and Neches River Basin, Texas.
Presents data relative to April-June floods, including general description, records of stage and discharge, storage and elevation at

two reservoirs, isohyetal maps, and other data related to the floods.

GsO 258. Theis, C. V., Burleigh, H. P., and Waite, H. A., 1935, Ground water in the Southern High Plains. (USGS Press Release)

Gives a general description of the occurrence of ground water and the water-bearing properties of the rock formations.

GsO 259. Turner, S. F., 1932, Ground-water conditions in East Texas oil field.

Gives information about ground-water conditions in the East Texas oil field with particular consideration of the possibility of contamination from oil-field operations.

GsO 260. _____1934, Well records, drillers' logs, and water analyses in Kenedy County, Texas.

GsO 261. _____1938, Memorandum for the Federal Prison Bureau on a ground-water supply for the Texarkana site.

Summarizes information about the availability of water at the site.

GsO 262. _____1939, The ground-water resources of Texas—their conservation and development.

Mentions several areas in which ground water was wasted or polluted. Also gives a bibliography of U.S. Geological Survey and Texas Board of Water Engineers publications.

GsO 263. Turner, S. F., and Cumley, J. C., 1934, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Brooks County, Texas.

GsO 264. Turner, S. F., and Livingston, Penn, 1933, Records of wells in Harris County, Texas.

GsO 265. _____1935, Records of wells in Harris, Galveston, Waller, Fort Bend, Brazoria, and Grimes Counties, Texas.

GsO 266. Turner, S. F., Lynch, W. A., and Cumley, J. C., 1934, Records of wells, drillers' logs, and water analyses, and map showing location of wells in Jim Wells County, Texas.

GsO 267. Twichell, Trigg, 1942, Water supply available from streams near Longview and Woodall.

Describes the amount, type, and duration of flow provided by streams near Longview and Woodall.

GsO 268. _____1942, Water supply available from streams in the Sabine River Basin near Big Sandy, Texas.

Provides data which indicate that Big Sandy Creek is the most reliable source of water for the city of Longview.

GsO 269. _____1944, Discharge capacity of the Trinity River levee system at Dallas.

Describes the discharge capacity of the Trinity River prior to and subsequent to the levee system.

GsO 270. _____1944, Water—a limited but replenishable Texas resource.

Presents historical data on water use and current availability for increasing demand.

GsO 271. _____1945, Surface runoff at Lubbock, Texas.

Compares runoff data of the head-water tributaries of the Brazos River.

GsO 272. _____1947, Surface-water resources of the Trinity River tributary area.

Contains location, features and water demands of the tributary area, rainfall, runoff, flood flows, and quality of water data.

GsO 273. _____1947, Water for Texas chemurgic and related activities.

Considers importance of water to location of new industries.

GsO 274. _____1957, Availability of rainfall and runoff data, February 1957.

Gives the historical data on several heavy rains, and describes stream-gaging operations and

methods for analytical and interpretive studies.

GsO 275. U.S. Geological Survey, 1961-1974, surface water records.

Records of stage, discharge, and contents of streams, lakes, and reservoirs in Texas have been published in annual reports, starting in 1961, in the following publications:

Surface Water Records of Texas 1961
Surface Water Records of Texas 1962
Surface Water Records of Texas 1963
Surface Water Records of Texas 1964
Water Resources Data for Texas 1965, Part 1. Surface Water Records
Water Resources Data for Texas 1966, Part 1. Surface Water Records
Water Resources Data for Texas 1967, Part 1. Surface Water Records
Water Resources Data for Texas 1968, Part 1. Surface Water Records
Water Resources Data for Texas 1969, Part 1. Surface Water Records
Water Resources Data for Texas 1970, Part 1. Surface Water Records
Water Resources Data for Texas 1971, Part 1. Surface Water Records
Water Resources Data for Texas 1972, Part 1. Surface Water Records
Water Resources Data for Texas 1973, Part 1. Surface Water Records

GsO 276. ——1961-1973, Water quality records.

Records of chemical analyses, suspended sediment, and temperature of surface waters of Texas have been published in annual reports, starting in 1964, in the following publications:

Water Quality Records in Texas 1964
Water Resources Data for Texas 1965, Part 2. Water Quality Records
Water Resources Data for Texas 1966, Part 2. Water Quality Records
Water Resources Data for Texas 1967, Part 2. Water Quality Records
Water Resources Data for Texas 1968, Part 2. Water Quality Records
Water Resources Data for Texas 1969, Part 2. Water Quality Records
Water Resources Data for Texas 1970, Part 2. Water Quality Records
Water Resources Data for Texas 1971, Part 2. Water Quality Records
Water Resources Data for Texas 1972, Part 2. Water Quality Records

GsO 277. U.S. Geological Survey, 1973, Drainage areas of Texas streams, Lavaca River Basin.

GsO 278. Welder, F. A., and George, W. O., 1955, Records of test wells at Canyon Reservoir site in Comal County, Texas.

Gives information, including electric logs and description logs, drawdowns, and computed transmissibilities for six test wells.

GsO 279. Wells, H. M., and Burleigh, H. P., 1936, Preliminary report on the underground water supply of the Plainview, Texas project.

Gives general information about the availability and use of ground water and the ground-water hydrology in a discussion of the feasibility of establishing a resettlement project by means of underground-water development.

GsO 280. West, S. W., and Broadhurst, W. L., 1973, Summary appraisals of the nation's ground-water resources—Rio Grande region.

Summarizes knowledge of ground-water resources of the

region and evaluates deficiencies in that knowledge as part of a nationwide survey of ground-water resources.

GsO 281. White, W. N., 1933, The new city well at Pecos, Texas.
Gives the results of test pumping a new city well and chemical analyses of the water.

GsO 282. _____1933, The water supply at Randolph Field near San Antonio, Texas.
Describes the water supply and makes recommendations for a new supply.

GsO 283. _____1935, Summary report on the survey of the underground waters of Texas.
Gives a list of the reports issued or in preparation to 1935, and a summary of the results of the ground-water investigations in different areas.

GsO 284. _____1936, Ground water in Hansford County, Texas.
Gives general information about the water-bearing beds, the depth and slope of the water table, and the wells of large yields.

GsO 285. _____1937, Investigations of underground water in the High Plains, Texas.
Explains some of the methods to be used in making the investigation.

GsO 286. _____1939, A few facts regarding ground-water supplies in Texas.
Gives general information about ground-water supplies and describes the types of ground-water investigations being made.

GsO 287. _____1940, Ground water in the Corpus Christi area, Texas.
Gives information about the availability of ground water in the area by counties.

GsO 288. _____1940, Prospecting for ground water.
Gives historical and current methods of locating ground water.

GsO 289. White, W. N., 1940, The movement of underground water in Texas.
Shows that the flow of ground water is analogous to the flow of surface water and describes the flow in three major Coastal Plain aquifers.

GsO 290. _____1941, Abilene Water Supply.
Gives information about the availability of ground water and about the reservoirs furnishing the Abilene water supply.

GsO 291. _____1941, Brownwood water supply.
Describes briefly the availability of water in the area.

GsO 292. _____1941, Ground water in the vicinity of Port O'Connor, Calhoun County, Texas.
Summarizes information about the availability and quality of ground water at Port O'Connor.

GsO 293. _____1941, Water supply of Baytown.
Gives information about the general availability and use of ground water and gives an appraisal of the capability for additional development.

GsO 294. _____1941, Water supply, Mission, Texas, National Defense Area.
Reports that test wells were drilled and water samples analyzed in an investigation to provide a ground-water supply for an Air Corps Flying School; and reports on the current surface-water supply.

GsO 295. _____1941, Water supply of San Angelo.
Gives general information about the availability and quality of ground water.

GsO 296. _____1942, Emergency water supply for naval reserve air base near Corpus Christi, Texas.
Suggests an area where an emergency supply from ground water might be developed.

GsO 297. White, W. N., 1943, Ground water in the vicinity of Diltz Field, Wilson County, Texas.

Gives information about the availability and use of ground water. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 298. _____1943, The geology of ground-water supplies in Texas.

Gives summary information about the importance and use of ground water, the geology in relation to the occurrence of ground water, and a general description of the most important aquifers.

GsO 299. _____1944, Ground-water problems in the Texas City-Alta Loma-Baytown district, Texas.

States briefly that rising chloride content of the ground water and low permeability of some sources tend to limit the availability of ground water.

GsO 300. _____1944, Ground water, Red River below Denison Dam.

Gives general information about the geology and the principal water-bearing formations.

GsO 301. _____1945, Ground water in Beaumont, Nederland, Port Neches, and Port Arthur areas, Texas.

Gives information about the quality of the ground water in the above areas. Also gives the increase in chloride in selected wells from 1941 to 1945 and the chloride in water at different depths in a well near Port Neches.

GsO 302. _____1945, Ground water in Texas.

Tells of the interest in ground-water investigations and gives a brief statement about the current (1945) programs.

GsO 303. _____1946, The occurrence and development of ground water in the 17 western states.

Describes briefly the availability and use of ground water in the 17 western states, the methods used in ground-water investigations, and the typical problems requiring investigations.

GsO 304. White, W. N., 1947, A few notes on origin of ground water with special reference to Texas.

Describes briefly the source, movement, occurrence, and recharge of ground water and gives some facts about the character of the rocks and geologic structure affecting the occurrence of ground water in Texas.

GsO 305. _____1948, New irrigation wells in the vicinity of Edna in Jackson County, Texas.

Gives well data for three new irrigation wells.

GsO 306. White, W. N., and George, W. O., 1943, Summary report on the leakage at the dam of the Tarrant County Control and Improvement District No. 1 near Bridgeport, Wise County, Texas.

Describes an investigation made to determine if water produced by seeps and springs was natural ground-water flow or was water leaking through the dam. Also gives logs of wells and analyses of water.

GsO 307. White, W. N., and Livingston, Penn, 1941, Water resources of Austin, Texas.

Gives information about geologic formations and the availability and quality of ground water. Also gives logs of wells.

GsO 308. White, W. N., and Meinzer, O. E., 1931, Ground water in the Winter Garden and adjacent districts in southwestern Texas.

Gives data on availibility of ground water for irrigation in Atascosa, Dimmit, Frio, La Salle, Maverick, Medina, and Uvalde Counties. Discusses saline contamination of wells and recommends methods of abatement.

GsO 309. White, W. N., and Sundstrom, R. W., 1941, Water resources in the vicinity of Freeport, Texas.

Summarizes the availability and use of ground water near Freeport and in areas inland from Freeport. Also gives records of wells, logs, and chemical analyses of ground water.

GsO 310. White, W. N., Turner, S. F., and Lynch, W. A., 1934, Ground water in Dimmit and Zavala Counties, Texas. (USGS Press Release)

Describes briefly the source of ground water used for irrigation, ground-water recharge, pumpage since 1929-30, and fluctuations of water levels.

GsO 311. Wilson, C. A., Smith, J. T., Thompson, G. L., and Sandeen, W. M., 1972, An evaluation of the use of drillers' logs in lithologic studies of the Ogallala Formation of the southern High Plains of Texas.

Indicates that lack of detailed and accurate information in many water-well drillers' logs prevents their use as a reliable source of lithologic information.

GsO 312. Winslow, A. G., 1956, Ground-water supplies for irrigation in Texas.

Describes the availability and use of ground water, with particular reference to irrigation by recognized divisions such as regions, basins, or areas.

GsO 313. Wood, L. A., 1956, Availability of ground water in the Gulf Coast region of Texas.

Gives information about the general geology, the availability, use, and quality of ground water; the quantity of water in transient storage; the water derived from compaction; recharge and discharge; and the relation of fresh ground water to salty ground water.

GsO 314. Yost, I. D., 1953, Noyes Canal, Menard County, Texas, Seepage investigations, May 19-20, July 2, 1953.

Presents data substantiating seepage losses for the length of the irrigation canal.

GsO 315. _____1958, Floods and flood control on the Colorado River at Austin.

Compares controlled discharge of the Colorado River during floods of 1952 and 1957 to floods prior to building of reservoirs, and relates the two floods to previous ones.

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INDEX

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Because the report series are rather numerous, each item in the index is referenced to the page on which the report is listed, as well as to the report series number. The following table shows the codes used in the index to categorize the various report series.

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Andrews: WdU 139, p. 58; WdU 143, p. 59; WdF 10, p. 70; WdF 142, p. 86; WdF 172, p. 90.

Angelina: WdR 110, p. 37; GsW 849-A, p. 98; GsO 15, p. 115; GsO 124, p. 122; GsO 126, p. 122.

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Archer: WdR 52, p. 32.

Armstrong: WdU 66, p. 54.

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Austin: WdR 68, p. 33; WdU 171, p. 60; WdF 149, p. 87.

Bailey: WdB 5406, p. 10; WdU 22, p. 51; WdU 124, p. 57; WdF 52, p. 75.

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Duval: WdR 181, p. 44; WdU 11, p. 50; WdU 55, p. 53; WdF 159, p. 88; GsW 776, p. 98; GsO 217, p. 129.

Eastland: WdU 192, p. 62; WdF 93, p. 80.

Ector: WdB 5210, p. 9; WdU 70, p. 54; WdF 60, p. 76; WdF 83, p. 79; WdF 142, p. 86; WdF 154, p. 88; WdF 165, p. 89; GsO 152, p. 125.

Edwards: WdB 6208, p. 19; WdU 100, p. 56; WdF 142, p. 86; GsW 1619-J, p. 103.

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Fisher: WdM 63-02, p. 47; GsO 154, p. 125.

Floyd: WdB 5304, p. 9; WdR 165, p. 43; WdU 39, p. 52; WdU 91, p. 55.

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Frio: WdB 5416, p. 10; WdB 6015, p. 17; WdR 32, p. 30; WdF 15, p. 70; WdF 92, p. 80; GsW 676, p. 97; GsO 180, p. 126; GsO 192, p. 127; GsO 308, p. 136.

Gaines: WdB 5407, p. 10; WdR 15, p. 28; WdU 58, p. 54.

Galveston: WdB 5502, p. 11; WdB 5808, p. 14; WdB 6303, p. 20; WdR 123, p. 39; WdR 139, p. 40; WdU 13, p. 50; WdU 155, p. 60; GsW 1416, p. 102; GsO 12, p. 114; GsO 13, p. 114; GsO 14, p. 114; GsO 88, p. 119; GsO 204, p. 128; GsO 239, p. 131.

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Gillespie: WdM 63-03, p. 47; WdU 208, p. 63; WdF 142, p. 86.

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Goliad: WdB 5711, p. 13; WdU 180, p. 61; WdF 44, p. 74.

Gonzales: WdR 4, p. 27; WdU 101, p. 56; WdF 15, p. 70; WdF 92, p. 80.

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Grayson: WdB 6013, p. 17; WdU 149, p. 59; WdU 251, p. 67; GsW 1646, p. 103.

Gregg: WdR 101, p. 37; WdL 0664, p. 49; WdU 27, p. 51; WdU 36, p. 52; WdU 201, p. 63; GsW 1079-B, p. 100; GsO 56, p. 117.

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Counties and Major River and Coastal Basins in Texas

N

CANADIAN
RED
SULPHUR
TRINITY
CYPRESS
BRAZOS
SABINE
NECHES
COLORADO
RIO GRANDE
GUADALUPE
SAN ANTONIO
LAVACA
SAN JACINTO
NUECES

DALLAM, SHERMAN, HANSFORD, OCHILTREE, LIPSCOMB
HARTLEY, MOORE, ROBERTS, HEMPHILL
OLDHAM, POTTER, CARSON, HUTCHINSON, WHEELER, GRAY
DEAF SMITH, RANDALL, ARMSTRONG, DONLEY, COLLINGSWORTH
PARMER, CASTRO, SWISHER, BRISCOE, HALL, CHILDRESS
FLOYD, HALE, MOTLEY, COTTLE, FOARD, HARDEMAN, WILBARGER, WICHITA, CLAY
BAILEY, LAMB, COCHRAN, HOCKLEY, CROSBY, DICKENS, KING, KNOX, BAYLOR, ARCHER
YOAKUM, TERRY, LUBBOCK, LYNN, GARZA, KENT, STONEWALL, HASKELL, THROCKMORTON, YOUNG
GAINES, DAWSON, MARTIN, BORDEN, HOWARD, SCURRY, FISHER, NOLAN, JONES, SHACKELFORD, STEPHENS, PALO PINTO, EASTLAND, ERATH, CALLAHAN, TAYLOR
ANDREWS, MITCHELL, STERLING, COKE, COLEMAN, BROWN, RUNNELS, CONCHO, MC CULLOCH, MILLS, COMANCHE, HAMILTON, CORYELL, LAMPASAS, MC LENNAN, FALLS, LIMESTONE, LEON, FREESTONE, ANDERSON, NAVARRO, HILL, BOSQUE, SOMERVELL, HOOD, JOHNSON, ELLIS, KAUFMAN, HENDERSON, VAN ZANDT, RAINS, WOOD, CAMP, MARION, HARRISON, UPSHUR, SMITH, GREGG, RUSK, PANOLA, CHEROKEE, NACOGDOCHES, SHELBY, SABINE, SAN AUGUSTINE, ANGELINA, TRINITY, HOUSTON, MADISON, POLK, TYLER, JASPER, NEWTON, ORANGE
WINKLER, LOVING, WARD, CRANE, MIDLAND, GLASSCOCK, REAGAN, UPTON, CROCKETT, IRION, TOM GREEN, SCHLEICHER, MENARD, SAN SABA, MILAM, BURNET, BELL, ROBERTSON, BRAZOS, GRIMES, WALKER, MONTGOMERY, SAN JACINTO, HARDIN, LIBERTY
EL PASO, HUDSPETH, CULBERSON, REEVES, PECOS, JEFF DAVIS, PRESIDIO, BREWSTER, TERRELL, KIMBLE, MASON, GILLESPIE, LLANO, BURNET, WILLIAMSON, TRAVIS, LEE, WASHINGTON, AUSTIN, WALLER, HARRIS, CHAMBERS, JEFFERSON, GALVESTON
SUTTON, KERR, EDWARDS, REAL, BANDERA, KENDALL, BLANCO, HAYS, CALDWELL, BASTROP, FAYETTE, COLORADO, WHARTON, BRAZORIA, FT. BEND
VAL VERDE, KINNEY, UVALDE, ZAVALA, MEDINA, BEXAR, COMAL, GUADALUPE, GONZALES, LAVACA, WILSON, DE WITT, JACKSON, VICTORIA, MATAGORDA
MAVERICK, ATASCOSA, FRIO, LA SALLE, DIMMIT, MC MULLEN, GOLIAD, REFUGIO, CALHOUN, BEE, LIVE OAK, SAN PATRICIO
WEBB, DUVAL, JIM WELLS, NUECES, KLEBERG, KENEDY, ZAPATA, JIM HOGG, BROOKS, STARR, HIDALGO, WILLACY, CAMERON

GULF OF MEXICO

NECHES-TRINITY
TRINITY-SAN JACINTO
SAN JACINTO-BRAZOS
BRAZOS-COLORADO
COLORADO-LAVACA
LAVACA-GUADALUPE
SAN ANTONIO-NUECES
NUECES-RIO GRANDE

10 0 10 20 30 40 50 60 70
SCALE IN MILES