TEXAS
WATER
DEVELOPMENT
BOARD

Report 124

GROUND-WATER RESOURCES OF ARANSAS COUNTY, TEXAS

DECEMBER 1970

TEXAS WATER DEVELOPMENT BOARD

REPORT 124

GROUND-WATER RESOURCES OF ARANSAS COUNTY, TEXAS

By

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United States Geological Survey

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ABSTRACT

Aransas County is in south Texas in the Coastal Bend region of the West Gulf Coastal Plain. Rockport, the county seat, with a population of 2,989 in 1960, is 26 miles north of Corpus Christi and 150 miles southeast of San Antonio.

The aquifers that yield water to wells are the Gulf Coast aquifer, mostly of Pliocene and Pleistocene age, that underlies the entire county; the Pleistocene barrier island and beach deposits, which are restricted to the peninsulas; and the Holocene barrier island deposits, which are restricted to St. Joseph Island.

Almost all ground water needed for public supply and industrial use is obtained from the Gulf Coast aquifer that underlies Live Oak Peninsula. During 1966, about 1,600 acre-feet or 1.4 mgd (million gallons per day) of ground water was pumped for all purposes in the county. About 672 acre-feet (0.60 mgd) was for public supply, 342 acre-feet (0.30 mgd) for industrial use, and 580 acre-feet (0.52 mgd) for rural domestic and livestock use.

Aquifer tests show that the coefficient of transmissibility of the Gulf Coast aquifer beneath Live Oak Peninsula averages about 3,000 gpd (gallons per day) per foot.

The sand that underlies Live Oak Peninsula contains about 600,000 acre-feet of fresh and slightly saline water. Of this volume, about 300,000 acre-feet is recoverable, but is subject to contamination by salt-water encroachment. To prevent this supply from being depleted, and from being contaminated, pumpage should not exceed about 11,000 acre-feet annually.

Throughout much of the rest of the county, slightly saline water predominates over fresh water. The quantity of slightly saline water moving through the Gulf Coast aquifer is estimated to be about 2,000 acre-feet per year. This quantity could probably be pumped on a long-term basis if proper well spacing and pumping rates are used.

One of the principal factors limiting the development of moderate supplies of ground water is the threat of salt-water intrusion from sands underlying the fresh-water zone; generally, intrusion results from wells being spaced too close together, or from pumping at excessive rates.

Fairly large quantities of moderately saline water are available for development; however, the economic use of this water depends on the development of economic demineralization processes.

The most satisfactory method of disposal of salt water is by the use of injection wells, but in 1961 only 500 barrels (0.06 acre-foot) of salt water produced from oil wells in Aransas County was disposed of by this method.

GROUND-WATER RESOURCES OF ARANSAS COUNTY, TEXAS

INTRODUCTION

Location and Extent of the Area

Aransas County is in south Texas in the Coastal Bend region of the West Gulf Coastal Plain (Figure 1). It is bounded on the north and northwest by Refugio County, on the east by Calhoun County, on the southeast by the Gulf of Mexico, on the south by Nueces County, and on the southwest by Nueces and San Patricio Counties.

Aransas County has a land area of 276 square miles. It consists of three peninsulas and several islands, the largest of which is St. Joseph Island. A large part of the county is within the areas of Aransas and Copano Bays.

Rockport, the county seat, which had a population of 2,989 in 1960, is 26 miles northeast of Corpus Christi and about 150 miles southeast of San Antonio.

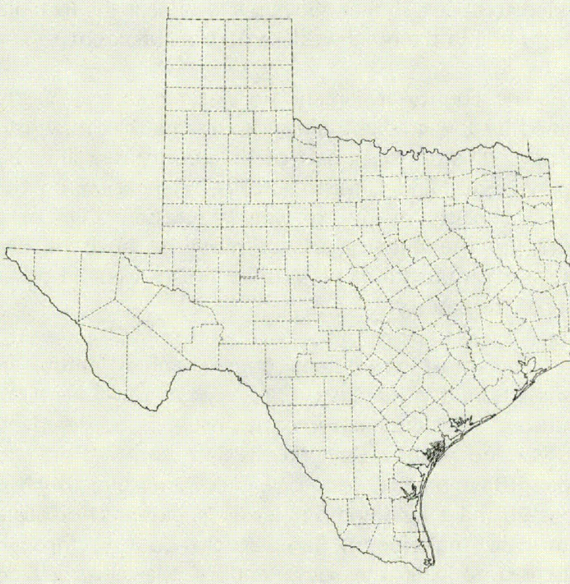


Figure 1.—Location of Aransas County

Purpose and Scope of the Investigation

The purpose of this study was to determine the occurrence, availability, dependability, quality, and quantity of the ground-water resources of Aransas County. The results of the study are published as a guide for developing, protecting, and obtaining maximum benefits from the available ground-water supplies.

The investigation specifically included: a delineation of the extent of sands containing fresh, slightly saline, and moderately saline water; determination of the chemical quality of the water; compilation of the quantity of water being withdrawn and an assessment of the effect of these withdrawals on water levels and water quality; determination of the hydraulic characteristics of the important water-bearing sands; and an estimate of the quantity of ground water available for development.

Methods of Investigation

The following items were included in the investigation of the ground-water resources of Aransas County:

1. An inventory was made of 187 water wells, 22 test wells, and 38 oil or gas tests (Table 7). The location of the wells are shown on Figure 22. Drillers' logs of 22 wells are given in Table 8.

2. More than 300 electric logs of oil or gas tests were compiled and used to determine the areal extent and thickness of the water-bearing formations. The locations of some of the tests are shown on Figure 22.

3. Records of ground-water withdrawals for public supply (city of Rockport) and industrial use were compiled (Figures 8 and 9).

4. Data were compiled from previous pumping tests to determine the hydraulic characteristics of the water-bearing sands (Table 3).

5. Water samples were collected for chemical analyses and records of chemical analyses from previous investigations were compiled to determine the chemical quality of the ground water (Table 10).

6. Altitudes of wells were determined from topographic maps.

7. Water-level measurements were made in wells and compared with available records of past fluctuations of water levels (Table 9).

8. Climatological data were compiled and analyzed (Figures 2 and 3).

9. A geologic map was prepared (Figure 5).

10. Hydrologic sections were prepared from electrical logs and drillers' logs (Figures 13, 14, and 19).

11. The quantity and quality of ground water available for development was determined.

12. Problems related to the development of ground-water supplies were studied.

13. A map showing the approximate altitude of the water levels in wells tapping the Gulf Coast aquifer and the barrier island and beach deposits was prepared (Figure 11).

14. Maps showing chloride and dissolved-solids content of ground water in various aquifers were prepared (Figures 12 and 15).

15. A map showing the potential for ground-water development was prepared (Figure 17).

16. A map showing the approximate thickness of the sand containing fresh to slightly saline water was prepared (Figure 18).

17. Maps showing the approximate altitude of the base of slightly saline and moderately saline water were prepared (Figures 20 and 21).

Previous Investigations

In 1939 an inventory of water wells in Aransas County was made by Carl E. Johnson (1940); the report included records of wells, drillers' logs, water analyses, and geologic sections of test wells. The public water supply of Rockport was described briefly by Broadhurst, Sundstrom, and Rowley (1950, p. 16-17). Swartz (1957) tabulated records of water levels in observation wells in Aransas and San Patricio Counties. A reconnaissance study of the ground-water resources of the Gulf Coast region, which includes Aransas County, was made by Wood, Gabrysch, and Marvin (1963).

Detailed reports have been published on the ground-water resources of several counties adjacent to Aransas County; they include Refugio County, Mason (1963); Victoria and Calhoun Counties, Marvin and others (1962); and Nueces and San Patricio Counties, Shafer (1968).

Some of the data collected during previous well inventories is included in this report. Table 1 shows the well numbers used in this report and the corresponding numbers used in previous ground-water reports in Aransas and adjacent counties.

Economic Development

The economy of Aransas County is dependent upon tourist trade, fishing, livestock raising, and the production of oil and gas. The United Carbon Company, Inc., about 5 miles southwest of Rockport, also contributes to the economy. Oil was discovered in Aransas County in 1936; by January 1, 1964, about 49 million barrels of crude oil was produced. There are few farms and no irrigation wells in the county.

The area is served by various water transportation facilities and deep water ports, and by air, rail, and bus lines. State Highway 35 crosses the county from north to south, and Farm Road 881 connects Rockport with Farm Road 136 and communities to the west.

Tourist attractions include the Aransas National Wildlife Refuge, a State Marine Laboratory at Rockport, Goose Island State Park, and a variety of hunting, fishing, and beach facilities.

Topography and Drainage

The topography of Aransas County is mainly a flat coastal plain, surrounded by deeply indented bays. The altitude of the land surface in the county ranges from sea level along the shore line of the bays and Gulf of Mexico to about 35 feet above sea level near the Refugio County line in the northwestern part of the county.

The county is largely tidewater country, poorly drained by low-gradient, sluggish streams that flow into the bays. The northern part of the county is drained by Copano, Salt, and Cavasso Creeks. Vegetation on the "flats" consists mainly of coastal grasses. Live oaks flourish on the sandy ridges; and mesquite, huisache, live oak, and various kinds of scrubby brush occur in other parts of the county.

The most prominent physiographic feature in Aransas County is Live Oak Ridge on Live Oak Peninsula. The dune-covered peninsula is bordered by Redfish and Aransas Bays on the east, and by Port and Copano Bays on the west. Live Oak Peninsula, which is about 20 miles long and 5 miles wide, extends northeast from near Ingleside in San Patricio County, through Rockport to near the south end of the causeway on State Highway 35. The ridge proper is a strip about 2 miles wide that extends along the center of the peninsula. The name, Live Oak Ridge, is derived from the elevated sand dunes and from the live oak trees that thrive along the sandy belt. The altitude of the land

Table 1.—Well Numbers Used in This Report and Corresponding Numbers Used in Previous Ground-Water Reports in Aransas and Adjacent Counties

NEW NUMBER	OLD NUMBER	NEW NUMBER	OLD NUMBER	NEW NUMBER	OLD NUMBER
		Aransas County by Johnson (1940) and Swartz (1957)			
AH-79-56-202	236	AH-79-64-803	91	AH-83-07-313	22
203	237	813	247	314	23
301	234	814	77	315	25
302	235	816	248	316	27
79-63-502	4	824	73	317	55
803	9	825	74	601	34
902	18	826	76	608	183
904	17	827	88	609	35
79-64-401	123	80-41-801	239	83-08-101	50
702	65	803	242	102	462
708	61	83-07-301	244	105	54
709	62	302	26	106	53
710	64	304	262	107	52
711	69	305	243	108	44
712	71	311	20	403	43
801	90	312	21		
		Calhoun County by Marvin and others (1962)			
BW-80-50-301	K-1				
		Refugio County by Muenster and Michal (1938)			
WH-79-48-502	610	WH-79-48-702	611	WH-79-56-401	311
601	601	79-55-301	309	502	312
		San Patricio County by Johnson (1939)			
WW-83-07-104	33	WW-83-07-801	78	WW-83-07-919	135
402	38	808	80		
403	36				

surface of Live Oak Peninsula ranges from sea level to about 25 feet above sea level along the crest of the ridge.

The terrain on St. Joseph Island ranges from flat to "badlands" dune topography. Largely because of wave action during times of heavy storms, the sand dunes are shifted from one place to another. Native vegetation on the island consists of a variety of coastal grasses, wild flowers, and a few dwarf mesquite.

Climate

The climate in Aransas County is dry subhumid according to the classification of Thornthwaite (1941, p. 2). The area is subject occasionally to tropical storms that move in from the Gulf of Mexico during the summer and fall. Destructive winds and torrential rains may occur during these storms. The average annual precipitation at Rockport during the period 1948-66 was about 31 inches. Annual precipitation was less than 20 inches in only 2 of the years since 1948, and was more than 40 inches in only 4 of the years since 1948 (see Figure 2).

The average annual gross lake-surface evaporation in Aransas County for the period 1940-65 was about 56 inches (Kane, 1967). This is nearly twice the average annual precipitation (Figure 2).

The normal annual temperature at Corpus Christi was 71.8°F (22°C) for the period 1931-60; the normal monthly temperature ranged from 57.4°F (14°C) in January to 84.2°F (29°C) in August (Figure 3).

Well-Numbering System

The well-numbering system used in this report is the one adopted by the Texas Water Development Board for use throughout the State (Figure 4). Under this system, which is based upon the divisions of latitude and longitude, each 1-degree quadrangle in the State is given a number consisting of two digits, from 01 to 89. These are the first two digits in the well number.

Each 1-degree quadrangle is divided into 7½-minute quadrangles which are given 2-digit numbers from 01 to 64. These are the third and fourth digits of the well number. Each 7½-minute quadrangle is divided into 2½-minute quadrangles which are given a single-digit number from 1 to 9. This is the fifth digit of the well number. Each well within a 2½-minute quadrangle is given a 2-digit number in the order in which it is inventoried. These are the last two digits of the well number. The 1-degree and 7½-minute quadrangles are shown on the well location map of this report (Figure 22).

In addition to the 7-digit well number, a 2-letter prefix is used to identify the county. The prefixes for Aransas and adjacent counties used in this report are as follows:

COUNTY	PREFIX
Aransas	AH
Calhoun	BW
Refugio	WH
San Patricio	WW

Acknowledgments

The writer wishes to express his appreciation to the property owners in Aransas County for granting access to their properties and for supplying information about their water wells; to the well drillers for providing logs and other information on water wells; to oil companies for their generous cooperation; and to county, city, and Federal officials for their assistance. Many records used in this report were collected previously by personnel of the U.S. Geological Survey and the Texas Water Development Board.

Definitions of Terms

In the following sections of the report, certain technical terms or terms subject to different interpretations are used. For convenience and clarification, these terms are defined as follows:

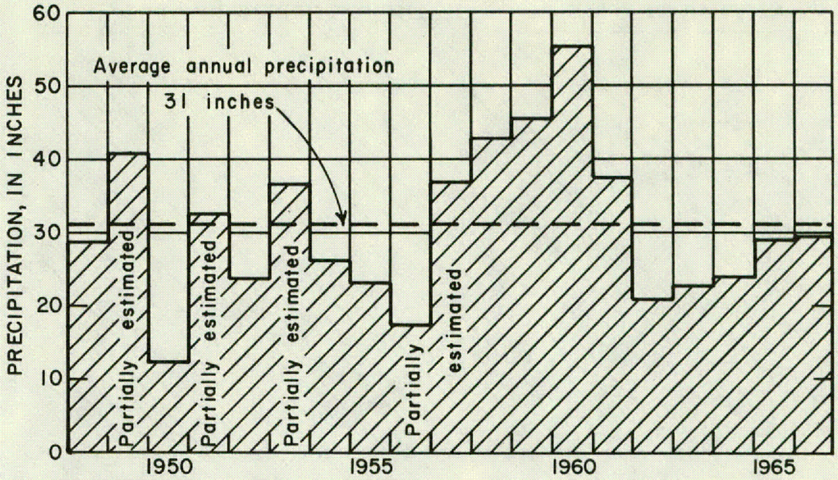
Acre-foot.—The volume of water required to cover 1 acre to a depth of 1 foot (43,560 cubic feet), or 325,851 gallons.

Alluvium.—Clay, sand, and silt of fluviatile, deltaic, coastal marsh, mudflat, and beach origin. Includes areas of active sand dunes, and some local reefs. Also called alluvial deposits.

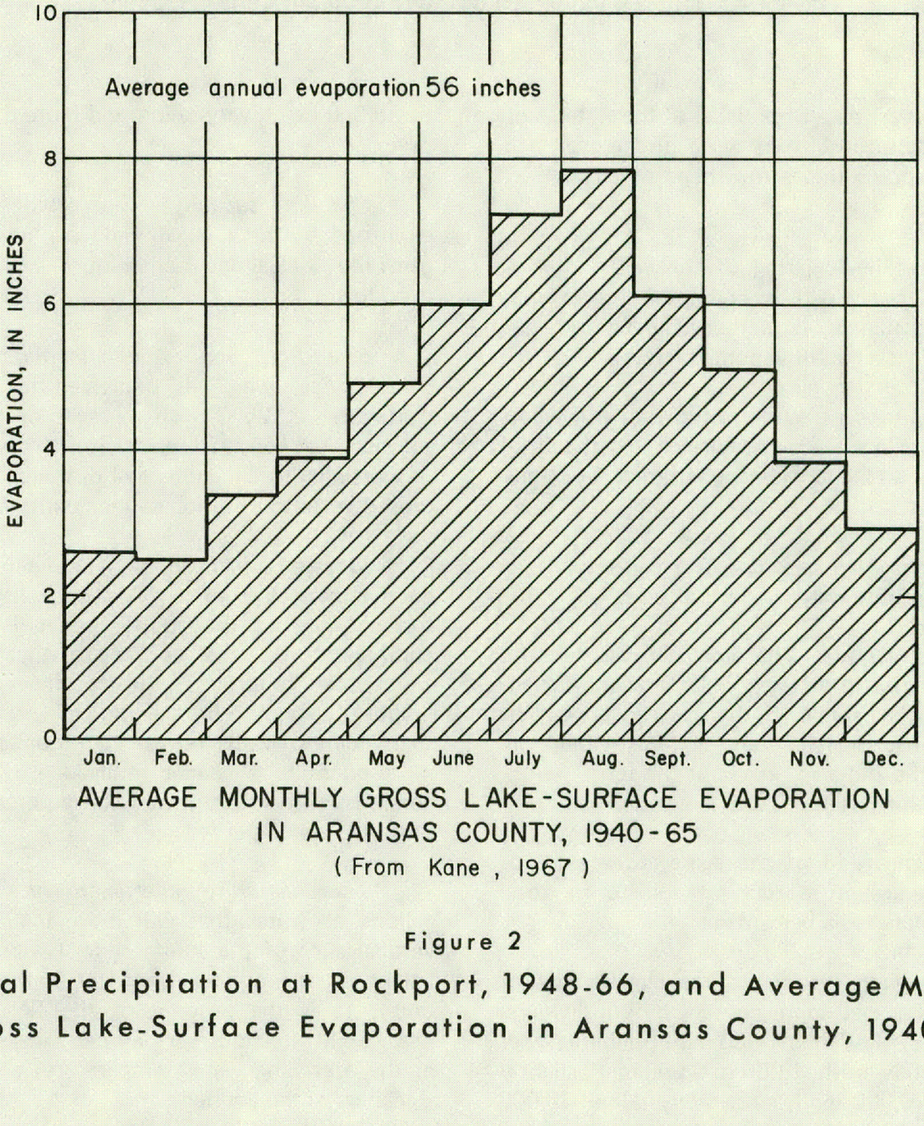
Aquifer.—A geologic formation, group of formations, or part of a formation that is water-bearing.

Aquifer test or pumping test.—A test that consists of the measurement at specific intervals of the discharge and water level of the well being pumped and the water levels in nearby observation wells. Formulas have been developed to show the relationship between the yield of a well, shape and extent of the cone of depression, and hydraulic properties of the aquifer such as the coefficients of transmissibility and storage.

Artesian water.—Ground water that is under sufficient pressure to rise in a well above the level at which it is encountered in the water-bearing formation; it does not necessarily rise to or above the surface of the ground.



ANNUAL PRECIPITATION AT ROCKPORT, 1948-66



AVERAGE MONTHLY GROSS LAKE-SURFACE EVAPORATION
IN ARANSAS COUNTY, 1940-65
(From Kane, 1967)

Figure 2

Annual Precipitation at Rockport, 1948-66, and Average Monthly Gross Lake-Surface Evaporation in Aransas County, 1940-65

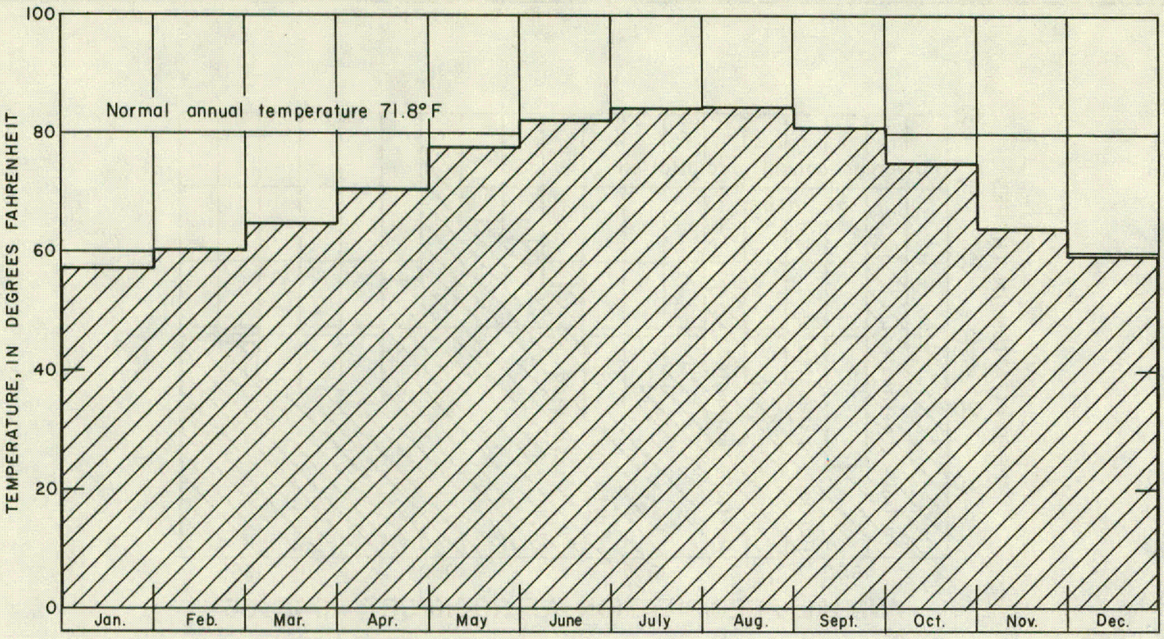


Figure 3.—Normal Monthly Temperature at Corpus Christi, 1931-60

Cone of depression.—Depression of the water table or piezometric surface surrounding a discharging well. The depression approximates the shape of an inverted cone.

Drawdown.—The lowering of the water table or piezometric surface caused by pumping (or artesian flow). In most instances, it is the difference, in feet, between the static level and the pumping level.

Evapotranspiration.—Water withdrawn by evaporation from a land area, a water surface, moist soil, or the water table, and the water consumed by transpiration of plants.

Permeability of an aquifer.—The capacity of an aquifer for transmitting water under pressure.

Piezometric surface.—The imaginary surface to which water will rise in artesian wells, and the surface formed by the water table in the outcrop areas. The words "piezometric surface" and "water table" are synonymous in the outcrop area, but the term "piezometric surface", alone, is applicable to artesian areas.

Porosity.—The ratio of the aggregate volume of interstices (openings) in a rock or soil to its total volume, usually stated as a percentage.

Salinity of water.—From a general classification of water based on dissolved-solids content by Winslow and Kister (1956, p. 5): less than 1,000 mg/l (milligrams per liter) dissolved solids, fresh; 1,000 to 3,000 mg/l, slightly saline; 3,000 to 10,000 mg/l, moderately saline; 10,000 to 35,000 mg/1, very saline; and more than 35,000 mg/l, brine.

Specific capacity.—The discharge of a well expressed as the rate of yield per unit of drawdown, generally in gallons per minute (gpm) per foot of drawdown.

Specific conductance (conductivity).—Specific conductance, which is expressed in micromhos per centimeter at 25°C, is a measure of the ability of a solution to conduct electricity. It is approximately proportional to the content of dissolved solids. Herein, it is used in the description of the quality of water.

Storage, coefficient of.—The volume of water an aquifer releases from or takes into storage per unit of surface area of the aquifer per unit change in the component of head normal to that surface. Under water-table conditions, the coefficient of storage is practically equal to the specific yield, which is defined as the volume of water released from or taken into storage in response to a change in head attributed partly to compressibility of the water and aquifer material in the saturated zone.

Transmissibility, coefficient of.—The number of gallons of water that will move in 1 day through a vertical strip of the aquifer 1 foot wide and having the height of the aquifer when the hydraulic gradient is unity. It is the product of the field coefficient of permeability (gallons per day per square foot, measured at the prevailing water temperature) and the saturated thickness of the aquifer.

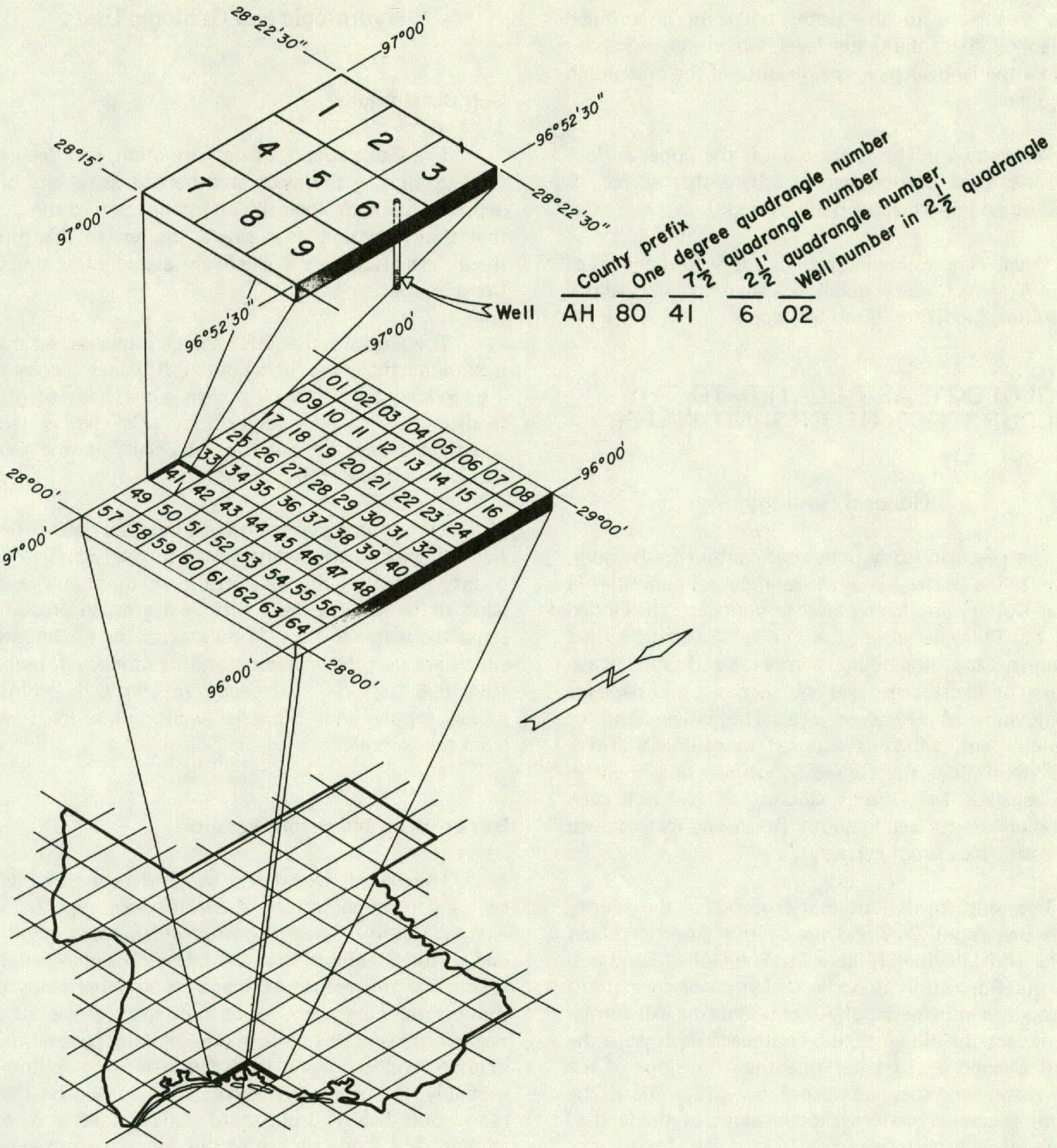


Figure 4

Well-Numbering System

Transmission capacity of an aquifer.—The quantity of water that can be transmitted through a given width of an aquifer at a given hydraulic gradient, usually expressed in acre-feet per year or million gallons per day (mgd).

Water level; static level; hydrostatic level.—In an unconfined aquifer, the water level is the distance from the land surface to the water table. In a confined (artesian) aquifer, the water level, which may be above or below the land surface, is a measure of the pressure in the aquifer.

Water table.—The water table is the upper surface of a zone of saturation except where that surface is formed by an impermeable body of rock.

Yield.—The following ratings apply to the yield of wells in Aransas County: small, less than 50 gpm (gallons per minute); moderate, 50 to 500 gpm.

GEOLOGY AS RELATED TO THE OCCURRENCE OF GROUND WATER

General Geology

The geologic formations that contain fresh water, slightly saline water, and moderately saline water in Aransas County are, from oldest to youngest: the Goliad Sand of Pliocene age; the Lissie Formation and Beaumont Clay (including barrier island and beach deposits) of Pleistocene age; and barrier island deposits and alluvium of Holocene age. The Willis Sand of Pliocene(?) age, which is exposed in southeast Texas immediately above the Goliad Sand, may be present in the subsurface in Aransas County; it has not been mapped on the surface in south Texas, and its existence in the subsurface is not certain.

The only formations that crop out in the county are the Beaumont Clay and the overlying barrier island deposits and alluvium (Figure 5). The Goliad Sand and the Lissie Formation underlie the younger formations and crop out northwest of Aransas County. All formations, except the alluvium, dip southeasterly toward the Gulf of Mexico at a greater rate than the slope of the land surface; thus they are deeper toward the coast. The alluvium generally conforms to the slope of the land in the areas of its occurrence.

Sand, silt, clay, and gravel compose the geologic formations, but because of the method of deposition, the formations are not persistent in lithology or thickness. Sand beds may grade laterally into clay or silt within short distances. These sand beds and other beds containing water are vertically interconnected with similar beds on a different level, so that a group of water-bearing beds within a formation or within a group of formations may be hydrologically interconnected to form a single aquifer.

A summary of the lithology, age, thickness, and water-bearing properties of the geologic and hydrologic units are given in Table 2.

Hydrologic and Geologic Units

Gulf Coast Aquifer

The Goliad Sand, Lissie Formation, and Beaumont Clay (excluding the associated barrier island and beach deposits) are hydrologically interconnected to the extent that they function as a single aquifer. In this report, these formations are collectively classified as the Gulf Coast aquifer.

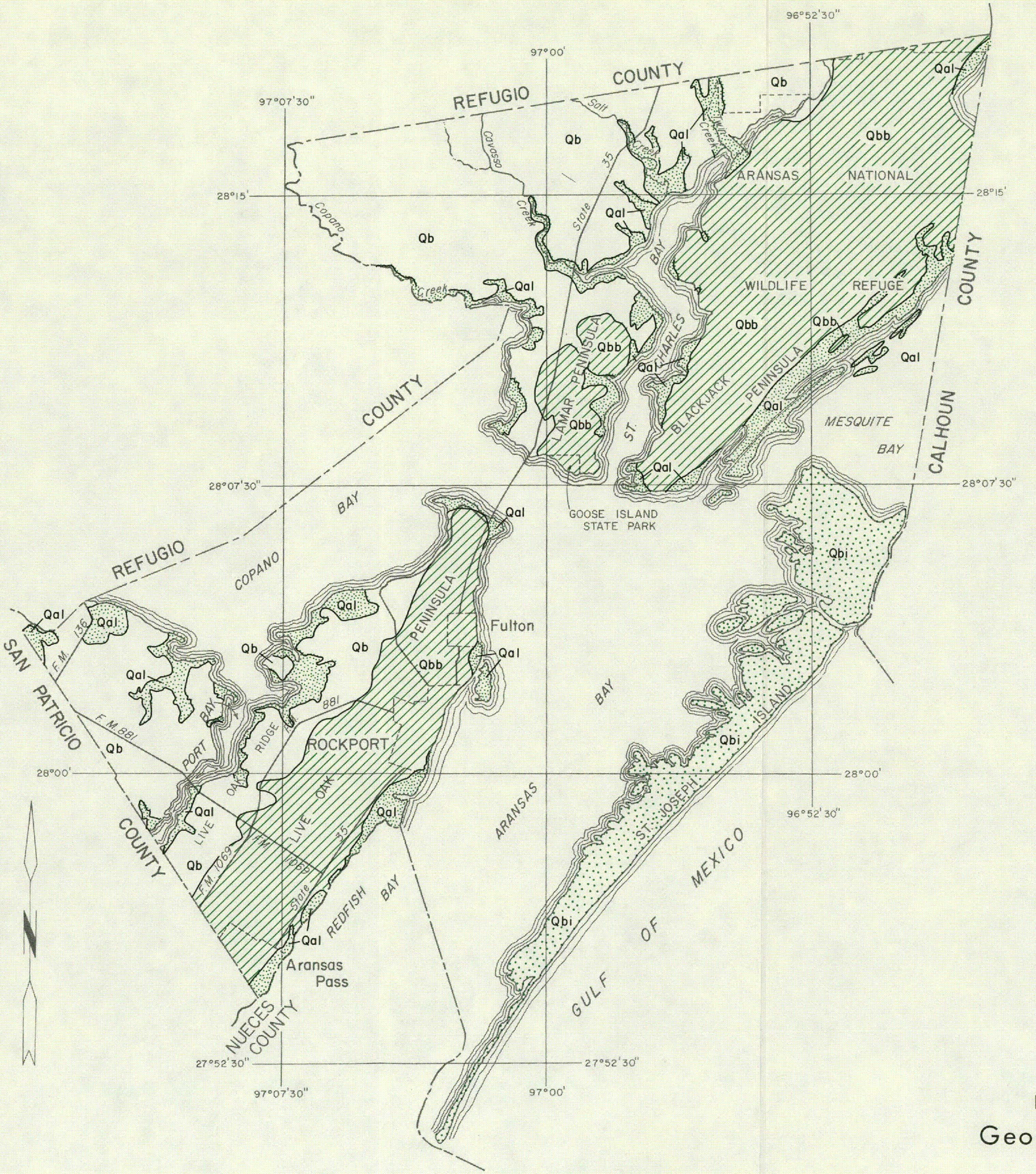
The Gulf Coast aquifer, which attains an estimated maximum thickness of about 1,700 feet, consists of interbedded sand and clay with some beds of gravel, sandstone, silt, and sandy clay. Caliche is locally abundant along the outcrop, especially in the Goliad Sand and Lissie Formation.

The aquifer yields small to moderate quantities of fresh to moderately saline water to many wells in the county. A few of the wells in the northern and western parts of the county have sufficient artesian pressure to cause the water to flow. In these areas the flowing wells, which are used for domestic and livestock purposes, are from 800 to 1,200 feet deep. On Live Oak Peninsula, public supply and industrial wells pump fresh water from the aquifer.

Barrier Island and Beach Deposits

The barrier island and beach deposits of Pleistocene age form an aquifer of considerable importance in Aransas County. These deposits, which are mapped as a part of the Beaumont Clay, are of beach and tidal-deltaic origin. For this reason, the deposits are more sandy than the surrounding clay, silt, and sand facies of the Beaumont, which is of fluviatile, deltaic, coastal marsh, mudflat, and lagoonal origin. This difference in lithology probably is sufficiently distinct to cause the barrier island and beach deposits to function as a separate aquifer. The sandy nature of the deposits permits rapid infiltration of rainfall; consequently, in many places the aquifer contains better quality water than the surrounding rocks.

The Pleistocene barrier island and beach deposits, which are composed of very fine to medium sand, attain an estimated maximum thickness of about 40 feet. This estimate is based largely on thickness assigned to similar deposits in southeast Texas. The aquifer crops out in a



EXPLANATION

QUATERNARY

Holocene

Qal — Alluvium

Clay, sand, and silt of fluviatile, deltaic, coastal marsh, mudflat, and beach origin. Not known to be tapped by wells

Qbi — Barrier island deposits

Sand, very fine to fine, silt, and clay of beach, tidal delta, and washover fan origin. Yields small quantities of fresh to moderately saline water to domestic and livestock wells on St. Joseph Island

Pleistocene

Qb | Qbb — Beaumont Clay

Qbb, barrier island and beach deposits; sand, very fine to medium of beach and tidal delta origin. Yields small to moderate quantities of fresh to moderately saline water mostly to domestic and livestock wells on Live Oak, and Blackjack Peninsula.

Qb, Beaumont Clay; clay, silt, and sand of fluviatile, deltaic, coastal marsh, mudflat, and lagoonal origin. Upper part of Gulf Coast aquifer which yields small to moderate quantities of fresh to moderately saline water to public supply, industrial, domestic, and livestock wells

Contact

0 2 4 6 8 10 Miles

Figure 5

Geologic Map

Base map from U.S. Geological Survey topographic quadrangles

Geology by Saul Aronow, Lamar State College of Technology, for the University of Texas, Bureau of Economic Geology, Geologic Atlas of Texas Project

Table 2.—Geologic and Hydrologic Units and Their Water-Bearing Properties

SYSTEM	SERIES	AQUIFER	STRATIGRAPHIC UNIT	ESTIMATED MAXIMUM THICKNESS (FEET)	LITHOLOGY	WATER-BEARING PROPERTIES
Quaternary	Holocene		Alluvium	?	Clay, sand, and silt.	May yield small quantities of water. Not known to be tapped by wells.
			Barrier island deposits	50(?)	Very fine to fine sand, silt, and clay.	Yields small quantities of fresh to moderately saline water to wells on St. Joseph Island.
	Pleistocene	Gulf Coast	Barrier island and beach deposits; Beaumont Clay	140(?)	Generally clay, silt, and sand. Barrier island and beach deposits mostly very fine to medium sand about 40 feet thick.	Barrier island and beach deposits yield small to moderate quantities of fresh to moderately saline water mostly to domestic and livestock wells on Live Oak and Blackjack Peninsulas. Gulf Coast aquifer yields small to moderate quantities of fresh to moderately saline water to many wells in the county. On Live Oak Peninsula, public supply and industrial wells pump fresh water from the aquifer.
			Lissie Formation	200(?)	Alternating thick to thin beds of sand, gravel, sandy clay and clay. Contains caliche locally.	
Tertiary	Pliocene		Goliad Sand	1,400(?)	Sand or sandstone interbedded with layers of gravel and clay. Contains an abundance of caliche along the outcrop.	

northeast-southwest belt across the central part of the county, and underlies the towns of Rockport, Fulton, and Aransas Pass. It occurs in most of the area of the Aransas National Wildlife Refuge and three peninsulas of the county—Live Oak, Lamar, and Blackjack.

The aquifer yields small to moderate quantities of fresh to moderately saline water mostly to domestic and livestock wells on Live Oak and Blackjack Peninsulas. These wells range in depth from 13 to 39 feet.

Barrier Island Deposits

The barrier island deposits of Holocene age form St. Joseph Island. These deposits, consisting of an estimated 50 feet of very fine to fine sand, silt, and clay of beach, tidal, deltaic, and washover-fan origin, overlie the Beaumont Clay section of the Gulf Coast aquifer and constitute a separate aquifer. The barrier island deposits, which are restricted in Aransas County to St. Joseph Island, are similar in composition and in origin to the older "relict" barrier island and beach deposits in the Beaumont Clay on the mainland.

Because of the large amounts of sand on the surface, rainfall rapidly infiltrates the aquifer. Fresh water accumulates in the aquifer, particularly in the area of sand dunes along the beach, in the form of thin lenses that immediately overlie saline water. Consequently, all fresh-water wells that tap the aquifer are shallow, penetrate only a few feet of fresh-water sand, and are capable of yielding only a few gallons per minute.

The barrier island deposits supply small quantities of fresh to slightly saline water to shallow wells on St. Joseph Island. All of the water is used for domestic and livestock purposes.

Alluvium

The alluvium of Holocene age consists of clay, sand, and silt of fluviatile, deltaic, coastal marsh, mudflat, and beach origin. It occurs in small patches along Twin, Salt, Cavasso, and Copano Creeks, and in the flats along the shores of the bays. Although the thickness of the alluvium is not known, the deposits are probably not more than several feet thick.

The alluvium is relatively unimportant as an aquifer because it is thin and not extensive. It is not known to be tapped by wells.

GROUND-WATER HYDROLOGY

General hydrologic principles have been described in considerable detail by Meinzer (1923), Meinzer and others (1942), Tolman (1937), Leopold and Langbein

(1960), Baldwin and McGuinness (1963), and a number of other authors in the United States and elsewhere. The following discussion applies these principles to the ground-water hydrology of Aransas County.

Source and Occurrence of Ground Water

The source of ground water in Aransas County is precipitation on the outcrop of the aquifer within the county and in the counties to the north and northwest. A part of the precipitation runs off or is consumed by evaporation, or is stored in the soil, later to be evaporated or transpired. A small part of the water infiltrates the soil and subsoil and moves downward to the water table where it becomes ground water. Factors that affect the amount of precipitation that becomes ground water, or recharge to the aquifer, include the amount and intensity of rainfall, the slope of the land surface, the type of soil, the permeability of the aquifer, the available storage space in the aquifer, and the rate of evapotranspiration.

Ground water in Aransas County occurs under water-table and artesian conditions. Under water-table conditions, the water is unconfined and does not rise above the level at which it is first encountered in a well. Under artesian conditions, the aquifer is overlain by relatively impermeable beds, and the water is confined under hydrostatic pressure. Where the elevation of the land surface at a well is considerably lower than the level of the outcrop of the aquifer, the pressure may be sufficient to cause the water to flow at the surface. Although the terms "water table" and "piezometric surface" are synonymous in the area of outcrop of an aquifer, the term "piezometric surface," as used in this report, applies only to the artesian parts of the aquifers.

In the areas where beds of permeable material crop out, ground water is unconfined and, therefore, under water-table conditions. Downdip from the outcrop areas, the permeable beds may be overlain by less permeable material, and the water may be confined or under artesian conditions. Both water-table and artesian conditions occur in the Gulf Coast aquifer. Water-table conditions prevail in the Pleistocene barrier island and beach deposits and in the Holocene barrier island deposits.

In Aransas County the Gulf Coast aquifer, unlike the other aquifers, cannot be considered at any one place to have a single water level. The land surface rises to the north and west and the successively deeper beds crop out and are recharged at increased distances to the north and west. As a generalization, the piezometric surfaces tend to be progressively higher with increased depth to the permeable beds.

Movement of Ground Water

Ground water moves, under the force of gravity, from the areas of recharge to the areas of discharge. After initial infiltration of water at the land surface, the dominant direction of movement through the zone of aeration is vertical. After reaching the zone of saturation, the water moves in the direction of the hydraulic gradient—that is, in the direction of the slope of the piezometric surface.

In Aransas County, the rate of movement of ground water ranges from tens to hundreds of feet per year, depending upon the hydraulic gradient, permeability and porosity of the sediment, and temperature of the water. The direction of movement in the Gulf Coast aquifer is generally southeastward toward the Gulf of Mexico. In the Pleistocene barrier island and beach deposits on Live Oak, Blackjack, and Lamar Peninsulas and in the Holocene barrier island deposits on St. Joseph Island, the water moves downward to the water table, then laterally to the land surface where the water is evaporated, transpired by vegetation, or discharged into the bays or the Gulf. Locally, the effects of heavy pumping may alter this pattern.

Aquifer Tests

Table 3 shows the results of aquifer tests made in the upper part of the Gulf Coast aquifer. The tests were made in wells WW-83-07-829, WW-83-07-835, and WW-83-07-836 on Live Oak Ridge near Aransas Pass about 3 miles southwest of Aransas County. The coefficients of transmissibility obtained from the test ranged from 1,500 to 3,900 gpd (gallons per day) per foot and averaged about 3,000 gpd per foot. These data compare favorably with the data obtained from aquifer tests made by Mason (1963) in wells tapping the Lissie Formation and Beaumont Clay, undifferentiated, in Refugio County.

Aquifer tests were made in five wells in Refugio County by Mason (1963). The wells are a few miles updip from the northern boundary of Aransas County. The aquifer tests indicated that the coefficients of transmissibility of sands in the lower part of the Gulf Coast aquifer ranged from 13,000 to 77,000 gpd per foot. The average coefficient of storage was 0.00021.

The data obtained from all aquifer tests were analyzed using the Theis non-equilibrium method as modified by Cooper and Jacob (1946, p. 526-534) and the Theis recovery method (Wenzel, 1942, p. 94-97).

Hydraulic characteristics of the Pleistocene barrier island and beach deposits and of the Holocene barrier island deposits were not obtained because suitable wells were not available to determine these characteristics by aquifer tests.

Table 3.—Summary of Aquifer Tests

WELL	SCREENED INTERVAL (FT)	AVERAGE DISCHARGE DURING TEST (GPM)	COEFFICIENT OF TRANSMISSIBILITY (GPD/FT)	SPECIFIC CAPACITY (GPM/FT)	COEFFICIENT OF STORAGE	REMARKS
WW-83-07-829	50-182	120	3,000	1.7	2.2×10^{-3}	Drawdown of pumped well.
83-07-829	50-182	—	3,000	—	—	Recovery after pumping 120 gpm.
83-07-835	—	—	1,500	—	9.6×10^{-3}	Drawdown interference from pumping well WW-83-07-829 at 120 gpm.
83-07-835	—	—	3,700	—	2.9×10^{-3}	Recovery after pumping 120 gpm from well WW-83-07-829.
83-07-836	—	—	3,400	—	8.6×10^{-3}	Drawdown interference from pumping well WW-83-07-829 at 120 gpm.
83-07-836	—	—	3,900	—	7.1×10^{-4}	Recovery after pumping 120 gpm from well WW-83-07-829.

The coefficients of transmissibility and storage determined from aquifer tests may be used to predict future drawdown of water levels caused by pumping. Figure 6 shows the theoretical relation between drawdown and distance for various periods of time for a well or group of wells pumping from an aquifer of infinite extent. The calculations of drawdown were based on a well or a group of wells tapping the upper part of the Gulf Coast aquifer. The fact that the rate of drawdown decreases with time is shown in this graph. For example, if the drawdown 1,000 feet from a well is 76 feet after 500 gpm (gallons per minute) had been pumped for 1

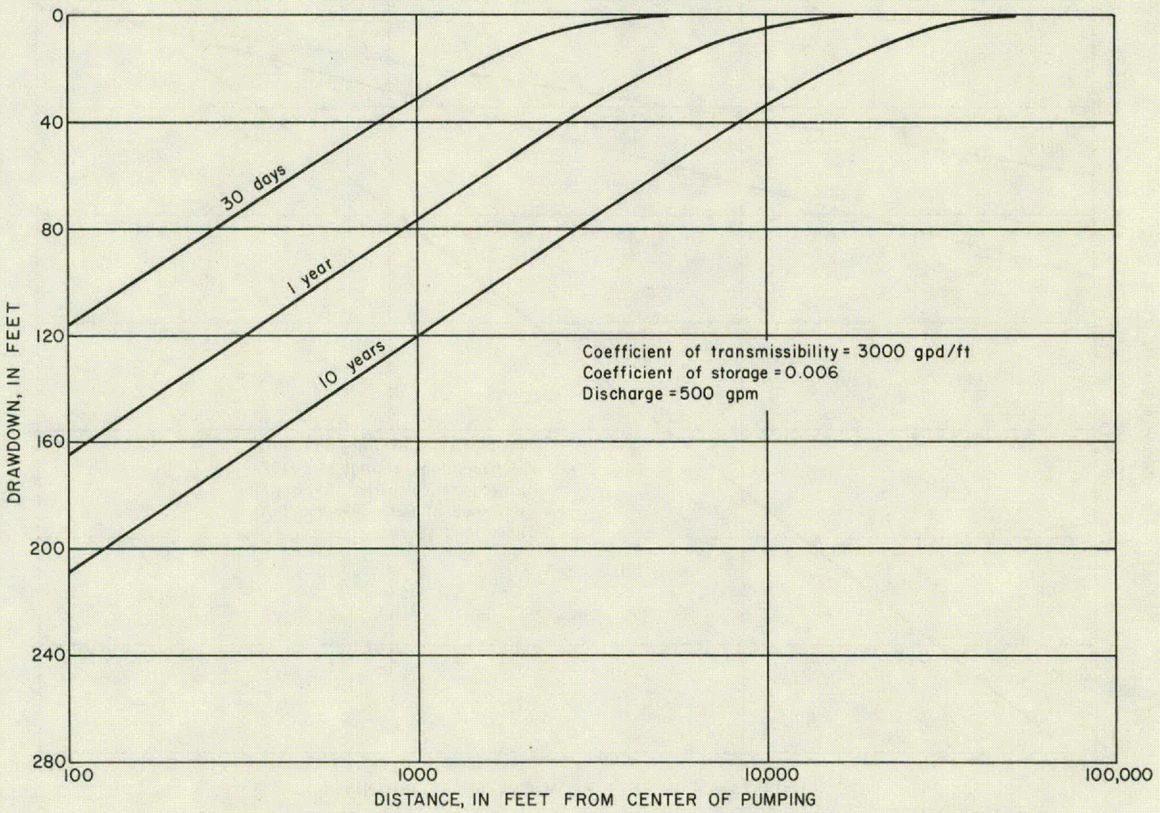


Figure 6.—Relation of Drawdown to Distance for Various Periods of Time

year, the drawdown would be about 120 feet after 500 gpm had been pumped for 10 years. The total drawdown at any one place within the area of influence of pumping from several wells would be the sum of the influences of the individual wells.

Figure 7 shows the theoretical relation among drawdown of water levels, distance from the center of pumping, and different coefficients of transmissibility in a homogeneous aquifer of infinite areal extent. The calculations of drawdown were based on a well or group of wells pumping 500 gpm continuously for one year from the lower part of the Gulf Coast aquifer; coefficients of transmissibility of 5,000, 15,000, and 25,000 gpd per foot and a coefficient of storage of 0.0002 were used in the calculations. For example, if the coefficients of transmissibility and storage were 25,000 gpd per foot and 0.0002, respectively, the drawdown in the water level would be about 22 feet at a distance of 1,000 feet from the pumped well. If the coefficients of transmissibility and storage were 5,000 gpd per foot and 0.0002, respectively, the drawdown would be about 91 feet at the same distance.

Wells drilled close together may create cones of depression that intersect, thereby causing additional lowering of the water table or piezometric surface. The overlapping of cones of depression between wells may cause a significant decrease in yield of the wells, or an increase in pumping costs, or both. In Aransas County, the overlapping of cones of depression between wells might also induce or hasten salt-water intrusion.

The specific capacity of a well is the yield in gallons per minute per foot of drawdown, the drawdown being the difference in the water level in a well when it is pumping and when it is idle. As a rule, the yield of a well varies directly with the drawdown—that is, doubling the drawdown of a well will double or nearly double its yield. Thus, the specific capacity is an aid in estimating the probable yield of a well, the drawdown, and the pumping level.

The specific capacities of wells AH-79-64-503, AH-79-64-504, AH-79-64-821, and WW-83-07-829, which tap the Gulf Coast aquifer, ranged from 1.4 to 2.4 gpm per foot of drawdown; the yields ranged from 120 to 187 gpm.

Ground-Water Development

The well inventory made during the investigation included all the municipal and industrial wells, and a representative number of domestic and livestock wells. Records of 247 wells are given in Table 7. During 1966 approximately 1,600 acre-feet of ground water or 1.4 mgd was withdrawn from all aquifers in Aransas County (Table 4).

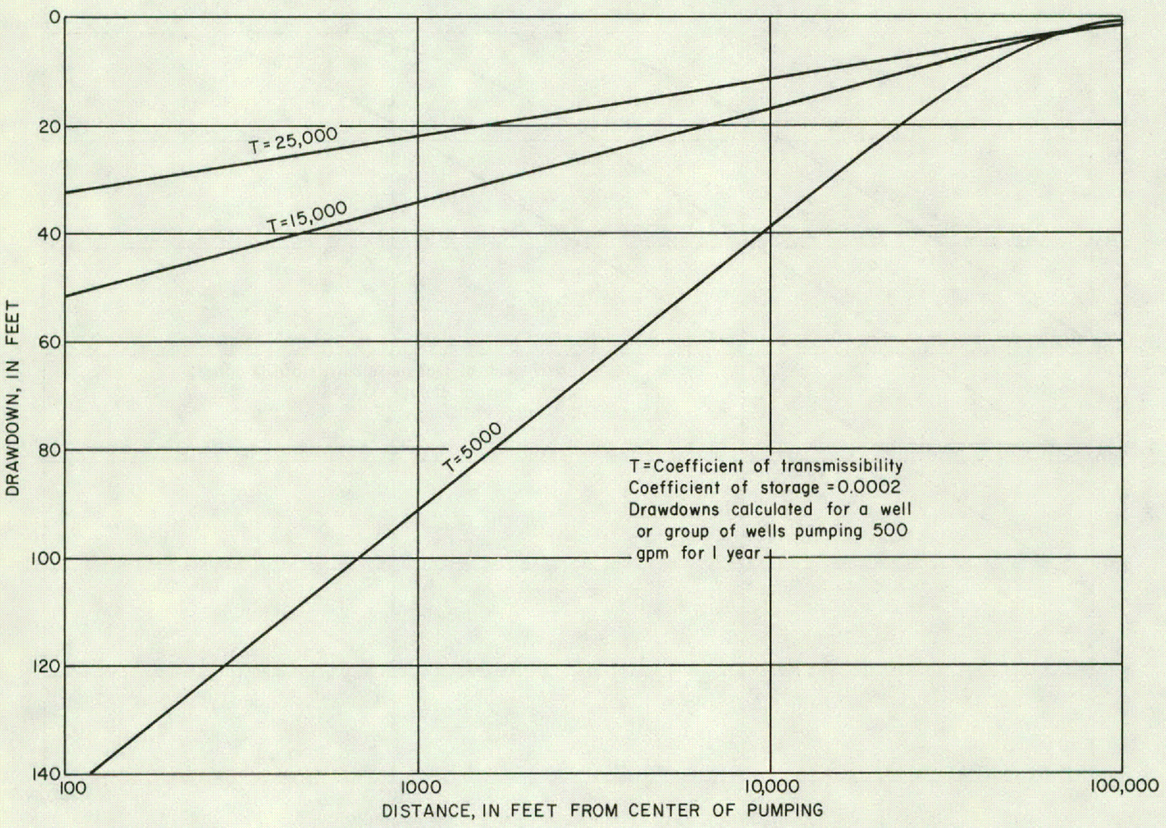


Figure 7.—Relation of Drawdown to Distance for Various Coefficients of Transmissibility

Public Supply

During 1966, the city of Rockport, Holiday Beach and Key Alegro development areas, and the Copano Water Company used about 672 acre-feet (0.60 mgd) of ground water. This is about 42 percent of the ground water pumped for all purposes during that year. (See Table 4).

In 1966, Rockport used about 658 acre-feet (0.59 mgd) which is 98 percent of the total amount of ground water used for public supply. The increasing population, particularly in suburban and housing development areas, has created a substantial need for additional supplies of water.

Broadhurst, Sundstrom, and Rowley (1950, p. 16) estimated that in 1945 the city of Rockport pumped about 0.06 mgd, or 67 acre-feet. This is about 10 percent of the quantity pumped for public supply in 1966. During the period from 1955 to 1966, pumpage by the city of Rockport (Figure 8) increased from about 172 acre-feet per year (0.15 mgd) to about 658 acre-feet per year (0.59 mgd).

In 1966, water for Rockport was obtained from about 13 wells. More recently, 2 or 3 new wells were drilled to replace old ones in an effort to obtain larger yields. The largest yearly increase in the quantity pumped was during 1965 when 52 percent more water was required than in 1964. All the water presently being used is obtained from the uppermost part of the Gulf Coast aquifer which underlies Live Oak Peninsula. During 1966, the well field was being extended northward toward Fulton.

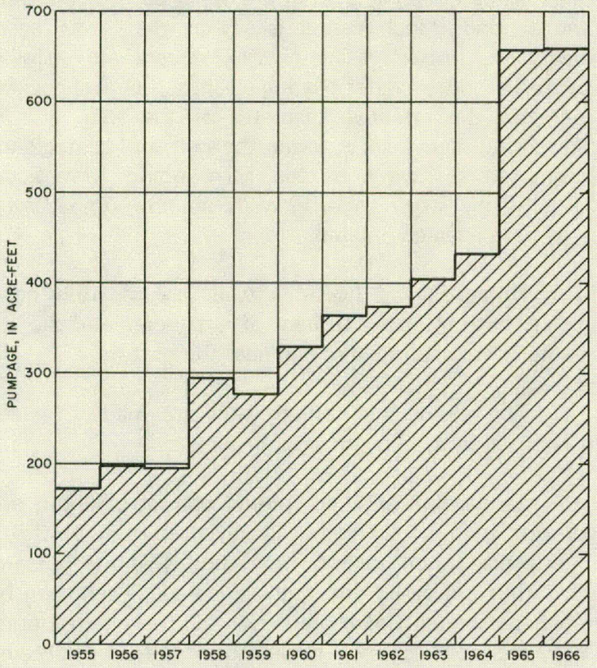


Figure 8.—Pumpage of Ground Water by City of Rockport, 1955-66

Table 4.—Use of Ground Water, 1966

USE	MILLION GALLONS PER DAY	ACRE-FEET PER YEAR
Public supply	0.60	672
Industrial	.30	342
Rural domestic and livestock	.52	580
Total*	1.4	1,600

*Figures are approximate because some of the pumpage is estimated.
Totals are rounded to two significant figures.

Irrigation

There are no irrigation wells in Aransas County. A few domestic or livestock wells are used on a part-time basis in very dry times to water grass and shrubs on golf courses or parks, and one or two wells were used very infrequently to irrigate small patches of coastal bermuda grass.

Industrial Use

In 1966, about 342 acre-feet (0.30 mgd) of ground water was pumped from wells in Aransas County for industrial use. This is about 21 percent of the total quantity pumped for all purposes during that year. The United Carbon Company, Inc., which began using ground water in 1941, and the Tenneco Oil Company, which began pumping in 1959, are the only plants using significant quantities of industrial water. Figure 9 shows the yearly use of ground water by these companies during the period 1955-66. Most of the industrial water is being used by the two industries for cooling purposes; however, a relatively small quantity is used for processing purposes by the United Carbon Company, Inc. Practically all the industrial water being pumped is from the upper part of the Gulf Coast aquifer.

Rural Domestic and Livestock Use

Rural domestic and livestock use of ground water in Aransas County in 1966 was estimated to be 580 acre-feet (0.52 mgd). This is about 36 percent of the total withdrawals for that year. Most of the wells used for domestic and livestock needs, including sand-point wells, are equipped with windmills, small electric pumps, or small gasoline engines that are designed to pump no more than a few gallons a minute. Several controlled flowing wells in the northwestern part of the county have yields ranging from about 2 to 35 gpm. Although ground water is generally available in sufficient quantities for present needs, poor quality water in some areas will limit the use and discourage further development. The Gulf Coast aquifer, the Pleistocene barrier island

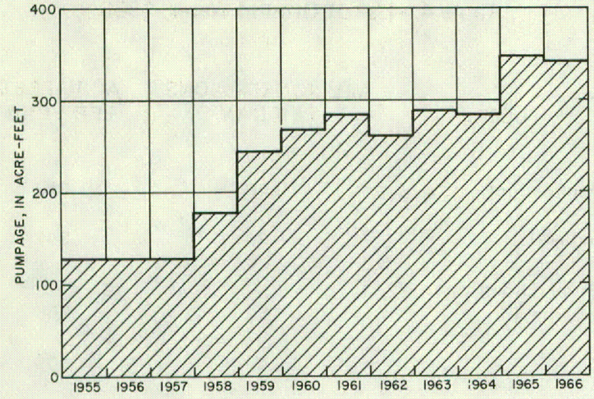


Figure 9.—Pumpage of Ground Water for Industry, 1955-66

and beach deposits, and the Holocene barrier island deposits supply water for rural domestic and livestock needs.

Changes in Water Levels

Water levels in wells in Aransas County fluctuate almost continuously as a result of changes in rates of recharge and discharge, loading and unloading by ocean tides, and changes in barometric pressure. Changes in water levels that occur in a few hours or a few days and which affect a small area are probably caused by local changes in the rate of discharge of wells. Long-term changes in water levels, which occur over a period of years and which affect a large area, are caused by major changes in ground-water withdrawals or by long-term changes in ground-water recharge.

Water levels in selected wells in Aransas County are measured periodically as a part of the statewide observation-well program conducted by the U.S. Geological Survey and the Texas Water Development Board. Most of the earliest measurements were made during the 1939 ground-water investigations; later measurements were made in 1959 in conjunction with a reconnaissance ground-water study in the Gulf Coast region. Table 9 gives the water levels for wells in Aransas and San Patricio Counties for various periods of years.

Figure 10 shows the record of rainfall at Aransas Pass from 1943 to 1966 and the changes in water levels in six wells from 1939 to 1967. Wells AH-79-64-813 and AH-83-07-609 tap the Pleistocene barrier island and beach deposits; the remainder tap the Gulf Coast aquifer. All wells are on Live Oak Peninsula.

During periods of low rainfall, the hydrographs show a general decline in the water levels; after periods of high rainfall, the hydrographs show a rise in water levels. The rise and decline of the water levels is greater in some wells than in others, which probably is due in part to differences in hydrologic continuity between wells. In general, the water levels shown in the hydrographs have changed very little since 1939. The water levels in wells AH-79-64-813 and AH-83-07-608 behave more radically; this is probably caused by heavy pumping from nearby municipal and industrial wells. Each hydrograph shows the decline of the water table during the 1950-56 drought and shows the rise resulting from heavy rainfall during the period 1957-59.

Figure 11 shows altitudes of the water levels in wells in the Gulf Coast aquifer and in the barrier island and beach deposits during 1966 and 1967. The water levels shown on the map are in wells a few tens of feet deep to a few hundred feet deep. Consequently, several zones of different artesian pressures are represented in addition to the water table. The water levels in the wells tapping the barrier island and beach deposits represent the water table; in the Gulf Coast aquifer, the water levels represent either artesian pressure or the water table, depending mostly on the depth of the wells. In the northwestern part of the county, wells 800 to 1,200 feet deep have sufficient artesian pressure to cause the water to flow.

Construction of Wells

Most wells in Aransas County are drilled wells, the exceptions being the relatively few driven or bored sand-point wells used for domestic and livestock purposes in the northern half of the county and on St. Joseph Island.

The municipal and industrial wells, some of which are underreamed and gravel-packed, are designed to pump moderate quantities of water. In many wells, large-diameter casing is set in the upper parts of the wells and 6- and 8-inch casing is set in the lower parts. Generally, slotted casing or well screens are installed opposite the water-bearing sands. Gravel-packing increases the effective diameter of the well, aids in preventing sand from entering the well, and protects the casing from caving of the surrounding formations. Usually, the larger capacity wells are test-pumped after they have been completed.

Domestic and livestock wells are generally completed with 10 to 20 feet of small-diameter slotted casing or stainless steel screen near the bottom.

The casing for drilled wells are made of steel, galvanized iron, wrought iron, or plastic.

Sand-point wells commonly consist of about one 20-foot joint of 2½-inch galvanized iron pipe with a 3-foot perforated section (sand point) at the bottom. The wells are easily and quickly installed—generally by ranch personnel. Some are driven, and some are bored. They are most common in sand dune areas, but because of the highly corrosive water pumped from most of the sand-point wells, the sand points must be changed or replaced about once each year.

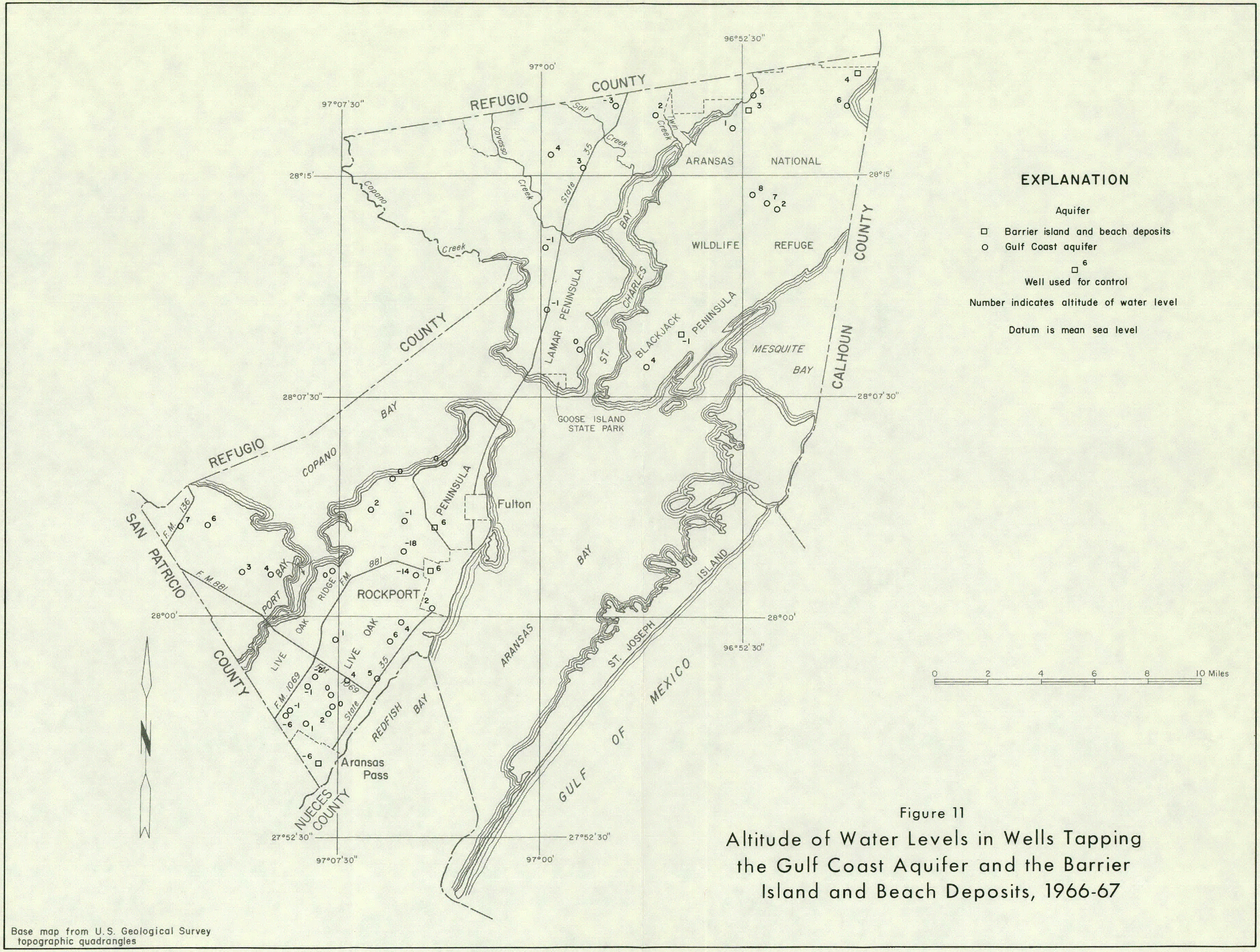


Figure 11

Altitude of Water Levels in Wells Tapping the Gulf Coast Aquifer and the Barrier Island and Beach Deposits, 1966-67

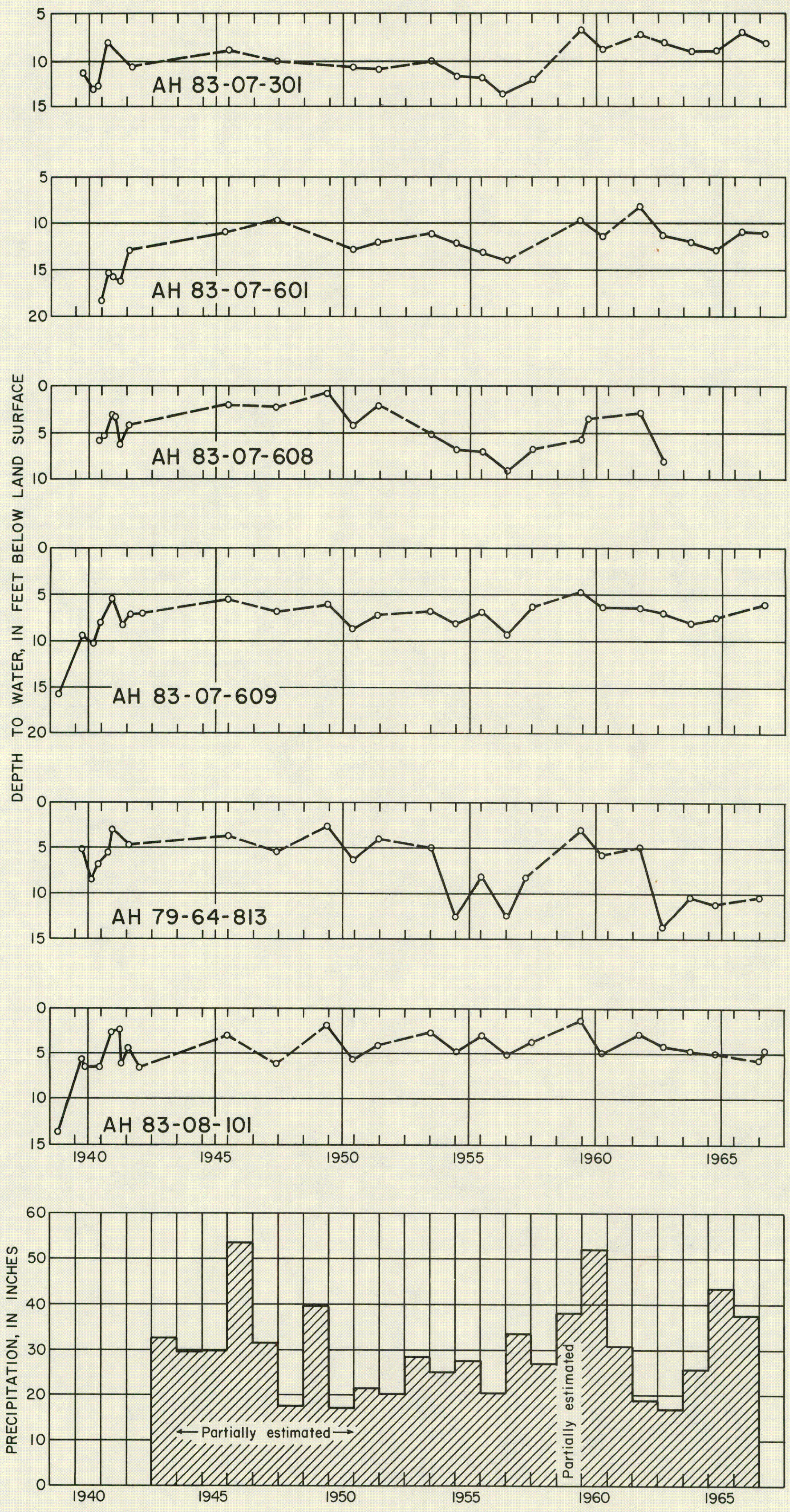


Figure 10

Water Levels in Wells, 1939-67, and Graph Showing Annual Precipitation at Aransas Pass, 1943-66

On Live Oak Ridge and elsewhere on the mainland, where a relatively thin fresh-water section overlies highly mineralized water, some drillers recommend that the bottoms of wells be at least 25 feet above the zone of "brackish" water to lessen the upward movement of salt water. For the same reason, drillers recommend that wells be completed above a bed of clay overlying the interface of fresh water and salt water.

QUALITY OF GROUND WATER

The chemical constituents in the ground water in Aransas County originate principally from the soil and rocks through which the water has moved. Generally, the chemical content of ground water increases with depth. Most deep ground water is free from contamination of organic matter. The temperature of ground water near the land surface is about the same as the mean annual air temperatue of the region, but increases with depth.

Table 10 shows 220 chemical analyses of water from selected wells and test holes in Aransas County and adjacent areas. All wells from which samples were taken are indentified on the well location map by means of lines over the last three digits of the well numbers.

Suitability of the Water for Use

The suitability of a water supply depends upon the chemical quality of the water and the limitations associated with the contemplated use of the water. The various criteria of water-quality requirements include bacterial content; physical characteristics such as temperature, odor and color; chemical content; and radioactivity. Usually the bacterial content and the undesirable physical properties can be alleviated economically, but the removal of undesirable chemical constituents can be difficult and expensive. The source and significance of dissolved-mineral constituents and properties of water summarized in Table 5 was adapted from Doll and others (1963, Table 6).

Public Supply

The U.S. Public Health Service (1962, p. 7-8) has established and periodically revises the standards for drinking water to be used on common carriers engaged in interstate commerce. The standards are designed to protect the traveling public and may be used to evaluate domestic and public water supplies. According to the standards, chemical constituents should not be present in a public water supply in excess of the concentrations shown in Table 5, except where more suitable supplies are not available.

When fluoride is naturally present in drinking water, the concentration should not average more than 0.8 mg/l (milligram per liter), the appropriate upper limit based on the annual average of maximum daily air temperature of 81.1°F (27°C) at Corpus Christi. In the Aransas County area, water from flowing wells with depths ranging from about 800 to 1,200 feet generally had the highest fluoride content, the maximum being 4.1 mg/l. Most of the shallower wells, 100 feet deep or less, had a fluoride content less than 0.8 mg/l.

The total iron content in water from 17 wells tapping the Gulf Coast aquifer ranged from 0.00 to 5.0 mg/l. In eight of the samples, the iron exceeded 0.3 mg/l. No relation was established between iron concentration and well depth. A composite sample of water from four wells in the barrier island deposits on St. Joseph Island showed a total iron content of 0.04 mg/l, which was below the 0.3 mg/l limit.

The chemical analyses indicate that the nitrate content in water from sampled wells in Aransas County is far less than the established upper limit of 45 mg/l. The nitrate content of water from 57 wells in the county ranged from 0.0 to 5.0 mg/l. Concentrations of nitrate were usually higher in the shallow wells tapping the Pleistocene barrier island and beach deposits and the Holocene barrier island deposits. Samples from most of the wells in the Gulf Coast aquifer contained less than 1 mg/l.

Water from only a few wells had a sulfate content in excess of 250 mg/l. Of 184 determinations of sulfate in water from wells tapping the Gulf Coast aquifer, 43 determinations exceeded 250 mg/l; the range was from 0.0 to 10,870 mg/l. Of nine determinations from wells in the Pleistocene barrier island and beach deposits, two exceed 250 mg/l. Two determinations of sulfate in water from wells in the Holocene barrier island deposits showed concentrations of 64 and 170 mg/l. Generally, samples from wells on Live Oak Peninsula contained less than 250 mg/l. Samples from some of the test holes shown on figures 13, 14, and 22 had high concentrations of sulfate and other mineral constituents. (See Table 10). Water at depths of 21 and 27 feet, from test hole AH-79-64-708, nearest the bay, had a sulfate content exceeding 10,000 mg/l, but the water from test holes near the crest of Live Oak Ridge generally had a sulfate content much less than 250 mg/l (Table 10).

The hardness of water, caused principally by calcium and magnesium, is important in a water supply, although no limits of rejection have been established by the U.S. Public Health Service. As the hardness of water increases, the desirability of the water decreases for most household purposes, especially cleaning, because of increased soap consumption, and heating, because of increased formation of scale in hot water heaters and water pipes. Water used for ordinary household purposes does not become particularly objectionable until it reaches the level of about 100 mg/l hardness (Hem, 1959, p. 147). The commonly accepted classification of water hardness is given in Table 5.

Table 5.—Source and Significance of Dissolved-Mineral Constituents and Properties of Water

CONSTITUENT OR PROPERTY	SOURCE OR CAUSE	SIGNIFICANCE
Silica (SiO_2)	Dissolved from practically all rocks and soils, commonly less than 30 mg/l. High concentrations, as much as 100 mg/l, generally occur in highly alkaline waters.	Forms hard scale in pipes and boilers. Carried over in steam of high pressure boilers to form deposits on blades of turbines. Inhibits deterioration of zeolite-type water softeners.
Iron (Fe)	Dissolved from practically all rocks and soils. May also be derived from iron pipes, pumps, and other equipment. More than 1 or 2 mg/l of iron in surface waters generally indicates acid wastes from mine drainage or other sources.	On exposure to air, iron in ground water oxidizes to reddish-brown precipitate. More than about 0.3 mg/l stains laundry and utensils reddish-brown. Objectionable for food processing, textile processing, beverages, ice manufacture, brewing, and other processes. U.S. Public Health Service (1962) drinking-water standards state that iron should not exceed 0.3 mg/l. Larger quantities cause unpleasant taste and favor growth of iron bacteria.
Calcium (Ca) and magnesium (Mg)	Dissolved from practically all soils and rocks, but especially from limestone, dolomite, and gypsum. Calcium and magnesium are found in large quantities in some brines. Magnesium is present in large quantities in sea water.	Cause most of the hardness and scale-forming properties of water; soap consuming (see hardness). Waters low in calcium and magnesium desired in electroplating, tanning, dyeing, and in textile manufacturing.
Sodium (Na) and potassium (K)	Dissolved from practically all rocks and soils. Found also in ancient brines, sea water, industrial brines, and sewage.	Large amounts, in combination with chloride, give a salty taste. Moderate quantities have little effect on the usefulness of water for most purposes. Sodium salts may cause foaming in steam boilers and a high sodium content may limit the use of water for irrigation.
Bicarbonate (HCO_3) and carbonate (CO_3)	Action of carbon dioxide in water on carbonate rocks such as limestone and dolomite.	Bicarbonate and carbonate produce alkalinity. Bicarbonates of calcium and magnesium decompose in steam boilers and hot water facilities to form scale and release corrosive carbon dioxide gas. In combination with calcium and magnesium, cause carbonate hardness.
Sulfate (SO_4)	Dissolved from rocks and soils containing gypsum, iron sulfides, and other sulfur compounds. Commonly present in mine waters and in some industrial wastes.	Sulfate in water containing calcium forms hard scale in steam boilers. In large amounts, sulfate in combination with other ions gives bitter taste to water. Some calcium sulfate is considered beneficial in the brewing process. U.S. Public Health Service (1962) drinking-water standards recommend that the sulfate content should not exceed 250 mg/l.
Chloride (Cl)	Dissolved from rocks and soils. Present in sewage and found in large amounts in ancient brines, sea water, and industrial brines.	In large amounts in combination with sodium, gives salty taste to drinking water. In large quantities, increases the corrosiveness of water. U.S. Public Health Service (1962) drinking-water standards recommend that the chloride content should not exceed 250 mg/l.
Fluoride (F)	Dissolved in small to minute quantities from most rocks and soils. Added to many waters by fluoridation of municipal supplies.	Fluoride in drinking water reduces the incidence of tooth decay when the water is consumed during the period of enamel calcification. However, it may cause mottling of the teeth, depending on the concentration of fluoride, the age of the child, amount of drinking water consumed, and susceptbility of the individual. (Maier, 1950)
Nitrate (NO_3)	Decaying organic matter, sewage, fertilizers, and nitrates in soil.	Concentration much greater than the local average may suggest pollution. U.S. Public Health Service (1962) drinking-water standards suggest a limit of 45 mg/l. Waters of high nitrate content have been reported to be the cause of methemoglobinemia (an often fatal disease in infants) and therefore should not be used in infant feeding (Maxcy, 1950). Nitrate has been shown to be helpful in reducing inter-crystaline cracking of boiler steel. It encourages growth of algae and other organisms which produce undesirable tastes and odors.
Dissolved solids	Chiefly mineral constituents dissolved from rocks and soils. Includes some water of crystallization.	U.S. Public Health Service (1962) drinking-water standards recommend that waters containing more than 500 mg/l dissolved solids not be used if other less mineralized supplies are available. Waters containing more than 1000 mg/l dissolved solids are unsuitable for many purposes.
Hardness as $CaCO_3$	In most waters nearly all the hardness is due to calcium and magnesium. All the metallic cations other than the alkali metals also cause hardness.	Consumes soap before a lather will form. Deposits soap curd on bathtubs. Hard water forms scale in boilers, water heaters, and pipes. Hardness equivalent to the bicarbonate and carbonate is called carbonate hardness. Any hardness in excess of this is called non-carbonate hardness. Waters of hardness as much as 60 mg/l are considered soft; 61 to 120 mg/l, moderately hard; 121 to 180 mg/l, hard; more than 180 mg/l, very hard.
Specific conductance (micromhos at 25°C)	Mineral content of the water.	Indicates degree of mineralization. Specific conductance is a measure of the capacity of the water to conduct an electric current. Varies with concentration and degree of ionization of the constituents.
Hydrogen ion concentration (pH)	Acids, acid-generating salts, and free carbon dioxide lower the pH. Carbonates, bicarbonates, hydroxides, and phosphates, silicates, and borates raise the pH.	A pH of 7.0 indicates neutrality of a solution. Values higher than 7.0 denote increasing alkalinity; values lower than 7.0 indicate increasing acidity. pH is a measure of the activity of the hydrogen ions. Corrosiveness of water generally increases with decreasing pH. However, excessively alkaline waters may also attack metals.

Water from most wells in Aransas County and adjacent areas was hard to very hard. The hardness of about half of the samples from the flowing wells that tap the Gulf Coast aquifer in the northwestern part of the county was less than 60 mg/l. Water having the greatest hardness was from some of the test holes that tested the Pleistocene barrier island and beach deposits and the Gulf Coast aquifer on Live Oak Peninsula. The hardness of samples from the shallow sand-point wells in the Holocene barrier island deposits on St. Joseph Island ranged from 227 to 820 mg/l.

The chloride content of water and the depth or screened intervals of wells tapping the aquifers in the county are shown on Figure 12. Generally, ground water having a chloride content of less than 250 mg/l is difficult to obtain in most parts of Aransas County. Figure 12 shows that ground water having a chloride content less than 250 mg/l is obtained almost entirely from wells on Live Oak Peninsula; these wells, which tap the Gulf Coast aquifer and the Pleistocene barrier island and beach deposits, yield water from sands ranging from about 30 to 180 feet below land surface. Chloride concentrations in these sands vary considerably across the peninsula (Figures 13 and 14). Sand beds nearest the crest of the ridge have the lower chloride content, whereas sand beds closer to the bay have much higher chlorides.

The chloride content of water in the deep sands in the northwestern part of the county increases downdip toward the southeast, as shown by the deep flowing wells in that area. Well AH-79-56-301, the most southeasterly of a group of wells tapping the lower part of the Gulf Coast aquifer, is 1,000 feet deep; it had a chloride content of 1,580 mg/l. No wells of about the same depth are known to exist southeast of this well; hence, there are no chemical analyses of ground water available from deep wells farther downdip. Electrical logs of oil and gas tests indicate, however, that the salinity of the water increases downdip very rapidly.

Water having a dissolved-solids content (degree of mineralization or "total salts") in excess of 500 mg/l is not recommended for public supply if other less mineralized supplies are available or can be made available at reasonable cost. Water with less than 500 mg/l dissolved solids is not available everywhere, and a considerable number of supplies with dissolved solids in excess of the recommended limit are used without any obvious ill effects. Usually, water containing more than 1,000 mg/l dissolved solids is unsuitable for many purposes.

In most of the samples analyzed (Table 10), the dissolved-solids content exceeded the 500 mg/l limit recommended by the U.S. Public Health Service. About half the samples had dissolved solids in excess of 1,000 mg/l, and almost one third had dissolved solids in excess of 3,000 mg/l. The few wells that yield water having less than 500 mg/l dissolved solids are mostly on Live Oak Peninsula and tap the upper part of the Gulf Coast aquifer or the Pleistocene barrier island and beach deposits. Figure 15 shows the dissolved-solids content of samples from wells and the well depths or screened intervals.

Irrigation

A classification commonly used for judging the quality of a water for irrigation was proposed in 1954 by the U.S. Salinity Laboratory Staff (1954, p. 69-82). The classification is based on the salinity hazard as measured by the electrical conductivity (specific conductance, Table 10) of the water and the sodium hazard as measured by the SAR (sodium-adsorption ratio, Table 10). The relative importance of the dissolved constituents in irrigation water is dependent upon the degree to which they accumulate in the soil. Under similar conditions more of the mineral content of the water will accumulate in tight soils than in more permeable soils. Sodium can be a significant factor in evaluating quality of irrigation water because water with a high SAR will cause the soil structure to break down by deflocculating the colloidal soil particles. Consequently, the soil may become plastic, thereby causing poor aeration, restricting the infiltration of water, and giving rise to problems in drainage and cultivation. These effects are especially true in fine-textured soils. Wilcox (1955, p. 15) stated that the system of classification of irrigation water proposed by the laboratory staff "is not directly applicable to supplemental waters used in areas of relatively high rainfall." Furthermore, Wilcox (1955, p. 16) indicated that generally water may be used safely for supplemental irrigation if its conductivity is less than 2,250 micromhos per centimeter at 25°C and its SAR is less than 14.

The SAR values of water from 59 wells tapping various aquifers in Aransas County and adjacent areas ranged from 2.5 to 50, and the conductivities of these waters ranged from 434 to 12,400 micromhos. The SAR values of water from 23 of the wells were less than 14, and the conductivities of water from 31 wells were less than 2,250 micromhos (Table 10).

Another factor used in assessing the quality of water for irrigation is the RSC (residual sodium carbonate, Table 10) in the water. Excessive RSC will cause the water to be alkaline, and the organic content of the soil will tend to dissolve. The soil may become a grayish-black and the land areas affected are referred to as "black alkali." Wilcox (1955, p. 11) states that laboratory and field studies have resulted in the conclusion that water containing more than 2.5 me/l (milliequivalents per liter) RSC is not suitable for irrigation. Water containing from 1.25 to 2.5 me/l is marginal, and water containing less than 1.25 me/l RSC probably is safe. Nevertheless, good irrigation practices and proper use of soil amendments might make possible the successful use of the marginal water for irrigation.

Furthermore, the degree of leaching will modify the permissible limit to some extent (Wilcox, Blair, and Bower, 1954, p. 265).

The RSC values of 58 water samples from wells tapping various aquifers ranged from 0.0 to 12.0 me/l. The RSC values of 26 samples exceeded 2.5 me/l, and were less than 1.25 me/l in 29 samples.

On the basis of salinity, SAR, and RSC values for the ground water tested, much of the water from the aquifers in Aransas County is undesirable for irrigation. Water from some of the wells, however, might be used sparingly to supplement rainfall, but it should be used with restraint.

Aransas County is not primarily an agricultural area. Soil drainage presents a real problem in many areas, and much of the terrain is not suitable for farming; thus, there are relatively few farms in the county, and no demand at present for irrigation water.

Industrial Use

Water used for industry may be classified as process water, cooling water, or boiler water. Water for cooling is the main requirement for most types of industries in Aransas County.

Water for cooling generally is selected on the basis of its temperature and source of supply; however, its chemical quality is also important. Hardness, silica, and iron may cause scale which adversely affects the heat-exchange surfaces in the cooling process. Corrosiveness also is an objectionable feature. Sodium chloride, acid, oxygen, and carbon dioxide are among substances that make water corrosive.

Process water is the term used for water incorporated into or in contact with the manufactured products. The quality requirements for this use include physical and biological as well as chemical factors. Water that is low in dissolved solids and contains little or no stain-producing iron and manganese is highly desirable for use as process water. The quality of water used in the manufacture of carbon black is important. Because water used for pelleting and gas quenching is used consumptively, the dissolved minerals in the water remain in the product as an impurity (Conklin, 1956, p. 95).

Boiler water should be noncorrosive and relatively free of scale-forming constituents. The calcium and magnesium content, which causes hardness, greatly affects the industrial value of the water by causing formation of "boiler scale." Silica in boiler water is undesirable because it also forms a hard scale, the scale-forming tendency increasing with pressure in the boiler. The following table shows the maximum suggested concentrations of silica for water used in boilers (Moore, 1940, p. 263):

CONCENTRATION OF SILICA (MG/L)	BOILER PRESSURE (POUNDS PER SQUARE INCH)
40	Less than 150
20	150-250
5	251-400
1	More than 400

The suitability of a water for most industrial uses generally is determined on the basis of temperature and quality of water. The temperature of ground water, which near the land surface is about the same as the average annual air temperature of the region, increases with depth. The average annual air temperature in Aransas County is about 72°F (22°C), and the temperature of water in shallow sands is about 70°F (21°C). The temperature gradient is about 1°F (0.56°C) for every 100 feet of depth.

The silica content in the water from wells in Aransas County ranged from 8.8 to 41 mg/l. About 60 percent of the samples had a silica content of less than 20 mg/l. There was no apparent relationship between the depth of the wells and the concentration of silica. Of the 55 water samples taken from the Gulf Coast aquifer, 13 exceeded 20 mg/l; but of the 8 samples from the Pleistocene barrier island and beach deposits, 6 exceeded 20 mg/l. Two samples of water from the Holocene barrier island deposits on St. Joseph Island showed silica to be less than 20 mg/l.

Most of the ground water in Aransas County is alkaline. The pH in all but 8 of the wells sampled exceeded 7.0, which is neutral.

Concentrations of iron, manganese, hardness, and dissolved solids, which also affect the suitability of water for industrial uses, have been discussed in the section on suitability for public supply.

Relation of Fresh Ground Water to Saline Ground Water

Some of the sediments comprising the aquifers were originally deposited in the Gulf of Mexico and therefore contained salt water at the time of deposition or were deposited in fresh water and later filled with salt water at a time of higher sea level. At some time after deposition, the sea receded and the process of flushing, recharge, and discharge began. Fresh water, originating as precipitation on the outcrop, forced the salt water downward, until the pressure exerted by the fresh water equalled the pressure exerted by the salt water. Discharge of the salt water may have been accomplished in several ways, but Winslow and others (1957, p. 387-388) concluded that in the Houston area the discharge took place through overlying clays. Before large withdrawals by wells, the hydraulic system was probably in dynamic

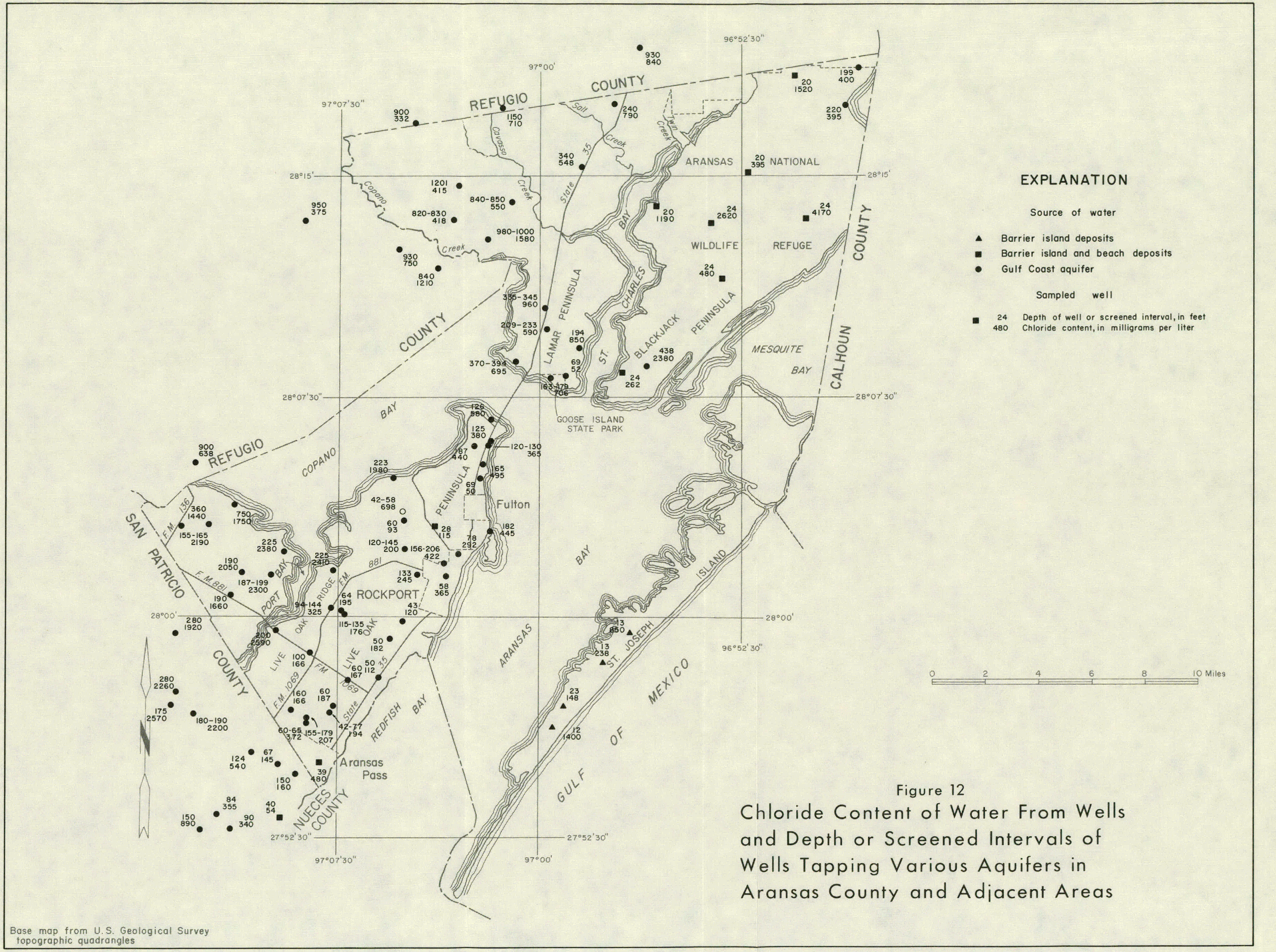
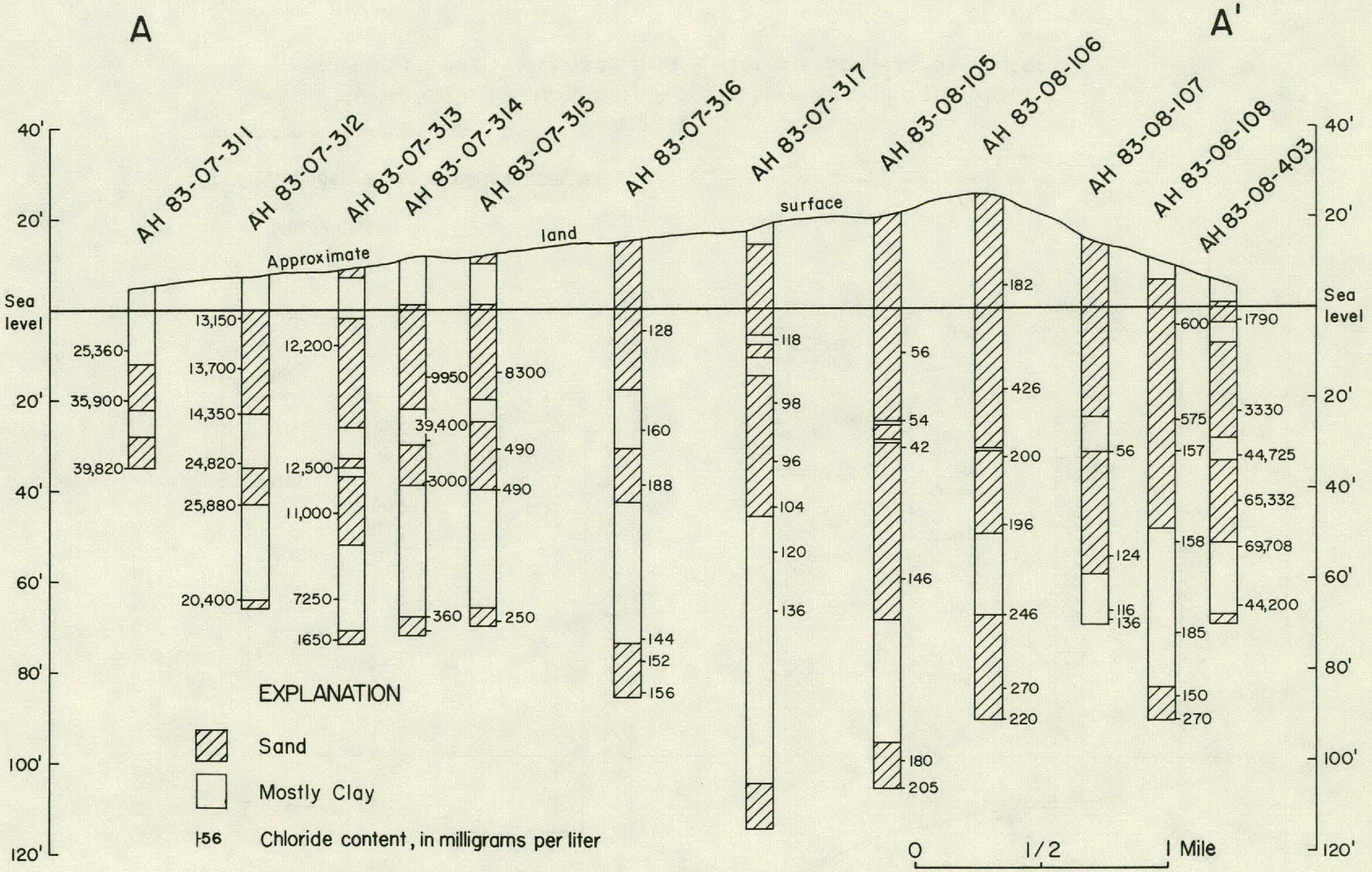


Figure 12

Chloride Content of Water From Wells and Depth or Screened Intervals of Wells Tapping Various Aquifers in Aransas County and Adjacent Areas



For location of section see Figure 22

Figure 13

Hydrologic Section A-A' Across Live Oak Peninsula
Showing Sand Thickness and Chloride Content of Water

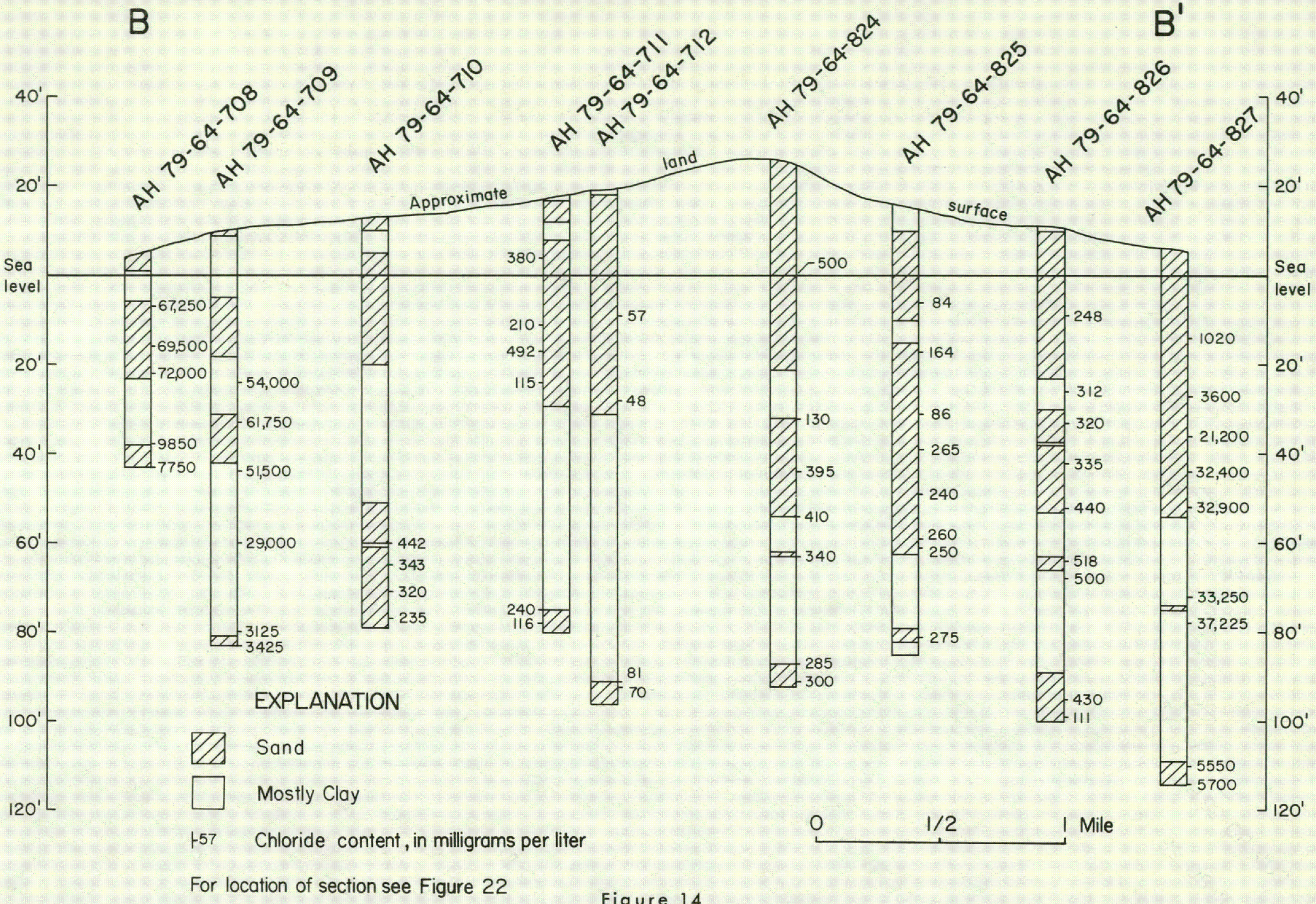


Figure 14
Hydrologic Section B-B' Across Live Oak Peninsula
Showing Sand Thickness and Chloride Content of Water

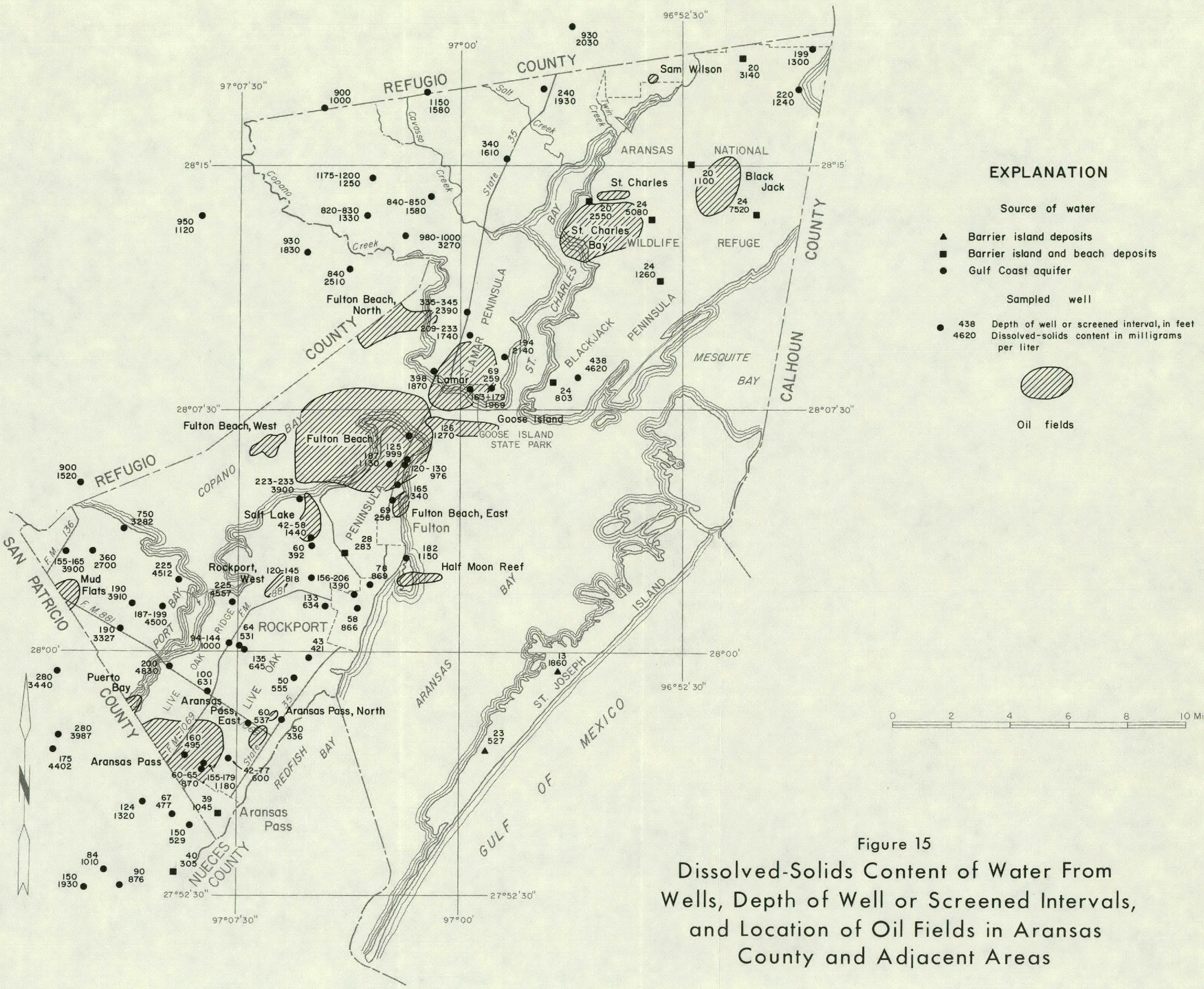


Figure 15

Dissolved-Solids Content of Water From Wells, Depth of Well or Screened Intervals, and Location of Oil Fields in Aransas County and Adjacent Areas

Base map from U.S. Geological Survey topographic quadrangles

equilibrium—that is, the fresh water-salt water interface was almost stationary. The pressure head of the fresh water was balanced by the static head of the salt water. Figure 16 shows this theoretical relationship of fresh water to salt water.

On St. Joseph Island, and to an extent on Live Oak, Lamar, and Blackjack Peninsulas, the fresh water-salt water interface generally is fairly sharply delineated, with the fresh-water body overlying the denser saline water. According to the Ghyben-Herzberg principle, "fresh water" will gradually accumulate beneath an island (or peninsula) composed entirely of permeable material and will gradually displace sea water to a depth of approximately 40 feet below sea level (if the average figure of 1.025 is used for the specific gravity of salt water) for each foot that the water table is above sea level. The term "fresh water" here refers to water significantly fresher than sea water but may not necessarily mean water having less than 1,000 mg/l dissolved solids. The aquifers underlying the peninsulas in Aransas County are not composed entirely of permeable material but are interbedded with clay. This interbedding probably affects the fresh water—salt water relationship somewhat, and the Ghyben-Herzberg principle may not rigidly apply. However, on St. Joseph Island, where the Holocene barrier island deposits are largely sand, the interface of fresh water and salt water is more sharply defined.

When water levels in the aquifers are lowered significantly, the dynamic equilibrium at the fresh water-salt water interface is disturbed, and salt water moves toward the areas of pumping. As the head in the fresh-water sands is lowered in the aquifers beneath the island and the peninsulas, a cone of salt water tends to penetrate upward into the fresh water, with the highest point directly beneath the pumping well. Pumping tests show that the amount of salt water produced from the pumping well decreases with lower rates of pumping. For instance, a reported test on a city of Aransas Pass well indicated a 40 percent reduction in chlorides when the pumping rate was reduced from 50 to 10 gpm. Available data, however, do not show extensive salt-water intrusion in Aransas County.

Horizontal encroachment of salt water on the peninsulas has not been a serious problem. This is generally because the salt water must move inland, and any horizontal movement is slow—only a few feet per year. If horizontal encroachment becomes a serious problem, wells should be relocated nearer the crest of the peninsulas, which approximates the center of the fresh-water zone.

DISPOSAL OF SALT WATER

According to a salt-water disposal inventory (Texas Water Commission and Texas Water Pollution Control Board, 1963), 4,887,167 barrels, or about 629 acre-feet of salt water was produced in conjunction with the production of oil in Aransas County in 1961. The oil fields, methods of disposal, and the quantity disposed are shown in Table 6. Figure 15 shows the location of the various oil fields.

The open-surface pit method of disposal is the most hazardous with regard to contamination of fresh water at shallow depths. In 1961, 1,981,679 barrels (255

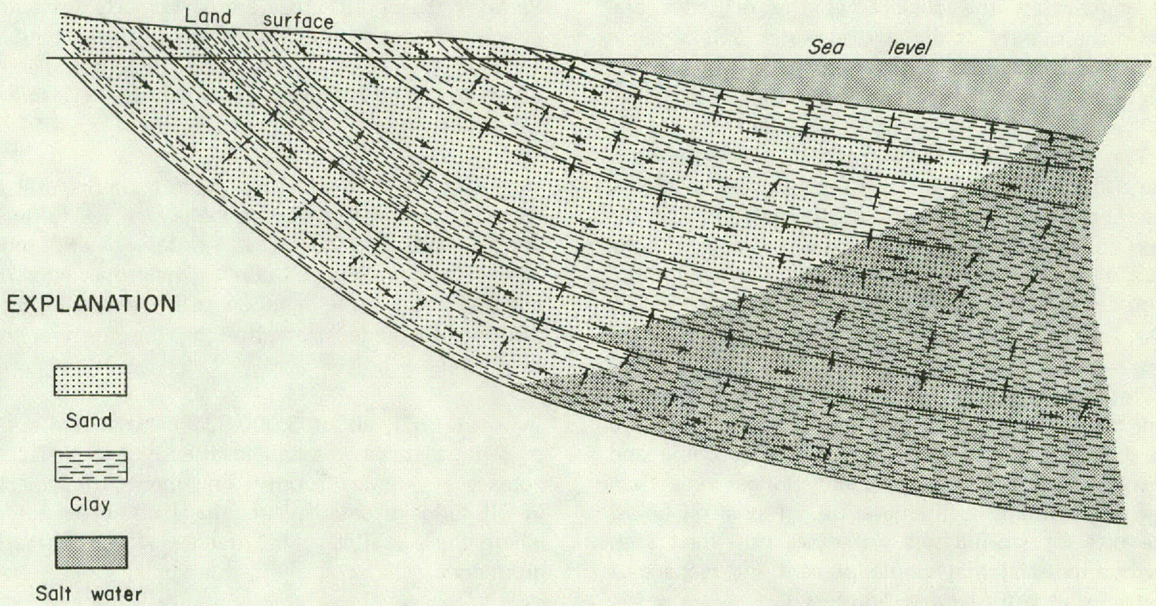


Figure 16.—Diagrammatic Sketch of the Theoretical Relationship of Fresh Water to Salt Water (After Winslow and Others, 1957, p. 386)

Table 6.—Methods of Disposal and Quantity of Salt Water Disposed in Aransas County in 1961

FIELD NAME	BRINE PRODUCTION (BARRELS)	BRINE DISPOSAL: INJECTION WELL (BARRELS)	INJECTION WELL (PERCENT)	OPEN SURFACE PIT (BARRELS)	OPEN SURFACE PIT (PERCENT)	SURFACE-WATER COURSE (BARRELS)	SURFACE-WATER COURSE (PERCENT)
Aransas Pass	842,115	—	—	842,115	100	—	—
Aransas Pass, East	4,100	—	—	4,100	100	—	—
Aransas Pass, North	400	—	—	400	100	—	—
Blackjack	15,490	—	—	15,490	100	—	—
Fulton Beach	2,407,472	—	—	795,850	33.1	1,611,522	66.9
Fulton Beach, East	110,853	500	0.5	62,235	56.1	48,118	43.4
Fulton Beach, North	118,907	—	—	61,857	52.0	57,050	48.0
Fulton Beach, West	555,396	—	—	—	—	555,396	100
Goose Island	575	—	—	575	100	—	—
Half Moon Reef	14,000	—	—	—	—	14,000	100
Lamar	10,750	—	—	10,750	100	—	—
Mud Flats	5,041	—	—	5,041	100	—	—
Puerto Bay	242,609	—	—	10,000	4.1	232,609	95.9
Rockport, West	346,692	—	—	—	—	346,692	100
Salt Lake	144,831	—	—	105,230	72.7	39,601	27.3
Sam Wilson	7,300	—	—	7,300	100	—	—
St. Charles	58,438	—	—	58,438	100	—	—
St. Charles Bay	2,198	—	—	2,198	100	—	—
Totals	4,887,167	500	.5	1,981,679	40.5	2,904,988	59.4

acre-feet) of salt water was disposed in open-surface pits in Aransas County. It is probable that a part of this salt water penetrated the surface at the pit sites and degraded the quality of the ground water. Salt water in open-surface pits is allowed to evaporate, but the salt residue remains as a source of contamination.

The time required for salt water from disposal pits to affect the quality of water in nearby wells may vary considerably, depending upon the permeability of the soil and aquifer, the gradient of the water table, and the distance of the wells from the source of contamination. The process may take several years or only a few months.

Once a source of contamination is eliminated, another problem is presented—that of water purification which, because of the slow process of leaching and dilution, may require a considerably longer time than the period of original contamination. In most oil fields, surface pits for storing salt water are not lined with impervious material that would prevent any seepage of salt water into the fresh-water aquifers.

No conclusive evidence of salt-water contamination was found in the water from wells sampled during this investigation. This should not, however, be construed to mean that contamination is not occurring. Parts of the county that are particularly susceptible to contamination by salt water are the very sandy areas such as Live Oak, Lamar, and Blackjack Peninsulas, where generally the water table is only a few feet below the land surface.

The most satisfactory method of disposal of salt water is through injection wells. In 1961, only 500 barrels (0.06 acre-foot) of salt water was disposed of by this method in Aransas County. The proper construction and operation of the injection wells are also important in assuring adequate protection of the fresh or slightly saline water.

In 1961, about 3,000,000 barrels (374 acre-feet) of salt water was discharged directly into surface-water courses in Aransas County. This method is widely used in oil fields situated near natural bodies of salt water where there is little or no danger of contamination of ground water.

The water-bearing units in Aransas County may also be invaded by salt water from improperly cased oil wells and oil tests. The Oil and Gas Division of the

Railroad Commission of Texas is responsible for establishing rules for the proper construction of oil wells. The Texas Water Development Board supplies data to oil operators and to the Railroad Commission so that all fresh-water strata may be protected. The term "fresh water" as used by the Railroad Commission may include water that is more mineralized than the "fresh to slightly saline water" used in this report.

A study of the published field rules of the Railroad Commission of Texas indicates that 14 oil and gas fields have rules governing the amount of cemented casing required to protect the fresh to slightly saline water in Aransas County. This investigation did not reveal any salt-water contamination as a result of inadequately or improperly cased oil wells.

AVAILABILITY OF GROUND WATER

The Gulf Coast aquifer and the Pleistocene barrier island and beach deposits are the principal sources of ground water for future development in Aransas County. The Holocene barrier island deposits locally contain relatively small supplies of water.

Figure 17 shows the potential for ground-water development in Aransas County. The delineation of areas within the county that are favorable for the development of ground water depends largely upon the saturated sand thickness and the quality of the water. A map of the county showing the thickness of sand containing fresh to slightly saline water reveals that thicknesses range from 0 to more than 200 feet (Figure 18). In most of the county, this sand contains only slightly saline water. The only significant fresh-water occurrence is on Live Oak Peninsula where the total thickness of sand containing fresh to slightly saline water ranges from 0 to less than 150 feet.

Despite the fact that almost all of the water presently being used in Aransas County is obtained from sand that underlies Live Oak Peninsula, this area of the county is the most favorable for development of additional fresh to slightly saline ground water. The quality of the water from wells on the peninsula is generally good, and many of the wells are capable of yielding moderate quantities of water. Water from most of the producing wells has a chloride content of less than 300 mg/l. (See Figure 12).

The quantity of ground water available for development on Live Oak Peninsula mainly depends upon the quantity of water in storage, the quality of the water, and the rate of recharge. About 25 square miles of the peninsula is underlain by both fresh and slightly saline water which extends to a maximum depth of more than 200 feet below land surface. The average accumulative thickness of sand is estimated to be about 125 feet. Assuming a porosity of 30 percent, the volume of fresh and slightly saline water in storage is about 600,000 acre-feet. Of this volume, about 300,000 acre-feet is recoverable but is subject to contamination from salt-water intrusion if the supply is pumped excessively.

To prevent this supply from being depleted and from being contaminated by salt-water intrusion, the rate of withdrawal by wells should not exceed the rate of recharge from rainfall. On the basis of a correlation of precipitation records with fluctuations of the water levels in wells, the amount of recharge from precipitation to the aquifers underlying Live Oak Peninsula has been estimated to be approximately 8 inches annually. This is equivalent to about 11,000 acre-feet of water, which replenishes the ground-water supply each year. As a comparison, slightly more than 1 inch of recharge would be required to replace the 1,600 acre-feet of ground water used for all purposes in 1966.

The 11,000 acre-feet of recharge represents the maximum quantity of water that could be pumped annually on Live Oak Peninsula on a long-term basis. Full recovery of the 11,000 acre-feet of annual recharge would require uniform spacing of wells and pumping rates that would lower the water table enough to prevent evapotranspiration. Under the present high-standing water table in much of the area, evaporation and transpiration consume most of the recharge.

Figure 17 shows a large area in the county that is unfavorable for the development of fresh water. In this area, which includes most of the northern half of the county, including most of the Aransas National Wildlife Refuge and Copano and Aransas Bays, slightly saline water greatly predominates over fresh water; and the chloride content usually exceeds 400 mg/l. An estimate of the amount of slightly saline water that can be pumped in this area on a long-term basis can be made by calculating the amount of water moving through the aquifers. Because adequate hydrologic data were not available within the county, hydrologic data in adjoining counties were used to arrive at an estimate of availability.

The quantity of slightly saline water moving through the Gulf Coast aquifer was calculated by the formula $Q = TIW$, in which Q is the quantity of water in gallons per day moving through the aquifer, T is the coefficient of transmissibility in gallons per day per foot, I is the hydraulic gradient of the piezometric surface in feet per mile, and W is the width of the aquifer in miles normal to the hydraulic gradient. Mostly on the basis of data available in Refugio and San Patricio Counties, the hydraulic gradient in Aransas County was assumed to be about 5 feet per mile and the coefficient of transmissibility about 15,000 gpd (gallons per day) per foot for a section of the aquifer having an average of 150 feet of saturated sand. The section lies along a line 25 miles long trending northeastward across the northern half of the county. Under these assumptions, the quantity of slightly saline water moving through the aquifer is about 2 mgd or about 2,000 acre-feet per year. This quantity

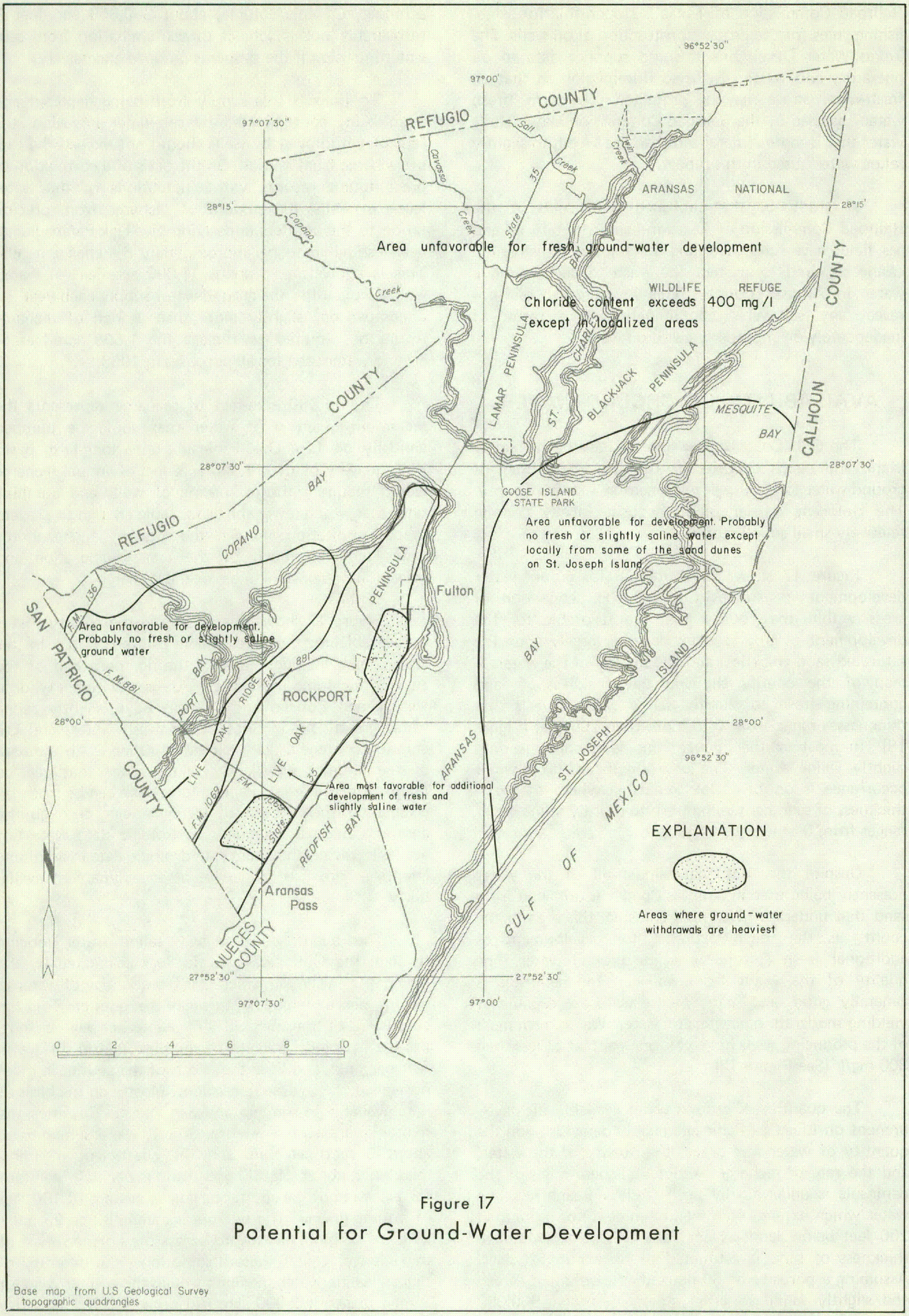


Figure 17

Potential for Ground-Water Development

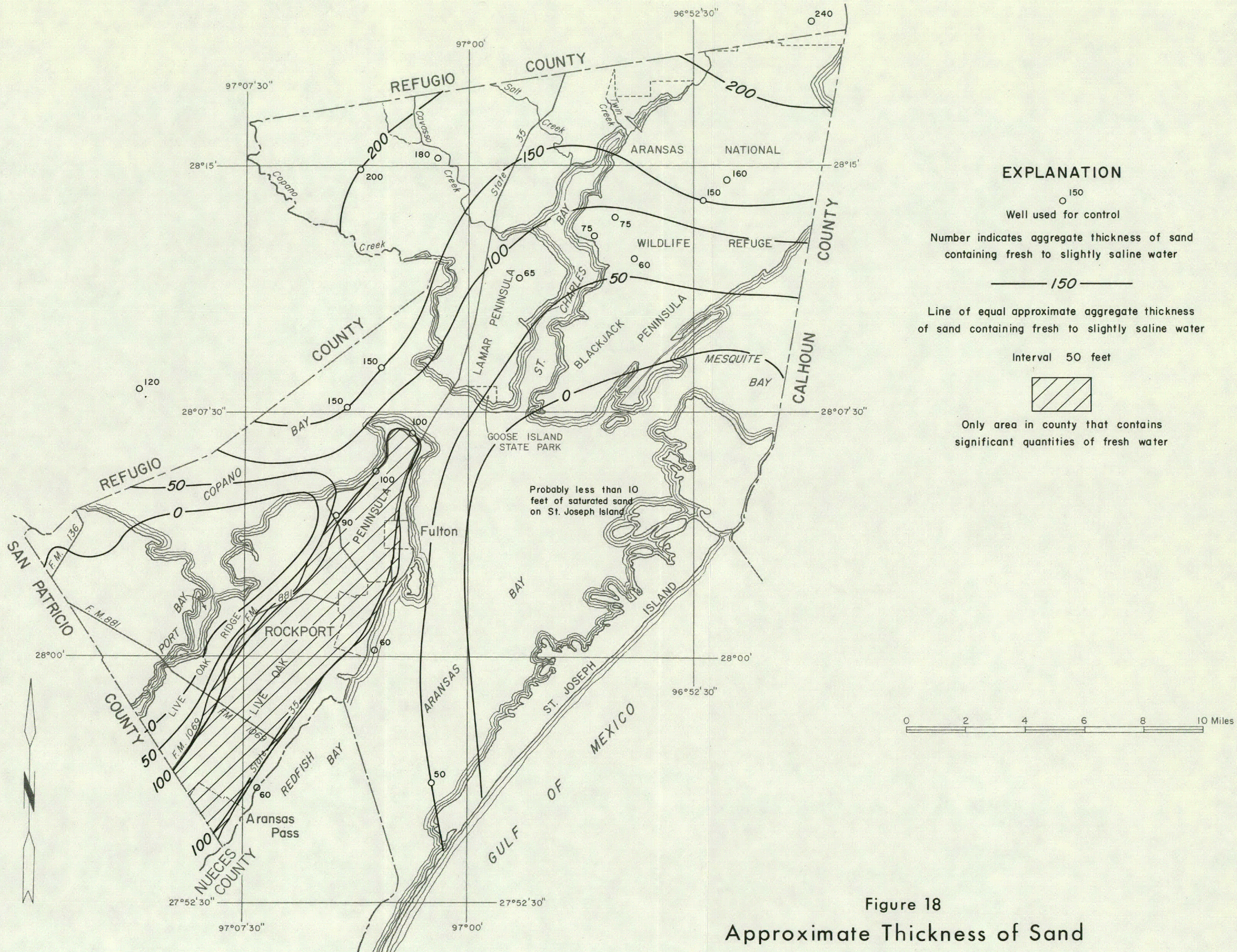


Figure 18

Approximate Thickness of Sand Containing Fresh to Slightly Saline Water

Base map from U.S. Geological Survey topographic quadrangles

of slightly saline water could probably be pumped on a long-term basis providing proper well spacing and pumping rates are taken into consideration to prevent encroachment of more highly mineralized water.

Figure 17 shows two areas that are unfavorable for ground-water development principally because they contain no fresh or slightly saline water of consequence. One of the areas is west of Live Oak Peninsula. All wells presently in this area pump only small quantities of water principally for livestock use; none of the water sampled was fresh or slightly saline. The other area, east of Live Oak Peninsula, includes a part of Aransas Bay and most of St. Joseph Island. Wells on the island are sand-point wells that yield small quantities of water from the Holocene barrier island deposits. The quality of this ground water varies considerably, but generally it is high in chlorides.

A factor limiting full development of the fresh or slightly saline water in many parts of the county is the threat of salt-water intrusion, both vertically and horizontally. The hydrologic section (Figure 19) shows that the Gulf Coast aquifer contains moderately and very saline water mainly in its lower portions, and that this water is adjacent to portions of the aquifer containing less mineralized water.

Moderately saline water probably underlies the base of the slightly saline water (Figure 20). This base becomes progressively deeper northward, reaching a maximum depth of more than 1,400 feet below sea level near the northwestern tip of the county. Throughout much of the county, fresh or slightly saline ground water is also overlain by moderately saline ground water. It was not possible to map the extent of the overlying moderately saline water, but available data indicate that this shallow water is present in the northwest corner of the county and in the central part as shown in the hydrologic section (Figure 19). Large-scale development of either fresh or slightly saline water in areas near an interface with more highly mineralized water should be avoided.

In summary, the Aransas County area is one in which only small quantities of fresh and slightly saline ground water can be developed. For this reason, it would be well to consider the moderately saline water as an important resource. The base of this water ranges in depth below sea level from less than 600 feet in parts of Aransas Bay and on St. Joseph Island to more than 1,600 feet in the northwestern tip of the county (Figure 21). Available electrical log data indicate that the sand containing moderately saline water probably has an aggregate thickness comparable to the sand that contains the slightly saline water. Much of the moderately saline water is readily available to wells, and if the demineralization of saline water becomes economically feasible, moderate to large quantities of water will be available for future development anywhere in the county.

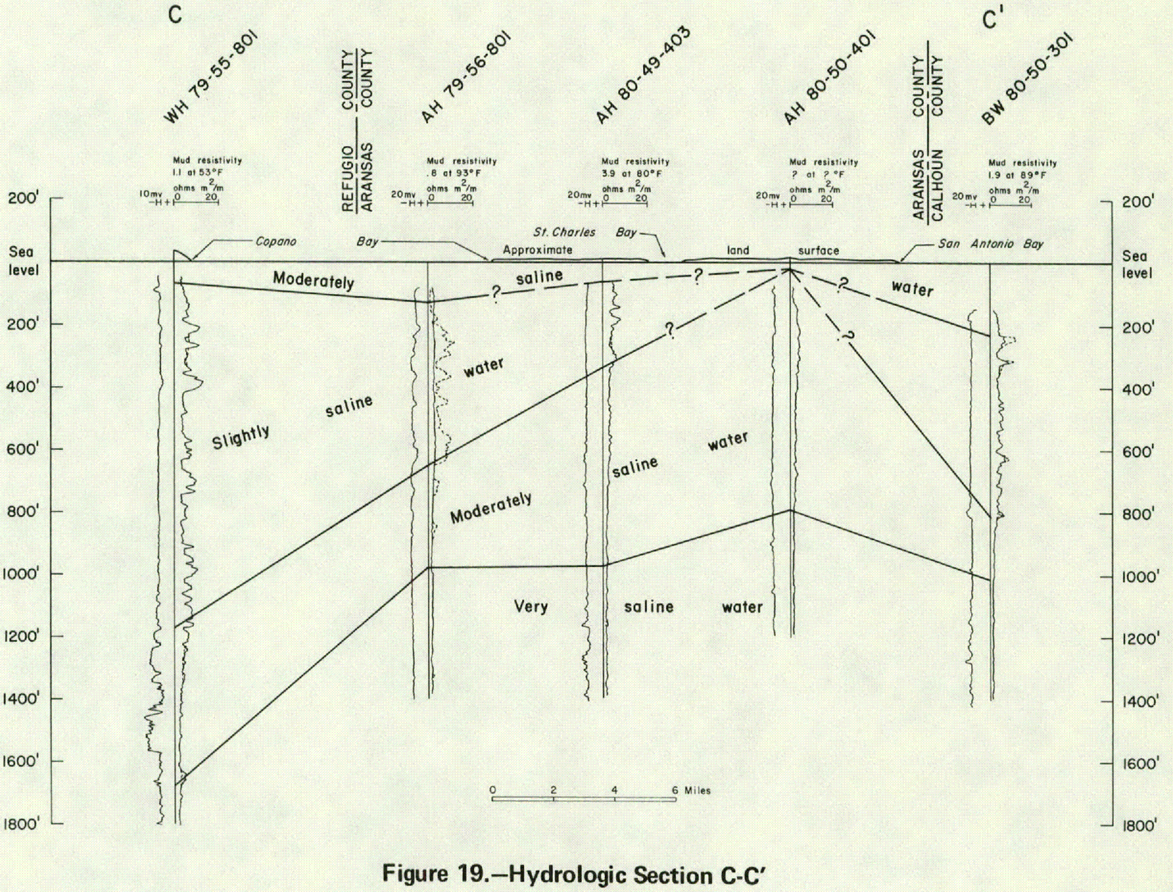


Figure 19.—Hydrologic Section C-C'

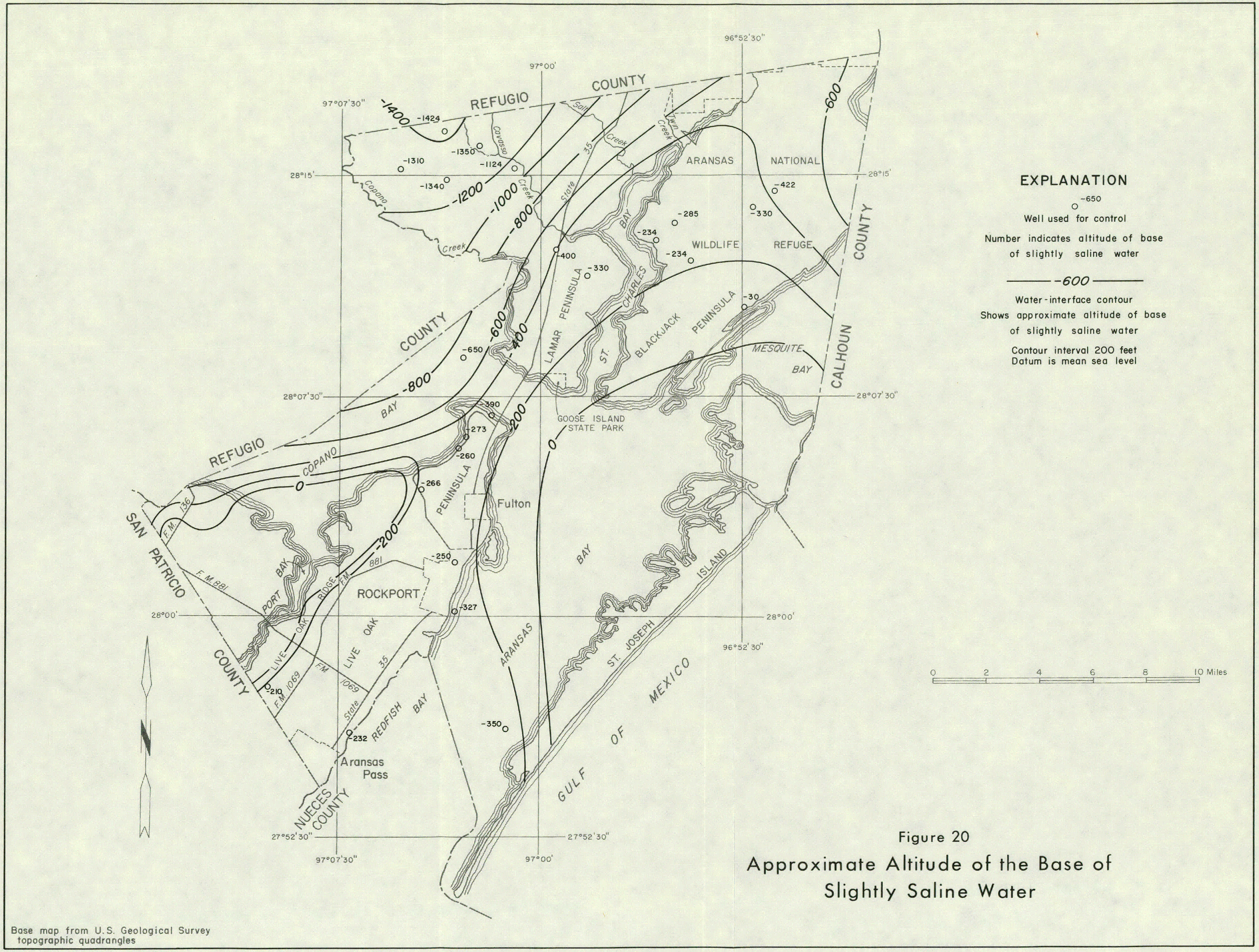


Figure 20

Approximate Altitude of the Base of Slightly Saline Water

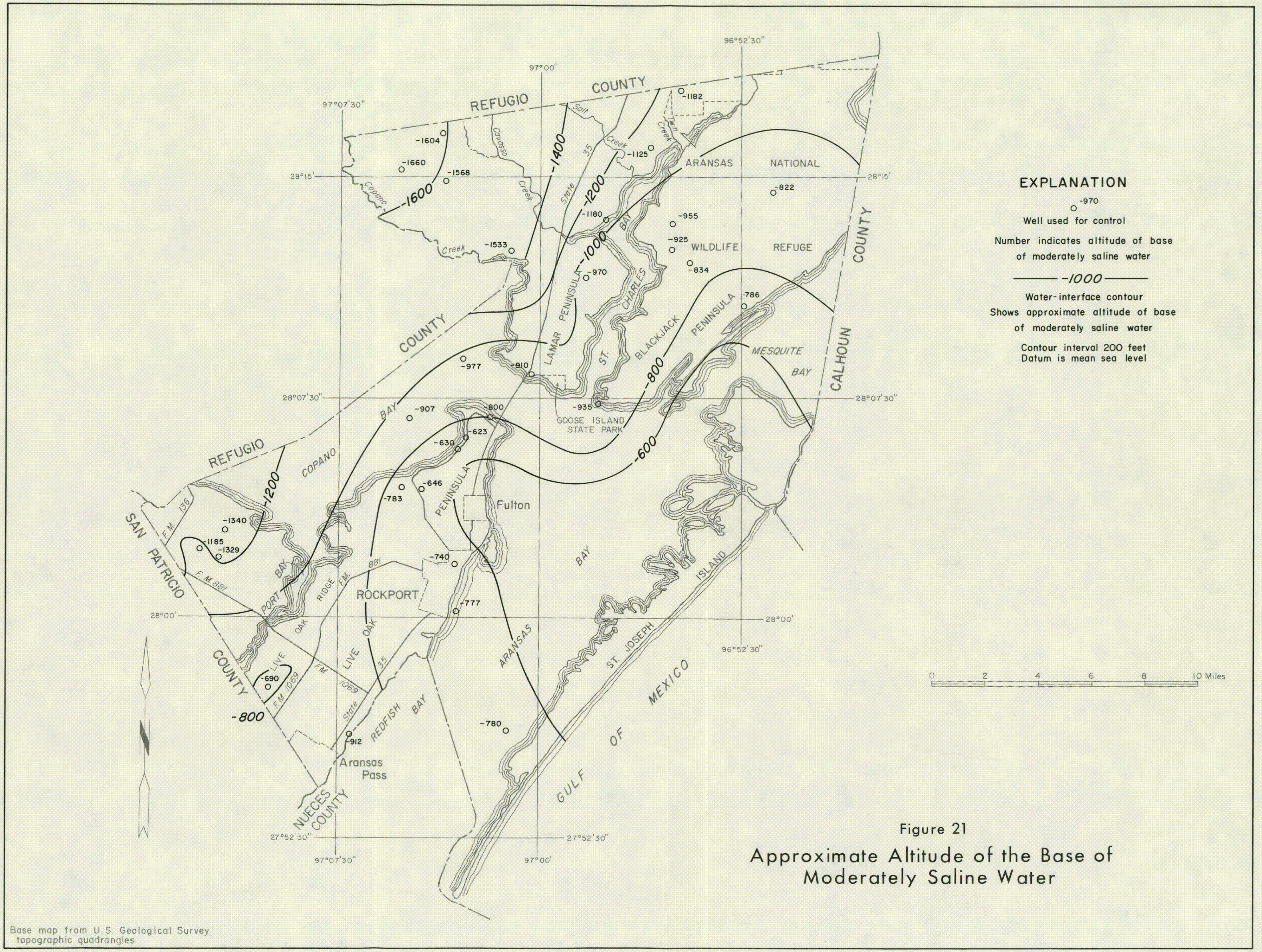


Figure 21

Approximate Altitude of the Base of Moderately Saline Water

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Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas

All wells are drilled unless otherwise noted in Remarks column.

Water level : Reported water levels given in feet; measured water levels, given in feet and tenths.
Method of lift and type of pump: A, airlift; Cf, centrifugal; E, electric; G, gasoline; H, hand; J, jet; N, none; P, piston; Ng, natural gas; T, turbine; W, windmill. Number indicates horsepower.
Use of water : D, domestic; Ind, industrial; I, irrigation; N, none; P, public supply; S, livestock.
Water-bearing unit : BI, barrier island deposits; BB, barrier island and beach deposits; GC, Gulf Coast aquifer.

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING		WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	REMARKS
				DIAMETER (IN.)	DEPTH (FT)			ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT			
						Aransas County						
AH-79-48-701	Tom O'Connor Est.	1952	1,000	2	--	GC	31	+17.0	Sept. 30, 1961	Flows	S	
703	R. H. Winsor Est.	1952	8,507	--	--	--	[3] 40	--	--	--	U	Oil test. [1]
802	J. M. Tatton	--	900	2	--	GC	16	+26.0	Oct. 3, 1961	Flows	S	
803	V. H. Tatton No. 3	--	1,900	2	--	--	[3] 40	--	--	--	U	Oil test. [1]
902	V. H. Tatton No. 10	1953	9,526	--	--	--	[3] 33	--	--	--	U	Do.
903	Sohio Oil Co.	1956	1,253	--	--	--	[3] 16	--	--	--	U	Do.
56-201	V. H. Tatton	1960	6,515	--	--	--	[3] 32	--	--	--	U	Do.
* 202	J. M. Tatton	old	830	6	820	GC	--	+	--	Flows	S	Flowing in 1966. Measured discharge was 5 3/4 gpm in 1939. Screened 820 ft to 830 ft.
* 203	do	1933	1,201	6	1,175	GC	--	+	--	Flows	S	Screened 1,175 ft to 1,200 ft. Yield was 35 gpm when drilled.
* 301	do	old	1,000	6	980	GC	--	+	--	Flows	S	Screened 980 ft to 1,000 ft.
* 302	do	old	850	6	840	GC	--	+	--	Flows	S	Flowing 1966. Screened 840 ft to 850 ft.
303	V. H. Tatton No. 2	1957	7,578	--	--	--	--	--	--	--	U	Oil test. [1]
801	State of Texas	--	--	--	--	--	[3] 15	--	--	N	U	Do.
* 901	Tenneco Oil Co.	1959	398	4.8	370	GC	--	--	--	T,E, 5	D,Ind	Supplies two company houses. Reported slightly saline. Plant started operation 1959. Estimated use-50 barrels a week. Yield was 65 gpm in 1959. [2]

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
AH-79-56-902	Emma Huddleston	1959	7,207	--	--	--	--	--	--	--	U	Oil test. 1/
* 63-401	Joe Mauch	1949	165	4	155	GC	19	12.0 11.6	Nov. 13, 1959 Feb. 28, 1967	T,E, 3/4	S	Reported salty. Used for observation well.
501	Martin Wheeler	1940	198	--	--	GC	--	--	--	J,E	D	5,000 mg/l chloride reported by owner in 1967.
* 502	Bankers Mortgage Co.	1920	750	4	--	GC	--	--	--	N	U	Destroyed. Well caved in about 10 years ago. Reported flow, 75 gpm in 1939. Formerly water used for livestock.
* 503	Martin Wheeler	1963	360	--	--	GC	20	14.1	Mar. 7, 1967	J,E,1	S	Pump set at 100 ft.
504	Bankers Mortgage Co. No. 46-1	1967	9,257	--	--	--	3/ 30	--	--	--	U	Oil test. 1/
701	Bankers Mortgage Co. No. 1	1950	9,726	--	--	--	15	--	--	--	U	Do.
* 801	Bankers Mortgage Co.	1956	199	4	187	GC	9	4.8 4.9	Nov. 13, 1959 Feb. 28, 1967	P,W	S,D	Used for observation well. This well is a replacement well for old well 16 in 1940 report; is 10 ft northeast of old well. Screened 187 ft to 199 ft. 4/
* 802	do	1962	190	4	--	GC	8	4.8	Jan. 18, 1967	P,W,6	S,D	Weak supply, not used for drinking, (salty). Drilled to replace well 7 in 1940 report.
* 803	do	1938	190	4	--	GC	9	--	--	P,W,6	S,D	Water reported slightly salty; supplied water for family and cattle in 1939.
804	Mortgage Land & Inv. Co.	1942	7,508	--	--	--	3/ 21	--	--	--	U	Oil test. 1/
* 902	Port Bay Hunting Club	1928	225	3	--	GC	8	7.7	Jan. 19, 1967	N	U	Several holes drilled to more than 400 ft produced only salty water. Formerly used for livestock.
903	J. T. Stellman	1965	148	24,8	94	GC	--	16	1965	T,E,5	D,I,S	Screened 94 ft to 144 ft. Reported yield of 90 gpm. Test hole to 557 ft; plugged back to 148 ft.
* 904	Bankers Mortgage Co.	1930	225	4	--	GC	--	60	1939	P,W	S	

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
AH-79-64-201	Mrs. Mike O'Donnell	1964	50	4	--	GC	10	9.5	Feb. 14, 1967	J,E, 1/2	D	
202	State of Texas	1948	7,301	--	--	--	3/ 17	--	--	--	U	Oil test. 1/
203	American Petrofina	1966	8,119	--	--	--	3/ 13	--	--	--	U	Do.
204	Renwar Oil Co.	1948	7,861	--	--	--	3/ 20	--	--	--	U	Do.
* 301	Aransas County	1957	186	16,8	130	GC	--	--	--	T,E,5	S,D	Estimate pump runs four hours per day; total for 3 pumps is about 35,000 gpd in 1959. Well still used in 1967, but not as much as in 1959. Yield was 55 gpm in 1959. Supplies water for 5 or 6 families.
* 302	do	1957	186	16,8	124	GC	--	--	--	T,E,5	S,D	Estimate pump on 4 hours per day (1959). Yield was 55 gpm in 1959. 1/ 2/
* 303	do	1957	187	16,8	130	GC	--	--	--	T,E,5	S,D	Estimate pump on 4 hours per day (1959). Yield was 35 gpm in 1959. 1/ 2/
* 304	B. B. Bettell	1949	125	4	--	GC	--	--	--	T,E, 3/4	D	
* 305	N. W. Cochran	1949	130	4	120	GC	--	--	--	A,E,1	D	Screened 120 ft to 130 ft.
* 306	Joe H. Slocum	1952	165	4	144	GC	12	14.0	Nov. 19, 1959	A,E, 3/4	D	Screened 144 ft to 163 ft.
* 307	Phillips Petroleum Co.	1964	126	4	120	GC	--	--	--	T,E,2	D	There are 5 or 6 wells here, all in a line; each has same type of pump. A resident (Mr. McCord) says the wells are all the same depth. They supply water for several houses. 2/
308	State of Texas	1949	7,602	--	--	--	3/ 10	--	--	--	U	Oil test. 1/
* 401	John P. Grimme	1930	60	3	--	GC	9	9.0 6.8 9.9	June 15, 1939 Nov. 13, 1959 Jan. 17, 1967	J,E, 1/2	S,D	"Old windmill still stands over well" (1959). There is a new well about 40 ft northeast of this well (1967).

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN.)	CASING DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
AH-79-64-402	-- Johnson	old	85	4	--	GC	6	3.6	Jan. 19, 1967	J,E, 1/2	S	Reported salty.
403	A. J. Mitchell	1963	236	2	225	GC	--	11	--	J,E, 3/4	D	Water too salty to drink reported. Screened 225 ft to 230 ft. 2/
* 404	Gordon Green	1963	233	4	223	GC	5	4.7	Feb. 14, 1967	J,E, 1/2	D	Water not used for drinking. Screened 223 ft to 233 ft. 2/
* 405	Copano Water Co.	1963	58	3	42	GC	--	14	1967	J,E, 1/2	P	One of three wells used to supply Copano Core and Copano Ridge subdivisions. All three wells are in a 50 ft triangle powered by one pump. Presently pumping 5,000 gpd, but will triple this during April-September. Presently, there are 65 customers, 25 permanent, others on weekends. See well AH-79-64-406 and 407. Screened 42 ft to 58 ft. 2/
406	do	1963	58	3	42	GC	--	--	--	J,E, 1/2	P	See well AH-79-64-405. Screened 42 ft to 58 ft.
407	do	--	58	3	42	GC	--	--	--	J,E, 1/2	P	Do.
408	V. O. Gwynn	1948	7,750	--	--	--	--	--	--	--	U	Oil test. 1/
* 501	--	--	28	3	--	BB	15	9	Feb. 7, 1967	J,E, 1/4	S	
502	Aransas County	1963	70	6	51	GC	--	--	--	--	I	Screened 51 ft to 58 ft.
503	City of Rockport No. 17	1966	221	14,8	118	GC	--	39.0	June 23, 1966	T,E, 15	P	Pumping test run by driller. 76 ft of drawdown. Pumped 187 gpm for 10 hours. 2/
504	City of Rockport	1966	230	14,8	130	GC	--	35.0	June 15, 1966	T,E, 15	P	128 ft of drawdown. Pumped 185 gpm for 10 hours. Screened 130 ft to 158 ft; 177 ft to 225 ft. 2/
505	J. T. Stellman	1965	144	20,8	89	GC	--	--	--	T,E,5	I	55 ft slotted pipe 89 ft to 144 ft. 2/
506	Modesett-Ken. Co.	1963	8,192	--	--	--	3/ 14	--	--	--	U	Oil test. 1/

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN.)	CASING DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
* AH-79-64-601	A. G. Collin	1942	69	3	--	GC	--	--	--	A,E, 1/3	D	"Well is by house, but is covered over - not visible on the surface."
602	L. D. Green	1963	62	4	--	GC	--	--	--	J,E	D	2/
* 603	Key Allegro Co.	1963	182	12,8	158	GC	--	6	--	T,E, 5	D,I,P	42,000 gallon concrete storage tank. 2-in. line from city of Rockport to supplement supply (principally during summer). Well was test pumped for 12 hours; pumped 100 gpm with 21 ft drawdown. 6-inch screen 158-182 ft.
701	Z. F. Roquette	1952?	130	5	130±	GC	5	5.4 9.9	Nov. 12, 1959 Feb. 28, 1967	J,E, 1 1/2	D	Used for observation well. Originally drilled to supply water for oil rig. Another well was drilled 80 ft southwest at the same time. It could be opened for measurement (1959). 4/
702	"Red" Harrist	1926	42	4	--	GC	6.5	6.0 18.6	May 17, 1939 June 25, 1942	N	U	Abandoned. Formerly observation well. 4/
703	Ben Dupnick	1962	135	4	--	GC	15.0	--	--	J,E, 1/2	S,D	
* 704	Marvin Townsend	1965	145	4	120	GC	10	27.6	Feb. 10, 1967	J,E, 1/2	D	Screened 120 ft to 145 ft. 2/
* 705	Live Oak County Club #1	1963	135	8	53	GC	--	16	1967	T,E, 5	D,I	Screened 53 to 68 ft and 115 to 135 ft. 2/ Yield was 65 gpm in 1967.
706	Live Oak County Club #2	1963	134	8	46	GC	--	16	1967	T,E, 5	D,I	Screened 46 to 61 ft and 115 to 132 ft. Yield was 65 gpm in 1967. 2/
* 707	Live Oak County Club	1952±	64	2	--	GC	--	--	--	T,E, 1	D,I	Water used for yard and swimming pool.
* 708	State of Texas	1939	48	--	--	GC	5.2	6.0	July 17, 1939	N	U	Destroyed. Formerly was a test well. See Figure 14. 2/
* 709	do	1939	93	--	--	GC	10.1	5.0	July 7, 1939	N	U	Do.
* 710	do	1939	92	--	--	GC	12.7	7.0	June 27, 1939	N	U	Do.

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
* AH-79-64-711	State of Texas	1939	98	--	--	GC	18	16	Sept. 1, 1939	N	U	Destroyed. Formerly was a test well. See Figure 14. 2/
* 712	do	1939	115	--	--	GC	19.3	14	June 13, 1939	N	U	Do.
801	City of Rockport No. 1	1938	78	13,6	68	GC	--	7	1938	T,E, 3	P	Screened 68 to 78 ft; 13 in. casing to 47 ft, 6 in. casing to 78 ft. Yield was 40 gpm in 1938. 2/
802	City of Rockport No. 2	1938	78	13,6	68	GC	--	7	1938	T,E, 3	P	Screened 68 ft to 78 ft. Yield was 40 gpm in 1938. 2/
* 803	City of Rockport No. 3	1944	78	16,10	53	GC	--	16 11.9	1944 Nov. 4, 1959	T,E, 3	P	In 1959, drawdown was 28 ft, yield was 30 gpm, and pumping level was 61 ft. Screened 53 ft to 78 ft.
809	City of Rockport No. 10	1952	200	8	--	GC	--	--	--	T,E, 7 1/2	P	Drilled as test hole to 1,378 ft. Plugged back to 200 ft. 80 ft of screen total; lowest screen from 170 ft to 200 ft. Yield was 80 gpm in 1959. 1/
810	City of Rockport No. 4	1947	227	16,8	45	GC	--	8	1947	T,E, 7 1/2	P	Screened 45 ft to 76 ft. 2/
811	City of Rockport No. 12	1954	197	16,8	47	GC	--	14	1954	T,E, 15	P	Screened 47 to 64 ft, 105 to 119 ft, 127 to 139 ft, and 151 to 192 ft. Yield was 175 gpm in 1959. 1/
812	City of Rockport No. 13	1958	204	16,8	53	GC	--	34	1958	T,E, 15	P	Screened 53 to 78 ft, 108 to 138 ft, and 158 to 198 ft. Yield was 175 gpm in 1958. 2/
813	C. A. Roe	old	29	4	--	BB	17	5.2 11.4	May 30, 1940 Jan. 12, 1967	Cf,E, 1/2	D,Ind	Used as observation well. 4/ Provides water for slaughter house.
* 814	H. G. Smith	1936	58	4	--	GC	10.4	16.3 6.0	June 19, 1939 Sept. 30, 1960	--	U	Abandoned. Formerly an observation well. Well inside one of the buildings at service station. 4/
815	City of Rockport No. 11	1954	199	16,8	46	GC	--	10.0	1954	T,E	P	Screened 46-60 ft, 111-114 ft, and 158-176 ft. 1/ 2/
816	Jack Rogers	1940	60	4	--	GC	24.0	+13.0 7.6	Mar. 23, 1940 Nov. 16, 1949	P,H	S,D	Formerly observation well. Other water level measurements in file. 4/

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN.)	CASING DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
AH-79-64-817	L. W. Hight	1966	46	4	--	GC	7.0	4.7	Feb. 15, 1967	J,E, 1/2	D	2/
* 818	John Clark	1966	133	4	--	GC	20	34.1	Feb. 16, 1967	J,E, 1/2	D	Another well, unused, no pump, about 7 or 8 ft east which is 60 ft deep (reported). Water level is 7.25 ft below top casing 1 ft above land surface. This well is representative of a large number of recently drilled wells in this (West Tarrace) subdivision. 2/
819	Wagley Lumber Co.	1966	152	4	142	GC	--	--	--	J,E, 1/2	D	Screened 142 ft to 152 ft. Pump set at 75 ft. 2/
820	City of Rockport No. 16	1966	216	14,8	112	GC	--	--	--	T,E, 15	P	Screened 112-152 ft and 171-211 ft. 2/
* 821	City of Rockport No. 15	1964	208	14,8	156	GC	--	44.0	Aug. 22, 1964	T,E, 15	P	100 ft of drawdown, pumped 140 gpm for 11 hours. Screened 156 ft to 206 ft. Casing is cemented. Pumping test by driller in file. 1/ 2/
822	City of Rockport No. 14	1958	209	--	--	GC	--	--	--	--	U	Used as a test well. Test hole is 6 3/4 in. 1/ 2/
823	State of Texas	1961	11,045	--	--	--	3/ 23	--	--	--	U	Oil test. 1/
* 824	do	1939	118	--	--	GC	26	18.0	June 5, 1939	N	U	Destroyed. Formerly test well. See Figure 14. 2/
* 825	do	1939	100	--	--	GC	15.6	4.0	June 7, 1967	N	U	Do.
* 826	do	1939	111	--	--	GC	10.8	16.0	May 25, 1939	N	U	Do.
* 827	do	1939	120	--	--	GC	6.0	10.0	do	N	U	Do.
80-41-602	Southland Drilling Co.	1963	7,595	--	--	--	3/ 18.0	--	--	--	U	Oil test. 1/
* 701	J. M. Tatton	1954±	340	4	--	GC	11.0	8.3	Dec. 21, 1966	P,W	S	
702	do	old	338	4	--	GC	15	11.4	do	P,W	S	

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING		WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	REMARKS
				DIAMETER (IN.)	DEPTH (FT)			ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT			
* AH-80-41-801	J. M. Tatton	1930's	78	8,4	--	GC	14	16.7 14.4 17.0	Oct. 19, 1959 Oct. 11, 1961 Dec. 21, 1966	P,W	S	
802	do	1956	117	4	--	GC	10	19.4	Oct. 11, 1961	P,W	S	Reported "sanded-up" in 1966. Has not been used in about five years.
803	do	old	240	8	--	GC	7.0	5.3	Dec. 20, 1966	P,W	S	Well not in use at present (1966). Screened 220 ft to 240 ft.
804	do	--	368	--	--	GC	--	--	--	P,W	S	
806	do	1955	7,508	--	--	--	--	--	--	--	U	Oil test. 1/
902	U.S. Government Aransas National Wild Life Refuge	1954	256	4	--	GC	10	4.2	Nov. 16, 1959	T,E	S	Current observation well. Another well, old and unused, formerly flowed here (reported). Water level now 6.25 ft below top of casing, one ft above land surface. May be same well. Hole in casing 2.0 ft above land surface. 4/
903	do	1954	--	8	--	--	6.0	+	--	P,W	S	Well flows, but mill installed to provide more water.
* 42-402	do	old	20	2	--	BB	12	--	--	P,W	U	Well filled. See Remarks on well 403.
403	do	1964	126	4	--	GC	10	4.5	Dec. 14, 1966	S,E,1	S,D	Drilled to replace old well AH-80-42-402 which is now filled. Several holes were drilled here. The deepest, 500 ft, had salty water, as did the 200 ft well. The altitude of the water level in the old well was +5 in 1959, about same elevation as present well. Hole in cover plate 1.0 ft above land surface.
* 502	U.S. Government	old	20	4,2	--	BB	8.0	4.0	do	P,W	S	
504	do	1956	57	3	--	GC	17.0	11.2	Nov. 16, 1959	N	U	

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
*AH-80-42-505	U.S. Government	--	199	4	--	GC	17.0	10.9	Dec. 14, 1966	J,E,1	D	Known as Headquarters Well (1966). Two other wells, old and unused, are here (see 504). Well with 6-in casing between 504 and 505, the water level was 15.17 ft below top casing. Two ft above ground level on December 14, 1966.
506	do	1966	32	--	--	BB	--	7.6	do	P,W	S	
* 702	do	old	20	2	--	BB	--	--	--	P,W	S	Sand-point well.
703	do	old	20	2	--	BB	15.0	--	--	P,W	S	Do.
704	do	--	24	8,2	--	BB	10.0	6.7	Dec. 14, 1966	P,W	S	Formerly Venada Mill. Drilled to replace AH-80-42-701 which was about same depth. Temp. 74° F.
705	do	1933±	24	2	--	BB	13.0	--	--	P,W	S	Known as "Salado Mill." Driven, sand point well. Water reported salty.
801	do	old	20	2	--	BB	16.0	--	--	P,W	S	
* 803	do	1966	220	4	--	GC	15.0	8.8	Dec. 14, 1966	S,E	D	Old well was 208 feet deep (old well 802 filled).
804	do	old	24	2	--	BB	--	--	--	P,W	S	Known as "Sierritos Mill." Sand-point well.
49-101	J. M. Tatton	1951	9,002	--	--	--	3/ 13.0	--	--	--	U	Oil test. Base fresh water 410 ft. Sand thickness 50 ft. 1/
102	do	1954±	300	4	--	GC	6.0	4.7 6.8	Nov. 16, 1959 Dec. 21, 1966	-- --	-- S	
103	North Central Oil Co.	1959	8,942	--	--	--	3/ 20.0	--	--	--	U	Oil test. 1/
201	St. Charles No. 18	--	--	--	--	--	3/ 25.0	--	--	--	U	Do.
202	St. Charles No. 15	1951	8,800	--	--	--	3/ 26.0	--	--	--	U	Do.
* 203	U.S. Government	old	20	2	--	BB	10.0	--	--	P,W	S	
204	St. Charles No. 10	1949	10,587	--	--	--	3/ 25.0	--	--	--	U	Oil test. 1/
* 301	U.S. Government	old	24	2	--	BB	13.0	--	--	P,W	S	Sand-point well.

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
* AH-80-49-401	John Zarsky	1966	351	4	335	GC	8.0	9.3	Dec. 12, 1966	J,E, 1/2	S	Screened 335 ft to 345 ft. 2/
402	do	1960	412	4	--	GC	--	10.0	--	Cf,E, 1/2	S,D	
403	V. H. Tatton	1949	10,015	--	--	--	3/ 20.0	--	--	--	U	Oil test. 1/
601	Western National Gas Company	1949	300	8	--	GC	13.0	9.9	Nov. 16, 1959	P,E,1	D	"Estimated 800 gpd used" (1959).
602	U.S. Government	old	24	2	--	BB	9.0	--	--	P,W	S	Two sand-point wells.
603	do	old	24	2	--	BB	8.0	--	--	P,W	S	There are two wells.
604	do	old	24	2	--	BB	11.0	--	--	P,W	S	There are three wells.
605	St. Charles No. 9	1948	11,264	--	--	--	3/ 16.0	--	--	--	U	Oil test. 1/
701	Otto Key	1920±	105	4	--	GC	19.0	10.5	Nov. 13, 1959	J,E,?	D	"Windmill had been shut down for several days at least" (1959). Bottom is filled with gravel.
702	State of Texas	1964	63	--	--	GC	--	9.1 10.1 10.3	Mar. 9, 1966 Mar. 15, 1966 Feb. 28, 1967	D	D,P	Texas Water Development Board observation well.
703	R. E. House	1963	90	4	68	GC	--	20.0	--	J,E, 1/2	D	Open hole 68 to 90 ft. 2/
* 704	Harold Larson	1960±	194	8	--	GC	12	11.9	Feb. 8, 1967	J,E, 3/4	D	Slightly salty water reported.
705	M. E. Allerkamp	1966	182	4	170	GC	--	--	--	J,E, 3/4	D	Screened 170 ft to 182 ft. 2/
* 706	Holiday Beach Development Company	1964	233	7	209	GC	--	20.9	--	S,E,5	P	Screened from 208 to 233 ft. Casing cemented from 0 to 209 ft. Two wells. Both yield about 130 gpm each, and pump into a concrete reservoir. Well also supplies water for swimming pool. Pump set at 126 ft. 2/
* 707	Humble Oil Co. No. 1	--	179	--	--	GC	--	--	--	T,E,1	D	Screened 163 ft to 179 ft.

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN.)	CASING DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
* AH-80-49-708	C. F. Hedrick	1963	69	4	58	GC	--	15.0	--	T,E, 1/2	D	Screened 58 ft to 68 ft. Four in. casing from 0 to 58 ft. Sand 60 to 68 ft. [2]
* 801	U.S. Government	1928	438	2	--	GC	7.0	3.1	Dec. 14, 1966	P,W	S	Formerly flowed.
* 802	do	old	24	2	--	BB	7.0	--	--	P,W	S	
901	do	--	32	2	--	BB	6.0	7.2	Dec. 14, 1966	P,W	S	
50-101	Denman Heirs	--	200	4	--	GC	13.0	6.3	do	--	S	Drilled to supply water for oil well drilling.
102	do	1952±	250	4	--	GC	11.0	9.1	Dec. 14, 1965	N	U	Do.
103	do	1955 ?	250	4	--	GC	14.0	6.4	Dec. 14, 1966	N	U	Do.
* 104	U.S. Government	--	24	2	--	BB	7.0	--	--	P,W	S	
105	do	--	24	2	--	BB	--	--	--	P,W	S	
106	do	--	24	2	--	BB	10.0	--	--	P,W	S	Identical wells a few ft west are known as the "St. Carlos Mills."
107	Western Natural Gas Co.	1951	8,983	--	--	--	[3] 28.0	--	--	--	U	Oil test. [1]
108	do	1951	11,616	--	--	--	[3] 29.0	--	--	--	U	Do.
201	U.S. Government	--	24	2	--	BB	--	--	--	P,W	S	
401	St. Charles No. 11	1949	8,512	--	--	--	[3] 14.0	--	--	--	U	Oil test. [1]
57-101	State of Texas	1952	10,506	--	--	--	[3] 15.0	--	--	--	U	Do.
102	do	1952	11,178	--	--	--	[3] 15.0	--	--	--	U	Do.
601	Perry Bass Est.	--	13	2	10	BI	--	--	--	P,W	S	
602	do	--	13	2	10	BI	--	--	--	P,W	S	Known as "Ranch Well No. 10."
801	do	--	11	2	8	BI	--	--	--	P,W	S	
802	do	--	11	2	8	BI	--	--	--	P,W	S	Screened 8 ft to 11 ft.
803	do	--	11	2	8	BI	--	--	--	P,W	S	Known as "Well No. 5." Screened from 8 ft to 11 ft.

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN.)	CASING DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
AH-80-57-901	Perry Bass Est.	--	13	2	10	BI	--	--	--	P,W	S	Known as "Well No. 6." Screened from 10 ft to 13 ft.
58-401	do	--	12	2	9	BI	--	--	--	P,W	S	Screened 9 ft to 12 ft.
* 82-01-101	do	--	13	2	10	BI	--	--	--	P,W	S	Screened 10 ft to 13 ft.
* 201	do	--	13	2	10	BI	--	--	--	P,W	S	Do.
* 401	do	1945±	23	2	20	BI	--	--	--	P,W	S,D	Screened 20 ft to 23 ft. Four wells pump into common line that terminates in two storage tanks. Known as "Headquarters Well."
* 402	do	1945±	23	2	20	BI	--	--	--	P,W	S,D	See Remarks on well AH-82-01-401.
* 403	do	1945±	23	2	20	BI	--	--	--	P,W	S,D	Do.
* 404	do	1945±	23	2	20	BI	--	--	--	P,W	S,D	Do.
* 405	do	--	12	2	9	BI	--	--	--	P,W	S	Screened 20 ft to 23 ft.
* 406	do	1954	--	6	--	--	--	--	--	N	U	Top of casing is about 20 ft above land surface. Could not obtain depth of well.
83-07-201	J. P. Barry No. 1	1948	2,301	--	--	--	5.0	--	--	--	U	Oil test. 1/
301	L. R. Young	old	68	4	--	GC	9.1	11.4	Mar. 27, 1940	C,E, 1/2	S,D	Current observation well. 4/
* 302	B. Grant	1933	100	6	--	GC	9.7	20.5 13.4	May 10, 1939 Nov. 16, 1949	P,W	S	Formerly observation well. 4/
304	do	--	100	6	--	GC	11.6	16.3	Dec. 28, 1940	P,W	S	Do.
305	T. O. McCullough	1938	35	4	--	BB	9.3	13.8 14.2	Mar. 27, 1940 June 26, 1942	P,W	S,D	Do.
306	Steve Miller	? 1964	52	4	--	GC	12.0	13.8	Feb. 9, 1967	J,E, 1/2	D	Screened 46 ft to 52 ft. 2/
307	J. E. Veazey	1965	96	4	86	GC	12.0	12.5	Feb. 22, 1967	J,E, 1/2	D	Screened 86 ft to 96 ft.
308	Ruby Huffmeyer	--	150	4	--	GC	--	--	--	T,E, 1/2	D	

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
AH-83-07-309	United Carbon Company	1954	168	10	--	GC	--	10.2	Nov. 6, 1959	T,E 5	Ind	Screened 35 ft to 75 ft. 2/
* 310	J. F. Coulter	1957	200	4	--	GC	3.0	+2.0	Mar. 29, 1967	J,E, 1/2	D	Not used for drinking - "too salty." Owner said well flowed when drilled.
311	State of Texas	1939	40	--	--	GC	5.1	16.0	July 7, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 20. 2/
* 312	do	1939	74	--	--	GC	7.8	10.0	May 6, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 21. 2/
* 313	do	1939	83	--	--	GC	9.0	16.0	May 2, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 22. 2/
* 314	do	1939	84	--	--	GC	11.5	16.0	May 9, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 23. 2/
* 315	do	1939	82	--	--	GC	12.3	10.0	Apr. 26, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 25. 2/
* 316	do	1939	101	--	--	GC	15.1	16.0	Apr. 18, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 27. 2/
* 317	do	1939	133	--	--	GC	25.0	22.0	do	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 55. 2/
* 601	C. M. Vaughan	1937	160	6	30	GC	10.0	18.3 11.2	Dec. 5, 1940 Feb. 28, 1967	A	S,D	Current observation well. Pumping test run on well. Drawdown on observation well, 1.37 ft (1966) for one day. Specific capacity was 32.8 gpm/ft for one day (observed). See other measurements in file. Screened 30-35 ft, 108-118 ft, and 150-160 ft. 4/

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN.)	CASING DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
*AH-83-07-602	Atlantic Ref. Gas Co.	1958	179	--	155	GC	--	--	--	A,Ng	Ind	"Estimated yearly pumpage is 22,995 gallons." Water used for cooling tower. Screened 155 ft to 179 ft.
604	do	1954	100	10	31	GC	20.0	19.8	Feb. 16, 1967	T,E,5	Ind	Screened 31-62 ft. Yield was 36 gpm in 1966. Plant well L-5. 1/ 2/
605	do	1956	121	10	83	GC	--	--	--	T,E,5	Ind	Screened 83 ft to 121 ft. Yield was 12.4 gpm in 1966. Plant well L-7. 2/
606	do	1954	105	20,10	60	GC	--	--	--	T,E,5	Ind	Yield was 13 gpm in 1966. Screened 60 ft to 82 ft. Plant well L-1. 1/ 2/
607	United Carbon Co.	1954	100	20,10	60	GC	--	--	--	T,E,5	Ind	Yield was 30.9 gpm in 1966. Screened 60 ft to 85 ft. Plant well L-4. 1/ 2/
608	E. N. Ovalline	1938	60	10	--	GC	10.3	5.7 8.2	Nov. 21, 1940 Feb. 13, 1963	--	U	Formerly observation well. Pumped 110 million gallons from 5 wells January 15, 1939 to August 1, 1939. 4/
* 609	B. F. Deason	1928	39	4	--	BB	10.2	15.6 6.1	Apr. 19, 1939 Feb. 28, 1967	N	U	Current observation well. 4/
* 615	Leslie Freeman	1965	65	4	60	GC	24.0	23.1	Feb. 9, 1967	J,E, 1/3	D	Screened 60 ft to 65 ft. 2/
616	David Maguglin	1964 ?	55	4	50	GC	--	--	--	J,E	D	Screened 50 ft to 55 ft. 2/
617	United Carbon Co.	1964	77	20,10	42	GC	17.0	15.3	Feb. 15, 1967	T,E,5	Ind	Twenty ft of 20-inch surface casing cemented in place. Screened 42 ft to 77 ft. Plant well L-2. 2/
618	Dick Brown	1964	60	4	--	GC	19.0	18.7	do	J,E, 1/2	--	2/
620	D. A. Holden	1957	50	4	--	GC	12.0	17.6	Feb. 22, 1967	J,E, 1/4	D	
08-101	C. C. Crab	1927	50	4	--	GC	10.2	13.7 4.6	Apr. 19, 1939 Feb. 28, 1967	P,H	S	Current observation well. See other water-level measurements in file. 4/

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
AH-83-08-102	Eric Herbst	1953?	50	4	--	GC	9.0	4.1 4.4	Nov. 20, 1951 Jan. 17, 1967	P,G,10	S	Formerly observation well. 4/
* 103	N. J. Netherland	1964	60	4	--	GC	--	7.0	--	J,E, 1/2	D	2/
* 104	Walter Newton	1966	43	4	--	GC	8.0	3.8	Feb. 9, 1967	P,H	D,I	Water used for garden.
* 105	State of Texas	1939	126	--	--	GC	20.1	22.0	Mar. 28, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 54. 2/
* 106	do	1939	116	--	--	GC	24.8	22.0	do	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 53. 2/
* 107	do	1939	85	--	--	GC	14.9	28.0	do	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 52. 2/
* 108	do	1939	101	--	--	GC	10.2	4.0	Apr. 6, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 44. 2/
401	United Carbon Co.	--	200	8	--	GC	--	--	--	T,E,5	U	Abandoned. Formerly domestic use. Yield was 25 gpm in 1967.
402	C. B. Shaffer No. 1	1947	8,578	--	--	--	3/ 18	--	--	--	U	Oil test. State Q-53. 1/
* 403	State of Texas	1939	75	--	--	GC	5.0	14.0	Mar. 28, 1939	N	U	Destroyed. Formerly test well. See Figure 13. WPA test well No. 43. 2/
601	do	1940	9,001	--	--	--	--	--	--	--	U	Oil test. 50 ft sand in fresh water. Top of fresh to slightly saline water 230 ft. Base of fresh to slightly saline water 350 - 370 ft. 1/
* 602	Perry Bass Est.	--	13	2	10	BI	--	--	--	P,W	S	
Calhoun County												
BW-80-50-301	State of Texas	1952	9,512	--	--	--	--	--	--	--	U	Oil test. Fresh or slightly saline water from 215 to 815 ft. 1/

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
						Refugio County						
WH-79-48-502	J. M. Tatton	old	840	6	--	GC	29.0	+17.0	Oct. 3, 1961	Flows	S	Known as "Chiltipin Well."
601	do	old	880	6	--	GC	24.0	+29.2	do	Flows	S	Known as "Thomas Lake Well."
702	Tom O'Conner Est.	old	960	--	--	GC	32.0	+16.9	Sept. 30, 1961	Flows	S	Temperature is 79°F.
* 801	do	old	900	2	--	GC	28.0	+25.0	Oct. 3, 1961	Flows	S	Known as "Upton Corner Well." Temperature is 80°F.
* 901	J. M. Tatton Est.	1945	1,150	4	--	GC	21.0	+	--	Flows	S	Temperature 80°F. Known as "McGrew Well."
* 55-301	Tom O'Conner Est.	--	950	6	--	GC	27.0	+25.0	Sept. 28, 1961	Flows	S	
601	do	1939	927	4	--	GC	24.0	+31.4	do	Flows	S	
603	do	1950	1,100	2	--	GC	15.0	+19.0	Oct. 10, 1961	Flows	S	
801	Jack Robbins	1951	8,937	--	--	--	3/ 34.0	--	--	--	U	Oil test. 1/
56-101	Tom O'Connor Est.	1939	960	4	--	GC	28.0	+27.6	Sept. 28, 1961	Flows	S	
* 401	do	old	930	6	--	GC	14.0	+17.2	Oct. 10, 1961	Flows	S	Temperature 83°F.
501	do	old	1,200	2	--	GC	9.0	+33.2	Sept. 28, 1961	Flows	S	
* 502	do	old	840	6	--	GC	11.0	+22.8	Oct. 10, 1961	Flows	S	Yield was 10 gpm in 1961. Temperature is 83°F.
601	do	1955	1,250	2	--	GC	11.0	+35.4	Sept. 28, 1961	Flows	S	2/
701	do	--	1,100	2	--	GC	9.0	+24.7	do	Flows	S	
* 63-103	T. M. Triplett	--	900	4	--	GC	17.0	+18.9 +12.4	June 26, 1946 Mar. 27, 1962	Flows	D	Supplied 14 houses
80-41-401	J. M. Tatton	1940	1,100	4	--	GC	21.0	+29.0	Oct. 4, 1961	Flows	S,D	
* 501	do	--	930	6	--	GC	12.0	+30.5	Oct. 3, 1961	Flows	S	Temperature 88°F.
42-503	M. C. Bauer No. 2	1953	2,622	--	--	--	3/ 33.0	--	--	--	U	Oil test. 1/

See footnotes at end of table.

Table 7.--Records of Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN.)	CASING DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
San Patricio County												
WW-83-07-101	Porterfield Est.	1955	200	4	--	GC	19.0	11.8	June 15, 1960	P,W	S,D	
102	Lee A. Miller	--	190	4	--	GC	14.0	6.6	May 14, 1965	P,W	S	Converted oil test casing perforated at about 190 ft. Salty water at 60 ft was reported.
* 104	Bankers Mortgage Co.	1927	280	4	--	GC	15.0	9.2	June 16, 1965	P,W	S,D	
* 402	Porterfield Est.	1921	175	--	--	GC	--	90.0	Sept. 14, 1938	P,H	U	WPA No. 38.
* 403	J. S. McCampbell	1927	280	2	--	GC	--	--	--	--	U	Hole filled to within a few ft below surface. WPA No. 36.
* 404	R. F. McCampbell	1960	192	4	--	GC	12.0	8.8	June 4, 1965	P,W	D	Not used for drinking. Ten ft screen and shale trap. Screened 180-190 ft. Water has a brackish taste.
* 510	C. J. Ruhman	1949	124	4	--	GC	9.0	8.9	June 16, 1965	J,E, 1/2	S,D	Replacement for well No. 52 in county report.
* 702	City of Ingleside #3	1947	150	6	--	GC	--	--	--	T,E, 1/2	I	City well No. 3. Used to irrigate parks and playing fields. Sands around 150 ft is chief aquifer. Total pumpage from well No. 2 and well No. 3 is estimated at 1,000,000 gallons in 1959. Yield was 33 gpm in 1960.
* 801	Leon Contreras	1931	84	4	--	GC	12.0	17.1 10.4	June 23, 1938 Mar. 19, 1962	Cf,E	D	Observation well. WPA No. 78. 4/
* 808	-- Murphy	1920	90	4	--	GC	--	14.9 13.8	June 22, 1938 Feb. 25, 1966	P	S,D	4/
829	Humble Oil Co.	1938	182	8	50	GC	18.3	20.0	Aug. 9, 1939	N	U	Formerly observation well. Known as "Producer Well." Yield was 120 gpm in 1947. Not in use Nov. 20, 1940. Length of well open to 132 ft. 38 ft of 20-inch casing. Balance 8-in., 70 ft sand, 136 ft screen.

See footnotes at end of table.

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING DIAM-ETER (IN.)	CASING DEPTH (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
WW-83-07-835	-- McCampbell	1939	--	--	--	--	18.0	20.0	Aug. 4, 1939	N	U	Destroyed. Test hole 1.
836	do	1939	--	--	--	--	18.0	21.0	Aug. 9, 1939	N	U	Destroyed. Test hole 2.
* 901	City of Aransas Pass	1950s	150	6	--	GC	--	--	--	T,E,5	P	Most of city uses water from Lake Corpus Christi. Most of the wells are not in operating condition. Lake and ground water would not mix satisfactorily - produced distasteful smell and taste. Used on standby basis. Yield was 75 gpm in 1960. City well No. 8.
* 916	Ware Peck	1958	67	4	--	GC	--	14.7	Nov. 20, 1959	A,J,E, 1	D	Observation well. Replacement for old well 125; 10 ft north-east of old well. Old well cemented over. 10 ft screen at bottom. Sand 57-67 ft. WPA No. 125 a.
* 919	V. Johnson Est.	1924	40	3	--	BB	8.4	5.3 3.1	June 26, 1938 Feb. 25, 1966	--	U	WPA No. 135. 4/

* See table 10 for chemical analyses of water from wells and test holes.
1/ Electric logs in files of Texas Water Development Board or U.S. Geological Survey offices, Austin, Texas.
2/ Drillers' logs in files of Texas Water Development Board or U.S. Geological Survey offices, Austin, Texas.
3/ Altitude from Kelly Bushing or derrick floor.
4/ See Table 9 for water levels in wells.

Table 8.—Drillers' Logs of Wells

	THICKNESS (FEET)	DEPTH (FEET)
Well AH-79-56-901		
Owner: Tenneco Oil Co. Driller: Carl Vickers		
Surface	16	16
Clay and shell	5	21
Sand	22	43
Clay	43	86
Sand	38	124
Shale and sand streaks	81	205
Shale	40	245
Sand	2	247
Shale	82	329
Sand	3	332
Shale	17	349
Sand	11	360
Shale	13	373
Sand	24	397
Shale	1	398
Well AH-79-64-201		
Owner: Mrs. Mike O'Donnell Driller: Milton Mundine		
Sand	2	2
Clay, brown	20	22
Sand, gray	13	35
Clay, gray	7	42
Clay, brown and blue	8	50
Well AH-79-64-307		
Owner: Phillips Petroleum Co. Driller: Milton Mundine		
Sand, white	10	10
Clay, brown	12	22
Sand, gray	14	36
Clay, blue	20	56
Sand, gray	7	63
Clay, red	40	103
Sand, gray	7	110
Sand, red	16	126

	THICKNESS (FEET)	DEPTH (FEET)
Well AH-79-64-404		
Owner: Gordon Green Driller: J. D. Hesseltine, Jr.		
Shell and mud	18	18
Sand	22	40
Clay	3	43
Sand	7	50
Clay	13	63
Sand	7	70
Clay	19	89
Sand, shell, brown	19	108
Clay	3	111
Clay and sand, broken	12	123
Clay	36	159
Rock	1	160
Sand	3	163
Clay	17	180
Sand	2	182
Clay	21	203
Sand	4	207
Clay	23	230
Sand, gray	6	236
Clay	2	238
Well AH-79-64-405		
Owner: Copano Water Co. Driller: J. D. Hesseltine, Jr.		
Sand	1	1
Clay, yellow and white	12	13
Sand	25	38
Clay, blue and pink	5	43
Sand and clay, broken	15	58
Well AH-79-64-503		
Owner: City of Rockport, well 17 Driller: Carl Vickers		
Surface sand	6	6
Sand, soft streaks	46	52
Sand, streaks of sand	6	58
Sand and shale	30	88
Shale	29	117
Sand, soft	3	120

	THICKNESS (FEET)	DEPTH (FEET)
Well AH-79-64-503—Continued		
Sand, firm	9	129
Sand, soft	4	133
Sand, firm	7	140
Sand, soft	11	151
Sand, firm	16	167
Sand, soft	16	183
Sand, firm	27	210
Shale	11	221

Well AH-79-64-505

Owner: J. T. Stellman
Driller: H & S Water Well Service, Inc.

	THICKNESS (FEET)	DEPTH (FEET)
Surface	6	6
Clay	9	15
Sand	2	17
Sand and shell	12	29
Sand	8	37
Clay and shell	17	54
Clay	35	89
Sand and streaks of clay	55	144

Well AH-79-64-602

Owner: L. D. Green
Driller: Milton Mundine

	THICKNESS (FEET)	DEPTH (FEET)
Surface, sand	4	4
Clay, light	20	24
Sand, gray	10	34
Clay, brown	6	40
Sand, gray	6	46
Clay, blue	6	52
Sand, gray	10	62

Well AH-79-64-704

Owner: Marvin Townsend
Driller: Milton Mundine

	THICKNESS (FEET)	DEPTH (FEET)
Surface sand	8	8
Clay, brown	19	27
Sand, gray	7	34
Clay, blue	11	45
Sand, gray	3	48
Clay, brown	4	52
Sand, gray	6	58
Clay, brown	62	120
Gray green sand, some shell	25	145

Well AH-79-64-705

Owner: Live Oak Country Club
Driller: H & S Water Well Service, Inc.

	THICKNESS (FEET)	DEPTH (FEET)
Clay	16	16
Sand	19	35
Shale	18	53
Sand, fine	15	68
Shale	47	115
Sand, fine	20	135

Well AH-79-64-803

Owner: City of Rockport, well 3
Driller: Layne-Texas Co.

	THICKNESS (FEET)	DEPTH (FEET)
Sand, white	18	18
Sand, gray, shell	29	47
Clay, and sandy clay	8	55
Sandy clay	4	59
Sand, white	6	65
Clay, sandy, brown, sand, fine	15	80

Well AH-79-64-817

Owner: L. W. Hight
Driller: Milton Mundine

	THICKNESS (FEET)	DEPTH (FEET)
Surface sand	6	6
Clay, brown	16	22
Sand, gray	13	35
Clay, rock, brown	2	37
Sand, gray	5	42
Clay, blue	4	46

Well AH-79-64-819

Owner: Wagley Lumber Co.
Driller: Wagley Lumber Co., Inc.

	THICKNESS (FEET)	DEPTH (FEET)
Sand	30	30
Shell	4	34
Sand	11	45
Clay	3	48
Sand, water	4	52
Clay	13	65
Sand, water	2	67
Clay	48	115

Table 8.—Drillers' Logs of Wells—Continued

	THICKNESS (FEET)	DEPTH (FEET)
Well AH-79-64-819—Continued		
Water sand	5	120
Clay	20	140
Water sand	12	152
Well AH-79-64-821		
Owner: City of Rockport, well 15 Driller: Layne-Texas Co.		
Surface material	51	51
Clay	65	116
Sand, water	5	121
Clay, brown	18	139
Sand	4	143
Clay	16	159
Sand	3	162
Clay	6	168
Sand, water	36	204
Clay	4	208
Well AH-80-49-401		
Owner: John Zarsky Driller: Kelley Water Well Service		
Sand	10	10
Clay	15	25
Sand	7	32
Clay	78	110
Sand	10	120
Clay	25	145
Sand	25	170
Shale	42	212
Sand	2	214
Shale	8	222
Sand	4	226
Shale	36	262
Sand	4	266
Shale, sandy	7	273
Sand	18	291
Shale	44	335
Sand	10	345
Shale	6	351

	THICKNESS (FEET)	DEPTH (FEET)
Well AH-80-49-703		
Owner: R. E. House Driller: A. L. Ballou		
Sand and shale, brown	49	49
Shale, blue	8	57
Shale, thin shale streaks	21	78
Shale, rock, sand	12	90
Well AH-80-49-705		
Owner: M. E. Allerkamp Driller: Milton Mundine		
Surface sand	2	2
Clay, brown	23	25
Sand, gray	5	30
Clay, brown	22	52
Sand, green	4	56
Clay	114	170
Sand, coarse	12	182
Well AH-80-49-706		
Owner: Holiday Beach Development Co. Driller: Martin Water Well Service, Inc.		
Surface sand	10	10
Clay, blue	120	130
Sand, white, fine	17	147
Clay, blue	62	209
Sand, water	24	233
Well AH-80-49-708		
Owner: C. F. Hedrick Driller: A. L. Ballou		
Surface sand	40	40
Shale, brown	9	49
Shale, blue	11	60
Sand	8	68
Shale, dark-colored	1	69
Well AH-83-07-306		
Owner: Steve Miller Driller: Milton Mundine		
Surface sand	4	4
Clay, light-colored	19	23
Sand, gray	9	32
Clay, brown	10	42

	THICKNESS (FEET)	DEPTH (FEET)
Well AH-83-07-306—Continued		
Sand, gray	4	46
Clay, blue	6	52
Well AH-83-07-615		
Owner: Leslie Freeman Driller: Milton Mundine		
Surface sand	6	6
Clay, brown	17	23
Sand, gray	7	30
Clay, brown	12	42
Sand, gray	4	46
Clay, brown	14	60
Sand, gray	5	65
Well AH-83-07-617		
Owner: United Carbon Co., Inc. (Kosmos Plant) Driller: H & S Water Well Service, Inc.		
Surface soil	5	5
Clay, streaks of sand	15	20
Clay	22	42
Sand	35	77

Table 9.—Water Levels in Wells in Aransas and San Patricio Counties
(Depth to water in feet below land surface)

Aransas County

Well AH-79-63-401

Owner: Joe Mauch

DATE	WATER LEVEL
Nov. 13, 1959	11.71
Mar. 30, 1964	11.68
Mar. 10, 1965	11.89
Mar. 15, 1966	12.17
Jan. 12, 1967	11.85
Feb. 28, 1967	11.57

Well AH-79-63-801

Owner: Bankers Mortgage Co.

DATE	WATER LEVEL
Nov. 13, 1959	4.8
Mar. 3, 1964	4.93
Mar. 10, 1965	5.39
Mar. 15, 1966	8.98
Jan. 12, 1967	5.45
Feb. 28, 1967	4.90

Well AH-79-64-701

Owner: Z. F. Roquette

DATE	WATER LEVEL
Nov. 12, 1959	5.45
Mar. 30, 1964	6.74
Mar. 10, 1965	7.29
Jan. 12, 1967	8.47
Feb. 28, 1967	9.91

Well AH-79-64-702

Owner: "Red" Harrist

DATE	WATER LEVEL
May 17, 1939	5.70
Mar. 20, 1940	7.79
Aug. 6, 1940	9.51
Nov. 20, 1940	9.48
May 16, 1941	6.62
May 30, 1941	9.46
Sept. 20, 1941	[a]26.79
Jan. 22, 1942	18.76
June 25, 1942	18.58

Well AH-79-64-813

Owner: C. A. Roe

DATE	WATER LEVEL
Mar. 23, 1940	5.20
Aug. 6, 1940	8.62
Nov. 20, 1940	6.85
May 16, 1941	3.01
May 30, 1941	5.16
Jan. 22, 1942	4.62
Dec. 28, 1945	3.89
Nov. 20, 1947	5.49
Nov. 16, 1949	2.59
Nov. 15, 1950	6.35
Nov. 20, 1951	4.15
Dec. 8, 1953	5.10
Dec. 14, 1954	13.14
Dec. 5, 1955	8.21
Dec. 5, 1956	12.52
Dec. 10, 1957	8.13
Nov. 12, 1959	3.03
Sept. 30, 1960	5.84
Mar. 19, 1962	5.02
Feb. 13, 1963	13.52
Mar. 30, 1964	10.41
Mar. 10, 1965	11.07
Jan. 12, 1967	11.45
Feb. 28, 1967	10.89

Well AH-79-64-814

Owner: H. G. Smith

DATE	WATER LEVEL
June 19, 1939	16.30
Mar. 19, 1940	5.83
Aug. 6, 1940	7.80
Nov. 20, 1940	8.40
May 16, 1941	3.80
May 30, 1941	2.60
Sept. 10, 1941	6.87
Jan. 20, 1942	5.14
June 25, 1942	6.02
Dec. 29, 1945	3.04
Nov. 20, 1947	6.70
Nov. 16, 1949	2.69
Nov. 15, 1950	7.23
Nov. 20, 1951	4.13
Dec. 8, 1953	3.0
Dec. 14, 1954	4.74
Dec. 5, 1955	6.32
Dec. 5, 1956	9.50
Dec. 10, 1957	7.44
Nov. 6, 1959	2.49
Sept. 30, 1960	6.01

Well AH-79-64-816

Owner: Jack Rogers

DATE	WATER LEVEL
Mar. 23, 1940	11.30
Aug. 5, 1940	16.89
Nov. 20, 1940	12.42
May 16, 1941	10.00
May 30, 1941	13.71
Sept. 10, 1941	12.32
Jan. 22, 1942	10.19
June 25, 1942	9.91
Dec. 28, 1945	7.78
Nov. 20, 1947	5.79
Nov. 16, 1949	7.57

Well AH-80-41-902

Owner: U.S. Government
Aransas National Wildlife Refuge

DATE	WATER LEVEL
Nov. 16, 1959	4.24
Mar. 31, 1964	8.06
Mar. 9, 1965	9.29
Dec. 14, 1966	8.84

Well AH-83-07-301

Owner: L. R. Young

DATE	WATER LEVEL
Mar. 27, 1940	11.41
Aug. 6, 1940	12.82

Table 9.—Water Levels in Wells in Aransas and San Patricio Counties—Continued

Well AH-83-07-301—Continued

DATE	WATER LEVEL
Nov. 20, 1940	12.58
May 16, 1941	8.66
May 30, 1941	8.42
Jan. 24, 1942	10.71
June 26, 1942	10.69
Dec. 29, 1945	8.62
Nov. 20, 1947	10.26
Nov. 15, 1950	10.77
Nov. 20, 1951	10.84
Dec. 8, 1953	10.11
Dec. 14, 1954	11.56
Dec. 5, 1955	11.69
Dec. 5, 1956	13.86
Dec. 10, 1957	12.14
Nov. 12, 1959	6.58
Sept. 30, 1960	8.75
Mar. 19, 1962	7.27
Feb. 13, 1963	8.04
Mar. 30, 1964	9.11
Mar. 10, 1965	9.06
Mar. 15, 1966	7.06
Feb. 28, 1967	8.16

Well AH-83-07-302

Owner: B. Grant

DATE	WATER LEVEL
May 10, 1939	20.5
Dec. 28, 1940	15.81
May 16, 1941	15.36
June 26, 1942	15.08
Dec. 29, 1945	16.76
Nov. 20, 1947	14.86
Nov. 16, 1949	13.43

Well AH-83-07-304

Owner: B. Grant

DATE	WATER LEVEL
Dec. 28, 1940	16.27
May 16, 1941	16.41
May 30, 1941	16.24
Jan. 22, 1942	16.94
Nov. 16, 1949	11.62
Nov. 15, 1950	17.96
Nov. 20, 1951	15.83
Dec. 8, 1953	17.18
Dec. 14, 1954	18.87
Dec. 6, 1955	21.80
Dec. 5, 1956	[b]24.36
Dec. 10, 1957	14.96
Nov. 12, 1959	14.20

Well AH-83-07-305

Owner: T. O. McCullough

DATE	WATER LEVEL
Mar. 27, 1940	13.82
Aug. 6, 1940	15.02
Dec. —	14.99
May 17, 1941	14.03
May 30, 1941	13.91
Jan. 22, 1942	13.83
June 26, 1942	14.15

Well AH-83-07-601

Owner: C. M. Vaughan

DATE	WATER LEVEL
Dec. 5, 1940	18.30
May 16, 1941	15.68
May 30, 1941	15.90
Sept. 11, 1941	16.39
Jan. 20, 1942	12.90
Dec. 29, 1945	11.15
Nov. 20, 1947	9.64
Nov. 15, 1950	12.82
Nov. 20, 1951	12.03
Dec. 8, 1953	11.27
Dec. 14, 1954	12.21
Dec. 6, 1955	13.32
Dec. 5, 1956	13.90
Nov. 12, 1959	9.65
Sept. 30, 1960	11.45
Mar. 19, 1962	8.28
Feb. 13, 1963	11.35
Mar. 30, 1964	12.23
Mar. 10, 1965	12.82
Mar. 15, 1966	10.97
Feb. 28, 1967	11.25

Well AH-83-07-608

Owner: E. N. Ovalline

DATE	WATER LEVEL
Nov. 21, 1940	5.69
Jan. 8, 1941	5.58
Jan. 30, 1941	5.62
May 18, 1941	3.06
June 1, 1941	2.97
Sept. 11, 1941	6.12
Jan. 22, 1942	4.36
Dec. 29, 1945	1.93
Nov. 21, 1947	2.20
Nov. 16, 1949	.70
Nov. 15, 1950	4.34
Nov. 20, 1951	2.16
Dec. 8, 1953	5.24
Dec. 14, 1954	6.73
Dec. 6, 1955	7.29
Dec. 5, 1956	9.24
Dec. 11, 1957	6.86
Nov. 6, 1959	5.92
Sept. 30, 1960	3.56
Mar. 19, 1962	2.88
Feb. 13, 1963	8.20

Well AH-83-07-609

Owner: B. F. Deason

DATE	WATER LEVEL
Apr. 19, 1939	15.60
Mar. 19, 1940	9.42
Aug. 5, 1940	10.39
Dec. 7, 1940	8.03
May 16, 1941	5.43
Nov. 11, 1941	8.32
Jan. 20, 1942	7.15

Table 9.—Water Levels in Wells in Aransas and San Patricio Counties—Continued

DATE	WATER LEVEL
Well AH-83-07-609—Continued	
June 26, 1942	7.64
Dec. 28, 1945	5.52
Nov. 21, 1947	6.86
Nov. 16, 1949	6.10
Nov. 15, 1950	8.71
Nov. 20, 1951	7.24
Dec. 8, 1953	6.81
Dec. 14, 1954	8.23
Dec. 5, 1955	6.86
Dec. 5, 1956	9.32
Dec. 11, 1957	6.41
Nov. 6, 1959	4.83
Sept. 30, 1960	6.44
Mar. 19, 1962	6.53
Feb. 13, 1963	7.02
Mar. 30, 1964	8.16
Mar. 10, 1965	7.51
Feb. 28, 1967	6.09
Well AH-83-08-101	
Owner: C. C. Crab	
Apr. 19, 1939	13.70
Mar. 20, 1940	5.56
May 6,1940	6.70
Dec. 5, 1940	6.60
May 17, 1941	2.56
June 1, 1941	2.29
Sept. 11, 1941	6.16
Jan. 20, 1942	4.45
June 26, 1942	6.62
Dec. 28, 1945	3.07
Nov. 21, 1947	6.25
Nov. 16, 1949	1.83
Nov. 15, 1950	5.63
Nov. 20, 1951	4.20
Dec. 8, 1953	2.73
Dec. 14, 1954	4.84
Dec. 5, 1955	3.10
Dec. 6, 1956	5.23
Dec. 10, 1957	3.61
Nov. 6, 1959	1.46
Sept. 30, 1960	5.11
Mar. 19, 1962	2.84
Feb. 13, 1963	4.29
Mar. 30, 1964	4.72
Mar. 10, 1965	4.85
Jan. 17, 1967	5.67
Feb. 28, 1967	4.57
Well AH-83-08-102	
Owner: Eric Herbst	
Nov. 20, 1951	4.07
Dec. 8, 1953	2.80
Dec. 14, 1954	4.25
Dec. 5, 1955	4.71
Dec. 5, 1956	6.13
Dec. 10, 1957	3.17
Nov. 6, 1959	1.36
Sept. 30, 1960	4.13
Mar. 19, 1962	6.53
Feb. 13, 1963	3.37
Jan. 17, 1967	4.4
San Patricio County	
Well WW-83-07-801	
Owner: Leon Contreras	
June 23, 1938	17.10
Dec. 14, 1939	22.80
Mar. 15, 1940	19.74
Aug. 6, 1940	21.04
Nov. 17, 1940	20.65
Feb. 28, 1941	21.33
Sept. 12, 1941	24.84
Jan. 20, 1942	22.28
June 26, 1942	20.92
Dec. 27, 1945	16.06
Nov. 15, 1949	13.05
Nov. 14, 1950	16.00
Nov. 20, 1951	17.36
Dec. 7, 1953	18.13
Dec. 13, 1954	18.00
Dec. 5, 1955	18.70
Dec. 4, 1956	16.84
Dec. 10, 1957	a/27.68
Nov. 19, 1959	13.30
Sept. 29, 1960	14.58
Mar. 19, 1962	10.43
Well WW-83-07-808	
Owner: — Murphy	
June 22, 1938	14.94
Dec. 14, 1939	16.60
Jan. 4, 1940	16.50
Mar. 15, 1940	16.82
Aug. 6, 1940	17.59
Dec. 3, 1940	17.52
Feb. 27, 1941	16.98
May 16, 1941	15.46
May 31, 1941	15.38
Sept. 12, 1941	16.96
Jan. 20, 1942	16.52
June 26, 1942	16.59
Nov. 7, 1945	14.05
Dec. 26, 1945	13.97
Nov. 21, 1947	13.46
Nov. 15, 1949	12.76
Nov. 14, 1950	15.81
Nov. 21, 1951	15.21
Dec. 8, 1953	15.61
Dec. 13, 1954	16.78
Dec. 5, 1955	15.99
Dec. 4, 1956	18.19
Dec. 10, 1957	17.22
Nov. 19, 1959	13.46
Sept. 29, 1960	14.82
Mar. 19, 1962	11.90

Table 9.—Water Levels in Wells in Aransas and San Patricio Counties—Continued

DATE	WATER LEVEL
Well WW-83-07-808—Continued	
Feb. 13, 1963	14.73
Mar. 17, 1964	17.44
Feb. 25, 1965	16.28
Feb. 25, 1966	13.80
Well WW-83-07-919	
Owner: V. Johnson Estate	
June 26, 1938	5.33
Dec. 7, 1940	5.44
Feb. 27, 1941	3.12
May 17, 1941	4.10
May 31, 1941	3.52
Sept. 13, 1941	6.96
Jan. 21, 1942	5.11
June 27, 1942	5.54
Nov. 7, 1945	4.74
Dec. 27, 1945	3.62
Nov. 21, 1947	5.49
Nov. 16, 1949	3.67
Nov. 15, 1950	7.10
Nov. 21, 1951	5.2
Dec. 9, 1953	5.4
Dec. 14, 1954	6.23
Dec. 5, 1955	5.36
Dec. 5, 1956	8.48
Dec. 11, 1957	5.40
Nov. 20, 1959	2.59
Sept. 30, 1960	4.91
Mar. 19, 1962	3.80
Feb. 13, 1963	4.70
Mar. 17, 1964	6.32
Feb. 25, 1965	4.48
Feb. 25, 1966	3.15

a/ pumped recently

b/ nearby well pumping

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas

Water-bearing unit: BI, barrier island deposits; BB, barrier island and beach deposits; GC, Gulf Coast aquifer

(Analyses given are in milligrams per liter except SAR, RSC, specific conductance, and pH.)

Analyses by U.S. Geological Survey except those in 1939 by Works Projects Administration and those indicated otherwise.

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CAL-CIUM (Ca)	MAGNE-SIUM (Mg)	SODIUM (Na)	POTAS-SIUM (K)	BICAR-BONATE (HCO_3)	SUL-FATE (SO_4)	CHLO-RIDE (Cl)	FLUO-RIDE (F)	NITRATE (NO_3)	DIS-SOLVED SOLIDS	HARD-NESS AS $CaCO_3$	SODIUM-ADSORP-TION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
								Aransas County												
AH-79-56-202	830	Mar. 28, 1967	GC	18	0.80	9.0	2.4	515	2.1	524	100	418	4.1	0.0	1,330	32	40	7.94	2,270	7.8
203	1,201	do	GC	17	.63	8.0	2.6	486	2.1	476	84	415	3.7	.0	1,250	30	39	7.19	2,170	7.9
301	1,000	Mar. 29, 1967	GC	19	1.7	27	13	1,240	4.3	508	139	1,580	--	.0	3,270	121	49	5.91	5,790	7.4
302	850	Mar. 28, 1967	GC	19	.20	10	3.2	615	2.0	552	98	550	3.0	.0	1,580	38	43	8.29	2,750	7.8
901	398	Jan. 11, 1967	GC	12	--	18	15	682	4.3	564	170	695	--	1.2	1,870	106	29	7.11	3,280	8.2
63-401	165	Jan. 12, 1967	GC	10	--	50	39	1,420	6.2	336	15	2,190	--	--	3,900	286	36	.00	7,000	8.0
502	750	June 20, 1939	GC	--	--	18	5	* 1,271	--	366	56	1,750	1.5	--	3,282	68	--	--	--	--
503	360	Mar. 7, 1967	GC	15	--	25	18	1,020	4.0	360	1.4	1,440	--	1.5	2,700	136	38	3.17	4,900	7.7
801	199	Jan. 12, 1967	GC	14	--	42	--	1,630	8.7	512	208	2,300	--	--	4,500	278	43	2.84	7,820	8.1
802	190	Jan. 18, 1967	GC	9.6	--	43	43	1,440	6.5	452	94	2,050	--	--	3,910	284	37	1.72	6,880	7.8
803	190	June 20, 1939	GC	--	--	32	26	* 1,240	--	512	117	1,660	--	--	3,327	186	--	--	--	--
902	225	May 17, 1939	GC	--	--	58	52	* 1,650	--	479	147	2,410	--	--	4,557	360	--	--	--	--
903	148	May 7, 1967	GC	20	.00	16	12	352	11	468	33	325	1.5	1.0	1,000	90	16	5.88	1,770	7.7
904	225	June 20, 1939	GC	--	--	58	52	* 1,637	--	464	161	2,380	--	--	4,512	348	--	--	--	
a/ 64-301	186	Jan. 17, 1967	GC	15	--	12	8.9	425	7.3	416	19	440	1.4	1.2	1,130	66	23	5.49	2,040	7.9
302	186	do	GC	15	--	12	8.9	425	7.3	416	19	440	1.4	1.2	1,130	66	23	5.49	2,040	7.9
303	186	do	GC	15	--	12	8.9	425	7.3	416	19	440	1.4	1.2	1,130	66	23	5.49	2,040	7.9
304	125	Oct. 6, 1949	GC	16	--	16	13	* 360	--	412	2	380	--	1.5	999	94	--	--	1,800	7.8
305	130	do	GC	14	--	15	12	* 455	--	403	13	365	--	1.5	976	87	--	--	1,790	8.3
305	130	July 23, 1956	GC	16	--	21	16	* 313	--	381	3.0	342	.9	.2	932	118	13	--	1,650	8.2

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	SODIUM-ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
AH-79-64-306	165	May 17, 1952	GC	15	--	9.1	9.5	* 501	--	516	28	495	--	0.8	1,340	62	--	--	2,360	8.2
307	126	Mar. 16, 1967	GC	22	--	54	35	375	18	322	26	580	0.4	.5	1,270	278	9.8	0.00	2,352	7.3
401	60	Jan. 17, 1967	GC	17	--	27	6.3	109	8.6	250	7.2	93	.4	.2	392	94	4.9	2.23	682	7.2
404	233	Feb. 14, 1967	GC	--	--	--	--	--	--	434	--	1,980	--	--	--	272	--	--	--	7.8
405	58	May 7, 1967	GC	22	0.01	88	22	422	14	258	42	698	.4	1.2	1,440	310	10	.00	2,620	7.4
501	28	do	BB	17	--	12	10	60	6.4	60	32	115	.0	.0	283	71	3.1	.00	545	6.4
601	69	Apr. 11, 1950	GC	17	--	34	5.6	* 52	--	172	9.3	50	--	.0	258	108	--	--	434	7.9
603	182	Oct. 18, 1967	GC	18	--	56	17	* 362	--	412	35	445	1.5	2.0	1,150	210	11	2.56	2,040	7.9
704	145	Feb. 10, 1967	GC	11	--	6.0	5.2	318	5.2	552	.0	200	1.6	.2	818	36	23	8.32	1,430	8.1
705	135	Mar. 29, 1967	GC	20	--	31	9.7	210	6.0	400	12	176	1.2	.0	645	118	8.4	4.2	1,110	7.4
707	64	do	GC	20	--	57	11	126	5.3	228	4.4	195	.1	.2	531	187	4.0	.00	952	7.1
708	12	July 17, 1939	GC	--	--	3,608	4,570	*35,700	--	220	9,999	67,250	--	--	121,237	27,800	--	--	--	--
708	21	do	GC	--	--	--	--	--	--	220	10,600	69,500	--	--	123,905	--	--	--	--	--
708	27	do	GC	--	--	3,304	5,200	*38,488	--	220	10,870	72,000	--	--	129,957	29,400	--	--	--	--
708	43	do	GC	--	--	828	632	* 4,709	--	268	766	9,850	--	--	16,924	4,670	--	--	--	--
708	48	July 19, 1939	GC	--	--	719	549	* 3,452	--	244	411	7,750	--	--	13,005	4,053	--	--	--	--
709	34	July 10, 1939	GC	--	--	3,104	3,750	*27,880	--	305	7,075	54,000	--	--	95,980	23,200	--	--	--	--
709	43	do	GC	--	--	3,592	3,860	*31,858	--	427	6,393	61,750	--	--	107,678	24,800	--	--	--	--
709	54	July 11, 1939	GC	--	--	--	--	--	--	378	6,754	51,500	--	--	90,927	--	--	--	--	--
709	70	July 13, 1939	GC	--	--	3,370	2,710	*11,004	--	305	2,258	29,000	--	--	48,474	19,600	--	--	--	--
709	90	July 17, 1939	GC	--	--	387	257	* 1,211	--	232	56	3,125	--	--	5,150	2,023	--	--	--	--
709	95	July 18, 1939	GC	--	--	402	269	* 1,361	--	220	56	3,425	.2	--	5,621	2,111	--	--	--	--
710	73	June 30, 1939	GC	--	--	65	28	* 317	--	403	12	442	--	--	1,062	277	--	--	--	--
710	78	do	GC	--	--	44	26	* 207	--	433	--	343	.5	--	914	216	--	--	--	--
710	84	July 5, 1939	GC	--	--	36	17	* 315	--	476	--	320	--	--	927	161	--	--	--	--
710	90	July 6, 1939	GC	--	--	23	13	* 302	--	525	--	235	.9	--	837	113	--	--	--	--
711	14	Sept. 4, 1939	GC	--	--	68	56	* 225	--	122	244	380	--	--	1,033	400	--	--	--	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	SODIUM-ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
AH-79-64-711	29	Sept. 4, 1939	GC	--	--	42	24	* 86	--	67	40	210	--	--	435	205	--	--	--	--
711	35	do	GC	--	--	161	114	* 44	--	49	92	492	--	--	929	582	--	--	--	--
711	42	do	GC	--	--	63	11	* 11	--	43	28	115	--	--	249	202	--	--	--	--
711	93	Sept. 12, 1939	GC	--	--	30	24	* 273	--	397	100	240	0.7	--	866	175	--	--	--	--
711	96	do	GC	--	--	2	476	* 10	--	476	68	116	--	--	702	46	--	--	--	--
712	28	June 27, 1939	BB	--	--	48	6	* 42	--	171	14	57	--	--	251	144	--	--	--	--
712	46	do	GC	--	--	36	9	* 72	--	256	--	48	.2	--	294	125	--	--	--	--
712	110	July 5, 1939	GC	--	--	25	11	* 171	--	427	15	81	--	--	513	107	--	--	--	--
712	111	July 6, 1939	GC	--	--	25	11	* 178	--	476	--	70	.6	--	526	107	--	--	--	--
801	--	June 15, 1939	GC	--	--	74	11	* 154	--	317	10	210	--	--	615	232	--	--	--	--
801	78	July 17, 1945	GC	17	0.43	92	16	182	12	339	15	292	.0	0.5	869	296	--	--	--	7.6
803	--	June 15, 1939	GC	--	--	72	11	* 149	--	317	--	200	.2	--	596	277	--	--	--	--
803	78	July 17, 1945	GC	15	.15	96	13	116	13	315	5.7	211	.2	.8	670	293	--	--	--	7.6
814	58	June 19, 1939	GC	--	--	82	11	* 244	--	317	--	365	--	--	866	252	--	--	--	--
818	133	Feb. 16, 1967	GC	25	--	33	23	166	11	232	15	245	.7	1.2	634	177	5.4	0.26	1,170	7.8
b/ 821	213	Aug. 22, 1964	GC	9	.07	31	10	* 412	--	480	26	422	--	--	1,390	120	--	--	2,097	7.9
824	26	June 6, 1939	BB	--	--	49	29	* 278	--	122	40	500	--	--	956	243	--	--	--	--
824	58	June 7, 1939	GC	--	--	49	13	* 87	--	207	13	130	.2	--	394	178	--	--	--	--
824	70	June 9, 1939	GC	--	--	78	23	* 187	--	146	18	395	--	--	780	289	--	--	--	--
824	80	June 12, 1939	GC	--	--	55	21	* 226	--	134	26	410	--	--	808	223	--	--	--	--
824	89	do	GC	--	--	40	16	* 228	--	195	16	340	--	--	743	165	--	--	--	--
824	113	June 26, 1939	GC	--	--	28	14	* 264	--	348	16	285	--	--	778	129	--	--	--	--
824	117	do	GC	--	--	27	12	* 290	--	378	14	300	--	--	829	118	--	--	--	--
825	22	June 7, 1939	BB	--	--	54	13	* 52	--	183	32	84	.3	--	325	188	--	--	--	--
825	33	do	BB	--	--	57	16	* 132	--	305	15	164	--	--	534	210	--	--	--	--
825	47	do	GC	--	--	--	--	--	--	256	12	86	--	--	362	--	--	--	--	--
825	55	do	GC	--	--	--	--	--	--	275	14	265	--	--	659	--	--	--	--	--
825	65	do	GC	--	--	--	--	--	--	305	14	240	--	--	645	--	--	--	--	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CAL-CIUM (Ca)	MAGNE-SIUM (Mg)	SODIUM (Na)	POTAS-SIUM (K)	BICAR-BONATE (HCO_3)	SUL-FATE (SO_4)	CHLO-RIDE (Cl)	FLUO-RIDE (F)	NITRATE (NO_3)	DIS-SOLVED SOLIDS	HARD-NESS AS $CaCO_3$	SODIUM-ADSORP-TION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
AH-79-64-825	75	June 16, 1939	GC	--	--	56	11	* 203	--	305	12	260	--	--	692	187	--	--	--	--
825	77	do	GC	--	--	--	--	--	--	262	15	250	--	--	627	--	--	--	--	--
825	97	June 21, 1939	GC	--	--	48	202	* 11	--	244	18	275	0.4	--	674	167	--	--	--	--
826	20	May 25, 1939	BB	--	--	78	24	* 129	--	250	20	248	.3	--	622	295	--	--	--	--
826	35	May 27, 1939	BB	--	--	--	--	--	--	305	20	312	--	--	766	--	--	--	--	--
826	46	do	GC	--	--	74	7	* 228	--	293	18	320	.4	--	791	215	--	--	--	--
826	55	do	GC	--	--	--	--	--	--	305	16	335	--	--	797	--	--	--	--	--
826	65	do	GC	--	--	74	18	* 283	--	281	24	440	.2	--	977	261	--	--	--	--
826	77	May 29, 1939	GC	--	--	81	27	* 270	--	165	32	518	--	--	1,009	312	--	--	--	--
826	81	May 31, 1939	GC	--	--	--	--	--	--	268	31	500	--	--	1,046	--	--	--	--	--
826	108	do	GC	--	--	82	26	* 236	--	244	18	430	--	--	912	311	--	--	--	--
826	111	do	GC	--	--	76	27	* 244	--	232	20	440	.7	--	922	302	--	--	--	--
827	20	May 9, 1939	BB	--	--	108	50	* 640	--	415	85	1,020	.4	--	2,112	476	--	--	--	--
827	33	May 10, 1939	BB	--	--	363	216	* 1,793	--	238	409	3,600	--	--	6,502	1,799	--	--	--	--
827	42	do	BB	--	--	1,570	1,570	*10,574	--	366	3,030	21,200	--	--	38,135	10,400	--	--	--	--
827	50	May 11, 1939	GC	--	--	1,808	2,310	*16,929	--	336	4,667	32,400	--	--	58,291	14,000	--	--	--	--
827	58	May 12, 1939	GC	--	--	1,762	2,290	*17,298	--	305	4,578	32,900	--	--	58,990	13,800	--	--	--	--
827	78	May 26, 1939	GC	--	--	--	--	--	--	183	2,877	33,250	--	--	56,211	--	--	--	--	--
827	84	May 27, 1939	GC	--	--	2,622	2,520	*14,846	--	73	2,877	37,225	--	--	55,639	16,900	--	--	--	--
827	116	June 1, 1939	GC	--	--	742	494	1,905	--	140	80	5,550	--	--	8,840	3,884	--	--	--	--
827	120	do	GC	--	--	766	501	1,973	--	153	97	5,700	.5	--	9,112	3,974	--	--	--	--
80-41-701	340	Jan. 20, 1967	GC	16	--	25	15	571	4.4	554	154	548	1.6	0.0	1,610	124	22	6.60	2,790	7.4
801	240	Feb. 9, 1962	GC	--	--	--	--	--	--	390	286	790	--	--	1,930	438	--	--	3,410	7.9
42-402	20	Mar. 8, 1967	BB	22	--	250	86	822	7.9	500	183	1,520	--	4.0	3,140	978	11	.00	5,440	7.2
505	199	do	GC	16	--	61	34	374	9.8	444	181	400	.6	1.8	1,300	292	9.5	1.44	2,200	7.7
702	20	do	BB	23	--	130	45	206	14	396	82	395	.6	5.0	1,100	510	4.0	.00	1,950	7.2
803	220	do	GC	8.8	0.00	58	41	344	11	392	190	395	.5	1.2	1,240	313	8.5	.16	2,130	7.8

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas--Continued

	WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CAL-CIUM (Ca)	MAGNE-SIUM (Mg)	SODIUM (Na)	POTAS-SIUM (K)	BICAR-BONATE (HCO_3)	SUL-FATE (SO_4)	CHLO-RIDE (Cl)	FLUO-RIDE (F)	NITRATE (NO_3)	DIS-SOLVED SOLIDS	HARD-NESS AS $CaCO_3$	SODIUM-ADSORP-TION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
	AH-80-49-203	20	Mar. 8, 1967	BB	34	--	170	63	702	16	460	150	1,190	--	3.5	2,550	683	12	0.00	4,450	7.2
	301	24	do	BB	29	--	296	157	1,400	20	592	272	2,620	--	--	5,080	1,380	16	.00	8,600	6.9
	401	351	do	GC	18	--	34	26	840	8.2	524	242	960	--	1.5	2,390	192	26	4.75	4,100	7.5
	602	24	do	BB	20	--	104	55	216	14	338	148	480	0.4	1.0	1,260	486	5.4	.00	2,220	7.1
	704	194	Feb. 8, 1967	GC	20	--	34	32	734	17	536	189	850	--	--	2,140	216	22	4.46	3,790	7.7
	706	233	Mar. 7, 1967	GC	18	0.05	23	23	608	9.0	550	195	590	1.1	.8	1,740	152	21	5.97	2,970	7.6
c/	707	179	Mar. 1, 1951	GC	37	.6	50	42	* 697	--	504	310	706	--	--	1,969	297	--	--	--	8.5
	708	69	Feb. 8, 1967	GC	17	--	20	4.8	70	3.9	186	.0	52	.2	.2	259	70	3.6	1.66	455	7.6
	801	438	Mar. 8, 1967	GC	17	.00	81	12	1,580	1.6	428	266	2,380	--	--	4,620	498	31	.00	7,910	7.4
	802	24	do	BB	22	--	70	31	183	13	396	26	262	.3	1.0	803	302	4.6	.45	1,450	7.0
	50-104	24	do	BB	25	--	564	308	1,760	46	348	476	4,170	--	--	7,520	2,670	--	.00	12,400	7.0
	82-01-101	13	May 30, 1967	BI	--	--	--	--	--	--	292	--	238	--	--	--	281	--	.00	1,410	7.1
	201	13	do	BI	13	--	103	58	475	54	274	170	850	--	2.2	1,860	496	9.3	.00	3,320	7.5
a/	401	23	do	BI	15	.04	58	20	103	5.3	222	64	148	.3	4.5	527	227	3.0	.00	941	7.5
a/	402	23	do	BI	15	.04	58	20	103	5.3	222	64	148	.3	4.5	527	227	3.0	.00	941	7.5
a/	403	23	do	BI	15	.04	58	20	103	5.3	222	64	148	.3	4.5	527	227	3.0	.00	941	7.5
a/	404	23	do	BI	15	.04	58	20	103	5.3	222	64	148	.3	4.5	527	227	3.0	.00	941	7.5
	405	12	do	BI	--	--	--	--	--	--	468	--	1,400	--	--	--	820	--	--	5,120	7.5
c/	406	--	Mar. 30, 1954	--	24	1.1	48	46	* 1,397	--	781	150	1,810	--	--	3,864	310	--	--	--	7.7
	83-07-302	100	May 10, 1939	GC	--	--	23	8	* 223	--	397	16	166	--	--	631	90	--	--	--	--
	310	200	Mar. 29, 1967	GC	15	5.0	53	56	1,760	16	524	78	2,590	--	--	4,830	362	40	1.04	8,590	7.6
	311	14	May 2, 1939	GC	--	--	1,332	1,580	*13,392	--	403	2,732	25,360	--	--	44,604	9,825	--	--	--	--
	311	25	May 5, 1939	GC	--	--	1,668	2,430	*19,254	--	366	4,903	35,900	--	--	64,353	14,200	--	--	--	--
	311	40	May 8, 1939	GC	--	--	1,864	2,500	*21,743	--	220	5,640	39,820	--	--	71,700	14,940	--	--	--	--
	312	10	May 4, 1939	GC	--	--	708	841	* 7,086	--	268	1,795	13,150	--	--	23,716	5,230	--	--	--	--
	312	21	May 8, 1939	GC	--	--	--	--	--	--	183	1,828	13,700	--	--	24,167	--	--	--	--	--
	312	31	May 9, 1939	GC	--	--	822	971	* 7,588	--	244	2,028	14,350	--	--	25,885	6,050	--	--	--	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	SODIUM-ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
AH-83-07-312	42	May 9, 1939	GC	--	--	--	--	--	--	342	4,313	24,820	--	--	45,210	--	--	--	--	--
312	51	May 10, 1939	GC	--	--	--	--	--	--	305	4,541	25,880	--	--	47,161	--	--	--	--	--
312	74	May 12, 1939	GC	--	--	1,794	1,420	* 9,875	--	275	2,690	20,400	--	--	36,329	10,300	--	--	--	--
313	16	May 2, 1939	GC	--	--	1,166	837	* 5,818	--	317	1,477	12,200	--	--	21,660	6,356	--	--	--	--
313	44	May 4, 1939	GC	--	--	1,254	849	* 5,856	--	281	1,439	12,500	--	--	22,040	6,624	--	--	--	--
313	54	do	GC	--	--	--	--	--	--	305	1,555	11,000	--	--	19,658	--	--	--	--	--
313	73	May 8, 1939	GC	--	--	930	560	* 3,142	--	256	982	7,250	--	--	12,990	4,626	--	--	--	--
313	82	do	GC	--	--	--	--	--	--	537	202	1,650	--	--	3,307	--	--	--	--	--
314	27	May 19, 1939	GC	--	--	998	619	* 4,801	--	268	1,179	9,950	--	--	17,689	5,042	--	--	--	--
314	41	May 8, 1939	GC	--	--	1,798	2,680	*21,188	--	275	5,544	39,400	--	--	70,756	15,500	--	--	--	--
314	50	May 10, 1939	GC	--	--	500	175	* 1,198	--	232	146	3,000	--	--	5,135	1,968	--	--	--	--
314	80	May 12, 1939	GC	--	--	45	23	* 316	--	439	28	360	--	--	988	209	--	--	--	--
314	83	May 11, 1939	GC	--	--	52	26	* 334	--	427	28	410	1.5	--	1,064	236	--	--	--	--
315	26	Apr. 27, 1939	GC	--	--	967	465	* 3,917	--	189	944	8,300	--	--	14,690	4,327	--	--	--	--
315	43	Apr. 28, 1939	GC	--	--	85	25	* 290	--	293	15	490	--	--	1,049	315	--	--	--	--
315	52	Apr. 29, 1939	GC	--	--	--	--	--	--	275	18	490	--	--	1,017	--	--	--	--	--
315	81	May 3, 1939	GC	--	--	30	12	* 246	--	336	28	250	--	--	731	122	--	--	--	--
316	20	Apr. 17, 1939	BB	--	--	54	15	* 89	--	146	96	128	--	--	459	199	--	--	--	--
316	42	Apr. 18, 1939	GC	--	--	52	13	* 109	--	220	15	160	.2	--	459	183	--	--	--	--
316	54	Apr. 25, 1939	GC	--	--	--	--	--	--	226	25	188	--	--	514	--	--	--	--	--
316	88	Apr. 28, 1939	GC	--	--	--	--	--	--	305	20	144	--	--	504	--	--	--	--	--
316	93	do	GC	--	--	--	--	--	--	299	41	152	--	--	541	--	--	--	--	--
316	100	Apr. 29, 1939	GC	--	--	21	10	* 168	--	268	20	156	--	--	507	96	--	--	--	--
317	25	Apr. 17, 1939	BB	--	--	41	17	* 63	--	134	29	118	--	--	334	170	--	--	--	--
317	39	Apr. 25, 1939	BB	--	--	57	10	* 53	--	177	18	98	.1	--	323	186	--	--	--	--
317	52	Apr. 17, 1939	GC	--	--	67	8	* 54	--	207	12	96	--	--	339	200	--	--	--	--
317	67	Apr. 25, 1939	GC	--	--	56	7	* 71	--	201	11	104	--	--	349	169	--	--	--	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CAL-CIUM (Ca)	MAGNE-SIUM (Mg)	SODIUM (Na)	POTAS-SIUM (K)	BICAR-BONATE (HCO_3)	SUL-FATE (SO_4)	CHLO-RIDE (Cl)	FLUO-RIDE (F)	NITRATE (NO_3)	DIS-SOLVED SOLIDS	HARD-NESS AS $CaCO_3$	SODIUM-ADSORP-TION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
AH-83-07-317	72	Apr. 25, 1939	GC	--	--	--	--	--	--	250	--	120	--	--	405	--	--	--	--	--
317	85	May 1, 1939	GC	--	--	50	13	* 114	--	275	--	136	.3	--	457	178	--	--	--	--
601	160	Mar. 2, 1939	GC	--	--	64	12	* 114	--	250	16	166	.3	--	495	210	--	--	--	--
602	179	Jan. 11, 1967	GC	18	--	10	5.0	445	5.4	788	94	207	3.0	0.5	1,180	46	29	12.0	1,950	7.8
609	39	Apr. 19, 1939	BB	--	--	88	13	* 304	--	293	16	480	.2	--	1,045	272	--	--	--	--
615	65	Mar. 29, 1967	GC	41	--	81	18	214	5.3	240	20	372	.3	.2	870	276	5.6	.00	1,570	7.2
617	77	Feb. 15, 1967	GC	24	1.5	50	16	132	7.2	132	110	194	.0	.2	600	191	4.2	.00	1,050	6.6
617	77	Feb. 16, 1967	GC	--	1.3	--	--	--	--	154	--	182	--	--	--	181	--	--	994	6.8
618	60	Feb. 15, 1967	GC	--	--	--	--	--	--	280	--	187	--	--	--	244	--	--	1,010	8.0
08-101	50	Apr. 19, 1939	GC	--	--	59	8	* 39	--	220	11	56	--	--	490	180	--	--	--	--
101	50	Jan. 17, 1967	GC	24	--	68	10	126	4.6	260	12	182	.3	.2	555	210	3.8	.05	994	7.3
102	50	do	GC	27	--	9.0	2.3	116	3.8	144	.4	112	.2	.2	326	32	8.9	1.99	603	8.5
103	60	Feb. 9, 1967	GC	27	--	64	9.6	122	4.4	288	0.4	167	0.1	0.8	537	199	3.8	0.74	963	7.8
104	43	do	GC	17	--	28	5.9	121	4.7	225	13	120	.2	.2	421	94	5.4	1.80	764	7.0
105	30	Mar. 29, 1939	BB	--	--	26	9	* 37	--	104	15	56	.3	--	194	100	--	--	--	--
105	45	do	GC	--	--	--	--	--	--	134	16	54	--	--	217	--	--	--	--	--
105	51	do	GC	--	--	52	6	* 42	--	207	15	42	.3	--	259	154	--	--	--	--
105	80	Apr. 14, 1939	GC	--	--	31	10	* 130	--	226	10	146	--	--	441	121	--	--	--	--
105	120	Apr. 18, 1939	GC	--	--	67	18	* 109	--	262	--	180	--	--	512	241	--	--	--	--
105	126	Apr. 25, 1939	GC	--	--	71	17	* 115	--	238	11	205	.3	--	539	245	--	--	--	--
106	20	Mar. 29, 1939	BB	--	--	61	21	* 96	--	189	34	182	--	--	487	238	--	--	--	--
106	43	do	GC	--	--	68	30	* 296	--	268	111	426	--	--	1,066	244	--	--	--	--
106	58	Apr. 4, 1939	GC	--	--	57	12	* 133	--	226	15	200	--	--	531	193	--	--	--	--
106	74	Apr. 5, 1939	GC	--	--	--	--	--	--	268	15	196	--	--	548	--	--	--	--	--
106	94	Apr. 7, 1939	GC	--	--	63	21	* 129	--	195	16	246	--	--	574	243	--	--	--	--
106	110	Apr. 11, 1939	GC	--	--	--	--	--	--	207	17	270	--	--	616	--	--	--	--	--
106	117	Apr. 12, 1939	GC	--	--	--	--	--	--	220	12	220	--	--	541	--	--	--	--	--
107	47	Mar. 30, 1939	GC	--	--	60	8	* 39	--	220	11	56	--	--	283	185	--	--	--	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	SODIUM-ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
AH-83-08-107	70	Apr. 5, 1939	GC	--	--	48	10	* 82	--	183	13	124	--	--	367	161	--	--	--	--
107	82	Apr. 7, 1939	GC	--	--	--	--	--	--	207	13	116	--	--	370	--	--	--	--	--
107	84	Apr. 8, 1939	GC	--	--	50	15	* 79	--	183	13	136	0.3	--	383	184	--	--	--	--
108	14	Apr. 7, 1939	BB	--	--	88	26	* 349	--	244	37	600	--	--	1,220	326	--	--	--	--
108	35	do	BB	--	--	--	--	--	--	232	33	575	--	--	1,136	--	--	--	--	--
108	42	do	BB	--	--	31	5	* 153	--	238	13	157	--	--	476	98	--	--	--	--
108	62	Apr. 10, 1939	GC	--	--	30	6	* 115	--	122	25	158	--	--	394	99	--	--	--	--
108	82	Apr. 11, 1939	GC	--	--	--	--	--	--	177	15	185	--	--	456	--	--	--	--	--
108	96	Apr. 12, 1939	GC	--	--	--	--	--	--	207	--	150	--	--	417	--	--	--	--	--
108	102	do	GC	--	--	53	18	* 158	--	189	13	270	.6	--	605	206	--	--	--	--
403	8	Mar. 28, 1939	BB	--	--	182	118	* 986	--	305	295	1,790	--	--	3,524	938	--	--	--	--
403	28	Mar. 29, 1939	BB	--	--	506	248	* 1,339	--	85	411	3,330	--	--	5,881	2,283	--	--	--	--
403	38	Mar. 30, 1939	BB	--	--	2,434	3,659	*21,503	--	122	4,519	44,725	--	--	76,925	21,130	--	---	--	--
403	48	do	GC	--	--	2,764	4,600	*33,829	--	244	6,886	66,332	--	--	113,584	26,000	--	--	--	--
403	58	Apr. 4, 1939	GC	--	--	3,200	4,800	*36,168	--	61	7,715	69,708	--	--	121,657	27,800	--	--	--	--
403	71	Mar. 30, 1939	GC	--	--	4,576	2,700	*19,556	--	122	2,547	44,200	--	--	73,666	22,600	--	--	--	--
602	13	May 30, 1967	BI	--	--	--	--	--	--	384	--	1,180	--	--	--	840	--	0.00	4,420	7.5
Refugio County																				
WH-79-48-801	900	Feb. 21, 1962	GC	18	--	6.0	2.5	* 376	--	342	85	332	2.1	0.0	1,000	26	32	5.10	1,730	7.9
901	1,150	do	GC	19	--	11	4.5	* 605	--	368	50	710	2.1	.0	1,580	46	39	5.11	2,810	7.8
55-301	950	Feb. 17, 1937	GC	--	--	16	3	* 426	--	427	95	375	--	--	1,120	552	26	--	--	--
56-401	930	do	GC	--	--	18	4	* 698	--	488	120	750	2.6	--	1,830	63	38	--	--	--
502	840	do	GC	--	--	16	4	* 778	--	425	133	840	2.0	--	2,030	63	43	--	--	--
502	840	Jan. 18, 1962	GC	19	--	16	6.9	* 957	--	403	101	1,210	2.3	.2	2,510	68	50	5.24	4,430	7.6
63-103	900	June 26, 1946	GC	--	--	7.0	28	* 597	--	453	54	638	--	1.0	1,520	29	48	--	--	--
80-41-501	930	Nov. 21, 1961	GC	16	--	12	6.4	* 778	--	555	104	840	--	.2	2,030	56	45	7.97	3,590	7.4
San Patricio County																				
WW-83-07-104	280	Oct. 13, 1938	GC	--	--	52	17	* 1,281	--	329	8	1,920	--	--	3,440	201	--	--	--	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Test Holes in Aransas County and Adjacent Areas--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	POTASSIUM (K)	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	SODIUM-ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25°C)	pH
WW-83-07-402	175	Sept. 19, 1938	GC	--	--	53	27	* 1,632	--	134	54	2,570	--	--	4,402	242	--	--	--	--
403	280	do	GC	--	--	54	18	* 1,493	--	329	--	2,260	--	--	3,987	211	--	--	--	--
404	192	June 4, 1965	GC	14	--	44	35	* 1,670	--	540	328	2,200	--	--	4,560	254	46	3.77	8,000	8.1
510	124	June 16, 1965	GC	23	--	12	11	* 493	--	420	37	540	1.1	0.2	1,320	75	25	5.39	2,370	8.4
702	150	July 8, 1965	GC	30	--	28	22	* 687	--	376	86	890	--	1.0	1,930	160	24	2.95	3,480	7.5
801	84	June 23, 1938	GC	--	--	35	22	* 332	--	421	54	355	--	--	1,010	179	--	--	--	--
808	90	June 22, 1938	GC	--	--	108	25	* 196	--	329	45	340	--	--	876	370	--	--	--	--
901	150	July 8, 1965	GC	25	0.12	55	13	* 128	--	278	9.4	160	1.7	.2	529	190	4.0	.75	967	6.9
916	67	do	GC	34	--	71	13	* 86	--	259	.2	145	.2	.2	477	230	2.5	.00	881	7.1
919	40	June 26, 1938	BB	--	--	65	5	* 50	--	256	5	54	.1	--	305	183	--	--	--	--

* Sodium and potassium are calculated as sodium (Na).
a/ Composite sample.
b/ Analysis made by Microbiology Service Laboratories, Houston, Texas.
c/ Analysis made by Humble Oil and Refining Co.

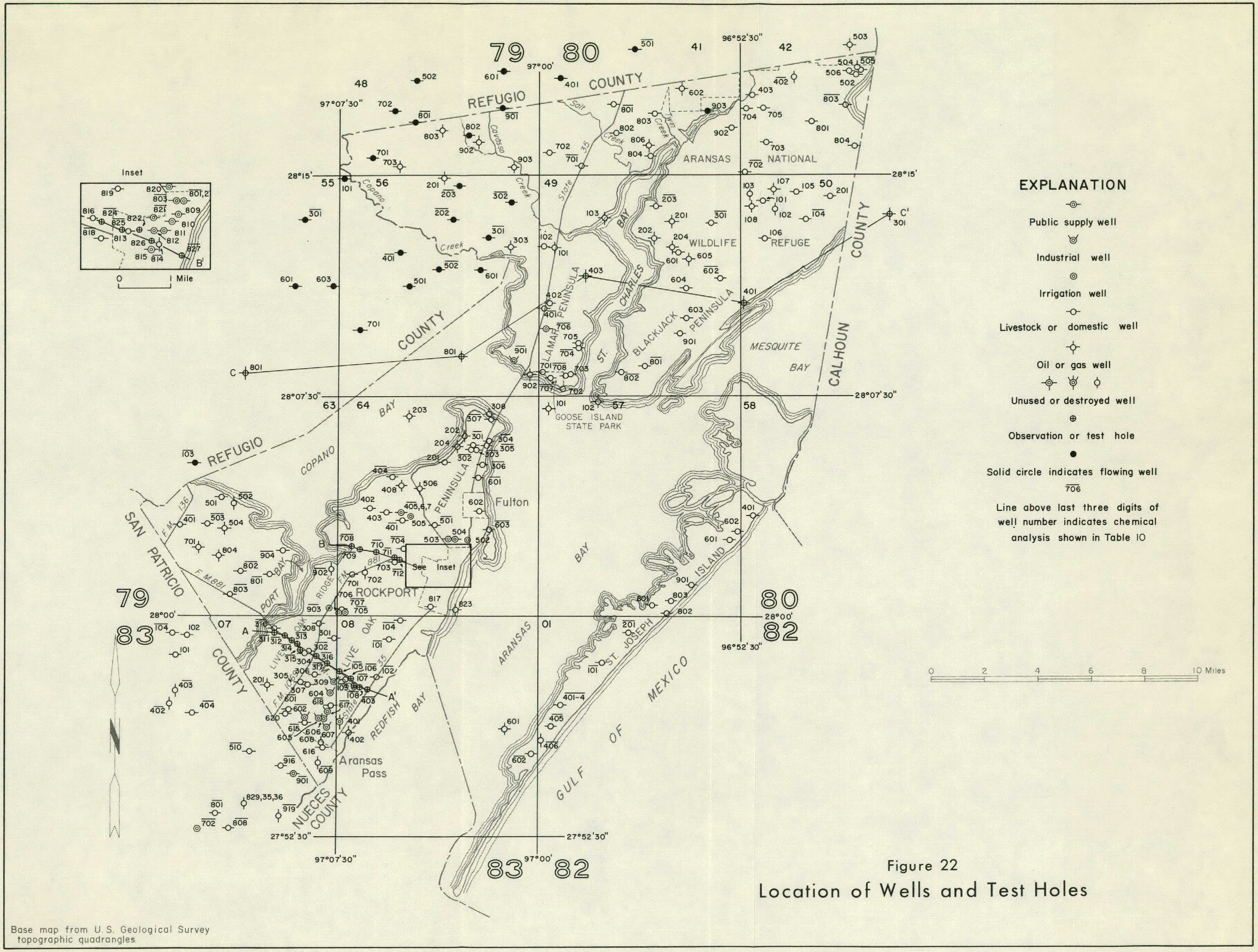

Figure 22

Location of Wells and Test Holes