STATE OF LOUISIANA

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

OFFICE OF PUBLIC WORKS AND INTERMODAL

PUBLIC WORKS AND WATER RESOURCES DIVISION

WATER RESOURCES

TECHNICAL REPORT

NO. 71

QUALITY OF WATER USED FOR DOMESTIC SUPPLY IN THE CHICOT AQUIFER SYSTEM OF SOUTHWESTERN LOUISIANA, 1994-2001

Prepared by the

U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

In cooperation with the

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

2003

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By

Lawrence B. Prakken

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CONVERSION FACTORS, DATUMS, AND ABBREVIATED WATER-QUALITY UNITS

Multiply	By	To obtain
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)
gallon per minute (gal/min)	0.06309	liter per second (L/s)
million gallons per day (Mgal/d)	3,875	cubic meter per day (m^3/d)

Temperature in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) as follows: °C = (°F - 32)/1.8.

Horizontal coordinate information in this report is referenced to the North American Datum of 1927.

Vertical coordinate information in this report is referenced to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

Abbreviated water-quality units:
microsiemens per centimeter at 25 degrees Celsius (µS/cm)
milligrams per liter (mg/L)
micrograms per liter (µg/L)

Quality of Water Used for Domestic Supply in the Chicot Aquifer System of Southwestern Louisiana, 1994-2001

By Lawrence B. Prakken

ABSTRACT

Water-quality data collected from 173 wells located in four hydrogeologic units (the undifferentiated sand, shallow sand, upper sand, and "200-foot" sand of the Lake Charles area) were used to characterize the general quality of water used for domestic supply in the Chicot aquifer system in southwestern Louisiana. For the purpose of discussion, the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area are presented as a single unit.

In the undifferentiated, upper, and “200-foot” sands of the study area, values for specific conductance and total dissolved solids (dissolved solids) are generally highest in the deeper sediments of the south, and lowest in the outcrop area of the north. There is an area of high (greater than 500 mg/L [milligrams per liter]) dissolved solids in western Jefferson Davis and eastern Calcasieu Parishes, which is associated with an area of saltwater near Iowa, Louisiana. The pH tends to be lowest in the northern part of the study area, and tends to increase in a southerly direction. The pH ranged from a low of 4.8 at well Al-316 in Allen Parish and well V-6081Z in Vernon Parish to a high of 8.2 at well Cu-7678Z in Calcasieu Parish. Ground water in the outcrop area tends to be low in solutes (dissolved matter) and is acidic. Along the southeastern boundary of the study area, there are some areas where the pH is below 6.5, indicating possible recharge. Within the study area, hardness ranged from a low of 1 mg/L as calcium carbonate at well I-6203Z in Iberia Parish to a high of 490 mg/L at well JD-5177Z in Jefferson Davis Parish. Soft (less than or equal to 60 mg/L as calcium carbonate) water predominates throughout the northern part of the study area with hardness generally increasing in a southeasterly direction. Hard (121-180 mg/L as calcium carbonate) to very hard (greater than 180 mg/L as calcium carbonate) water predominates in the southeastern part of the study area, with the exception of the eastern and southeastern Lafayette Parish area where the wells yielded soft to moderately hard (61-120 mg/L as calcium carbonate) water.

Chloride concentrations throughout the study area generally were well below the U.S. Environmental Protection Agency Secondary Maximum Contaminant Level (SMCL) of 250 mg/L. The maximum chloride concentration was 290 mg/L at well Ve-7020Z, which is located in southern Vermilion Parish near the Gulf Coast. A localized area of elevated chloride concentrations is present in western Jefferson Davis and eastern Calcasieu Parish. Throughout the study area, sulfate, fluoride, and nitrate concentrations were all below U.S. Environmental Protection Agency standards.

Iron concentrations in water from the undifferentiated, upper, and “200-foot” sands were above the SMCL of 300 μg/L (micrograms per liter) in much of the study area, but below 300 μg/L in the outcrop area, the southwestern part of the study area, and a localized area near southeastern Lafayette Parish. Iron concentrations increase abruptly south of the outcrop area. Manganese concentrations

were above the SMCL of 50 μg/L in much of the study area, but below 50 μg/L in the northern part of the study area and in several small areas throughout the study area. Manganese concentrations, like iron concentrations, increase abruptly south of the outcrop area.

Water from the shallow sand had a wide variation in water quality: specific conductance ranged from 300 to 1,220 microsiemens per centimeter; dissolved solids ranged from 201 to 704 mg/L; pH ranged from 6.8 to 7.5; hardness ranged from 96 to 330 mg/L as calcium carbonate; and chloride ranged from 4.2 to 227 mg/L. Sulfate ranged from less than 0.2 to 2.7 mg/L; fluoride ranged from 0.2 to 0.4 mg/L; and nitrate (as nitrogen) ranged from less than 0.02 to 7.8 mg/L (7.8 mg/L was the maximum concentration measured of all the wells sampled for this study). Iron ranged from less than 10 to 8,670 μg/L; manganese ranged from less than 1 to 458 μg/L.

INTRODUCTION

The Chicot aquifer system underlies an area of about 9,000 mi^2 in southwestern Louisiana and provides fresh ground water for industry, agricultural irrigation, domestic purposes, and public supply. In 2000, approximately 800 Mgal/d of water was withdrawn from the aquifer (Sargent, 2002, p. 92); about two-thirds of that amount was used for rice irrigation. About 12 Mgal/d was withdrawn from domestic wells.

Domestic wells, often in rural areas, are not subject to regulatory standards regarding the water’s suitability as drinking water. Although various investigations of the Chicot aquifer system have been performed, none have specifically addressed the quality of water from domestic wells. In 1999, the U.S. Geological Survey (USGS), in cooperation with the Louisiana Department of Transportation and Development (DOTD), began a study to characterize the general quality of water used for domestic supply in the Chicot aquifer system.

Purpose and Scope

This report describes the general quality of water used for domestic supply in the Chicot aquifer system. Water-quality data collected during July 1994 through January 1996 from 142 wells screened within the Chicot aquifer system provide a basic data set for the report. Additional data collected during 2000-2001 from 31 wells screened within the Chicot aquifer system also are included. Water-quality data collected from three hydrogeologic units within the Chicot aquifer system (the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, hereinafter referred to as the “200-foot” sand) were used to generate areal maps of total dissolved solids (dissolved solids), pH, hardness, chloride, iron, and manganese. Other water-quality constituents included seven major inorganic ions (calcium, magnesium, sodium, potassium, bicarbonate, sulfate, and fluoride) and seven nutrients (nitrate, nitrite, nitrate plus nitrite, ammonia, ammonia plus organic nitrogen, phosphorus, and orthophosphorus). Data also are presented in tables. A secondary data set consisting of water-quality data from nine wells screened in the shallow sand of the Chicot aquifer system is discussed separately. Water-quality data are compared to U.S. Environmental Protection Agency (USEPA) drinking-water standards.

Description of Study Area

The study area is located in southwestern Louisiana and includes all or parts of the following parishes: Acadia, Allen, Beauregard, Calcasieu, Cameron, Evangeline, Iberia, Jefferson Davis, Lafayette, Rapides, St. Landry, St. Martin, St. Mary, Vermilion, and Vernon (fig. 1). The study area is mainly rural and agricultural with larger population centers in the cities of Lake Charles and Lafayette. The study area has a temperate, almost subtropical climate with hot, humid summers and mild winters.

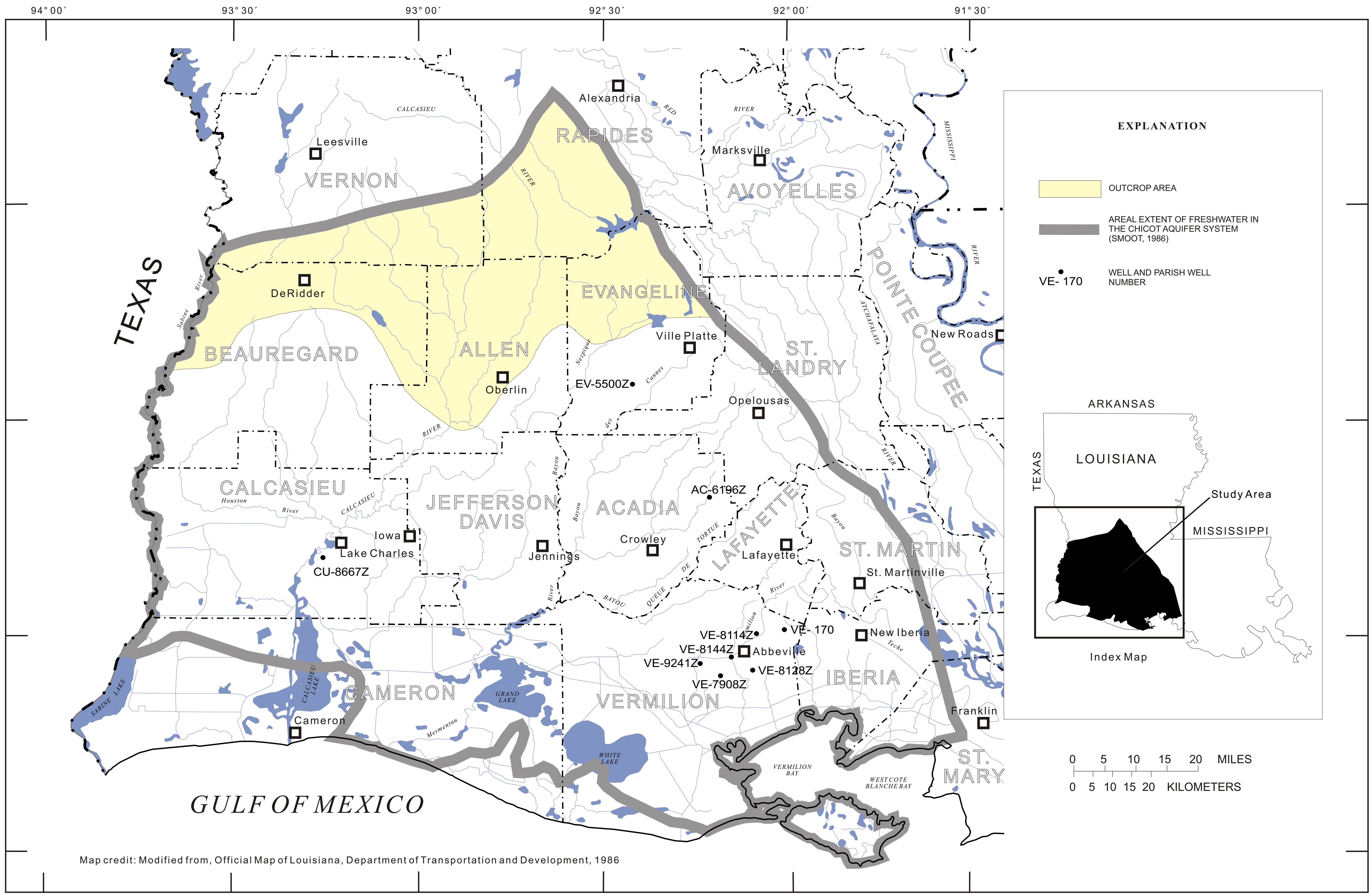
Previous Investigations

Nyman (1989) summarized water quality for the Atchafalaya aquifer, Chicot aquifer system, Evangeline aquifer, and Jasper aquifer system. The report presents maps of specific conductance, pH, hardness, and iron concentrations for these aquifers. Tomaszewski (1992) described the occurrence and distribution of selected chemical characteristics, including organic and inorganic constituents for 12 Louisiana aquifers, including the Chicot aquifer system. Maps show the generalized areal distributions of hardness, sodium, dissolved solids, dissolved iron, and dissolved manganese. Sargent and McGee (1998) documented the occurrence of nitrate as nitrogen and presented data for selected water-quality properties and constituents in water from 160 shallow domestic wells in southwestern Louisiana, including 150 wells completed within the Chicot aquifer system. Results indicated there is no widespread occurrence of high nitrate (greater than 10.0 mg/L) concentrations within the Chicot aquifer system. Stuart and Demas (1990) presented synthetic organic chemical data from 65 wells throughout the State, including 14 wells completed in the Chicot aquifer system.

Saltwater within the Chicot aquifer system has been discussed in several reports, but two have dealt specifically with that issue. Nyman (1984) presented facts and discussion about saltwater within the Chicot aquifer system and indicated that high-chloride concentrations occur in coastal zones and isolated bodies north of the coast. Lovelace (1999) presented an updated assessment of chloride concentrations within different hydrogeologic units of the Chicot aquifer system.

Acknowledgments

The author gratefully acknowledges the assistance and cooperation of private well owners who allowed their wells to be sampled. Additionally, the author thanks Zahir “Bo” Bolourchi, Chief, Water Resources Programs, Louisiana Department of Transportation and Development, for providing well information and assistance in the publication of this report.



Louisiana Department of Transportation and Development - U.S. Geological Survey Water Resources Cooperative Program

Figure 1. Location of the study area and sampled wells screened in the shallow sand of the Chicot aquifer system, southwestern Louisiana.

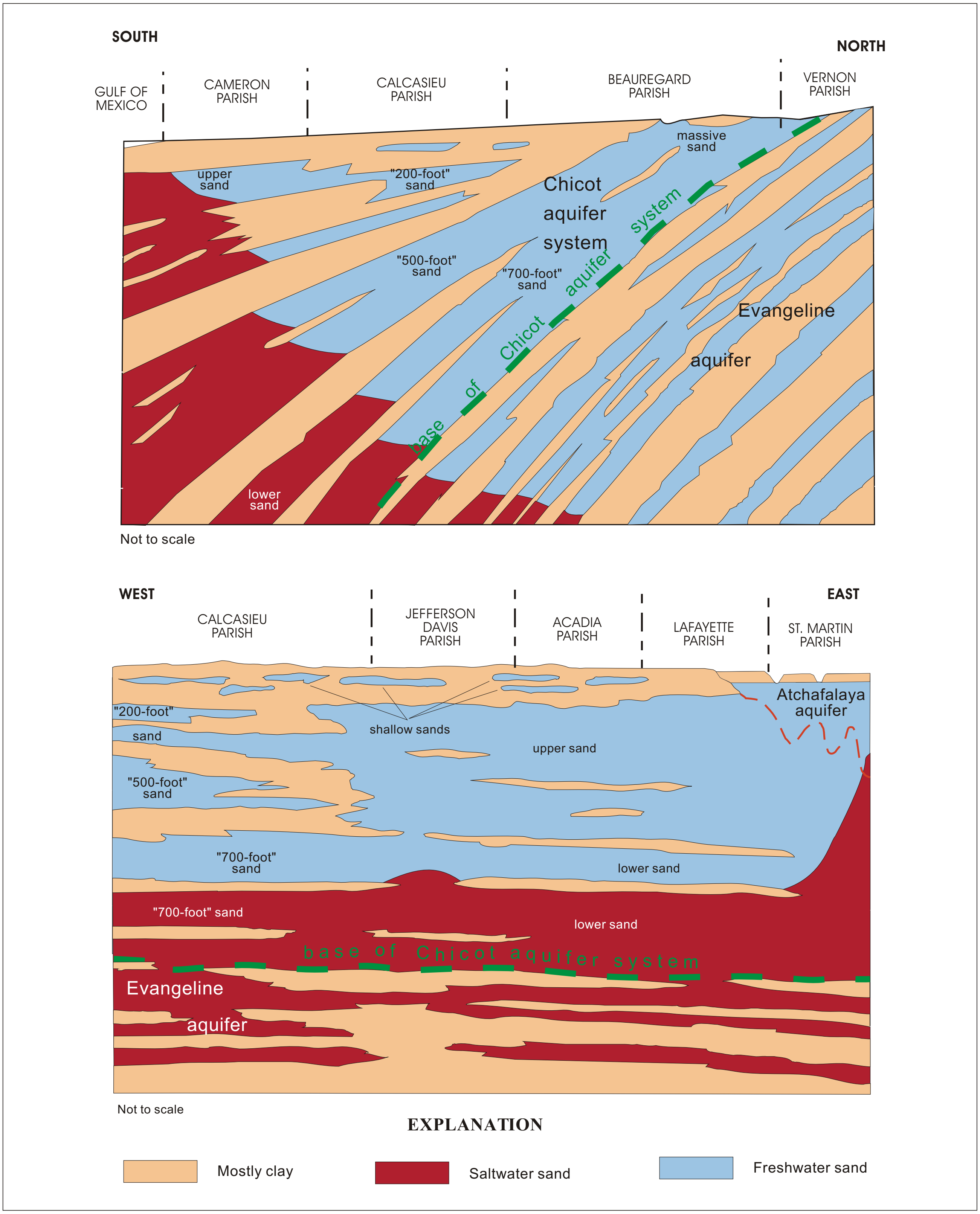
HYDROGEOLOGY

The Chicot aquifer consists of sediments such as gravel, sand, silt, and clay that were mainly deposited during the Pleistocene series, approximately 10,000 to 1,600,000 years ago (Hansen, 1991, p. 59). A detailed description of the depositional history of the Chicot aquifer system is presented in Jones and others (1954, p. 47). The Chicot aquifer system consists of aquifers (sand and gravel deposits), which readily produce water from wells, and clay layers, which act to retard the vertical flow of water between aquifers. The Chicot aquifer system is divided into seven aquifers: the undifferentiated (massive), shallow, upper, and lower sands and the "200-foot," "500-foot," and "700-foot" sands of the Lake Charles area. Figure 2 shows idealized hydrogeologic sections through southwestern Louisiana. Figure 3 shows selected hydrogeologic units in central and southwestern Louisiana, including the hydrogeologic units pertinent to this report.

The oldest deposits of the Chicot aquifer system are exposed at the surface (outcrop) in the northern part of the study area. Infiltration of rainwater into this outcrop area serves to recharge well water withdrawn farther down gradient in the aquifer. The hydrogeologic unit in the northern part of the study area, including the outcrop area, is referred to as the undifferentiated sand (sometimes called the massive sand) because of the lack of lithologic markers such as continuous clay confining beds, or continuous gravel layers underlying sand layers, which allow for delineation of hydrogeologic units. The undifferentiated sand is located approximately north of lat 30º20 ′N for most of the study area.

Most of southwestern Louisiana is overlain by a clay layer known as the surficial confining unit; the permeable recharge area in the northern part of the study area is an exception. Within the surficial confining unit are scattered sand streaks, lenses, and layers known as the shallow sand, which can provide water for domestic purposes. An extensive sand layer in southeastern Cameron, southern Vermilion, and western Iberia Parishes overlies the upper sand and also is classified as a shallow sand (Harder and others, 1967, p. 7).

As the undifferentiated sand dips southward into Calcasieu Parish, it continues to deepen and becomes separated by a clay layer. This clay layer allows the undifferentiated sand to be delineated into two separate hydrogeologic units referred to as the "500-foot" and "700-foot" sands of the Lake Charles area, based on their depth below land surface in that area. A third aquifer is present in Calcasieu Parish; separated from the "500-foot" sand by a clay layer, the "200-foot" sand underlies the surficial confining unit (fig. 2). Most domestic wells in Calcasieu Parish are screened in the "200-foot" sand. Regarding the recharge area of the "200-foot" sand, Harder (1960a, p. 27) states the following: “The outcrop and recharge area of the ‘200-foot’ sand is in northern Calcasieu and southern Beauregard Parishes, where in many places it is covered by a clay layer up to 75 ft thick. Where the clay layer is very thick, probably little recharge occurs; however, where it is quite thin or nonexistent, large amounts of water can move down into the sand.” More recent studies indicate the "200-foot" sand is hydrologically connected to the upper sand, which is immediately to the east (Nyman, 1984, p. 41).



Louisiana Department of Transportation and Development-U.S. Geological Survey Water Resources Division Cooperative Program

Figure 2. Idealized hydrogeologic sections through southwestern Louisiana (modified from Nyman, 1984; Lovelace, 1999).

<table>
<tr><th rowspan="4">System</th><th rowspan="4">Series</th><th colspan="4">Hydrogeologic Unit</th></tr>
<tr><th colspan="4">Central and southwestern Louisiana</th></tr>
<tr><th rowspan="2">Aquifer system or confining unit</th><th colspan="3">Aquifer or confining unit</th></tr>
<tr><th>Lake Charles area</th><th>Rice-growing area</th><th>Outcrop area</th></tr>
<tr><td rowspan="4">Quaternary</td><td rowspan="4">Pleistocene</td><td rowspan="4">Chicot aquifer system or surficial confining unit</td><td>Shallow sand or surficial confining unit</td><td>Atchafalaya aquifer, shallow sand, or surficial confining unit</td><td rowspan="4">Undifferentiated (massive) sand, upland terrace aquifer, or surficial confining unit</td></tr>
<tr><td>"200-foot" sand</td><td>Upper sand</td></tr>
<tr><td>"500-foot" sand</td><td rowspan="2">Lower sand</td></tr>
<tr><td>"700-foot" sand</td></tr>
<tr><td rowspan="3">Tertiary</td><td>Pliocene
?</td><td colspan="4">Evangeline aquifer</td></tr>
<tr><td rowspan="2">Miocene</td><td colspan="4">Castor Creek confining unit</td></tr>
<tr><td>Jasper aquifer system</td><td colspan="3">Williamson Creek aquifer
Dough Hills confining unit
Carnahan Bayou aquifer</td></tr>
</table>

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Figure 3. Selected hydrogeologic units in central and southwestern Louisiana (modified from Lovelace and Lovelace, 1995).

East of Calcasieu Parish the undifferentiated sand is divided by a clay layer into two units called the upper sand and lower sand (fig. 2). The lower sand is hydrogeologically connected to the "700-foot" sand of the Lake Charles area. The upper sand hydrogeologic unit is stratigraphically equivalent to, and continuous with, the "200-foot" sand and extends from the eastern edge of Calcasieu Parish nearly to the Atchafalaya River. The upper sand is generally more than 400 ft thick, and many irrigation and industrial wells can be pumped at rates greater than 2,000 gal/min (Nyman, 1989, p. 9).

Recharge to the upper sand occurs through a complex process affected by various factors such as pumpage from the aquifer, rainfall (or lack of), and head pressures in adjacent aquifers. In addition to recharge from the outcrop area, interconnections with the Atchafalaya aquifer allow water from the Atchafalaya aquifer to recharge the upper sand. Recharge by vertical leakage occurs by the slow movement of water through clay layers from aquifers of relatively high head to aquifers of low head. Vertical leakage plays an important recharge role in the coastal areas, where the water level in the Chicot aquifer is lower than the water level in the wetlands above it and in the Evangeline aquifer below it (Nyman, 1984, p. 10). A USGS report presented the results of a digital ground-water-flow model, which indicated that under 1981 conditions, vertical leakage provided about 67 percent of the recharge to the Chicot aquifer system with about 28 percent provided from the outcrop area (Nyman and others, 1990, p. 51). The report also stated that 65 percent of the water (primarily from the upper sand) pumped from rice-growing areas was supplied by vertical leakage from the surface in and near the pumping centers (Nyman and others, 1990, p. 33).

DISTRIBUTION OF DOMESTIC WELLS

Figure 4 shows the locations of existing domestic wells screened in the Chicot aquifer system that are registered with the State of Louisiana (Zahir "Bo" Bolourchi, Louisiana Department of Transportation and Development, written commun., 2002). Because registration of water wells started in 1984, many unregistered domestic wells may exist. Table 1 lists the number of registered domestic wells screened in each sand unit, and the percentage of wells in each sand unit by parish. Water-quality data for wells in the lower sand, "500-foot" sand, and "700-foot" sand are not presented in this report because less than 5 percent of registered, existing domestic wells screened in the Chicot aquifer system are open to these sands.

Table 1. *Distribution of domestic wells screened in sands in the Chicot aquifer system by parish, southwestern Louisiana*

[The aquifer names for the "200-foot," "500-foot," and "700-foot," sand units refer to sands of the Lake Charles area.]

Parish	Number of domestic wells screened in each sand unit and percent in each sand unit by parish							
	Sand:	Undifferentiated	Shallow[1]	Upper[1]	Lower	"200-foot"	"500-foot"	"700-foot"
	Wells:	2,400	2,800	8,800	4	2,500	805	11
	Percent							
Acadia		11	2	14				
Allen		10			25			
Beauregard		20	1					
Calcasieu		1	9	1		99	99	100
Cameron			1	1		1	1	
Evangeline		7	1					
Iberia			7	14				
Jefferson Davis		3		11	25			
Lafayette		5	2	36				
Rapides		6						
St. Landry		17		1	50			
St. Martin				3				
St. Mary			2					
Vermilion			74	20				
Vernon		20						

[1]Totals do not equal 100 percent due to rounding.

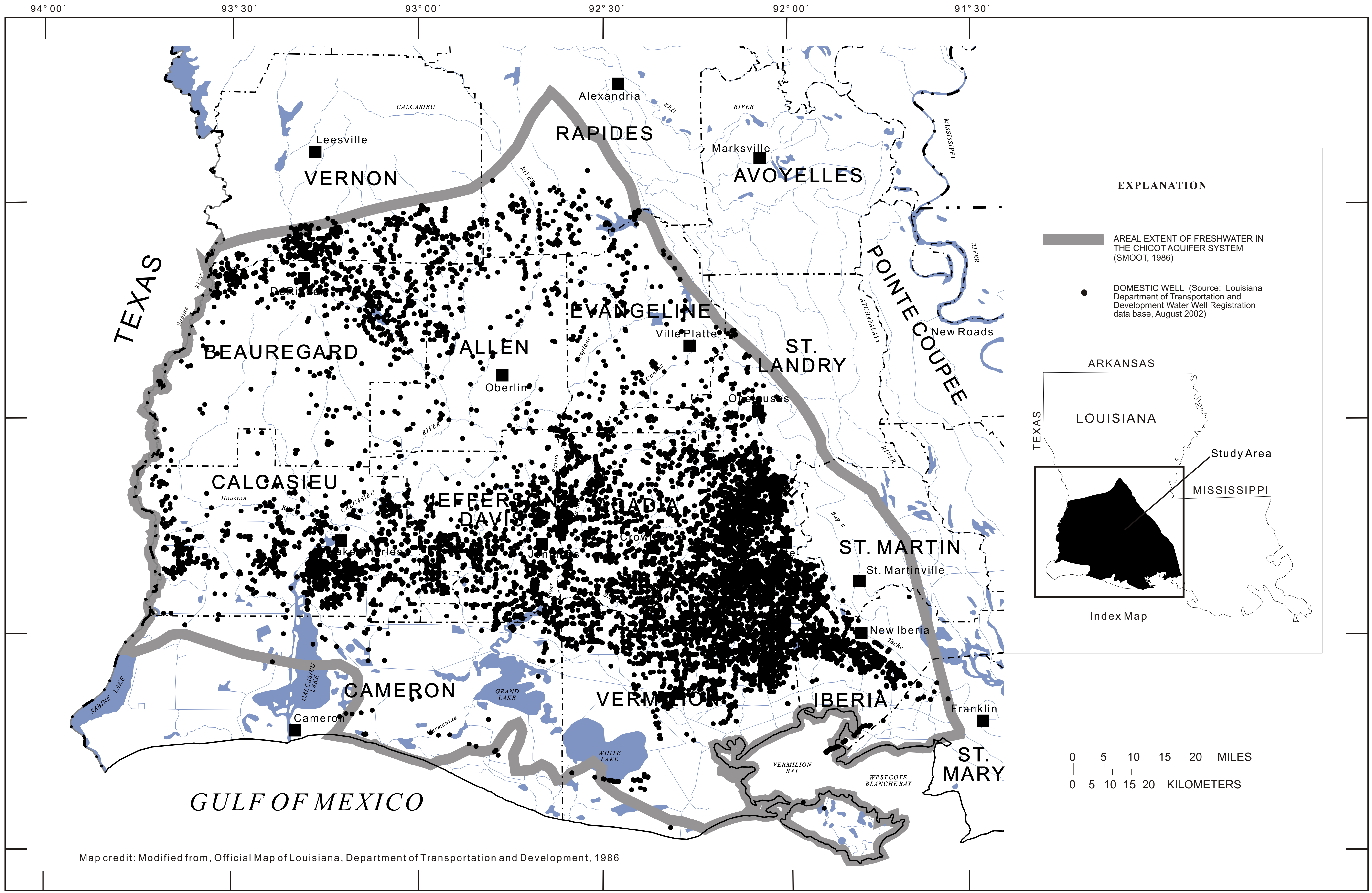

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Figure 4. Location of domestic wells screened in the undifferentiated sand, upper sand, “200-foot” sand of the Lake Charles area, and shallow sands, Chicot aquifer system, southwestern Louisiana.

DRINKING WATER STANDARDS

The USEPA has established National Primary[1] and Secondary[2] Drinking Water Regulations for public water systems. Public water systems may use any state-approved treatment methods to comply with Maximum Contaminant Levels (MCL's). MCL's are listed for about 80 contaminants which include 16 inorganic contaminants, such as lead and mercury; 7 disinfectants and disinfection by-products, such as chlorine; 53 organic contaminants, such as pesticides and herbicides; 3 radionuclides, including alpha and beta particles and radium; and 7 microorganism contaminants, such as *Giardia Lamblia* and *Cryptosporidium* (U.S. Environmental Protection Agency, 2002).

Secondary Maximum Contaminant Levels (SMCL's) are listed for 15 contaminants which include aluminum, chloride, color, copper, corrosivity, fluoride, foaming agents, iron, manganese, odor, pH, silver, sulfate, dissolved solids, and zinc (U.S. Environmental Protection Agency, 2002). At considerably higher concentrations than the SMCL's, health risks may be associated with the contaminants (U.S. Environmental Protection Agency, 2002).

Water-quality data discussed in this report include two constituents with MCL's: fluoride (4.0 mg/L) and nitrate (10 mg/L as N). The data include seven constituents with SMCL's: dissolved solids (500 mg/L), pH (outside the range of 6.5 to 8.5 standard units), sulfate (250 mg/L), chloride (250 mg/L), fluoride (2.0 mg/L), iron (300 μg/L), and manganese (50 μg/L). MCL's and SMCL's also are listed in the water-quality tables (appendixes 3 and 4).

DATA COLLECTION, METHODS, AND DEFINITION OF TERMS

Water samples collected from wells during 1994-96 were sampled in accordance with established USGS standard methods and techniques, as described by Brown and others (1970). Before sampling, wells were pumped until the specific conductance, pH, and water temperature of the water stabilized. Samples were collected as close as possible to the well to ensure that the water samples were representative of water in the aquifer and not representative of conditions in a pressure or treatment tank. However, in some instances samples were collected after the water entered a

[1]Primary Drinking-Water Regulations Maximum Contaminant Level (MCL): Enforceable, health-based regulation that is to be set as close to the Maximum Contaminant Level Goal as is feasible. The definition of feasible means the use of best technology, treatment techniques, and other means that the Administrator of the U.S. Environmental Protection Agency finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are generally available (taking cost into consideration).

[2] Secondary Drinking-Water Regulations Secondary Maximum Contaminant Level (SMCL): Contaminants that affect the aesthetic quality of drinking water. At high concentrations or values, health implications as well as aesthetic degradation may also exist. SMCL's are not Federally enforceable, but are intended as guidelines for the states.

pressure tank. When this occurred, the tank was flushed and refilled before sample collection. Water samples collected during 2000-2001 were collected using methods described by Wilde and others (1998). Before a sample for laboratory analysis was collected, field values for specific conductance, pH, and water temperature were recorded. Field values for either alkalinity or acid neutralizing capacity (ANC) were recorded at selected wells.

Specific conductance is a measure of the ability of water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25º Celsius. Specific conductance is related to the type and concentration of ions in solution and can be used to approximate the dissolved-solids concentration of water (Goree and others, 2001). When water has been filtered, the remaining matter in the water is referred to as dissolved. Dissolved solids are the residual solids remaining in filtered water after evaporation. Within the Chicot aquifer system, undesirable dissolved solids are often mineral salts, iron oxides, manganese oxides, or components of hardness. Specific conductance meters are relatively inexpensive and offer a convenient means to estimate dissolved-solids concentrations. In natural waters, the concentration of dissolved solids in milligrams per liter is 54 to 96 percent of the specific conductance in microsiemens per centimeter at $25^{o}C$ (Hem, 1985, p. 67). Nyman (1989, p. 6) indicated that, in general, dissolved-solids concentrations for water in the Chicot aquifer system can be estimated by multiplying the specific conductance by 0.65. A good multiplier for a particular parish can be determined by selecting and comparing values for specific conductance and dissolved solids in appendixes 3 and 4.

The pH of water is the negative logarithm of the hydrogen-ion activity. Solutions with a pH less than 7 are termed “acidic” while solutions with a pH greater than 7 are termed “basic” or “alkaline.” The pH is represented on a scale where 0 is very acidic, 7 is neutral, and 14 is very basic (Goree and others, 2001). (Note that the SMCL for pH is outside the range of 6.5 to 8.5 standard units.) Low pH water has corrosive effects on piping and metallic plumbing fixtures. Low pH water also can ionize and bring into solution undesirable constituents such as iron, manganese, and lead.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather (the greater the hardness, the more soap is needed) (Goree and others, 2001). Hard water contributes to boiler scale and mineral deposits in pipes and water heaters. It is attributable to the presence of alkaline earths (principally calcium and magnesium) and can be expressed as an equivalent concentration of calcium carbonate ($CaCO_3$). The USGS reports hardness (mg/L as $CaCO_3$) as follows: 0-60, soft water; 61-120, moderately hard water; 121-180, hard water; and greater than 180, very hard water (U.S. Geological Survey, 2002).

Bicarbonate (HCO_3^-) is a major ion formed when carbon dioxide (CO_2) in water reacts with carbonate minerals (Swenson and Baldwin, 1965, p. 15). In areas of the Chicot aquifer system where the water is hard to very hard, bicarbonate plays an important role in buffering the pH of water. A solution is said to be buffered if its pH is not greatly changed by the addition of moderate quantities of acid or base (Hem, 1985, p. 63). Bicarbonate concentrations in this report were calculated by multiplying the ANC field value by 1.2192 (Hem, 1985, p. 55., table 8). If ANC field values were not available, ANC laboratory values were used, followed by field alkalinity values, followed by laboratory alkalinity values.

Sulfate (SO_4^{2-}) is a naturally occurring anion which, in high concentrations, may produce a disagreeable taste or odor in water. Health concerns regarding sulfate in drinking water have been raised due to reports of people getting diarrhea after drinking water with high concentrations of sulfate (U.S. Environmental Protection Agency, 2002).

Chloride exists as an anion (Cl^-) in water, and is a component of common table salt (sodium chloride). High chloride levels make the water taste salty. Many plants are susceptible to saltwater poisoning or are saltwater intolerant.

Fluoride exists as an anion in water (F^-). In some states, fluoride is added by public-supply systems to waters with low fluoride concentrations as part of an effort to reduce tooth decay. The public-supply fluoridation process attempts to bring the fluoride concentration to an optimal level of 0.7 to 1.2 mg/L, depending on the average maximum daily air temperature of the area (Centers for Disease Control and Prevention, 2002).

Nitrates generally occur in oxygenated ground water near the land surface and are often detected in close proximity to the source of the contaminant. Sources of contamination may include septic systems, animal feces, or fertilizers. Methemoglobinemia (blue-baby syndrome) may be caused by excessive concentrations of nitrate (greater than 10 mg/L nitrate as N) in drinking water. Nitrite (NO_2^-) may be found in oxygen-depleted ground water. In the data tables accompanying this report, concentrations of nitrogen containing compounds are reported in “mg/L as N.” A description of how nitrate was calculated for this report, as well as a calculation table (table 2), is quoted from Sargent and McGee (1998, p. 8-9):

“Concentrations of nitrogen as nitrite plus nitrate and as nitrite in the water samples were determined by quantitative chemical analysis at the USGS laboratory in Denver. The difference between these two laboratory-reported concentrations was used to calculate the concentration of nitrate as nitrogen. Many of the nitrate concentrations presented in this report are not in the USGS water-quality data base because a calculated concentration for nitrate as nitrogen is not reported when one or both concentrations used in the calculation are less than the analytical detection limit. For this report, nitrate concentrations are calculated in the following manner: if the laboratory-reported nitrite concentration is at or less than the detection limit and the laboratory-reported nitrite plus nitrate concentration is also at or less than the detection limit, a concentration for nitrate as nitrogen is reported as the detection limit (given as the larger value). If one concentration is at or greater than the detection limit and the other is not, then the smaller concentration is subtracted from the larger concentration, and the result is reported with or without the less-than sign, depending upon the larger concentration. When the reported nitrite plus nitrate as nitrogen concentration is greater than 1.0 mg/L, and the reported nitrite as nitrogen concentration is less than the detection limit, the nitrate concentration is reported as the same concentration as nitrite plus nitrate to the nearest tenth decimal.”

Iron is a naturally occurring element often found dissolved in ground water that has been in contact with iron-bearing rocks. If brought into contact with air, dissolved iron in water often will oxidize, precipitate out of solution, and produce reddish-brown (rust) stains (Swenson and Baldwin, 1965, p. 15). Laundry and porcelain fixtures may easily stain due to high iron concentrations in

Table 2. *Calculation of concentrations of nitrate as nitrogen*

[Source: Sargent and McGee, 1998, p. 9. mg/L, milligrams per liter; <, less than; >, greater than]

Reporting level	Scenario	Dissolved nitrite plus nitrate as nitrogen (mg/L)	Dissolved nitrite as nitrogen (mg/L)	Dissolved nitrate as nitrogen (calculated mg/L)
If <1.0	Both reported concentrations are less than detection limits	<A	<B	Use the larger value of A or B <0.02
	Example:	<0.02	<0.01	
	One reported concentration is greater than detection limit, and the other is less than detection limit	A	<B	A - B = C
	Example:	0.33	<0.01	0.32
If >1.0	Reported nitrite plus nitrate concentration is greater than 1.0 mg/L, and reported nitrite concentration is less than detection limit	A.X (X is the tenth decimal)	<B	A . X - B = A . X
	Example:	7.8	<0.01	7.8

water. In iron-bearing rocks where there are low-pH waters, large quantities of iron may be dissolved and transported in the water.

Manganese is a naturally occurring element that resembles iron in its chemical behavior. Like iron, manganese also precipitates out of solution when brought into contact with air, producing dark stains on surfaces on which it dries. Laundry and porcelain fixtures may easily stain due to high manganese concentrations in water (Swenson and Baldwin, 1965, p. 15). In manganese-bearing rocks where there are low-pH waters, large quantities of manganese may be dissolved and transported in the water.

QUALITY OF WATER

Water-quality data from 173 wells are presented in this report (appendixes 3 and 4). Sixty-three wells are screened in the undifferentiated sand, 74 wells are screened in the upper sand, 27 wells are screened in the "200-foot" sand, and 9 wells are screened in the shallow sand. Well-construction and water-level data are presented in appendixes 1and 2. Appendixes 2 and 4 consist of shallow sand data, and appendixes 1 and 3 consist of combined data from the undifferentiated, upper, and "200-foot" sands. Specific conductance and pH values discussed in this report refer to field-measured values (both field and laboratory-measured values are listed in appendixes 3 and 4).

Undifferentiated Sand, Upper Sand, and “200-foot” Sand of the Lake Charles Area

For the purpose of discussion, the undifferentiated, upper, and "200-foot" sands are presented as a single unit. Discussion of selected water-quality properties and constituents are presented for these three sands in the following sections, and locations of sampled wells are shown in figure 5.

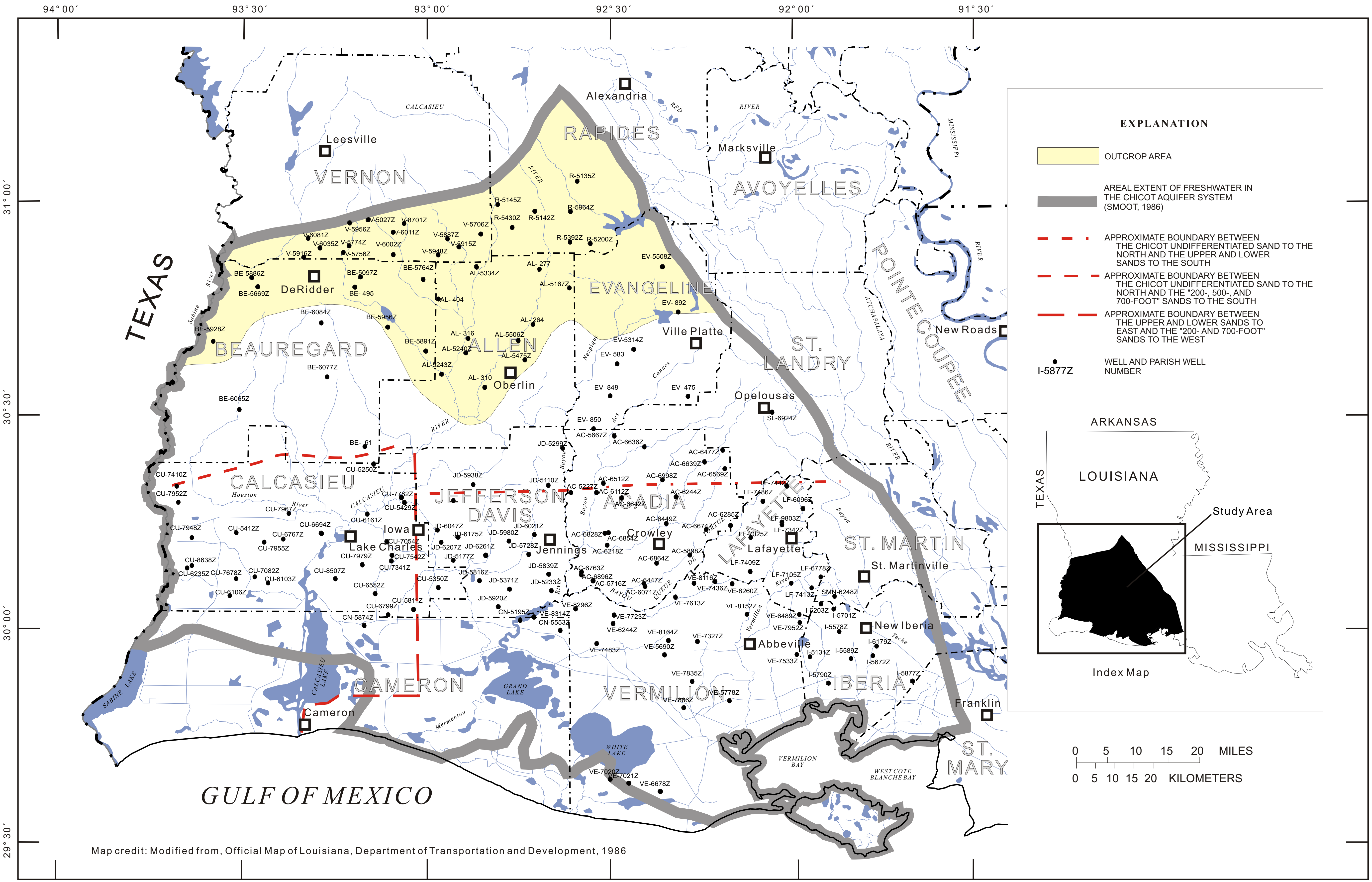

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Figure 5. Location of sampled wells screened in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana.

Specific Conductance and Dissolved Solids

Specific conductance values ranged from 23 μS/cm at well V-8701Z in Vernon Parish to a high of 1,610 μS/cm at well Ve-7020Z located in Vermilion Parish along the Gulf Coast. Dissolved-solids concentrations ranged from a low of 29 mg/L at well V-8701Z in Vernon Parish, to a high of 858 mg/L at well JD-5177Z in Jefferson Davis Parish. Plate 1 shows dissolved-solids concentrations in the study area. Specific conductance and dissolved-solids values generally are lowest in the northern part of the study area and are highest in the southern part. An exception to this occurs at the southeastern edge of the study area (near the area of southeastern Lafayette and northwestern Iberia Parishes), where a grouping of 7 wells (Lf-6778Z, Lf-7105Z, Lf-7413Z, Ve-6489Z, Ve-7952Z, I-6203Z, and SMn-6248Z) had specific conductance values less than 300 μS/cm and dissolved-solids concentrations below 200 mg/L. The most likely reason for these low dissolved-solids concentrations is proximity to a recharge source (newer water) that is naturally low in dissolved solids. This recharge source may be surface waters transported by vertical leakage into the upper sand, or ground water from the neighboring Atchafalaya aquifer immediately to the east. Dissolved-solids concentrations exceeded the SMCL of 500 mg/L in western Jefferson Davis Parish and eastern Calcasieu Parish (pl. 1). This can be attributed to a body of saltwater in the Iowa, Louisiana, area that was described by Nyman (1984, p. 26-30). Dissolved-solids concentrations also exceeded the SMCL in Vermilion Parish, particularly near the Gulf Coast, where chloride is an important contributor to dissolved solids.

The pH

Within the study area, the pH ranged from a low of 4.8 at wells Al-316 in Allen Parish and V-6081Z in Vernon Parish to a high of 8.2 at well Cu-7678Z in Calcasieu Parish. Ground water in the outcrop area, which receives direct infiltration of rain water, tends to be low in solutes (dissolved matter) and is acidic (pl. 2). Farther down gradient, properties of the water change with prolonged contact with various minerals. There are relatively higher specific conductance, dissolved solids, and pH south of the outcrop area compared to the outcrop area. Within the study area, pH generally increases in a southerly direction. However, there are some areas along the southeastern boundary of the study area where the pH is below 6.5, indicating possible effects from recharge.

Hardness

Within the study area, hardness ranged from a low of 1 mg/L as $CaCO_3$ at well I-6203Z in Iberia Parish to a high of 490 mg/L at well JD-5177Z in Jefferson Davis Parish. Soft water predominates throughout the northern part of the study area, and hardness generally increases toward the southeast (pl. 3). Hard to very hard water predominates in the southeastern part of the study area, with the exception of the eastern and southeastern Lafayette Parish area where the wells yielded soft to moderately hard water.

Chloride

Plate 4 shows the distribution of chloride concentrations within the study area. Chloride concentrations throughout most of the study area were well below the SMCL of 250 mg/L. The maximum chloride concentration (290 mg/L) occurred at well Ve-7020Z, which is located in southern Vermilion Parish near the Gulf Coast. Areas immediately along the coast are susceptible to saltwater intrusion caused by ground-water withdrawals which can have the effect of drawing saltwater into freshwater aquifers. High-chloride water is present in the upper sand along the coast, but due to the density of the saltwater, tends to be in the deeper, bottom part of the aquifer (Nyman, 1984, p. 9-13).

A localized area of elevated chloride concentrations is present in western Jefferson Davis Parish and eastern Calcasieu Parish. Lovelace (1999) described the occurrence of saltwater in the Chicot aquifer system in detail, and noted this localized area in the upper sand and its extension into the "200-foot" sand. Lovelace (1999) also noted another localized area of high chloride concentrations in the upper sand located south of Abbeville along the lower Vermilion River area in Vermilion Parish. However, no wells screened in the upper sand in this area were sampled during this study, and consequently, plate 4 does not identify this localized area of high chloride concentrations. Lovelace (1999, p. 14) states, “Water in the ‘200-foot’ sand in western Cameron Parish is generally salty in all but the northernmost parts of the parish (Nyman, 1989, pl. 9).”

Sulfate, Fluoride, and Nitrate

Throughout the study area, sulfate, fluoride, and nitrate concentrations were all below primary and secondary USEPA standards (appendix 3). The highest sulfate concentration in the study area was 48 mg/L as sulfate at well Cu-5350Z in Calcasieu Parish, and the highest fluoride concentration was 0.6 mg/L as fluorine at well Cu-6106Z in Calcasieu Parish. The highest nitrate concentration was 5.6 mg/L as nitrogen at well V-6081Z in Vernon Parish.

Iron and Manganese

Within the study area, iron concentrations ranged from values below the laboratory reporting limit to a high of 7,700 μg/L at well Cu-5429Z in Calcasieu Parish. Laboratory reporting limits are concentrations below which, because of instrumentation and methodology limitations, the laboratory cannot determine whether the constituent is present or not. Water samples collected in 1994-96 had a laboratory reporting limit of 3 μg/L for iron. Samples collected in 2000-2001 had a laboratory reporting limit of 10 μg/L. Iron concentrations above the SMCL of 300 μg/L were detected in much of the study area (pl. 5). Iron concentrations below the SMCL were detected in the outcrop area, the southwestern part of the study area, and a localized area near southeastern Lafayette Parish. Iron concentrations increase abruptly south of the outcrop area, as in Evangeline Parish where six of seven wells sampled had iron concentrations of 1,800 μg/L or greater.

Within the study area, manganese concentrations ranged from values below the laboratory reporting limit to a high of 1,000 μg/L at well Ve-7952Z in Vermilion Parish. Manganese concentrations were above the SMCL of 50 μg/L in much of the study area (pl. 6). Manganese concentrations below the SMCL were detected in the northern part of the study area and in several small areas throughout the study area. Manganese concentrations, like iron concentrations, increase abruptly south of the outcrop area. Manganese concentrations greater than 200 μg/L occur in a band extending from the southwestern to the northeastern part of the study area, in the southeastern part of the study area, and in a localized area of eastern Calcasieu Parish.

Shallow Sand

Data from nine wells screened in the shallow sand are presented in this report. Six of the nine wells are in Vermilion Parish, and the remaining wells are in Acadia, Calcasieu, and Evangeline Parishes (fig. 1). The deepest well (Ve-8128Z) is 200 ft in depth and located in Vermilion Parish. Because of the small number of wells sampled, areal interpretation of water quality was not justifiable and constituent maps were not created. Figure 1 shows the location of the wells that were sampled. Many factors affect the quality of water from the wells, including the thickness or extent of the sand in which the well is screened; nearness to, and effect of, a recharge source (rainfall, river stage, or vertical leakage); chemical composition of the minerals with which the water is in contact; and the length of time the water is in contact with the minerals. For these reasons, data indicated a wide variation in water quality. Specific conductance ranged from 300 to 1,220 μS/cm; dissolved solids ranged from 201 to 704 mg/L; pH ranged from 6.8 to 7.5; hardness ranged from 96 to 330 mg/L as $CaCO_3$ (moderately hard to very hard water). Sulfate ranged from less than 0.2 to 2.7 mg/L; chloride ranged from 4.2 to 227 mg/L; and fluoride ranged from 0.2 to 0.4 mg/L. Nitrate (as nitrogen) ranged from less than 0.02 to 7.8 mg/L. Of all the wells sampled for this study, 7.8 mg/L was the highest concentration measured. Iron ranged from less than 10 to 8,670 μg/L, and manganese ranged from less than 1 to 458 μg/L.

In Vermilion Parish, five of the six wells in the shallow sand have generally similar water-quality characteristics (Ve-7908Z, Ve-8114Z, Ve-8128Z, Ve-8144Z, and Ve-9241Z). Specific conductance ranged from 509 to 862 μS/cm; dissolved solids ranged from 286 to 458 mg/L; pH ranged from 6.8 to 7.2 (near neutral); hardness ranged from 160 to 220 mg/L as $CaCO_3$ (hard to very hard water); iron ranged from 1,200 to 2,000 μg/L (well above the SMCL of 300 μg/L); and manganese ranged from 105 to 220 μg/L (well above the SMCL of 50 μg/L). These five wells, located near Abbeville, may be screened in a localized sand referred to as the Abbeville unit (Nyman, 1984, p. 4). Water-quality characteristics for well Ve-170 differ from characteristics for the other five wells in Vermilion Parish.

SUMMARY

The Chicot aquifer system underlies an area of about 9,000 square miles in southwestern Louisiana and provides fresh ground water for industry, agricultural irrigation, domestic purposes, and public supply. In 2000, about 12 million gallons per day of water was withdrawn from domestic wells screened in the aquifer. Water-quality data from 173 wells screened in the Chicot aquifer system are presented in this report. Well-construction and water-level data for selected wells also are included.

Sixty-three wells are located in the undifferentiated sand; 74 wells are located in the upper sand; 27 wells are located in the "200-foot" sand of the Lake Charles area; and 9 wells are located in the shallow sand. The undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area are presented as a single unit, and the quality of water in these sands is discussed as such.

Specific conductance values ranged from 23 μS/cm (microsiemens per centimeter at 25 ^{o}C) at well V-8701Z in Vernon Parish to a high of 1,610 μS/cm at well Ve-7020Z located in Vermilion Parish along the Gulf Coast. Concentrations of total dissolved solids (dissolved solids) ranged from a low of 29 mg/L (milligrams per liter) at well V-8701Z in Vernon Parish, to a high of 858 mg/L at well JD-5177Z in Jefferson Davis Parish. Specific conductance and dissolved-solids values generally are lowest in the northern part of the study area and are highest in the southern part. There is an area of high dissolved solids in western Jefferson Davis and eastern Calcasieu Parishes, which is associated with an area of saltwater near Iowa, Louisiana. In southeastern Lafayette and northwestern Iberia Parishes a grouping of seven wells yielded water with specific conductance values less than 300 μS/cm and dissolved-solids values below 200 mg/L. The most likely reason for these low dissolved-solids concentrations is proximity to a recharge source that is naturally low in dissolved solids.

Within the study area, pH ranged from a low of 4.8 at wells Al-316 in Allen Parish and V-6081Z in Vernon Parish to a high of 8.2 at well Cu-7678Z in Calcasieu Parish. Ground water in the outcrop area tends to be low in solutes (dissolved matter) and is acidic. Farther down gradient, properties of the water change with prolonged contact with various minerals, yielding relatively higher specific conductance, dissolved solids, and pH values. Within the study area, pH tends to increase in a southerly direction. However, along the southeastern boundary of the study area, there are some areas where the pH is below 6.5, indicating possible recharge.

Within the study area, hardness ranged from a low of 1 mg/L as $CaCO_3$ at well I-6203Z in Iberia Parish to a high of 490 mg/L at well JD-5177Z in Jefferson Davis Parish. Soft water (less than or equal to 60 mg/L as calcium carbonate) predominates throughout the northern part of the study area with hardness generally increasing in a southeasterly direction. Hard (121-180 mg/L as calcium carbonate) to very hard (greater than 180 mg/L as calcium carbonate) water predominates in the southeastern part of the study area, with the exception of the eastern and southeastern Lafayette Parish area where the wells yielded soft to moderately hard (61-120 mg/L as calcium carbonate) water.

Chloride concentrations throughout most of the study area were well below the SMCL of 250 mg/L. The maximum chloride concentration, 290 mg/L, occurred in well Ve-7020Z which is located in southern Vermilion Parish near the Gulf Coast. A localized area of elevated chloride concentrations is present in western Jefferson Davis Parish and eastern Calcasieu Parish. Throughout the study area, sulfate, fluoride, and nitrate concentrations were all below primary and secondary USEPA standards.

Within the study area, iron concentrations ranged from values below the laboratory reporting limit to a high of 7,700 μg/L at well Cu-5429Z in Calcasieu Parish. Iron concentrations were above the U.S. Environmental Protection Agency (USEPA) Secondary Maximum Contaminant Level

(SMCL) of 300 μg/L (micrograms per liter) in much of the study area. Iron concentrations below 300 μg/L were detected in the outcrop area, the southwestern part of the study area, and a localized area near southeastern Lafayette Parish. Iron concentrations increase abruptly south of the outcrop area, as in Evangeline Parish where 6 of 7 wells sampled had iron concentrations of 1,800 μg/L or greater.

Within the study area, manganese concentrations ranged from values below the laboratory reporting limit to a high of 1,000 μg/L at well Ve-7952Z in Vermilion Parish. Manganese concentrations were above the SMCL of 50 μg/L in much of the study area. Manganese concentrations below the SMCL were detected in the northern part of the study area and in several small areas throughout the study area. Manganese concentrations, like iron concentrations, increase abruptly south of the outcrop area. Manganese concentrations greater than 200 μg/L occur in a band extending from the southwestern to the northeastern part of the study area, in the southeastern part of the study area, and in a localized area of eastern Calcasieu Parish.

Data from nine wells screened in the shallow sand are presented in this report. Because of the small number of wells sampled, areal interpretation of water quality was not justifiable. The shallow sand wells showed a wide variation in water quality. Specific conductance ranged from 300 to 1,220 μS/cm; dissolved solids ranged from 201 to 704 mg/L; pH ranged from 6.8 to 7.5; hardness ranged from 96 to 330 mg/L as calcium carbonate. Chloride ranged from 4.2 to 227 mg/L; sulfate ranged from less than 0.2 to 2.7 mg/L; fluoride ranged from 0.2 to 0.4 mg/L; and nitrate (as nitrogen) ranged from less than 0.02 to 7.8 mg/L (7.8 mg/L was the highest concentration measured of all the wells sampled for this study). Iron ranged from less than 10 to 8,670 μg/L, and manganese ranged from less than 1 to 458 μg/L.

In Vermilion Parish, water from five of the six wells in the shallow sand have generally similar water-quality characteristics: specific conductance ranged from 509 to 862 μS/cm; dissolved solids ranged from 286 to 458 mg/L; pH ranged from 6.8 to 7.2 (which is near neutral); hardness ranged from 160 to 220 mg/L as $CaCO_3$ (hard to very hard water); iron ranged from 1,200 to 2,000 μg/L (well above the SMCL of 300 μg/L); and manganese ranged from 105 to 220 μg/L (well above the SMCL of 50 μg/L). These five wells, located near Abbeville, may be screened in a localized sand referred to as the Abbeville unit. Water-quality characteristics for well Ve-170 differ from characteristics for the other five wells in Vermilion Parish.

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APPENDIXES

1. Description and water level (1975-2000) for selected wells in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana
2. Description and water level (1992-2000) for selected wells in the shallow sand of the Chicot aquifer system, southwestern Louisiana
3. Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana, 1994-2001
4. Water-quality data from wells sampled in the shallow sand of the Chicot aquifer system, southwestern Louisiana, 1995 and 2000

Appendix 1. *Description and water level (1975-2000) for selected wells in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana*

[NAD 27, North American Datum of 1927; NGVD 29, National Geodetic Vertical Datum of 1929; P, polyvinyl chloride; G, galvanized iron; S, steel; Z, other; 112CHCTs, undifferentiated sand; 112CHCTU, upper sand; 11202LC, "200-foot" sand of the Lake Charles area; --, no data available]

Local well number (see fig. 5 for location)	Identification number	Latitude (NAD 27)	Longitude (NAD 27)	Land-net location	Aquifer code	Date of well construc-tion	Altitude of land surface, in feet above NGVD 29	Depth of well, in feet	Depth to bottom of casing, in feet	Diameter of screen, in inches	Casing material	Water level, in feet below land surface	Date of water-level measure-ment
					Acadia Parish								
Ac-5227Z	301957092363901	301957	923639	S 40 T 8S R 2W	112CHCT	4/27/1983	30	130	--	--	P	55	4/27/1983
Ac-5667Z	302802092293101	302802	922931	S 05 T 7S R 1W	112CHCT	8/23/1985	25	160	150	2	P	90	8/23/1985
Ac-5716Z	300731092330401	300731	923304	S 39 T11S R 2W	112CHCTU	12/19/1985	10	160	--	2	P	34	12/19/1985
Ac-5898Z	301103092171701	301103	921717	S 08 T10S R 2E	112CHCTU	4/10/1992	25	165	159	2	P	62	4/10/1992
Ac-6071Z	300638092243701	300638	922437	S 06 T11S R 1E	112CHCTU	11/4/1987	15	150	144	2	P	45	11/4/1987
Ac-6112Z	301947092320101	301947	923201	S 25 T 8S R 2W	112CHCTU	3/10/1988	20	170	160	2	P	65	3/10/1988
Ac-6218Z	301230092304501	301230	923045	S 08 T10S R 1W	112CHCTU	10/14/1986	20	156	140	2	P	52	10/14/1986
Ac-6244Z	301918092192801	301918	921928	S 40 T 8S R 1E	112CHCTU	11/19/1988	30	178	163	2	P	54	11/19/1988
Ac-6285Z	301511092103701	301511	921037	S 20 T 9S R 3E	112CHCTU	6/22/1989	20	180	174	4	P	60	6/22/1989
Ac-6447Z	300704092244701	300704	922447	S 01 T11S R 1W	112CHCTU	6/19/1990	10	195	189	2	P	58	6/19/1990
Ac-6449Z	301532092210601	301532	922106	S 22 T 9S R 1E	112CHCTU	10/12/1989	25	145	139	2	P	65	10/12/1989
Ac-6477Z	302555092114801	302555	921148	S 77 T 7S R 3E	112CHCT	7/3/1990	45	200	190	2	P	85	7/3/1990
Ac-6512Z	302121092310201	302121	923102	S 13 T 8S R 2W	112CHCT	8/23/1990	30	185	179	2	P	78	8/23/1990
Ac-6569Z	302313092112901	302313	921129	S 05 T 8S R 3E	112CHCT	11/15/1990	40	200	190	4	P	75	11/15/1990
Ac-6636Z	302624092243202	302624	922432	S 18 T 7S R 1E	112CHCT	12/30/1990	30	150	144	2	P	78	12/30/1990
Ac-6639Z	302415092144601	302415	921446	S 50 T 7S R 2E	112CHCT	1/2/1991	40	190	184	2	P	73	1/2/1991
Ac-6642Z	301912092282101	301912	922821	S 28 T 8S R 1W	112CHCTU	1/3/1991	30	135	129	2	P	71	1/3/1991
Ac-6674Z	301439092143601	301439	921436	S 23 T 9S R 2E	112CHCTU	12/20/1990	30	140	134	2	P	60	12/20/1990
Ac-6763Z	300845092345401	300845	923454	S 60 T10S R 2W	112CHCTU	5/14/1991	10	150	145	2	P	40	5/14/1991
Ac-6828Z	301412092310601	301412	923106	S 22 T 9S R 2W	112CHCTU	10/22/1991	22	165	160	2	P	45	10/22/1991
Ac-6854Z	301416092303301	301416	923033	S 38 T 9S R 1W	112CHCTU	3/25/1993	25	147	141	2	P	54	3/25/1993
Ac-6864Z	300956092224101	300956	922241	S 21 T10S R 1E	112CHCTU	4/26/1993	20	182	177	2	P	50	4/26/1993
Ac-6896Z	300825092350001	300825	923500	S 67 T10S R 2W	112CHCTU	--	10	96	--	2	P	--	--
Ac-6998Z	302145092212501	302145	922125	S 15 T 8S R 1E	112CHCT	1973	37	200	190	4	P	--	--

Appendix 1. *Description and water level (1975-2000) for selected wells in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana—Continued*

Local well number (see fig. 5 for location)	Identification number	Latitude (NAD 27)	Longitude (NAD 27)	Land-net location	Aquifer code	Date of well construc-tion	Altitude of land surface, in feet above NGVD 29	Depth of well, in feet	Depth to bottom of casing, in feet	Diameter of screen, in inches	Casing material	Water level, in feet below land surface	Date of water-level measure-ment
					Allen Parish								
Al-264	304344092424201	304344	924242	S 07 T 4S R 3W	112CHCT	8/19/1965	95	100	90	2	G	--	--
Al-277	305127092413201	305127	924132	S 29 T 2S R 3W	112CHCT	3/1/1973	123	90	80	2	P	23.37	3/8/1985
Al-310	303453092503701	303453	925037	S 35 T 5S R 5W	112CHCT	10/13/1975	60	230	210	6	S	35.43	10/13/1975
Al-316	304147092532201	304147	925322	S 21 T 4S R 5W	112CHCT	6/4/1988	71	80	70	2	P	20	6/4/1988
Al-404	304721092581201	304721	925812	S 15 T 3S R 6W	112CHCT	5/9/1990	130	115	95	4	P	36	5/9/1990
Al-5167Z	304857092363601	304857	923636	S 07 T 3S R 2W	112CHCT	6/2/1992	121	91	81	2	P	43	6/2/1992
Al-5240Z	303947092534101	303947	925341	S 32 T 4S R 5W	112CHCT	11/19/1988	76	100	90	2	P	36	11/19/1988
Al-5243Z	303647092573301	303647	925733	S 14 T 5S R 6W	112CHCT	4/7/1989	60	105	95	2	P	20	4/7/1989
Al-5334Z	305156092515801	305156	925158	S 22 T 2S R 5W	112CHCT	7/13/1990	140	80	70	2	P	27	7/13/1990
Al-5475Z	303839092435101	303839	924351	S 01 T 5S R 4W	112CHCT	8/3/1999	82	78	68	2	P	66.1	5/2/2000
Al-5506Z	304128092450401	304128	924504	S 23 T 4S R 4W	112CHCT	--	85	105	--	2	P-	--	--
					Beauregard Parish								
Be-61	302630093101101	302630	931011	S 22 T 7S R 8W	112CHCT	12/10/1945	66	370	290	--	--	69.85	5/1/1996
Be-495	304903093115302	304903	931153	S 09 T 3S R 8W	112CHCT	3/23/1988	172	140	120	4	P	45	3/23/1988
Be-5097Z	305028093105901	305028	931059	S 34 T 2S R 8W	112CHCT	3/31/1983	160	125	120	2	P	12	3/31/1983
Be-5669Z	304903093274701	304903	932747	S 11 T 3S R11W	112CHCT	5/26/1992	189	110	100	2	P	21	5/26/1992
Be-5764Z	305020093003001	305020	930030	S 32 T 2S R 6W	112CHCT	4/1/1989	140	150	140	2	P	27	4/5/1989
Be-5886Z	305021093284701	305021	932847	S 34 T 2S R11W	112CHCT	9/6/1992	137	70	50	4	P	36	9/6/1992
Be-5891Z	304001093001701	304001	930017	S 32 T 4S R 6W	112CHCT	9/15/1992	80	80	70	2	P	18	9/15/1992
Be-5928Z	304140093343502	304140	933435	S 22 T 4S R12W	112CHCT	3/8/1991	82	90	80	2	P	18	3/8/1991
Be-5956Z	304324093063001	304324	930630	S 08 T 4S R 7W	112CHCT	10/29/1992	130	120	110	2	P	40	10/29/1992
Be-6065Z	303153093303201	303153	933032	S 20 T 6S R11W	112CHCT	8/8/1995	89	250	245	2	P	50	8/8/1995
Be-6077Z	303626093161201	303626	931612	S 22 T 5S R 9W	112CHCT	9/4/1995	103	180	175	2	P	52	9/4/1995
Be-6084Z	304409093171801	304409	931718	S 09 T 4S R 9W	112CHCT	6/4/1996	174	197	187	2	P	41	6/4/1996
					Calcasieu Parish								
Cu-5250Z	302403093084601	302403	930846	S 01 T 8S R 8W	11202LC	7/5/1983	20	140	128	2	P	45	7/5/1983
Cu-5350Z	300636092581501	300636	925815	S 10 T11S R 6W	112CHCTU	11/8/1983	20	219	--	--	--	45	11/8/1983

Appendix 1. *Description and water level (1975-2000) for selected wells in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana—Continued*

Local well number (see fig. 5 for location)	Identification number	Latitude (NAD 27)	Longitude (NAD 27)	Land-net location	Aquifer code	Date of well construc-tion	Altitude of land surface, in feet above NGVD 29	Depth of well, in feet	Depth to bottom of casing, in feet	Diameter of screen, in inches	Casing material	Water level, in feet below land surface	Date of water-level measure-ment
					Calcasieu Parish—Continued								
Cu-5412Z	301426093310701	301426	933107	S 32 T 9S R11W	11202LC	10/2/1991	21	165	160	2	P	45	10/2/1991
Cu-5429Z	301838093034601	301838	930346	S 35 T 8S R 7W	11202LC	2/16/1984	20	180	175	2	P	62	2/16/1984
Cu-5811Z	300331093021601	300331	930216	S 25 T11S R 7W	11202LC	5/9/1985	10	350	340	4	P	48	5/9/1985
Cu-6103Z	300717093254701	300717	932547	S 07 T11S R10W	11202LC	4/2/1986	20	285	279	2	P	51	4/2/1986
Cu-6106Z	300527093321701	300527	933217	S 24 T11S R12W	11202LC	4/28/1986	10	159	154	2	P	27	4/28/1986
Cu-6161Z	301658093094602	301658	930946	S 14 T 9S R 8W	11202LC	5/27/1986	15	165	160	2	P	45	5/27/1986
Cu-6235Z	300912093390401	300912	933904	S 36 T10S R13W	11202LC	7/15/1986	12	170	160	2	P	22	7/15/1986
Cu-6552Z	300544093083001	300544	930830	S 24 T11S R 8W	11202LC	8/5/1987	8	180	--	2	P	64	8/5/1987
Cu-6694Z	301415093171901	301415	931719	S 33 T 9S R 9W	11202LC	3/4/1988	15	155	150	2	P	68	3/4/1988
Cu-6767Z	301332093232701	301332	932327	S 04 T10S R10W	11202LC	5/9/1988	15	350	340	2	P	67	5/9/1988
Cu-6799Z	300243093062202	300243	930622	S 32 T11S R 7W	11202LC	4/9/1988	12	300	295	2	P	41	4/9/1988
Cu-7054Z	301306093063601	301306	930636	S 32 T 9S R 7W	11202LC	3/1/1989	20	295	285	2	P	60	3/1/1989
Cu-7082Z	300816093280501	300816	932805	S 03 T11S R11W	11202LC	8/15/1988	13	260	240	4	P	42.94	6/28/2000
Cu-7341Z	301020093055201	301020	930552	S 20 T10S R 7W	11202LC	1/30/1990	20	225	220	2	P	50	1/30/1990
Cu-7410Z	302108093405103	302108	934051	S 22 T 8S R13W	11202LC	--	32	220	--	--	P	--	--
Cu-7542Z	301108093054601	301108	930546	S 16 T10S R 7W	11202LC	6/20/1990	21	210	200	4	P	89	6/20/1990
Cu-7678Z	300755093310301	300755	933103	S 05 T11S R11W	11202LC	12/6/1990	8	315	310	2	P	42	12/6/1990
Cu-7782Z	301920093041501	301920	930415	S 27 T 8S R 7W	11202LC	3/12/1991	10	165	160	4	P	55	3/12/1991
Cu-7948Z	301340093382601	301340	933826	S 36 T 9S R13W	11202LC	8/1/1991	22	250	240	2	P	34	8/1/1991
Cu-7952Z	301924093403502	301924	934035	S 34 T 8S R13W	11202LC	8/9/1991	25	205	200	2	P	28	8/9/1991
Cu-7955Z	301306093263902	301306	932639	S 01 T10S R11W	11202LC	8/11/1991	15	350	340	2	P	60	8/11/1991
Cu-7967Z	301707093223202	301707	932232	S 15 T 9S R10W	11202LC	9/24/1991	19	220	210	2	P	70	9/24/1991
Cu-7979Z	300949093103502	300949	931035	S 27 T10S R 8W	11202LC	9/14/1991	21	205	200	2	P	70	9/14/1991
Cu-8507Z	300749093145801	300749	931458	S 02 T11S R 9W	11202LC	11/2/1992	10	230	225	2	P	62	11/2/1992
Cu-8638Z	300943093381902	300943	933819	S 25 T10S R13W	11202LC	3/10/1993	12	185	180	2	P	20	3/10/1993

Appendix 1. *Description and water level (1975-2000) for selected wells in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana—Continued*

Local well number (see fig. 5 for location)	Identification number	Latitude (NAD 27)	Longitude (NAD 27)	Land-net location	Aquifer code	Date of well construction	Altitude of land surface, in feet above NGVD 29	Depth of well, in feet	Depth to bottom of casing, in feet	Diameter of screen, in inches	Casing material	Water level, in feet below land surface	Date of water-level measurement
Cameron Parish													
Cn-5195Z	300156092445601	300156	924456	S 02 T12S R 4W	112CHCTU	10/13/1987	5	160	150	2	P	30	10/13/1987
Cn-5553Z	300031092382401	300031	923824	S 11 T12S R 3W	112CHCTU	7/11/1990	6	230	220	4	P	35	7/11/1990
Cn-5874Z	300111093101601	300111	931016	S 15 T12S R 8W	11202LC	10/20/1976	10	340	334	2	P	46	10/20/1976
Evangeline Parish													
Ev-475	303330092172501	303330	921725	S 37 T 6S R 2E	112CHCT	12/4/1990	53	160	154	2	P	90	12/4/1990
Ev-583	303808092285801	303808	922858	S 09 T 5S R 1W	112CHCT	7/9/1992	55	200	194	2	P	98	7/9/1992
Ev-848	303332092300501	303332	923005	S 05 T 6S R 1W	112CHCT	10/9/1990	54	165	160	2	P	98	10/9/1990
Ev-850	302858092325101	302858	923251	S 35 T 6S R 2W	112CHCT	8/22/1988	40	185	175	4	P	85	8/22/1988
Ev-892	304525092185701	304525	921857	S 58 T 3S R 1E	112CHCT	2/8/1990	60	190	170	6	Z	75	2/8/1990
Ev-5314Z	304010092261601	304010	922616	S 39 T 4S R 1W	112CHCT	8/3/1988	--	180	--	--	--	--	--
Ev-5508Z	305150092213101	305150	922131	S 22 T 2S R 1E	112CHCT	--	142	140	--	--	P	--	--
Iberia Parish													
I-5131Z	295634091575301	295634	915753	S 04 T13S R 5E	112CHCTU	11/11/1991	5	180	170	2	P	10	11/11/1991
I-5578Z	300007091530601	300007	915306	S 84 T12S R 6E	112CHCTU	5/21/1987	15	80	70	2	P	18	5/21/1987
I-5589Z	295611091511602	295611	915116	S 04 T13S R 6E	112CHCTU	2/13/1992	5	260	250	2	P	10	2/13/1992
I-5672Z	295639091474001	295639	914740	S 13 T13S R 7E	112CHCTU	5/9/1992	15	210	205	2	P	8	5/9/1992
I-5701Z	300319091535901	300319	915359	S 30 T11S R 6E	112CHCTU	3/4/1992	25	224	218	2	P	20	3/4/1992
I-5790Z	295248091545701	295248	915457	S 54 T12S R 5E	112CHCTU	9/8/1988	5	270	260	2	P	17	9/8/1988
I-5877Z	295258091411901	295258	914119	S 30 T13S R 8E	112CHCTU	3/2/1992	8	360	350	2	P	11	3/2/1992
I-6179Z	295801091470702	295801	914707	S 30 T12S R 2E	112CHCTU	8/24/1991	15	260	254	2	P	8	8/24/1991
I-6203Z	300401091555901	300401	915559	S 23 T11S R 5E	112CHCTU	10/21/1991	30	130	124	2	P	25	10/21/1991
Jefferson Davis Parish													
JD-5110Z	302102092401701	302102	924017	S 16 T 8S R 3W	112CHCT	10/11/1982	20	180	174	2	P	78	10/11/1982
JD-5177Z	301009092554501	301009	925545	S 24 T10S R 6W	112CHCTU	10/1/1983	11	100	90	4	P	31	10/3/1983
JD-5233Z	300607092395001	300607	923950	S 10 T11S R 3W	112CHCTU	10/22/1991	11	146	136	2	P	35	10/22/1991

Appendix 1. *Description and water level (1975-2000) for selected wells in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana—Continued*

Local well number (see fig. 5 for location)	Identification number	Latitude (NAD 27)	Longitude (NAD 27)	Land-net location	Aquifer code	Date of well construc-tion	Altitude of land surface, in feet above NGVD 29	Depth of well, in feet	Depth to bottom of casing, in feet	Diameter of screen, in inches	Casing material	Water level, in feet below land surface	Date of water-level measure-ment
Jefferson Davis Parish—Continued													
JD-5299Z	302619092375701	302619	923757	S 13 T 7S R 3W	112CHCT	3/8/1984	29	191	185	2	P	68	3/8/1984
JD-5371Z	300627092464302	300627	924643	S 09 T11S R 4W	112CHCTU	1/1/1985	18	230	220	4	P	45	1/27/1985
JD-5728Z	301115092433001	301115	924330	S 12 T10S R 4W	112CHCTU	5/27/1987	10	200	194	2	P	55	5/27/1987
JD-5816Z	300733092513101	300733	925131	S 02 T11S R 5W	112CHCTU	6/30/1988	5	150	145	4	P	45	6/30/1988
JD-5839Z	300826092401701	300826	924017	S 27 T10S R 3W	112CHCTU	9/19/1988	10	140	130	2	P	30	9/19/1988
JD-5920Z	300351092483001	300351	924830	S 29 T11S R 4W	112CHCTU	1/31/1992	6	225	220	2	P	40	1/31/1992
JD-5938Z	302109092523101	302109	925231	S 15 T 8S R 5W	112CHCT	7/25/1989	35	145	140	4	P	60	9/25/1989
JD-5980Z	301305092464301	301305	924643	S 33 T 9S R 4W	112CHCTU	12/19/1989	17	145	140	2	P	58	12/19/1989
JD-6021Z	301402092423501	301402	924235	S 30 T 9S R 3W	112CHCTU	11/9/1989	15	220	210	4	P	59	11/9/1989
JD-6047Z	301442092582301	301442	925823	S 27 T 9S R 6W	112CHCTU	8/22/1990	29	200	190	2	P	70	8/22/1990
JD-6175Z	301341092550301	301341	925503	S 31 T 9S R 5W	112CHCTU	9/15/1992	17	165	160	2	P	70	9/15/1992
JD-6207Z	301258092574401	301258	925744	S 03 T10S R 6W	112CHCTU	10/28/1992	20	235	230	2	P	70	10/28/1992
JD-6261Z	301109092503201	301109	925032	S 13 T10S R 5W	112CHCTU	9/23/1993	13	145	140	2	P	60	9/23/1993
Lafayette Parish													
Lf-6096Z	301731091584801	301731	915848	S 04 T 9S R 5E	112CHCTU	1/10/1992	15	70	65	2	P	20	1/15/1995
Lf-6778Z	300751091560002	300751	915600	S 35 T10S R 5E	112CHCTU	3/15/1990	35	130	124	2	P	33	5/15/1990
Lf-7025Z	301328092072001	301328	920720	S 36 T 9S R 3E	112CHCTU	5/7/1990	30	100	94	2	P	50	5/7/1990
Lf-7105Z	300700092004801	300700	920048	S 01 T11S R 4E	112CHCTU	5/30/1991	25	90	84	2	P	35	5/30/1991
Lf-7342Z	301536092021501	301536	920215	S 13 T 9S R 4E	112CHCTU	11/16/1992	45	105	100	2	P	48	11/16/1992
Lf-7409Z	300841092072901	300841	920729	S 37 T10S R 3E	112CHCTU	1/2/1993	25	120	115	2	P	38	1/2/1993
Lf-7413Z	300617091573101	300617	915731	S 09 T11S R 5E	112CHCTU	2/4/1993	20	70	65	2	P	22	2/4/1993
Lf-7442Z	302046092012502	302046	920125	S 23 T 8S R 4E	112CHCTU	2/19/1993	50	110	104	2	P	50	2/19/1993
Lf-7486Z	301836092051901	301836	920519	S 79 T10S R 4E	112CHCTU	4/23/1993	25	90	85	2	P	35	4/23/1993
Lf-9803Z	301538092021301	301538	920213	S 13 T 9S R 4E	112CHCTU	--	45	100	--	2	P	--	--
Rapides Parish													
R-5135Z	310400092352101	310400	923521	S 17 T 1N R 2W	112CHCT	5/19/1986	160	100	90	2	P	40	5/19/1986
R-5142Z	305945092422201	305945	924222	S 06 T 1S R 3W	112CHCT	4/10/1986	165	100	90	2	P	30	4/10/1986

Appendix 1. *Description and water level (1975-2000) for selected wells in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana—Continued*

Local well number (see fig. 5 for location)	Identification number	Latitude (NAD 27)	Longitude (NAD 27)	Land-net location	Aquifer code	Date of well construction	Altitude of land surface, in feet above NGVD 29	Depth of well, in feet	Depth to bottom of casing, in feet	Diameter of screen, in inches	Casing material	Water level, in feet below land surface	Date of water-level measurement
					Rapides Parish—Continued								
R-5145Z	310040092482701	310040	924827	S 32 T 1N R 4W	112CHCT	6/1986	180	95	85	2	P	25	6/1986
R-5200Z	305510092331901	305510	923319	S 03 T 2S R 2W	112CHCT	6/23/1987	140	97	87	2	P	40	6/23/1987
R-5392Z	305523092363401	305523	923634	S 31 T 1S R 2W	112CHCT	11/17/1991	163	92	82	2	P	36	11/17/1991
R-5430Z	305727092460601	305727	924606	S 22 T 1S R 4W	112CHCT	6/19/1992	150	100	90	2	P	6	6/19/1992
R-5964Z	305949092363001	305949	923630	S 06 T 1S R 2W	112CHCT	7/7/1995	160	110	80	4	P	55	7/7/1995
					St. Landry Parish								
SL-6924Z	303112092034001	303112	920340	S 77 T 6S R 4E	112CHCT	--	60	50	--	--	G	--	--
					St. Martin Parish								
SMn-6248Z	300504091534801	300504	915348	S 23 T11S R 6E	112CHCTU	4/3/1986	25	170	164	2	P	35	4/3/1986
					Vermilion Parish								
Ve-5690Z	295659092213101	295659	922131	S 03 T13S R 1E	112CHCTU	4/29/1985	0	126	116	2	P	35	4/29/1985
Ve-5778Z	295027092105902	295027	921059	S 08 T14S R 3E	112CHCTU	9/13/1991	5	390	380	2	P	14	9/13/1991
Ve-6244Z	300127092294901	300127	922949	S 06 T12S R 1W	112CHCTU	11/3/1986	8	182	176	2	P	30	11/3/1986
Ve-6489Z	300239091593801	300239	915938	S 31 T11S R 5E	112CHCTU	2/19/1986	20	103	97	3	P	35	2/19/1986
Ve-6678Z	293741092221902	293741	922219	S 09 T16S R 1E	112CHCTU	4/1/1988	5	530	520	2	P	6	4/1/1988
Ve-7020Z	293925092302501	293925	923025	S 31 T15S R 1W	112CHCTU	11/22/1988	5	490	480	2	P	--	--
Ve-7021Z	293851092272401	293851	922724	S 03 T16S R 1W	112CHCTU	11/24/1988	5	540	530	2	P	--	--
Ve-7327Z	295850092160901	295850	921609	S 21 T12S R 2E	112CHCTU	4/26/1990	12	130	120	2	P	26	4/26/1990
Ve-7436Z	300718092125801	300718	921258	S 01 T11S R 2E	112CHCTU	1/29/1988	20	160	154	2	P	55	1/29/1988
Ve-7483Z	295837092322901	295837	923229	S 26 T12S R 2W	112CHCTU	10/29/1990	5	160	150	4	P	30	10/29/1990
Ve-7533Z	295652092000101	295652	920001	S 06 T13S R 5E	112CHCTU	7/30/1990	5	160	150	2	P	15	7/30/1990
Ve-7613Z	300508092194001	300508	921940	S 14 T11S R 1E	112CHCTU	4/14/1991	15	195	189	2	P	44	4/17/1991
Ve-7723Z	300239092294001	300239	922940	S 32 T11S R 1W	112CHCTU	8/20/1991	9	170	160	2	P	30	8/20/1991
Ve-7835Z	295312092170101	295312	921701	S 29 T13S R 2E	112CHCTU	3/12/1992	6	126	116	2	P	12	3/12/1992
Ve-7886Z	294929092182601	294929	921826	S 18 T14S R 2E	112CHCTU	5/22/1992	3	80	70	2	P	5	5/22/1992
Ve-7952Z	300126091593001	300126	915930	S 06 T12S R 5E	112CHCTU	10/31/1990	10	74	68	2	P	32	10/31/1990

Appendix 1. *Description and water level (1975-2000) for selected wells in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana—Continued*

Local well number (see fig. 5 for location)	Identification number	Latitude (NAD 27)	Longitude (NAD 27)	Land-net location	Aquifer code	Date of well construc- tion	Altitude of land surface, in feet above NGVD 29	Depth of well, in feet	Depth to bottom of casing, in feet	Diameter of screen, in inches	Casing material	Water level, in feet below land surface	Date of water-level measure- ment
					Vermilion Parish—Continued								
Ve-8116Z	300704092163701	300704	921637	S 05 T11S R 2E	112CHCTU	2/20/1993	20	190	185	2	P	50	2/20/1993
Ve-8152Z	300236092080302	300236	920803	S 35 T11S R 3E	112CHCTU	4/14/1993	15	120	115	2	P	27	4/14/1993
Ve-8164Z	295900092205302	295900	922053	S 22 T12S R 1E	112CHCTU	4/21/1993	11	86	76	2	P	24	4/21/1993
Ve-8260Z	300658092102601	300658	921026	S 04 T11S R 3E	112CHCTU	7/9/1993	21	106	100	2	P	45	7/9/1993
Ve-8296Z	300333092355501	300333	923555	S 29 T11S R 2W	112CHCTU	8/24/1993	9	165	160	4	P	40	8/24/1993
Ve-8314Z	300225092424202	300225	924242	S 31 T11S R 3W	112CHCTU	9/17/1993	6	170	160	4	P	35	9/17/1993
					Vernon Parish								
V-5027Z	305832093094401	305832	930944	S 14 T 1S R 8W	112CHCT	3/15/1985	260	125	115	2	P	29	3/15/1985
V-5706Z	305632092511501	305632	925115	S 26 T 1S R 5W	112CHCT	7/15/1989	170	120	110	2	P	--	--
V-5756Z	305353093134801	305353	931348	S 07 T 2S R 8W	112CHCT	2/13/1990	180	120	110	2	P	--	--
V-5774Z	305453093125001	305453	931250	S 08 T 2S R 8W	112CHCT	4/19/1990	200	125	115	2	P	28	4/19/1990
V-5887Z	305554092564101	305554	925641	S 36 T 1S R 6W	112CHCT	4/17/1992	150	100	90	2	P	6	4/17/1992
V-5915Z	305445092545001	305445	925450	S 06 T 2S R 5W	112CHCT	3/16/1992	150	100	90	2	P	33	3/16/1992
V-5916Z	305314093201601	305314	932016	S 13 T 2S R10W	112CHCT	3/13/1992	200	130	120	2	P	42	3/13/1992
V-5948Z	305337092581201	305337	925812	S 10 T 2S R 6W	112CHCT	8/3/1992	150	120	110	2	P	27	8/3/1992
V-5956Z	305808093124601	305808	931246	S 20 T 1S R 8W	112CHCT	6/11/1991	255	170	160	2	P	65	6/11/1991
V-6002Z	305339093053501	305339	930535	S 09 T 2S R 7W	112CHCT	7/29/1991	160	135	125	2	P	10	7/29/1991
V-6011Z	305649093053501	305649	930535	S 28 T 1S R 7W	112CHCT	10/3/1991	200	110	100	2	P	30	10/3/1991
V-6035Z	305436093173701	305436	931737	S 09 T 2S R 9W	112CHCT	9/15/1992	180	140	130	2	P	11	9/15/1992
V-6081Z	305556093193301	305556	931933	S 31 T 1S R 9W	112CHCT	2/22/1993	205	70	60	2	P	10	2/22/1993
V-8701Z	305810093034001	305810	930340	S 23 T 1S R 7W	112CHCT	10/1/1970	200	60	--	--	P	22	10/1/1970

Appendix 2. *Description and water level (1992-2000) for selected wells in the shallow sand of the Chicot aquifer system, southwestern Louisiana*

[NAD 27, North American Datum of 1927; NGVD 29, National Geodetic Vertical Datum of 1929; P, polyvinyl chloride; --, no data available]

Local well number	Identification number)	Latitude (NAD 27)	Longitude (NAD 27)	Land-net location	Aquifer code	Date of well construc-tion	Altitude of land surface, in feet above NGVD 29	Depth of well, in feet	Depth to bottom of casing, in feet	Diameter of screen, in inches	Casing material	Water level, in feet below land surface	Date of water-level measure-ment
					Acadia Parish								
Ac-6196Z	301955092125901	301955	921259	S 57 T 8S R 2E	112CHCTS	7/29/1992	35	38	18	4	P	14	7/29/1992
					Calcasieu Parish								
Cu-8667Z	301138093151601	301138	931516	S 14 T10S R 9W	112CHCTS	4/27/1993	15	80	75	2	--	20	4/27/1993
					Evangeline Parish								
Ev-5500Z	303550092252401	303550	922524	S 24 T 5S R 1W	112CHCTS	--	57	43	--	--	--	9.02	8/16/2000
					Vermilion Parish								
Ve-170	300121092005701	300121	920057	S 01 T12S R 4E	112CHCTS	1/1/1948	--	70	--	--	--	--	--
Ve-7908Z	295504092111201	295504	921112	S 17 T13S R 3E	112CHCTS	6/1/1992	9	120	115	2	P	12	6/1/1992
Ve-8114Z	300045092052702	300045	920527	S 42 T12S R 4E	112CHCTS	1/14/1993	10	126	116	2	P	20	1/14/1993
Ve-8128Z	295546092060001	295546	920600	S 42 T13S R 4E	112CHCTS	3/11/1993	12	200	195	2	P	20	3/11/1993
Ve-8144Z	295737092092001	295737	920920	S 57 T12S R 3E	112CHCTS	3/10/1993	10	90	80	2	P	22	3/10/1993
Ve-9241Z	295640092144801	295640	921448	S 03 T13S R 2E	112CHCTS	6/19/1996	10	90	80	2	P	22	6/19/1996

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana,, 1994-2001*

[Concentrations are in milligrams per liter, except as noted. 112CHCT, undifferentiated sand; 112CHCTU, upper sand; 11202LC, "200-foot" sand of Lake Charles area; <, less than indicated value; --, no data available; E, estimated; M, detected but not quantifiable; USEPA, U.S. Environmental Protection Agency; MCL, Maximum Contaminant Level; SMCL, Secondary Maximum Contaminant Level]

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
Acadia Parish														
Ac-5227Z	2/14/1995	112CHCT	380	389	7.5	7.8	19.5	120	35	8.8	31	1.1	180	<0.2
Ac-5667Z	2/27/1995	112CHCT	452	464	7.4	7.8	20.7	160	44	11	41	1.4	240	<.2
Ac-5716Z	2/14/1995	112CHCTU	814	831	7.5	7.6	20.1	200	55	16	96	2.5	340	<.2
Ac-5898Z	2/14/1995	112CHCTU	620	634	7.4	7.6	21.0	190	48	17	64	2.1	380	<.2
Ac-6071Z	2/27/1995	112CHCTU	705	722	7.5	7.8	21.9	220	56	20	79	2.7	430	<.2
Ac-6112Z	11/20/2000	112CHCTU	--	526	--	7.8	--	140	41.5	9.63	48.9	1.4	240	<.1
Ac-6218Z	2/14/1995	112CHCTU	692	705	7.5	7.6	21.0	200	53	16	72	2.1	320	<.2
Ac-6244Z	2/15/1995	112CHCTU	743	690	7.3	7.8	21.4	230	57	21	69	2.2	390	<.2
Ac-6285Z	2/27/1995	112CHCTU	564	579	7.4	7.7	21.5	210	51	20	49	2.7	360	<.2
Ac-6447Z	2/14/1995	112CHCTU	673	702	7.5	7.8	21.5	220	57	20	68	2.7	420	<.2
Ac-6449Z	2/15/1995	112CHCTU	685	684	7.5	7.8	20.7	210	54	18	74	2.5	390	<.2
Ac-6477Z	2/13/1995	112CHCT	551	612	7.3	7.7	20.1	250	60	25	38	1.7	390	<.2
Ac-6512Z	1/10/2001	112CHCT	--	525	--	7.6	--	160	44.9	10.8	46.7	1.5	240	<.1
Ac-6569Z	2/13/1995	112CHCT	688	656	7.1	7.5	21.5	250	67	21	49	2.6	400	3.9
Ac-6636Z	2/27/1995	112CHCT	608	623	7.4	7.8	20.9	170	43	14	72	1.8	300	<.2
Ac-6639Z	2/13/1995	112CHCT	592	691	7.2	7.7	20.8	270	70	22	44	1.7	370	.5
Ac-6642Z	2/14/1995	112CHCTU	714	727	7.4	7.7	21.1	200	54	16	75	2.0	320	<.2
Ac-6674Z	2/27/1995	112CHCTU	650	664	7.3	7.7	21.3	220	62	17	65	1.6	390	1.8
Ac-6763Z	2/14/1995	112CHCTU	672	694	7.6	7.5	21.3	140	38	11	88	2.4	280	<.2
Ac-6828Z	2/28/1995	112CHCTU	638	657	7.5	7.8	21.2	150	42	12	86	1.8	300	<.2
Ac-6854Z	2/14/1995	112CHCTU	999	1,030	7.4	7.5	21.2	270	70	22	110	2.8	350	<.2
Ac-6864Z	2/14/1995	112CHCTU	666	700	7.5	7.7	21.3	220	56	20	66	2.6	400	<.2

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
							Acadia Parish—Continued							
Ac-6896Z	7/21/2000	112CHCTU	741	750	7.4	7.6	25.8	160	42.6	12.1	90.2	2.2	270	<.3
Ac-6998Z	9/26/2000	112CHCT	707	711	7.0	7.5	21.3	230	59.4	19.2	60.4	2.2	410	<.3
							Allen Parish							
Al-264	12/5/1995	112CHCT	237	234	6.4	7.9	21.5	6	1.6	.4	50	.8	120	1.7
Al-277	12/5/1995	112CHCT	89	90	5.9	7.1	21.5	11	2.7	1.1	13	1.0	29	.7
Al-310	12/6/1995	112CHCT	121	103	6.1	6.8	19.5	22	6.0	1.8	11	1.4	33	3.2
Al-316	12/5/1995	112CHCT	64	61	4.8	6.0	17.6	9	2.3	.8	5.1	2.4	10	.3
Al-404	12/5/1995	112CHCT	36	38	5.0	6.7	20.6	6	1.2	.7	3.7	1.1	11	<.2
Al-5167Z	12/12/2000	112CHCT	264	289	--	7.3	16.0	77	19.1	7.05	26.3	1.5	99	3.6
Al-5240Z	2/6/2001	112CHCT	63	57	5.5	5.8	21.8	9	2.55	.74	5.4	1.6	12	2.2
Al-5243Z	7/27/2000	112CHCT	--	48	--	6.1	--	8	1.93	.69	5.1	.9	20	.9
Al-5334Z	12/5/1995	112CHCT	46	46	5.3	6.5	17.8	6	1.4	.5	5.5	1.7	17	.3
Al-5475Z	5/2/2000	112CHCT	227	233	6.1	6.4	20.7	57	12.7	6.08	21.6	1.6	77	5.0
Al-5506Z	12/14/2000	112CHCT	95	52	6.7	7.2	16.7	11	2.88	1.01	4.6	1.0	20	.3
							Beauregard Parish							
Be-61	7/27/1994	112CHCT	227	219	6.4	6.9	26.2	57	14	5.4	22	1.8	94	3.9
Be-495	7/27/1994	112CHCT	104	98	6.1	6.7	22.6	25	6.2	2.2	10	1.6	45	1.8
Be-5097Z	7/18/1995	112CHCT	37	42	5.3	6.0	20.4	8	1.8	.8	4.9	1.1	13	0.4
Be-5669Z	7/18/1995	112CHCT	31	36	5.2	5.9	20.9	7	1.6	.8	2.8	1.2	11	.3
Be-5764Z	7/19/2000	112CHCT	42	44	5.6	6.2	22.2	7	1.8	.54	4.3	1.6	15	.4
Be-5886Z	7/19/1995	112CHCT	27	31	4.9	5.5	20.4	4	.8	.6	3.2	.8	12	.5
Be-5891Z	7/18/1995	112CHCT	27	31	5.1	5.8	19.7	4	.9	.4	3.1	1.5	11	.2
Be-5928Z	6/7/2000	112CHCT	66	69	6.2	7.3	23.5	13	3.52	.94	6.7	1.5	18	5.5

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and “200-foot” sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
Beauregard Parish—Continued														
Be-5956Z	7/18/1995	112CHCT	102	111	5.7	6.3	20.7	21	5.2	2.0	12	1.3	41	1.2
Be-6065Z	6/8/2000	112CHCT	105	110	6.3	6.6	21.5	17	4.39	1.47	13.6	2.5	33	2.0
Be-6077Z	7/26/2000	112CHCT	158	158	6.1	6.5	22.1	37	9.05	3.42	14.5	2.0	63	4.9
Be-6084Z	6/6/2000	112CHCT	82	86	6.4	6.7	22.7	14	3.5	1.27	10.6	1.6	34	2.8
Calcasieu Parish														
Cu-5250Z	1/18/2001	11202LC	442	445	7.1	7.2	19.5	120	29.7	11.6	45.6	1.7	210	5.2
Cu-5350Z	3/28/1995	112CHCTU	739	773	7.5	8.0	22.0	140	34	13	120	1.3	310	48
Cu-5412Z	3/29/1995	11202LC	316	332	7.2	7.6	19.9	83	23	6.3	37	2.0	160	2.5
Cu-5429Z	3/28/1995	11202LC	636	658	7.8	8.0	18.5	130	35	11	84	2.1	230	<.2
Cu-5811Z	7/26/1994	11202LC	944	956	7.3	8.0	24.3	88	24	6.9	166	2.0	260	<.2
Cu-6103Z	3/29/1995	11202LC	388	409	7.8	8.1	21.3	110	34	7.1	45	1.4	240	<.2
Cu-6106Z	3/29/1995	11202LC	761	798	7.7	8.1	20.7	73	17	7.4	160	1.4	440	7.4
Cu-6161Z	3/28/1995	11202LC	408	430	7.5	8.3	20.3	100	28	8.1	53	1.4	240	<.2
Cu-6235Z	3/29/1995	11202LC	419	440	7.6	8.2	20.7	47	12	4.1	84	.9	250	<.2
Cu-6552Z	3/28/1995	11202LC	578	607	7.8	7.9	19.4	120	35	9.0	88	1.6	340	<.2
Cu-6694Z	3/27/1995	11202LC	434	454	7.7	8.3	22.8	80	21	6.7	73	1.2	260	1.5
Cu-6767Z	3/29/1995	11202LC	324	342	7.3	7.9	21.3	88	25	6.3	35	2.0	160	<.2
Cu-6799Z	3/28/1995	11202LC	619	647	7.8	8.1	22.0	130	34	9.8	96	1.5	340	<.2
Cu-7054Z	7/27/1994	11202LC	692	701	7.2	8.0	23.2	92	22	8.9	130	1.3	410	.4
Cu-7082Z	8/16/2000	11202LC	408	411	8.1	8.1	--	64	16.9	5.19	67.2	1.2	300	<.3
Cu-7341Z	3/28/1995	11202LC	362	379	7.5	8.0	23.3	100	29	6.7	43	1.9	200	1.5
Cu-7410Z	11/21/2000	11202LC	--	242	--	7.2	--	68	18.1	5.47	22.2	1.6	130	3.0
Cu-7542Z	7/26/1994	11202LC	837	850	7.1	7.9	23.0	160	41	14	126	1.6	380	39

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
Calcasieu Parish—Continued														
Cu-7678Z	3/29/1995	11202LC	407	428	8.2	8.4	21.5	46	13	3.2	81	.9	250	.3
Cu-7782Z	7/27/1994	11202LC	912	913	6.7	7.4	21.6	200	50	18	108	2.5	270	<.2
Cu-7948Z	3/29/1995	11202LC	293	308	7.3	7.7	21.7	66	18	5.0	40	1.9	150	.2
Cu-7952Z	3/29/1995	11202LC	300	316	7.5	8.0	20.4	66	18	5.0	44	1.5	170	2.3
Cu-7955Z	3/27/1995	11202LC	349	365	7.5	8.0	22.8	110	35	6.6	31	2.0	190	2.8
Cu-7967Z	11/15/2000	11202LC	298	295	6.9	7.0	19.1	81	20.5	7.28	26.5	2.2	140	2.8
Cu-7979Z	3/28/1995	11202LC	595	625	7.5	7.9	22	160	41	13	73	2.0	260	31
Cu-8507Z	3/28/1995	11202LC	586	615	7.9	8.1	22.3	72	17	7.1	120	1.2	350	<.2
Cu-8638Z	3/29/1995	11202LC	403	425	8.0	8.1	20.4	49	13	4.0	80	.9	250	<.2
Cameron Parish														
Cn-5195Z	5/9/1995	112CHCTU	573	571	7.4	7.9	21.9	130	16	22	68	2.6	250	<.2
Cn-5553Z	5/9/1995	112CHCTU	751	743	7.5	7.9	22.3	170	49	12	94	2.3	280	<.2
Cn-5874Z	9/7/2000	11202LC	537	533	7.6	8.0	23.4	77	20	6.49	91.3	1.3	280	E.2
Evangeline Parish														
Ev-475	1/23/1996	112CHCT	695	697	7.1	7.5	20.8	310	60	40	38	2.0	450	<.2
Ev-583	1/24/1996	112CHCT	328	329	6.9	7.1	18.1	110	27	9.8	27	1.1	150	2.1
Ev-848	1/24/1996	112CHCT	509	479	7.3	7.2	18.2	160	43	13	39	1.5	220	<.2
Ev-850	1/24/1996	112CHCT	502	498	7.2	7.4	20.4	160	46	12	39	1.4	210	<.2
Ev-892	12/5/1995	112CHCT	434	415	6.8	7.6	20.4	150	40	13	21	1.0	200	4.9
Ev-5314Z	1/24/1996	112CHCT	629	623	7.0	7.2	21.1	170	46	13	74	1.4	270	31
Ev-5508Z	1/11/2001	112CHCT	--	129	--	6.3	--	30	7.74	2.51	14.2	0.7	59	.6
Iberia Parish														
I-5131Z	6/20/1995	112CHCTU	544	510	7.2	7.8	21.4	190	47	17	45	1.3	320	<0.2
I-5578Z	6/20/1995	112CHCTU	534	499	7.2	7.8	22.8	220	62	15	26	2.0	320	<.2

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
						Iberia Parish—Continued								
I-5589Z	6/20/1995	112CHCTU	556	510	7.2	8.2	21.6	200	52	18	34	1.4	310	<.2
I-5672Z	6/20/1995	112CHCTU	938	893	7.1	8.0	21.5	440	110	40	38	1.8	610	<.2
I-5701Z	6/20/1995	112CHCTU	441	415	7.3	7.9	21.1	180	52	13	18	1.4	260	.8
I-5790Z	6/21/1995	112CHCTU	496	511	7.2	8.0	21.9	210	59	14	35	1.6	310	<.2
I-5877Z	6/20/1995	112CHCTU	700	652	7.3	8.2	22.2	260	66	22	49	2.2	380	<.2
I-6179Z	6/20/1995	112CHCTU	908	840	7.0	7.8	21.8	410	110	34	32	3.1	560	<.2
I-6203Z	6/21/1995	112CHCTU	266	256	6.2	7.1	21.4	1	.2	.05	60	.2	140	1.8
						Jefferson Davis Parish								
JD-5110Z	3/1/1995	112CHCT	366	372	7.3	7.3	16.1	100	23	11	36	1.4	160	.3
JD-5177Z	7/18/2000	112CHCTU	1,420	1,420	7.0	7.3	28.4	490	129	39.5	75.5	1.7	360	24.1
JD-5233Z	2/28/1995	112CHCTU	638	659	7.7	8.0	22.0	150	41	11	85	1.5	240	<.2
JD-5299Z	3/1/1995	112CHCT	264	276	7.6	7.8	19.5	75	18	7.3	27	1.4	120	1.9
JD-5371Z	7/12/2000	112CHCTU	763	750	7.3	7.5	23.5	220	60.1	17.1	63.4	1.7	260	5.8
JD-5728Z	2/28/1995	112CHCTU	544	564	7.6	7.9	20.2	160	39	15	63	1.3	270	6.4
JD-5816Z	2/28/1995	112CHCTU	451	467	7.4	7.6	21.7	140	34	13	47	1.2	220	<.2
JD-5839Z	2/28/1995	112CHCTU	558	574	7.6	8.0	22.0	170	47	12	56	1.6	240	.3
JD-5920Z	2/28/1995	112CHCTU	541	553	7.7	7.8	21.2	170	44	14	53	1.3	250	<.2
JD-5938Z	11/14/2000	112CHCT	--	293	--	6.9	--	56	13.3	5.59	38.3	1.5	120	2.8
JD-5980Z	2/28/1995	112CHCTU	420	428	7.1	7.6	21.2	120	27	13	45	1.4	190	5.9
JD-6021Z	2/28/1995	112CHCTU	448	461	7.1	7.5	21.0	120	28	12	52	1.6	180	3.8
JD-6047Z	2/28/1995	112CHCTU	1,080	1,120	7.2	7.5	20.2	160	38	15	160	2.3	220	<.2
JD-6175Z	2/28/1995	112CHCTU	503	513	7.1	7.4	21.4	150	36	15	44	1.5	170	16
JD-6207Z	2/28/1995	112CHCTU	1,040	1,080	7.5	7.8	20.3	150	37	14	160	2.1	250	1.2
JD-6261Z	2/28/1995	112CHCTU	424	433	7.2	7.4	21.6	120	30	12	43	1.4	180	6.6

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
Lafayette Parish														
Lf-6096Z	3/14/1995	112CHCTU	438	447	7.1	7.6	19.5	220	52	22	6.8	1.4	280	6.3
Lf-6778Z	3/14/1995	112CHCTU	144	146	6.4	6.8	20.6	46	12	3.9	10	2.7	80	1.6
Lf-7025Z	3/13/1995	112CHCTU	458	443	7.2	7.7	20.9	170	48	13	27	1.8	280	<.2
Lf-7105Z	3/14/1995	112CHCTU	244	243	7.1	7.2	20.7	92	21	9.6	14	1.7	150	.4
Lf-7342Z	3/13/1995	112CHCTU	137	--	6.4	6.7	20.5	43	11	3.7	11	.8	80	5.3
Lf-7409Z	3/13/1995	112CHCTU	473	463	7.2	7.7	20.7	170	48	12	33	1.7	290	<.2
Lf-7413Z	3/14/1995	112CHCTU	117	119	6.1	6.4	20.7	29	6.8	3.0	11	1.2	52	1.7
Lf-7442Z	3/13/1995	112CHCTU	113	115	6.1	6.6	20.3	29	7.0	2.8	11	1.6	51	1.7
Lf-7486Z	3/14/1995	112CHCTU	435	427	7.2	7.6	21.1	100	25	10	54	1.2	260	<.2
Lf-9803Z	11/29/2000	112CHCTU	--	200	--	6.4	--	59	16.4	4.45	14.9	1.4	63	7.3
Rapides Parish														
R-5135Z	8/16/1995	112CHCT	59	69	5.7	6.4	21.4	7	1.6	.8	3.4	2.0	37	.3
R-5142Z	8/16/1995	112CHCT	39	44	5.6	6.5	20.5	7	1.8	.6	5.3	1.1	22	<.2
R-5145Z	8/16/1995	112CHCT	95	99	6.4	7.0	23.6	15	3.7	1.4	13	.9	33	1.0
R-5200Z	8/16/1995	112CHCT	131	136	5.4	6.3	22.0	30	7.9	2.5	12	1.8	22	<.2
R-5392Z	8/16/1995	112CHCT	135	136	6.2	6.5	20.8	37	8.6	3.7	12	.7	52	.6
R-5430Z	8/16/1995	112CHCT	126	128	6.1	6.8	26.5	25	5.7	2.5	16	1.2	56	.7
R-5964Z	9/19/2000	112CHCT	40	43	5.4	5.9	24.3	6	1.32	.65	4.8	1.2	15	.4
St. Landry Parish														
SL-6924Z	9/11/2000	112CHCT	519	511	7.1	7.5	22.8	210	54.5	17.7	23	1.6	310	<0.3
St. Martin Parish														
SMn-6248Z	3/14/1995	112CHCTU	236	221	6.8	7.2	20.3	84	19	8.9	12	1.2	140	<.2

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
							Vermilion Parish							
Ve-5690Z	6/5/1995	112CHCTU	838	792	7.3	8.0	21.8	150	36	14	130	2.4	440	<.2
Ve-5778Z	6/6/1995	112CHCTU	658	615	7.2	7.8	22.9	210	56	16	52	1.6	370	<.2
Ve-6244Z	6/6/1995	112CHCTU	840	791	7.5	8.0	22.4	190	50	16	100	2.7	450	<.2
Ve-6489Z	6/7/1995	112CHCTU	228	222	6.5	7.2	21.3	71	18	6.3	17	1.3	100	1.8
Ve-6678Z	6/6/1995	112CHCTU	1,100	1,040	7.5	8.0	23.3	180	43	18	160	2.3	430	<.2
Ve-7020Z	6/6/1995	112CHCTU	1,610	1,550	7.7	8.0	22.7	170	40	17	280	3.1	430	<.2
Ve-7021Z	6/6/1995	112CHCTU	1,140	1,070	7.6	7.8	23.5	130	31	12	200	2.2	420	<.2
Ve-7327Z	6/5/1995	112CHCTU	825	781	7.2	7.8	21.4	180	46	17	110	1.9	430	<.2
Ve-7436Z	8/2/2000	112CHCTU	686	686	7.2	7.4	25.2	220	54	21.7	53.7	2.9	420	E.2
Ve-7483Z	6/6/1995	112CHCTU	938	881	7.5	8.0	22.4	210	55	18	110	3.1	480	<.2
Ve-7533Z	6/7/1995	112CHCTU	490	463	7.0	7.7	21.9	170	42	17	28	1.2	290	<.2
Ve-7613Z	6/5/1995	112CHCTU	687	646	7.4	7.9	22.0	160	40	15	76	1.3	380	<.2
Ve-7723Z	6/6/1995	112CHCTU	827	765	7.5	7.8	21.9	200	52	17	98	2.9	450	<.2
Ve-7835Z	6/5/1995	112CHCTU	885	832	7.2	7.9	21.7	220	59	18	96	2.2	420	<.2
Ve-7886Z	6/5/1995	112CHCTU	792	743	7.2	7.8	21.4	230	59	19	68	1.8	350	<.2
Ve-7952Z	6/7/1995	112CHCTU	236	229	6.5	7.3	20.8	75	18	7.3	16	1.1	130	<.2
Ve-8116Z	6/20/1995	112CHCTU	705	654	7.3	8.0	22.2	190	45	18	74	2.4	380	.3
Ve-8152Z	6/7/1995	112CHCTU	608	574	7.0	7.8	21.4	140	38	11	74	1.2	320	<.2
Ve-8164Z	6/5/1995	112CHCTU	859	815	7.3	8.0	21.6	160	38	15	130	1.3	430	<.2
Ve-8260Z	6/20/1995	112CHCTU	599	558	7.2	7.8	22.1	150	43	11	67	2.2	320	<.2
Ve-8296Z	6/6/1995	112CHCTU	950	894	7.5	8.0	21.9	240	65	20	90	2.6	370	<.2
Ve-8314Z	6/6/1995	112CHCTU	760	721	7.5	8.0	22.1	140	35	12	100	1.5	280	<.2

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
						Vernon Parish								
V-5027Z	7/28/1994	112CHCT	46	47	6.1	6.5	24.2	9	2.3	.82	4.6	1.2	12	5.2
V-5706Z	7/19/1995	112CHCT	76	83	5.5	6.2	23.9	10	2.2	1.2	12	.7	26	.3
V-5756Z	7/28/1994	112CHCT	52	52	5.8	6.5	20.7	9	2.5	.72	6.0	1.4	17	.8
V-5774Z	7/19/1995	112CHCT	103	111	6.3	6.9	21.5	18	4.3	1.8	13	1.6	34	3.6
V-5887Z	7/19/1995	112CHCT	55	61	5.3	5.9	20.0	12	3.2	1.0	4.7	1.9	13	.5
V-5915Z	7/19/1995	112CHCT	55	62	5.4	6.0	19.7	7	1.8	.6	9.1	1.2	29	.6
V-5916Z	7/19/1995	112CHCT	55	61	5.5	6.2	20.8	10	2.5	1.0	6.6	2.2	28	.6
V-5948Z	7/19/1995	112CHCT	68	75	5.7	6.4	20.2	11	2.7	1.0	10	1.2	35	.7
V-5956Z	8/15/1995	112CHCT	42	46	5.4	6.4	22.8	10	3.0	.7	3.2	2.4	22	1.1
V-6002Z	7/19/1995	112CHCT	56	63	5.8	6.4	20.2	11	2.6	1.0	7.8	1.5	34	.4
V-6011Z	7/19/1995	112CHCT	40	45	5.3	5.9	20.7	8	2.2	.7	4.1	1.4	15	3.9
V-6035Z	7/19/1995	112CHCT	31	36	5.3	6.0	20.8	6	1.8	.4	3.0	1.9	17	.5
V-6081Z	8/15/1995	112CHCT	74	76	4.8	5.5	19.6	18	3.2	2.5	4.2	1.3	7	.2
V-8701Z	8/17/2000	112CHCT	23	25	5.9	6.2	22.0	4	.81	.53	2.0	.9	9	.4
USEPA SMCL					**6.5 - 8.5**	**6.5 - 8.5**								**250**

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area,Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
							Acadia Parish								
Ac-5227Z	2/14/1995	112CHCT	30	0.3	46	242	<0.02	<0.010	<0.020	0.58	0.56	0.26	0.23	840	210
Ac-5667Z	2/27/1995	112CHCT	31	.2	43	264	<.02	<.010	<.020	.35	.32	.24	.05	1,700	140
Ac-5716Z	2/14/1995	112CHCTU	100	.2	33	468	<.02	<.010	<.020	1.5	1.4	.21	.03	1,500	100
Ac-5898Z	2/14/1995	112CHCTU	22	.2	38	372	<.02	<.010	<.020	3.0	2.9	.39	.08	1,500	62
Ac-6071Z	2/27/1995	112CHCTU	24	.1	37	408	<.02	<.010	<.020	3.7	3.5	.39	.09	1,600	110
Ac-6112Z	11/20/2000	112CHCTU	50.2	.2	42.5	317	<.047	<.006	<.047	.786	.84	.044	.056	1,810	154
Ac-6218Z	2/14/1995	112CHCTU	70	.2	34	404	<.02	<.010	<.020	.83	.8	.19	.02	2,200	130
Ac-6244Z	2/15/1995	112CHCTU	29	.2	36	410	<.02	<.010	<.020	1.5	1.5	.40	.03	2,500	87
Ac-6285Z	2/27/1995	112CHCTU	16	.2	37	324	<.02	<.010	<.020	1.4	1.3	.24	.10	670	100
Ac-6447Z	2/14/1995	112CHCTU	24	.1	30	408	<.02	<.010	<.020	2.6	2.5	.30	.04	1,600	100
Ac-6449Z	2/15/1995	112CHCTU	26	.1	34	408	<.02	<.010	<.020	2.0	1.8	.19	.03	3,400	83
Ac-6477Z	2/13/1995	112CHCT	12	.2	34	362	<.02	<.010	<.020	.65	.62	.26	.07	1,500	160
Ac-6512Z	1/10/2001	112CHCT	48.7	E.2	41.8	306	<.047	<.006	<.047	.673	.76	.074	.032	1,790	131
Ac-6569Z	2/13/1995	112CHCT	24	.2	36	390	<.02	<.010	<.020	.96	.94	.37	.02	2,200	150
Ac-6636Z	2/27/1995	112CHCT	53	.2	40	346	<.02	<.010	<.020	1.4	2.0	.50	.10	1,900	120
Ac-6639Z	2/13/1995	112CHCT	45	.2	35	402	<.02	<.010	<.020	.65	.59	.30	.01	2,300	170
Ac-6642Z	2/14/1995	112CHCTU	76	.2	36	420	<.02	<.010	<.020	.99	.95	.28	.03	2,200	210
Ac-6674Z	2/27/1995	112CHCTU	31	.2	32	378	<.02	<.010	<.020	.36	.36	.25	.02	2,200	160
Ac-6763Z	2/14/1995	112CHCTU	83	.2	40	398	<.02	<.010	<.020	3.0	3.0	.33	.11	1,100	84
Ac-6828Z	2/28/1995	112CHCTU	65	.2	38	364	<.02	<.010	<.020	.94	.91	.22	.10	1,400	80
Ac-6854Z	2/14/1995	112CHCTU	160	.2	34	568	<.02	<.010	<.020	.96	.96	.24	.01	3,400	230
Ac-6864Z	2/14/1995	112CHCTU	24	.1	31	402	<.02	<.010	<.020	2.5	2.5	.26	.05	1,700	130
Ac-6896Z	7/21/2000	112CHCTU	101	.2	34.3	422	<.05	<.010	<.050	1.03	1.1	.068	.143	1,160	53
Ac-6998Z	9/26/2000	112CHCT	35.2	.2	36.5	410	<.05	<.010	<.050	1.4	1.6	.076	.18	2,190	90

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area,Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
						Allen Parish									
Al-264	12/5/1995	112CHCT	11	0.4	47	192	<0.02	<0.010	<0.020	0.22	0.22	0.35	0.24	200	7
Al-277	12/5/1995	112CHCT	11	<.1	22	92	<.02	<.010	<.020	.01	<.20	.04	.04	M	1
Al-310	12/6/1995	112CHCT	5.6	.1	32	94	<.02	<.010	<.020	.02	<.20	.16	.16	5,100	590
Al-316	12/5/1995	112CHCT	7.1	<.1	17	52	1.1	<.010	1.1	.02	<.20	<.020	.01	210	4
Al-404	12/5/1995	112CHCT	5.6	<.1	22	44	.11	<.010	.12	.01	<.20	<.020	.01	10	<1
Al-5167Z	12/12/2000	112CHCT	31.6	E.2	49.8	191	<.047	<.006	<.047	<.041	<.10	.162	.157	70	481
Al-5240Z	2/6/2001	112CHCT	6.2	<.2	26	68	.334	E.003	.337	<.041	<.10	<.006	<.018	150	8
Al-5243Z	7/27/2000	112CHCT	4.0	<.1	30.2	53	.041	<.010	.051	<.020	<.10	.023	.021	<10	<2
Al-5334Z	12/5/1995	112CHCT	3.9	<.1	35	64	.32	<.010	.33	.01	<.20	<.020	.01	<3	<1
Al-5475Z	5/2/2000	112CHCT	26.3	<.1	58.3	180	<.05	<.010	<.050	.022	<.10	.208	.186	20	73
Al-5506Z	12/14/2000	112CHCT	4.6	<.2	23.4	47	.678	<.006	.684	<.041	<.10	<.006	<.018	<10	E2
						Beauregard Parish									
Be-61	7/27/1994	112CHCT	19	.2	61	172	<.02	<.010	<.020	--	--	--	--	--	--
Be-495	7/27/1994	112CHCT	6.5	<.1	50	108	.06	<.010	.07	--	--	--	--	--	--
Be-5097Z	7/18/1995	112CHCT	4.8	<.1	17	36	.66	<.010	.67	.02	<.20	.03	.03	M	3
Be-5669Z	7/18/1995	112CHCT	3.6	<.1	17	54	.62	<.010	.63	.02	<.20	.04	<.010	M	2
Be-5764Z	7/19/2000	112CHCT	2.7	<.1	28	47	.706	<.010	.716	<.020	<.10	<.006	<.010	E10	<2
Be-5886Z	7/19/1995	112CHCT	4.0	<.1	14	30	.14	<.010	.15	.02	<.20	<.020	<.010	10	7
Be-5891Z	7/18/1995	112CHCT	3.6	<.1	15	30	.29	<.010	.30	.02	<.20	<.020	<.010	M	3
Be-5928Z	6/7/2000	112CHCT	4.3	<.1	32.6	71	<.05	<.010	<.050	<.020	<.10	.134	.111	560	14
Be-5956Z	7/18/1995	112CHCT	13	<.1	51	106	.02	<.010	.03	.02	<.20	.26	.26	10	1
Be-6065Z	6/8/2000	112CHCT	8.2	<.1	60	123	<.05	<.010	<.050	<.020	<.10	.066	.053	70	27
Be-6077Z	7/26/2000	112CHCT	10.9	.2	62.5	141	<.05	<.010	<.050	.032	E.05	.88	.800	1,440	70
Be-6084Z	6/6/2000	112CHCT	6.8	<.1	52.2	91	<.05	<.010	<.050	.022	<.10	.035	.026	<10	<2

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and “200-foot” sand of the Lake Charles area,Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
Calcasieu Parish															
Cu-5250Z	1/18/2001	11202LC	34	0.2	37.9	266	<0.047	<0.006	<0.047	0.096	0.12	0.241	0.234	690	418
Cu-5350Z	3/28/1995	112CHCTU	65	.2	31	478	<.02	<.010	<.020	.18	<.20	.22	.09	910	180
Cu-5412Z	3/29/1995	11202LC	23	.2	47	228	<.02	<.010	<.020	.15	<.20	.24	.27	1,000	340
Cu-5429Z	3/28/1995	11202LC	96	.2	19	356	<.02	<.010	<.020	.16	.29	.03	<.010	7,700	190
Cu-5811Z	7/26/1994	11202LC	175	.1	32	532	<.02	<.010	<.020	--	--	--	--	--	--
Cu-6103Z	3/29/1995	11202LC	14	<.1	27	250	.08	<.010	.09	.24	.24	.14	.12	70	110
Cu-6106Z	3/29/1995	11202LC	39	.6	23	484	.01	<.010	.02	.47	.49	.16	.18	110	90
Cu-6161Z	3/28/1995	11202LC	19	.1	30	260	<.02	<.010	<.020	.19	<.20	.10	.12	240	100
Cu-6235Z	3/29/1995	11202LC	20	.2	18	262	<.02	<.010	<.020	.40	.38	.17	.19	260	52
Cu-6552Z	3/28/1995	11202LC	34	<.1	27	372	<.02	<.010	<.020	.38	.39	.13	.13	250	89
Cu-6694Z	3/27/1995	11202LC	18	<.1	16	260	.01	<.010	.02	.25	.26	.13	.14	110	100
Cu-6767Z	3/29/1995	11202LC	24	.2	39	220	<.02	.01	<.020	.26	.30	.17	.20	3,600	340
Cu-6799Z	3/28/1995	11202LC	42	.1	26	398	<.02	<.010	<.020	.37	.37	.14	.15	160	32
Cu-7054Z	7/27/1994	11202LC	33	.3	19	418	.01	<.010	.02	--	--	--	--	--	--
Cu-7082Z	8/16/2000	11202LC	11.1	<.1	18.1	240	<.05	<.010	<.050	.328	.36	.181	.175	40	75
Cu-7341Z	3/28/1995	11202LC	15	.1	40	256	<.02	<.010	<.020	.18	<.20	.19	.20	310	250
Cu-7410Z	11/21/2000	11202LC	13.3	.2	53.7	182	<.047	E .003	<.047	.053	.11	.37	.308	--	239
Cu-7542Z	7/26/1994	11202LC	70	.2	24	502	.87	<.010	.88	--	--	--	--	--	--
Cu-7678Z	3/29/1995	11202LC	15	.1	15	258	<.02	<.010	<.020	.30	.33	.19	.18	30	46
Cu-7782Z	7/27/1994	11202LC	157	.2	42	509	<.02	<.010	<.020	--	--	--	--	--	--
Cu-7948Z	3/29/1995	11202LC	20	.2	45	208	<.02	<.010	<.020	.14	<.20	.32	.33	530	280
Cu-7952Z	3/29/1995	11202LC	12	.2	28	198	.04	<.010	.05	.17	<.20	.26	.28	50	150
Cu-7955Z	3/27/1995	11202LC	19	.1	51	240	<.02	<.010	<.020	.15	<.20	.14	.17	310	210
Cu-7967Z	11/15/2000	11202LC	22.1	.2	55	200	<.040	.007	<.047	E.033	<.10	.223	.198	2,810	289
Cu-7979Z	3/28/1995	11202LC	51	.2	40	388	<.02	<.010	<.020	.22	.22	.14	.14	400	270

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area,Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
Calcasieu Parish—Continued															
Cu-8507Z	3/28/1995	11202LC	28	.1	19	370	<.02	<.010	<.020	.34	.33	.16	.18	90	93
Cu-8638Z	3/29/1995	11202LC	15	.1	18	254	<.02	<.010	<.020	.37	.40	.18	.18	60	63
Cameron Parish															
Cn-5195Z	5/9/1995	112CHCTU	62	.2	36	312	<.02	<.010	<.020	.39	.35	.19	.16	340	120
Cn-5553Z	5/9/1995	112CHCTU	100	.1	26	404	<.02	<.010	<.020	1.2	1.2	.21	.18	570	73
Cn-5874Z	9/7/2000	11202LC	32.2	.1	22.8	313	<.05	<.010	<.050	.595	.68	.221	.215	100	53
Evangeline Parish															
Ev-475	1/23/1996	112CHCT	7.9	.3	30	394	<.02	<.010	<.020	.89	.90	.23	.19	2,000	150
Ev-583	1/24/1996	112CHCT	24	.2	42	206	.02	<.010	.03	.10	<.20	.08	.10	2,000	200
Ev-848	1/24/1996	112CHCT	40	.2	47	288	<.02	<.010	<.020	.38	.40	.24	.21	2,900	290
Ev-850	1/24/1996	112CHCT	49	.2	48	298	.02	<.010	.03	1.2	1.2	.26	.26	1,800	340
Ev-892	12/5/1995	112CHCT	21	.2	21	252	<.02	<.010	<.020	.03	<.20	.23	.01	4,200	290
Ev-5314Z	1/24/1996	112CHCT	44	.5	36	376	<.02	<.010	<.020	.14	<.20	.14	.11	1,800	280
Ev-5508Z	1/11/2001	112CHCT	8.3	E.1	46.9	108	.177	<.006	.183	<.041	<.10	.28	.26	E10	<3
Iberia Parish															
I-5131Z	6/20/1995	112CHCTU	10	.2	30	302	<.02	<.010	<.020	.71	.68	.15	.06	1,200	230
I-5578Z	6/20/1995	112CHCTU	8.7	.2	34	312	<.02	<.010	<.020	.02	<.20	.09	.10	140	280
I-5589Z	6/20/1995	112CHCTU	14	.2	32	308	<.02	<.010	<.020	.57	.58	.12	.06	1,000	190
I-5672Z	6/20/1995	112CHCTU	8.6	.2	34	500	<.02	<.010	<.020	.67	.73	.16	.02	2,300	450
I-5701Z	6/20/1995	112CHCTU	6.7	.2	41	262	<.02	<.010	<.020	.02	<.20	.14	.12	520	120
I-5790Z	6/21/1995	112CHCTU	14	.2	36	308	<.02	<.010	<.020	.24	.28	.21	.05	1,800	320
I-5877Z	6/20/1995	112CHCTU	27	.1	34	388	<.02	<.010	<.020	1	.97	.08	.07	770	96
I-6179Z	6/20/1995	112CHCTU	9.6	.2	40	486	<.02	<.010	<.020	3	2.8	.21	.02	2,900	310
I-6203Z	6/21/1995	112CHCTU	10	.4	36	178	.59	<.010	.60	.01	<.20	.27	.26	10	2

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and “200-foot” sand of the Lake Charles area,Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
							Jefferson Davis Parish								
JD-5110Z	3/1/1995	112CHCT	36	0.3	45	218	<0.02	0.01	<0.020	0.07	<0.20	0.17	0.05	5,100	400
JD-5177Z	7/18/2000	112CHCTU	264	.4	24.3	858	.248	<.010	.258	<.020	<.10	.049	.045	10	130
JD-5233Z	2/28/1995	112CHCTU	89	.1	40	360	<.02	<.010	<.020	.41	.38	.21	.15	820	90
JD-5299Z	3/1/1995	112CHCT	24	.3	47	172	.01	<.010	.02	.04	<.20	.05	.05	390	400
JD-5371Z	7/12/2000	112CHCTU	107	.2	42.3	440	<.05	<.010	<.050	.161	.17	.165	.207	660	325
JD-5728Z	2/28/1995	112CHCTU	50	.3	30	308	.03	<.010	.04	.18	<.20	.13	.11	200	220
JD-5816Z	2/28/1995	112CHCTU	44	.2	42	262	<.02	<.010	<.020	.14	<.20	.29	.17	990	170
JD-5839Z	2/28/1995	112CHCTU	66	.1	42	318	<.02	<.010	<.020	.35	.33	.18	.11	910	130
JD-5920Z	2/28/1995	112CHCTU	53	.1	31	304	<.02	<.010	<.020	.30	.28	.23	.17	450	150
JD-5938Z	11/14/2000	112CHCT	29.4	.3	54.2	198	<.047	<.006	<.047	.065	E.07	.541	.401	2,620	369
JD-5980Z	2/28/1995	112CHCTU	43	.3	50	246	<.02	.01	<.020	.12	<.20	.32	.23	2,400	250
JD-6021Z	2/28/1995	112CHCTU	56	.2	51	266	<.02	<.010	<.020	.15	<.20	.26	.28	1,600	390
JD-6047Z	2/28/1995	112CHCTU	250	.2	45	596	<.02	<.010	<.020	.26	.26	.34	.01	2,000	250
JD-6175Z	2/28/1995	112CHCTU	64	.2	48	302	<.02	.01	<.020	.11	<.20	.23	.12	2,600	300
JD-6207Z	2/28/1995	112CHCTU	230	.2	41	582	<.02	<.010	<.020	.21	.22	.28	.18	840	170
JD-6261Z	2/28/1995	112CHCTU	43	.2	48	250	<.02	<.010	<.020	.12	<.20	.34	.18	1,900	280
							Lafayette Parish								
Lf-6096Z	3/14/1995	112CHCTU	2.8	.3	41	276	<.02	<.010	<.020	.03	<.20	.09	.09	590	980
Lf-6778Z	3/14/1995	112CHCTU	2.3	.2	43	114	.81	<.010	.82	.01	<.20	.36	.38	M	<1
Lf-7025Z	3/13/1995	112CHCTU	7.3	.2	33	260	<.02	<.010	<.020	.26	.23	.55	.19	1,400	290
Lf-7105Z	3/14/1995	112CHCTU	3.3	.3	39	160	<.02	<.010	<.020	.04	<.20	.41	.42	90	490
Lf-7342Z	3/13/1995	112CHCTU	5.2	.3	47	116	.46	<.010	.47	.05	<.20	.63	.56	4,200	<1
Lf-7409Z	3/13/1995	112CHCTU	9.3	.2	34	276	<.02	<.010	<.020	.15	<.20	.23	.10	1,200	280
Lf-7413Z	3/14/1995	112CHCTU	5.2	.1	39	102	1.70	<.010	1.7	.01	<.20	.14	.13	10	<1
Lf-7442Z	3/13/1995	112CHCTU	4.7	.2	35	100	1.10	<.010	1.1	.01	<.20	.23	.24	40	1

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area,Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
Lafayette Parish—Continued															
Lf-7486Z	3/14/1995	112CHCTU	12	.4	32	260	<.02	<.010	<.020	.04	<.20	.23	.28	2,400	370
Lf-9803Z	11/29/2000	112CHCTU	20.2	.3	46.1	152	.709	E.003	.712	<.041	<.10	.616	.598	880	11
Rapides Parish															
R-5135Z	8/16/1995	112CHCT	3.5	<.1	20	62	.36	.01	.37	.03	<.20	<.020	<.010	10	2
R-5142Z	8/16/1995	112CHCT	3.8	<.1	32	58	.10	.01	.11	.01	.20	.02	.02	10	<1
R-5145Z	8/16/1995	112CHCT	12	<.01	43	94	.03	.01	.04	.01	.20	.02	.02	M	1
R-5200Z	8/16/1995	112CHCT	29	<.1	35	124	.11	.01	.12	.01	.20	.02	.01	20	2
R-5392Z	8/16/1995	112CHCT	15	<.1	54	140	.18	<.010	.19	<.010	<.20	.14	.18	10	<1
R-5430Z	8/16/1995	112CHCT	12	<.1	52	118	.01	.01	.02	.01	.20	.13	.11	10	4
R-5964Z	9/19/2000	112CHCT	4.1	<.1	24	46	.068	<.010	.078	<.020	<.10	.009	<.010	E10	E1
St. Landry Parish															
SL-6924Z	9/11/2000	112CHCT	16.1	.2	34.7	300	<.05	<.010	<.050	.168	.22	.072	.158	2,180	140
St. Martin Parish															
SMn-6248Z	3/14/1995	112CHCTU	3.1	.2	49	160	<.02	<.010	<.020	.20	<.20	.41	.41	3,900	200
Vermilion Parish															
Ve-5690Z	6/5/1995	112CHCTU	47	.2	33	466	<.02	<.010	<.020	1.4	1.3	.39	.17	920	64
Ve-5778Z	6/6/1995	112CHCTU	23	.2	34	358	<.02	<.010	<.020	.79	.71	.25	.02	1,100	160
Ve-6244Z	6/6/1995	112CHCTU	39	.1	32	454	<.02	<.010	<.020	2.8	2.7	.37	.12	980	76
Ve-6489Z	6/7/1995	112CHCTU	14	.3	21	150	.28	<.010	.29	.02	<.20	.43	.42	M	660
Ve-6678Z	6/6/1995	112CHCTU	130	<.1	25	582	<.02	<.010	<.020	1.8	1.7	.20	.14	400	34
Ve-7020Z	6/6/1995	112CHCTU	290	<.1	25	838	<.02	<.010	.020	2.2	2.0	.22	.13	410	69
Ve-7021Z	6/6/1995	112CHCTU	150	.1	27	600	<.02	<.010	<.020	1.7	1.6	.34	.27	380	32
Ve-7327Z	6/5/1995	112CHCTU	39	.3	30	454	<.02	<.010	<.020	.95	.93	.44	.05	1,400	120
Ve-7436Z	8/2/2000	112CHCTU	17.7	<.1	34.2	401	<.05	<.010	<.050	2.56	2.7	.445	.583	1,680	94
Ve-7483Z	6/6/1995	112CHCTU	57	<.1	31	502	<.02	<.010	<.020	3.0	2.8	.33	.10	1,000	91

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area,Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
							Vermilion Parish—Continued								
Ve-7533Z	6/7/1995	112CHCTU	9.9	.3	38	258	<.02	<.010	<.020	.78	.73	.42	.14	920	340
Ve-7613Z	6/5/1995	112CHCTU	26	.2	33	378	<.02	<.010	<.020	2.5	2.3	.29	.08	1,300	41
Ve-7723Z	6/6/1995	112CHCTU	35	.1	32	450	<.02	<.010	<.020	3.2	3.0	.35	.08	1,100	110
Ve-7835Z	6/5/1995	112CHCTU	62	.2	35	478	<.02	<.010	<.020	1.5	1.4	.54	.04	1,500	140
Ve-7886Z	6/5/1995	112CHCTU	70	.2	37	422	<.02	<.010	<.020	.69	.71	.53	.05	2,200	300
Ve-7952Z	6/7/1995	112CHCTU	5.8	.2	43	152	<.02	<.010	<.020	.12	<.20	.56	.56	30	1,000
Ve-8116Z	6/20/1995	112CHCTU	21	.2	31	374	<.02	<.010	<.020	2.0	1.7	.23	.08	1,600	47
Ve-8152Z	6/7/1995	112CHCTU	26	.4	29	346	<.02	<.010	<.020	.21	.21	.42	.09	1,600	210
Ve-8164Z	6/5/1995	112CHCTU	52	.2	29	468	<.02	<.010	<.020	1.8	1.7	.32	.18	620	77
Ve-8260Z	6/20/1995	112CHCTU	26	.2	32	338	<.02	<.010	<.020	.37	.38	.11	.11	1,300	170
Ve-8296Z	6/6/1995	112CHCTU	110	.1	30	498	<.02	<.010	<.020	1.6	1.4	.16	.02	1,200	90
Ve-8314Z	6/6/1995	112CHCTU	91	.2	36	412	<.02	<.010	<.020	.36	.37	.20	.09	730	66
							Vernon Parish								
V-5027Z	7/28/1994	112CHCT	4.1	<.1	58	90	.01	<.010	.02	--	--	--	--	--	--
V-5706Z	7/19/1995	112CHCT	9.2	<.1	46	104	1.60	<.010	1.6	.02	<.20	.12	.08	<3	2
V-5756Z	7/28/1994	112CHCT	4.2	<.1	35	67	<.02	<.010	<.020	--	--	--	--	--	--
V-5774Z	7/19/1995	112CHCT	14	<.1	32	94	.25	<.010	.26	.03	<.20	.10	.10	10	30
V-5887Z	7/19/1995	112CHCT	5.5	<.1	21	66	3.00	<.010	3.0	.02	<.20	<.020	.01	M	2
V-5915Z	7/19/1995	112CHCT	4.6	<.1	34	70	.03	<.010	.04	.02	<.20	<.020	.01	40	4
V-5916Z	7/19/1995	112CHCT	4.6	<.1	34	80	<.02	<.010	<.020	.02	<.20	<.020	.01	M	2
V-5948Z	7/19/1995	112CHCT	5.7	<.1	46	94	.01	<.010	.02	.02	<.20	.09	.07	M	1
V-5956Z	8/15/1995	112CHCT	3.6	<.1	64	98	.03	.01	.04	.01	.20	.02	.01	<3	<1
V-6002Z	7/19/1995	112CHCT	3.6	<.1	46	86	.03	<.010	.04	.02	<.20	.02	.02	M	1
V-6011Z	7/19/1995	112CHCT	3.9	<.1	48	78	<.02	<.010	<.020	.02	<.20	<.020	.01	30	13
V-6035Z	7/19/1995	112CHCT	3.7	<.1	18	44	<.02	<.010	<.020	.02	<.20	<.020	.01	M	1

Appendix 3. *Water-quality data from wells sampled in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area,Chicot aquifer system, southwestern Louisiana, 1994-2001—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
							Vernon Parish—Continued								
V-6081Z	8/15/1995	112CHCT	5.9	<.1	10	72	5.6	<.010	5.6	.01	<.20	<.020	<.010	10	15
V-8701Z	8/17/2000	112CHCT	3.3	<.1	15.3	29	.196	<.010	.206	<.020	<.10	<.006	<.010	<10	<2
USEPA MCL				**4.0**			**10**								
USEPA SMCL			**250**	**2.0**		**500**								**300**	**50**

Appendix 4. *Water-quality data from wells sampled in the shallow sand of the Chicot aquifer system, southwestern Louisiana, 1995 and 2000*

[Concentrations are in milligrams per liter, except as noted. 112CHCTS, shallow sand of the Chicot aquifer system; <, less than indicated value; E, estimated; USEPA, U.S. Environmental Protection Agency; SMCL, Secondary Maximum Contaminant Level; MCL, Maximum Contaminant Level]

Local well number	Sample date	Aquifer code	Specific conductance, field, in microsiemens per centimeter at 25 degrees Celsius	Specific conductance, laboratory, in microsiemens per centimeter at 25 degrees Celsius	pH, whole, field, in standard units	pH, whole, laboratory, in standard units	Water temperature, in degrees Celsius	Hardness, total (as $CaCO_3$)	Calcium, dissolved (as Ca)	Magnesium, dissolved (as Mg)	Sodium, dissolved (as Na)	Potassium, dissolved (as K)	Bicarbonate (as HCO_3)	Sulfate, dissolved (as SO_4)
							Acadia Parish							
Ac-6196Z	2/13/1995	112CHCTS	631	725	7.0	7.5	19.7	240	60	22	63	0.8	240	1.3
							Calcasieu Parish							
Cu-8667Z	3/28/1995	112CHCTS	511	538	7.5	7.8	20.7	130	29	13	69	2.0	270	1.4
							Evangeline Parish							
Ev-5500Z	7/10/2000	112CHCTS	1,220	1,210	7.2	7.2	22.2	330	80.2	31.8	106	1.3	360	2.7
							Vermilion Parish							
Ve-170	8/3/2000	112CHCTS	300	277	6.9	6.8	21.9	96	23.7	8.91	19.1	1.3	180	<.3
Ve-7908Z	6/6/1995	112CHCTS	793	746	7.2	7.8	21.2	190	47	18	94	2.2	390	<.2
Ve-8114Z	6/7/1995	112CHCTS	603	567	7.0	7.6	21.3	160	39	16	62	1.9	320	<.2
Ve-8128Z	6/7/1995	112CHCTS	509	481	7.2	7.8	21.3	170	47	12	38	1.3	280	<.2
Ve-8144Z	6/6/1995	112CHCTS	862	815	7.1	7.8	20.2	220	57	18	88	1.6	340	<.2
Ve-9241Z	8/18/2000	112CHCTS	739	729	6.8	7.4	21.7	180	49.0	13.7	93.1	1.6	450	E.2
USEPA SMCL					**6.5 - 8.5**	**6.5 - 8.5**								**250**

Appendix 4. *Water-quality data from wells sampled in the shallow sand of the Chicot aquifer system, southwestern Louisiana, 1995 and 2000—Continued*

Local well number	Sample date	Aquifer code	Chloride, dis-solved (as Cl)	Fluoride, dis-solved (as F)	Silica, dis-solved (as SiO_2)	Dis-solved solids, residue at 180 degrees Celsius	Nitro-gen, nitrate, dis-solved (as N)	Nitro-gen, nitrite, dis-solved (as N)	Nitrogen, nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, dis-solved (as N)	Phos-phorus, dis-solved (as P)	Phos-phorus, ortho, dis-solved (as P)	Iron, dis-solved (in micro-grams per liter as Fe)	Manga-nese, dissolved (in micro-grams per liter as Mn)
Acadia Parish															
Ac-6196Z	2/13/1995	112CHCTS	64	0.3	27	420	7.8	<0.010	7.8	0.01	<0.20	0.03	0.05	10	<1
Calcasieu Parish															
Cu-8667Z	3/28/1995	112CHCTS	38	.2	23	312	<.02	<.010	<.020	.54	.53	.22	.25	40	110
Evangeline Parish															
Ev-5500Z	7/10/2000	112CHCTS	227	.3	25.0	704	2.29	<.010	2.3	.174	.20	.091	.081	<10	148
Vermilion Parish															
Ve-170	8/3/2000	112CHCTS	4.2	.2	47.0	201	<.033	.017	<.050	.499	.52	.236	.03	8,670	458
Ve-7908Z	6/6/1995	112CHCTS	51	.3	34	426	<.02	<.010	<.020	.59	.59	.39	.02	2,000	160
Ve-8114Z	6/7/1995	112CHCTS	25	.4	37	338	<.02	<.010	<.020	.10	<.20	.28	.02	2,000	220
Ve-8128Z	6/7/1995	112CHCTS	16	.2	35	286	<.02	<.010	<.020	.21	<.20	.30	.05	1,200	130
Ve-8144Z	6/6/1995	112CHCTS	95	.2	30	458	<.02	<.010	<.020	.64	.61	.40	.02	1,700	200
Ve-9241Z	8/18/2000	112CHCTS	32.7	.2	36.8	442	<.05	<.010	<.050	.479	.61	.727	.583	1,540	105
USEPA MCL				**4.0**			**10**								
USEPA SMCL			**250**	**2.0**		**500**								**300**	**50**

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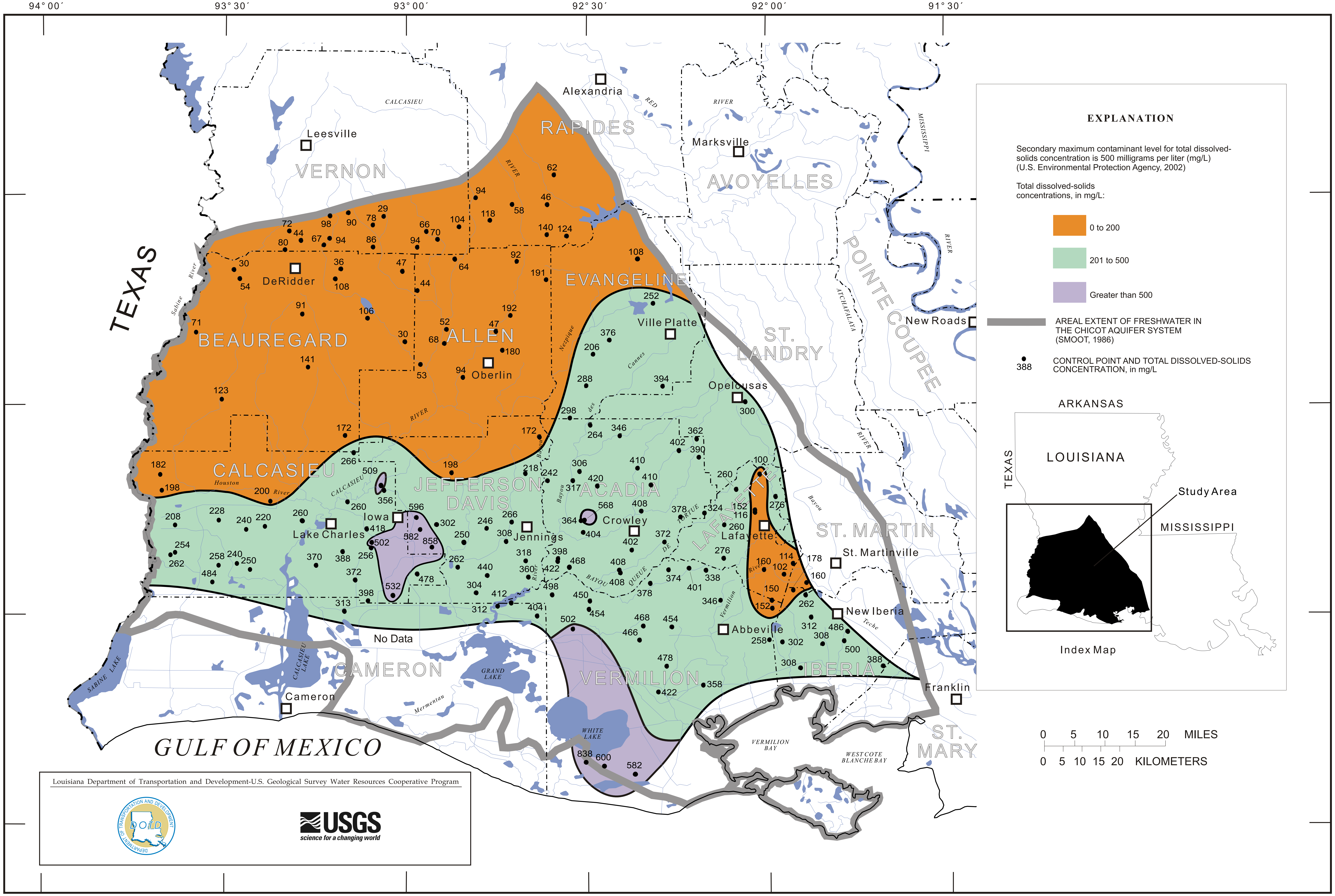

Map credit: Modified from Official Map of Louisiana, Louisiana Department of Transportation and Development, 1986

Plate 1. Total dissolved-solids concentrations in the undifferentiated sand, upper sand, and “200-foot” sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana.

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PUBLIC WORKS AND WATER RESOURCES DIVISION
WATER RESOURCES SECTION

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WATER RESOURCES TECHNICAL REPORT NO. 71
Values for pH--PLATE 2

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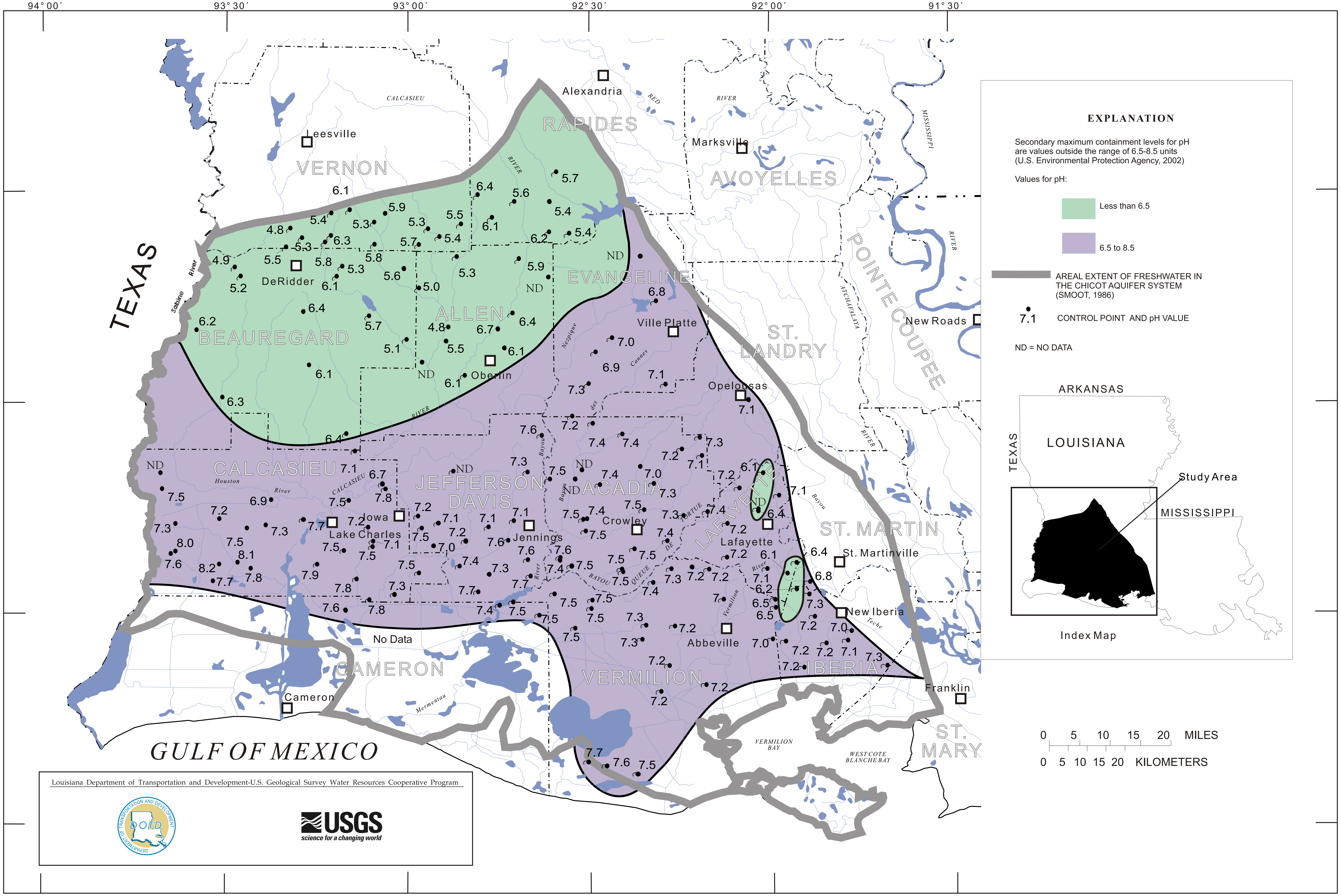

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Plate 2. Values for pH in the undifferentiated sand, upper sand, and “200-foot”sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana.

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WATER RESOURCES TECHNICAL REPORT NO. 71
Hardness concentrations--PLATE 3

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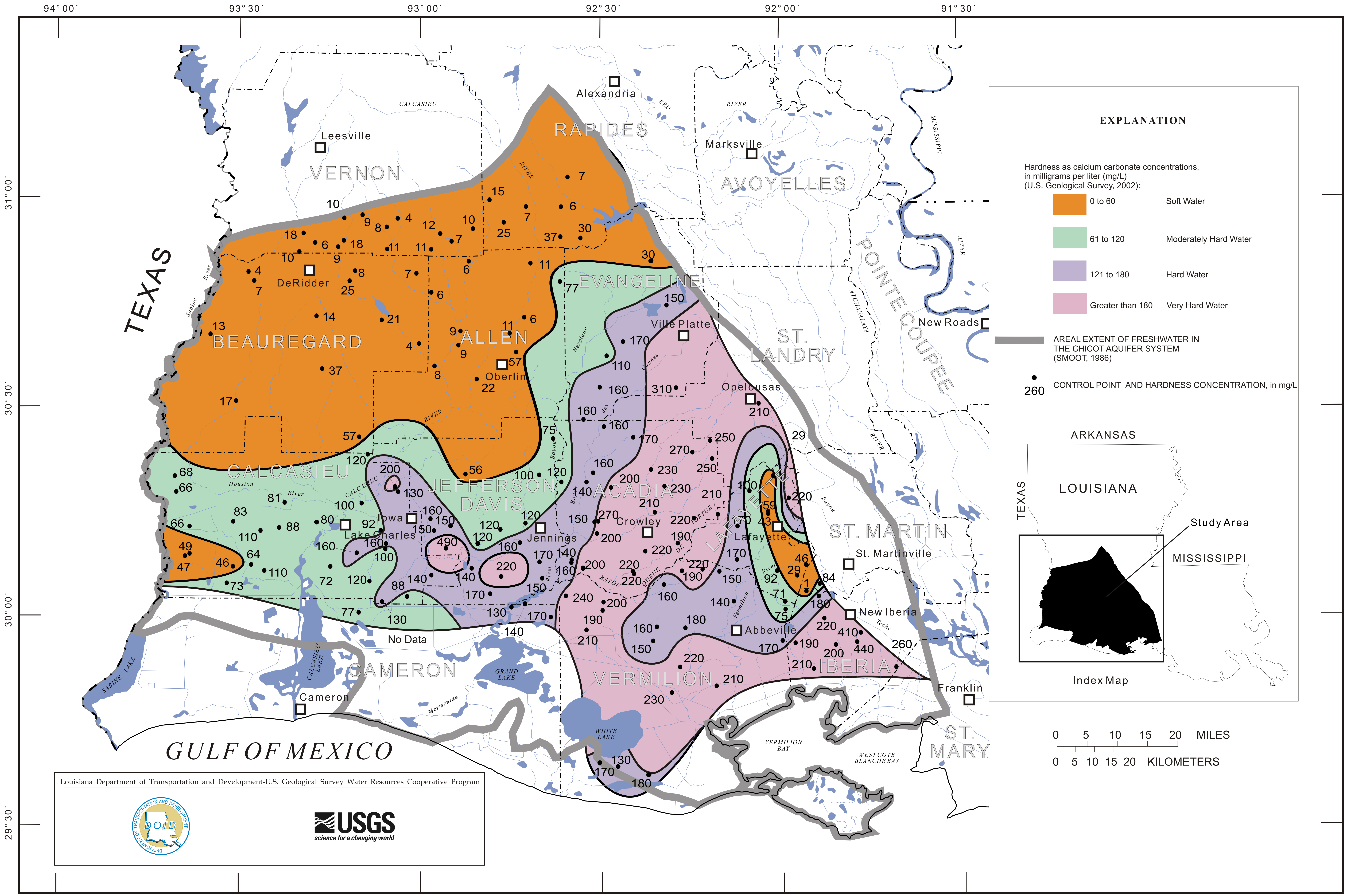

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Plate 3. Hardness concentrations in the undifferentiated sand, upper sand, and "200-foot" sand of the Lake Charles area, Chicot aquifer system southwestern Louisiana.

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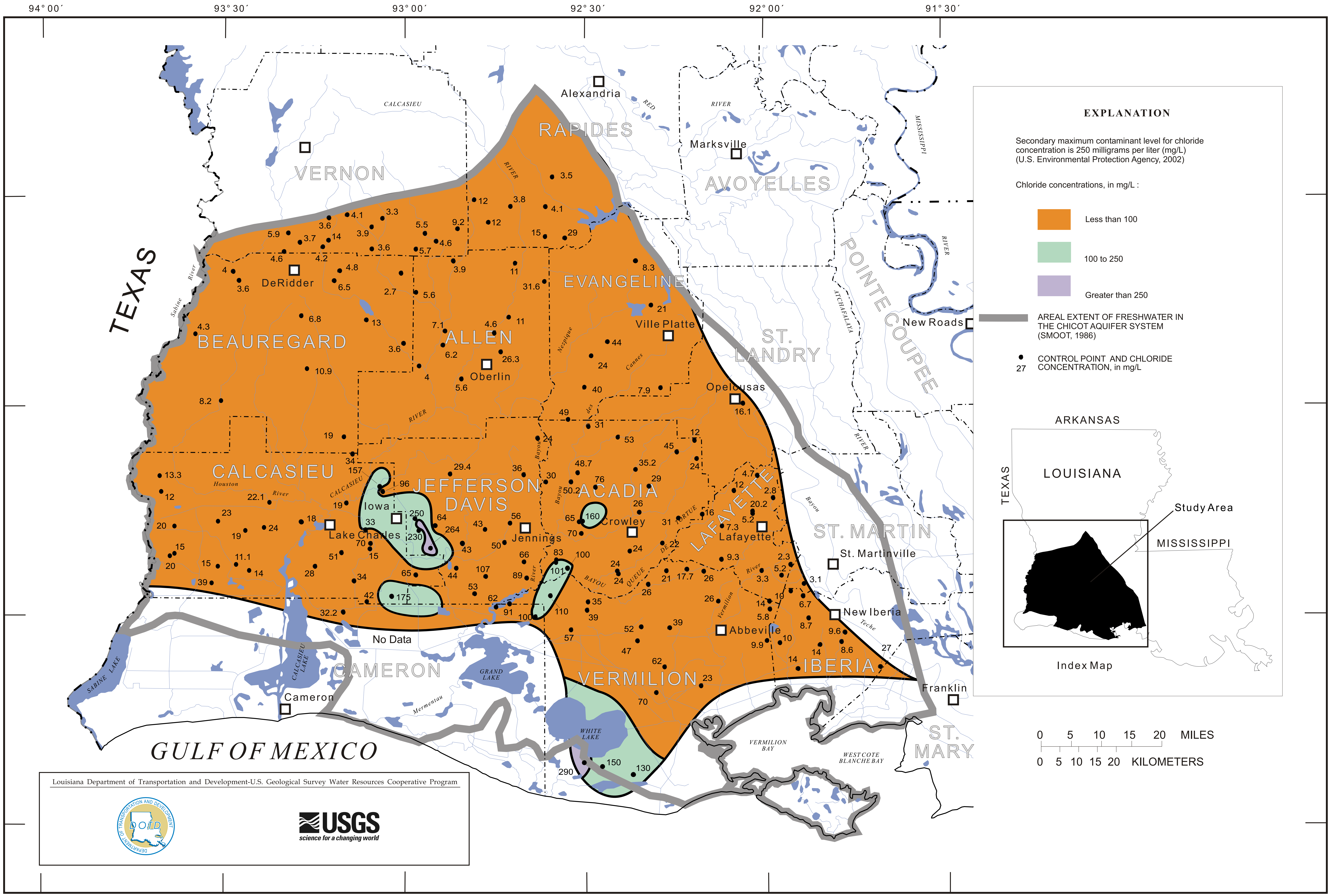

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Plate 4. Chloride concentrations in the undifferentiated sand, upper sand, and “200-foot” sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana.

Prakken, Lawrence B., 2003, Quality of water used for domestic supply in the Chicot aquifer system of southwestern Louisiana, 1994-2001

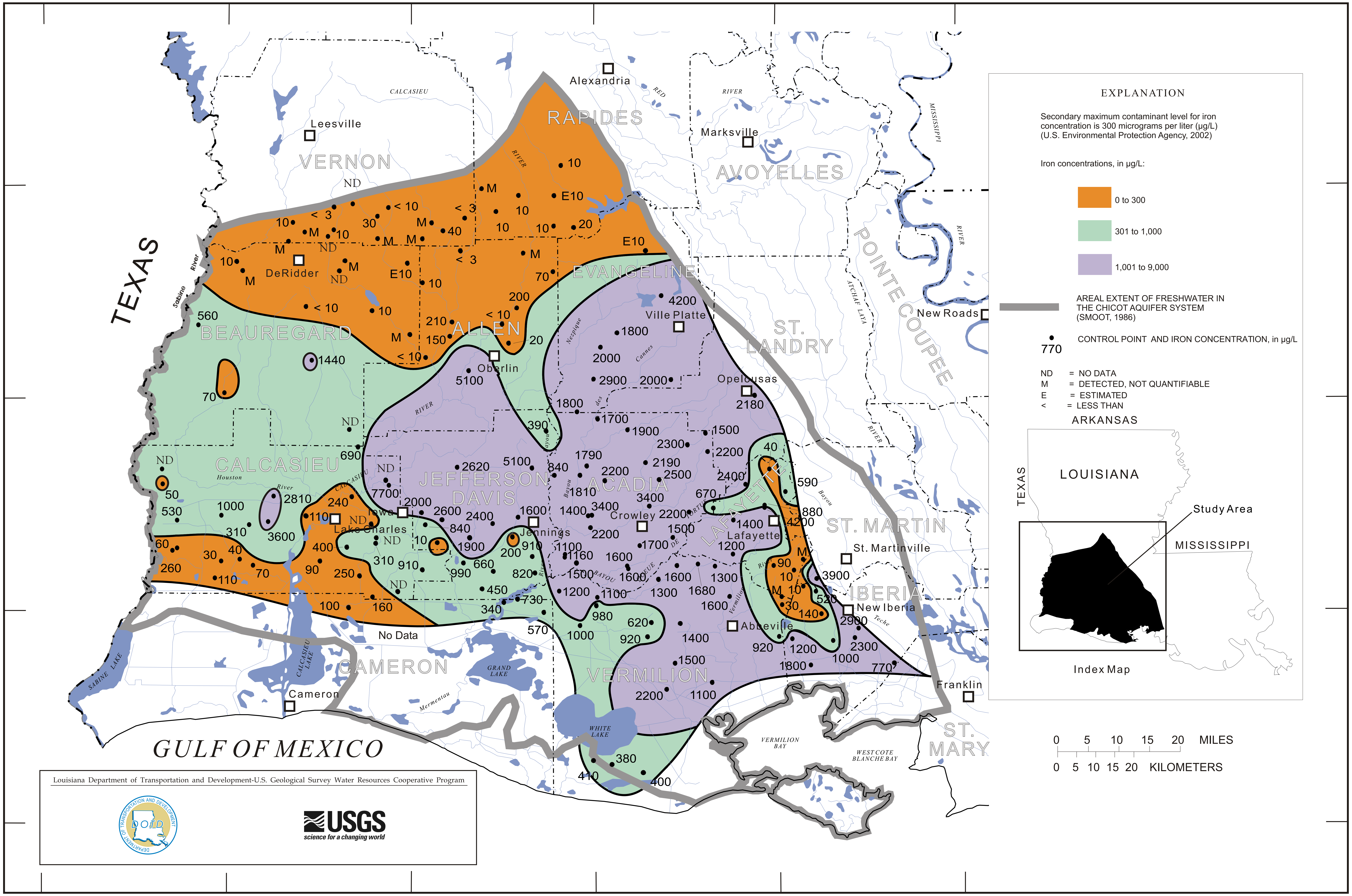

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Plate 5. Iron concentrations in the undifferentiated sand, upper sand, and “200-foot” sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana.

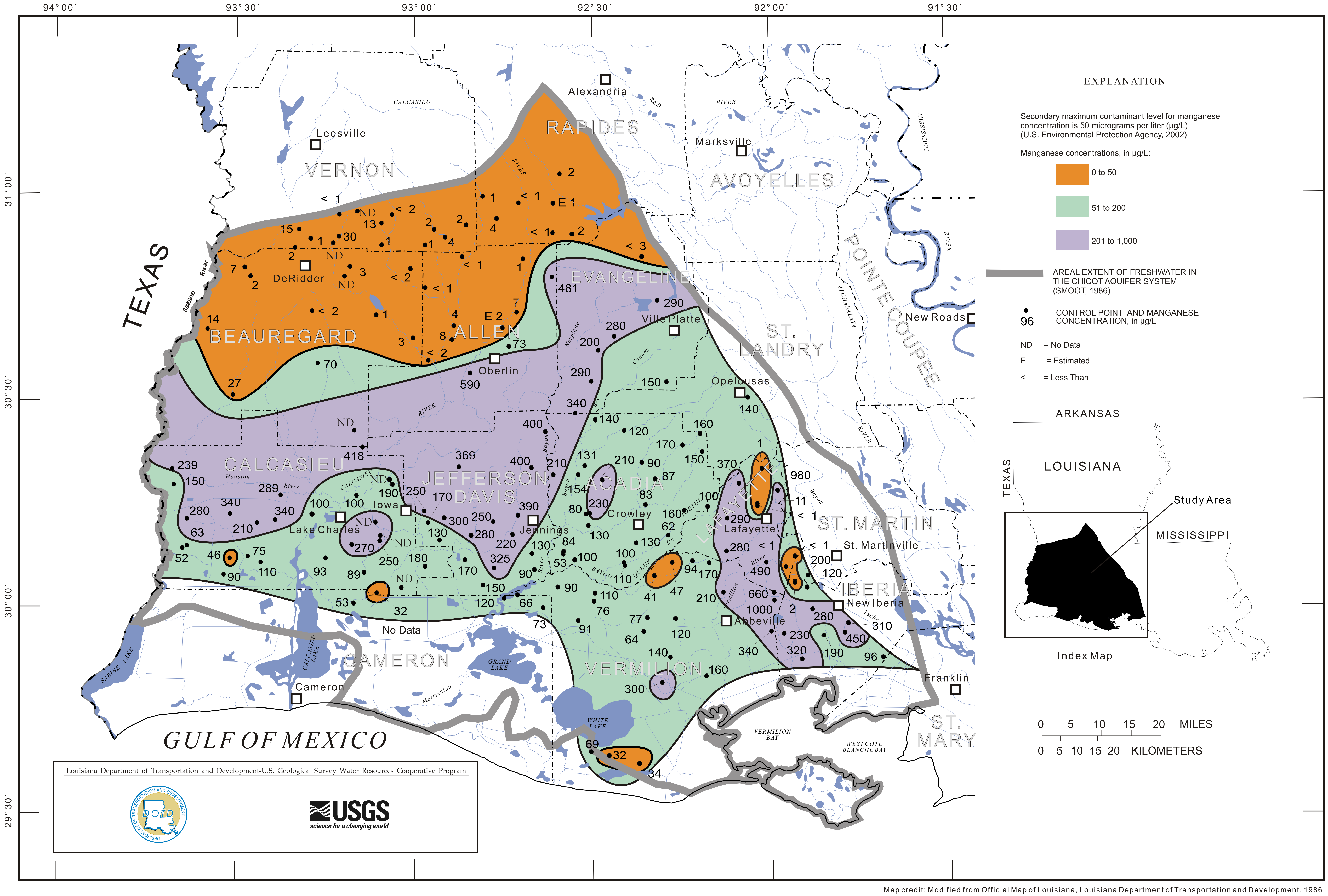

Plate 6. Manganese concentrations in the undifferentiated sand, upper sand, "200-foot" sand of the Lake Charles area, Chicot aquifer system, southwestern Louisiana.