USGS
science for a changing world

In cooperation with the

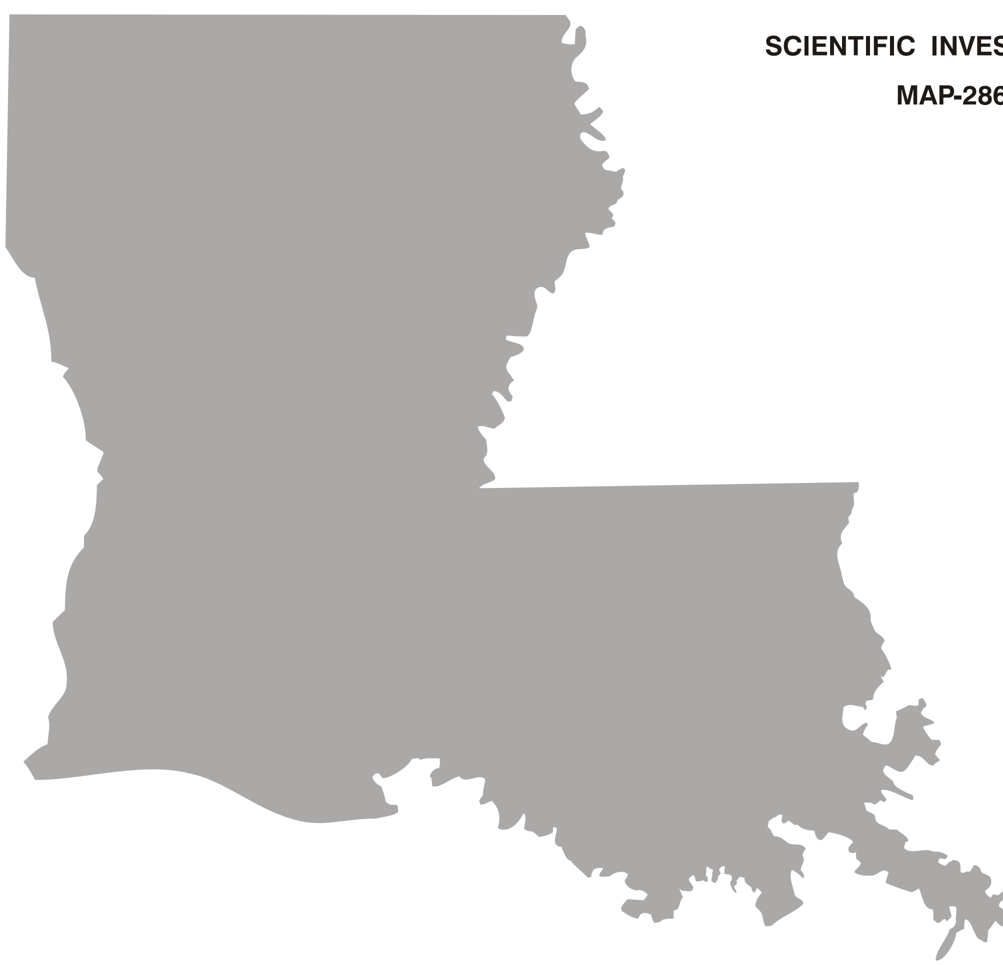
STATE OF LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

OFFICE OF PUBLIC WORKS AND INTERMODAL

PUBLIC WORKS AND WATER RESOURCES DIVISION

Louisiana Ground-Water Map No. 17: Generalized Potentiometric Surface of the Kentwood Aquifer System and the “1,500-foot” and “1,700-foot” Sands of the Baton Rouge Area in Southeastern Louisiana, March-April 2003

SCIENTIFIC INVESTIGATIONS
MAP-2862



U.S. Department of the Interior
U.S. Geological Survey

L.B. Prakken--Louisiana Ground-Water Map No. 17: Generalized Potentiometric Surface of the Kentwood Aquifer System and the “1,500-foot” and “1,700-foot” Sands of the Baton Rouge Area in Southeastern Louisiana, March-April 2003

SIM-2862

Errata Sheet

Louisiana Ground-Water Map No. 17: Generalized Potentiometric Surface of the Kentwood Aquifer System and the “1,500-foot” and “1,700-foot” Sands of the Baton Rouge Area in Southeastern Louisiana, March-April 2003

by Lawrence B. Prakken, 2004

Error: Figure 4 Y-axis caption reads “WATER LEVEL, IN FEET ABOVE (+) OR BELOW (-) LAND SURFACE”.

Correction: “WATER LEVEL, IN FEET ABOVE OR BELOW NGVD 29”.

Prepared in cooperation with the

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Office of Public Works and Intermodal
Public Works and Water Resources Division

Prakken, L.B., 2004, Louisiana Ground-Water Map no. 17:
Generalized potentiometric surface of the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area in southeastern Louisiana, March-April 2003

INTRODUCTION

The Kentwood aquifer system is a principal source of fresh ground water in St. Tammany Parish in southeastern Louisiana. The Kentwood aquifer system includes the Kentwood, Abita, Covington, and Slidell aquifers (Nyman and Fayard, 1978, table 2). The system is adjacent to and correlative to the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area, which underlie East and West Baton Rouge, East and West Feliciana, Livingston, Pointe Coupee, and St. Helena Parishes (fig. 1). The Baton Rouge fault interrupts the aquifer system along a line that is approximately located between Baton Rouge and Slidell (fig. 2). South of the fault, many of the aquifers contain saltwater. In 2000, an estimated 43 Mgal/d of water was withdrawn from the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands for various uses including public supply, industrial, agricultural, and rural domestic (table 1). Of that amount, approximately 32 Mgal/d (74 percent) was withdrawn for public-supply use. About 25 Mgal/d (58 percent) of the 43 Mgal/d was withdrawn in East Baton Rouge Parish (B.P. Sargent, U.S. Geological Survey, written commun., 2004). Pumpage data for calendar year 2000 (B.P. Sargent, U.S. Geological Survey, written commun., 2004) are listed in table 1. Figure 3 shows the locations of water-withdrawal centers where average daily withdrawals exceeded 0.5 Mgal/d during April 2003.[1]

System	Series	Stratigraphic unit		Hydrogeologic units: Aquifer system or confining unit		Aquifer or confining unit: Baton Rouge area[1]		Aquifer or confining unit: Eastern Florida Parishes: St. Tammany, Tangipahoa, and Washington	
Quaternary	Holocene	Mississippi River and other alluvial deposits		Near-surface aquifers or surficial confining unit		Mississippi River alluvial aquifer		Shallow sands	
	?			?					
	Pleistocene	Unnamed Pleistocene deposits		Southern Hills regional aquifer system[2]	Chicot equivalent aquifer system or surficial confining unit	Shallow sands		Upland terrace aquifer	
						Upland terrace aquifer	"400-foot" sand	Upper Ponchatoula aquifer	
							"600-foot" sand		
Tertiary	Pliocene	Fleming Formation	Blounts Creek Member		Evangeline equivalent aquifer system or surficial confining unit	"800-foot" sand		Lower Ponchatoula aquifer	
						"1,000-foot" sand			
						"1,200-foot" sand		Big Branch aquifer	
	?					"1,500-foot" sand		Kentwood aquifer system	Kentwood aquifer
									Abita aquifer
						"1,700-foot" sand			Covington aquifer
									Slidell aquifer
	Miocene		Castor Creek Member		Unnamed confining unit	Unnamed confining unit			
			Williamson Creek Member Dough Hills Member Carnahan Bayou Member		Jasper equivalent aquifer system	"2,000-foot" sand		Tchefuncte aquifer	
								Hammond aquifer	
						"2,400-foot" sand		Amite aquifer	
						"2,800-foot" sand		Ramsay aquifer	
			Lena Member		Unnamed confining unit	Unnamed confining unit			
	? Oligocene	Catahoula Formation			Catahoula equivalent aquifer system	Catahoula aquifer		Franklinton aquifer	

[1]East Baton Rouge, East Feliciana, Livingston, Pointe Coupee, St. Helena, West Baton Rouge, and West Feliciana.
[2]Buono, 1983.

Figure 1. Partial stratigraphic column of hydrogeologic units in southeastern Louisiana (modified from Nyman and Fayard, 1978, table 2; Stuart and others, 1994, fig. 5; Lovelace and Lovelace, 1995, fig. 1; Griffith, in press, fig. 3).

According to data from the Louisiana State Census Data Center (2003), some of the largest population increases in the State from 1990 to 2000 occurred in St. Tammany (+32.4 percent), Livingston (+30.2 percent), and Tangipahoa (+17.4 percent) Parishes. These population increases have been accompanied by increased withdrawals of ground water during the same period (Lovelace, 1991; Sargent, 2002): +40 percent in St. Tammany Parish, +63 percent in Livingston Parish, and +35 percent in Tangipahoa Parish.

Since the early 1900's, water withdrawals for public supply and industry in East Baton Rouge Parish have influenced ground-water levels in the "1,500-foot" and "1,700-foot" sands, and to a lesser extent, the correlative sands of the Kentwood aquifer system. This pumpage has affected water levels as far east as Tangipahoa Parish (Nyman and Fayard, 1978, p. 41). Water-level data indicate that water levels in the "1,500-foot" sand and deeper aquifers in southeastern Louisiana declined about 1 to 2 ft/yr during the period 1990 to 2000 (Tomaszewski, and others, 2002).

Additional information about ground-water flow and effects of increased withdrawals on water levels in the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area is needed to assess ground-water-development potential and to protect the resource. To meet this need, the U.S. Geological Survey (USGS), in cooperation with the Louisiana Department of Transportation and Development, began a study in 2003 to determine water levels, flow direction, and water-level trends for the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area. This report presents data and maps that illustrate the potentiometric surface during spring 2003 and water-withdrawal centers for these aquifers. Clay layers separating the aquifers or sand units in this report are not impermeable. The clays contain silty and sandy material which make the clays "leaky." In some areas, the clay layer separating aquifers or sand units is thin or missing. Because of this, a generalized potentiometric-surface map can be created. Water levels were not measured south of the Baton Rouge fault where aquifers are offset and hydrologically separated from equivalent units to the north of the fault (Griffith, in press). Graphs showing long-term water-level trends for selected wells in the study area are presented. Arrows on the potentiometric-surface map show generalized direction of ground-water flow and illustrate the effect of water withdrawal on water levels and flow direction in the study area.

The study area is located in southeastern Louisiana and includes all or parts of the following parishes: East Baton Rouge, East Feliciana, Livingston, Pointe Coupee, St. Helena, St. Tammany, Tangipahoa, Washington, West Baton Rouge, and West Feliciana (fig. 2). The study area is bounded approximately by the Louisiana-Mississippi state line to the east and north, the Baton Rouge fault to the south, and the western boundaries of Pointe Coupee and West Baton Rouge Parishes to the west. The Baton Rouge metropolitan area, the Covington-Mandeville area, and the Slidell area are the largest population centers which use water from the aquifers in the study area.

ACKNOWLEDGMENTS

The author gratefully acknowledges the assistance and cooperation of many public water suppliers and private well owners who allowed USGS personnel to measure water levels in their wells. Additionally, the author thanks Z. "Bo" Bolourchi, Chief, Public Works and Water Resources Division, Louisiana Department of Transportation and Development, for providing well information which was used for selection and documentation of wells for this study.

HYDROGEOLOGY

North of the study area, in southwestern Mississippi, deposits of the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area are in contact with the Citronelle Formation and the alluvium of major rivers (Nyman and Fayard, 1978, p. 30). The Kentwood aquifer system is stratigraphically adjacent to the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area. Clay layers located between the aquifers act to retard, but not prevent, the vertical flow of water between adjacent aquifers. The "1,500-foot" and "1,700-foot" sands were originally identified and named for their depth of occurrence in the Baton Rouge area, and have been shown to extend into Livingston and St. Helena Parishes. East of these parishes, the sands are recognized using Kentwood aquifer system terminology.

In southeastern Louisiana, the Kentwood aquifer system and "1,500-foot" and "1,700-foot" sands are confined aquifers which dip and thicken in a southerly direction toward the Gulf of Mexico. Precipitation is the principal source of recharge to the Kentwood aquifer system (Nyman and Fayard, 1978, p. 32) and "1,500-foot" and "1,700-foot" sands of the Baton Rouge area (Tomaszewski, 1996, p. 7, fig. 3). Additional recharge occurs throughout the aquifer system by vertical leakage from areas of higher hydraulic head to areas of lower hydraulic head. Figure 1 shows a partial stratigraphic column of hydrogeologic units in southeastern Louisiana.

The Kentwood aquifer is located in northern Tangipahoa and Washington Parishes. South of an east-west trending line running approximately from 2 mi north of Roseland, Louisiana, to 2 mi south of Franklinton, Louisiana, the Kentwood aquifer is separated by clay into an upper (Abita) and lower (Covington) aquifer (Nyman and Fayard, 1978, pl. 8). The Covington aquifer correlates with the "1,700-foot" sand of the Baton Rouge area, and the Abita aquifer correlates with the "1,500-foot" sand of the Baton Rouge area. In southern St. Tammany Parish, the Covington aquifer is itself separated into an upper and lower aquifer (Nyman and Fayard, 1978, p. 30). The upper aquifer retains the name of the Covington aquifer, while the lower aquifer has been named the Slidell aquifer (fig. 1).

[1]Computed from April 2003 data provided by major water users and/or 2000 water use data provided by minor users (B.P. Sargent, U.S. Geological Survey, written commun., 2004).

POTENTIOMETRIC SURFACE

A generalized potentiometric-surface map was constructed using water-level data from 116 wells screened in the Kentwood, Abita, Covington, and Slidell aquifers and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area. Contours were initially generated using commercially available software, then adjusted to account for the Baton Rouge fault. Contours were adjusted around withdrawal centers and smoothed. Most of the water levels in the Kentwood aquifer system in this report were measured in March-April 2003 using a calibrated pressure gage for flowing artesian conditions (the wells are naturally flowing at land surface). Steel or electrical measuring tapes marked with 0.01-ft gradations were used for wells where the water level was below land surface. Wells in which water levels were measured were not being pumped at the time of measurement. Water-level data are listed in table 2.

Ground water moves through the study area from areas of higher hydraulic head to areas of lower hydraulic head. The direction of ground-water flow is indicated on the potentiometric-surface map (fig. 2) by flow arrows, drawn perpendicular to the equipotential lines. The general direction of ground-water flow in the Kentwood aquifer system and "1,500-foot" and "1,700-foot" sands is from the upland areas in the northern part of the study area, where water levels are highest, to lowland areas in the south, where water levels are lowest. Water levels in northern Tangipahoa Parish and northwestern Washington Parish are the highest in the study area. These areas are closest to the recharge area in southern Mississippi, which is at a higher topographic elevation. Within the study area, water levels are lowest in East Baton Rouge Parish where water withdrawals have depressed the potentiometric surface.

A north-south trending flow pattern is present in eastern Tangipahoa Parish; water levels along the western edge of the parish are affected by water withdrawals from Livingston and East Baton Rouge Parishes, and water levels along the eastern edge of the parish are affected by withdrawals from the Covington-Mandeville and Slidell areas in St. Tammany Parish. In Washington, St. Tammany, and eastern Tangipahoa Parishes, ground-water flow is generally south-southeast toward withdrawal centers in southern St. Tammany Parish. Kentwood aquifer system withdrawal centers in St. Tammany Parish, shown in figure 3, include the Covington-Mandeville area where approximately 4.73 Mgal/d was withdrawn in April 2003, and the Slidell area where approximately 5.47 Mgal/d was withdrawn, also in April 2003. Values on the pumpage map represent summed withdrawal rates from wells located in the general vicinity (within 7 mi or less) of the data point. The highest water level measured, about 226 ft above NGVD 29, was in the Kentwood aquifer at well Ta-407, in northern Tangipahoa Parish.

The general direction of ground-water flow in the "1,500-foot" and "1,700-foot" sands is toward withdrawal centers in East Baton Rouge Parish where over 28 Mgal/d was withdrawn and from northwestern Livingston Parish where approximately 3.14 Mgal/d was withdrawn from these sands in April 2003. Water withdrawals in the Baton Rouge metropolitan area have created a cone of depression, causing water to flow radially into the area. The Baton Rouge fault acts as a leaky barrier, restricting ground-water flow from the south (Whiteman, 1979). The lowest water level measured, about 141 ft below NGVD 29, was in the "1,500-foot" sand at well EB-657 in East Baton Rouge Parish.

Table 1. Withdrawal rates, by parish and public supply, for the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area, southeastern Louisiana, 2000.

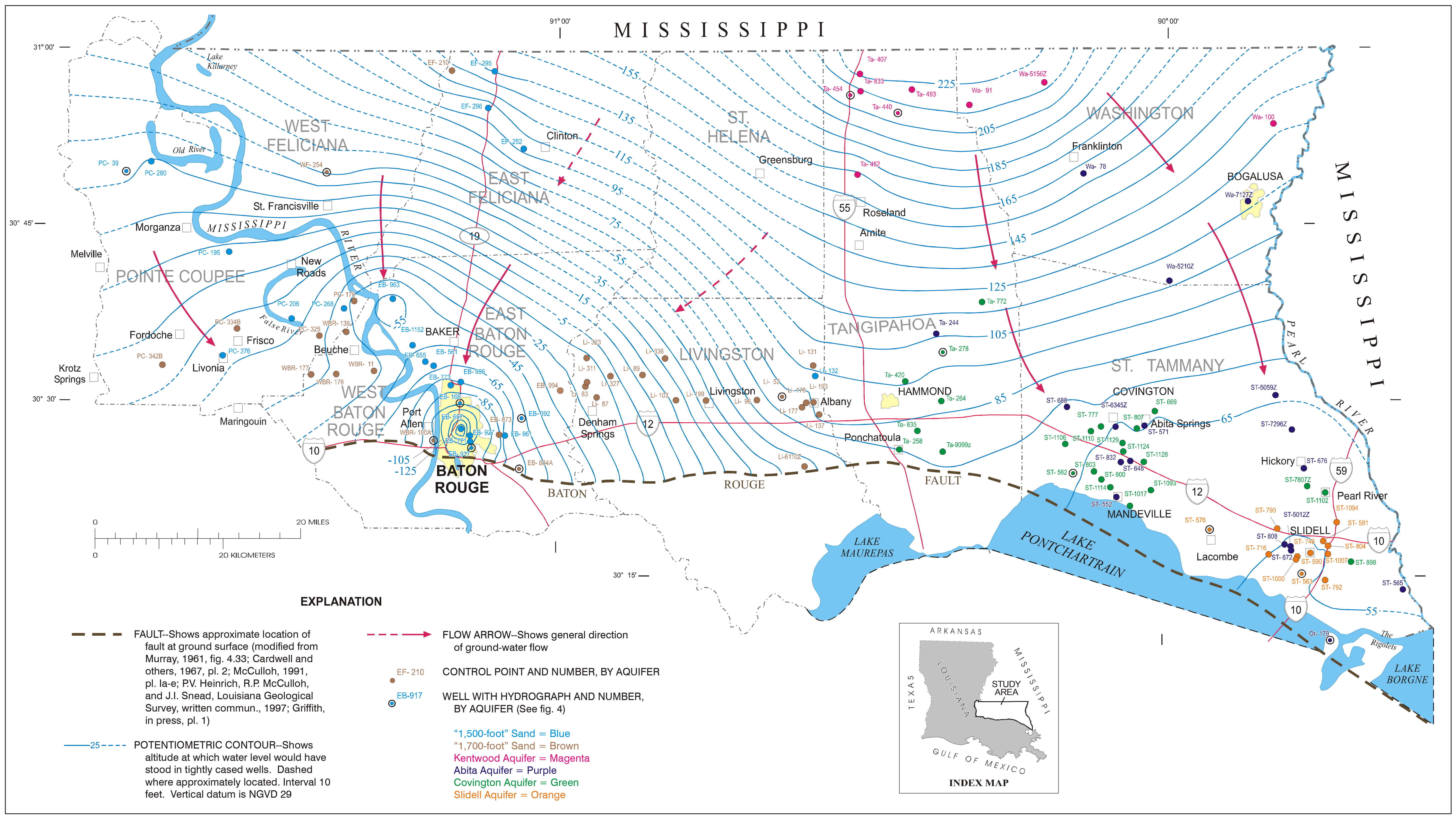
Baton Rouge area — Total pumpage (million gallons per day)

Parish[1]	"1,500-foot" sand: Parish	"1,500-foot" sand: Public supply	"1,500-foot" and "1,700-foot" sands[2]: Parish	"1,500-foot" and "1,700-foot" sands[2]: Public supply	"1,700-foot" sand: Parish	"1,700-foot" sand: Public supply	Total, Baton Rouge area: Parish	Total, Baton Rouge area: Public supply
East Baton Rouge	14.46	12.59	6.07	0	4.19	2.27	24.73	14.86
West Baton Rouge	2.87	2.83	0	0	.09	.04	2.96	2.87
East Feliciana	.22	.21	0	0	0	0	.22	.21
West Feliciana	0	0	0	0	0	0	.01	0
Livingston	.01	0	0	0	3.09	2.84	3.10	2.84
Pointe Coupee	.21	.14	0	0	.20	.06	.41	.19
Subtotal[3]	17.78	15.77	6.07	0	7.58	5.20	31.43	20.97

Kentwood aquifer system — Total pumpage (million gallons per day)

Parish	Abita aquifer: Parish	Abita aquifer: Public supply	Covington aquifer: Parish	Covington aquifer: Public supply	Kentwood aquifer: Parish	Kentwood aquifer: Public supply	Slidell aquifer: Parish	Slidell aquifer: Public supply	Total, Kentwood aquifer system: Parish	Total, Kentwood aquifer system: Public supply
St. Tammany	.86	.76	2.50	2.43	.01	0	6.91	6.89	10.27	10.09
Tangipahoa	.04	0	.33	.24	.97	.77	0	0	1.34	1.01
Washington	0	0	.01	0	.13	0	0	0	.14	0
Subtotal	.90	.76	2.84	2.67	1.11	.77	6.91	6.89	11.76	11.10
Total: Kentwood aquifer system and "1,500-foot" and "1,700-foot" sands of the Baton Rouge area									43.18	32.07

[1]No water was withdrawn in St. Helena Parish.
[2]Multiscreened wells.
[3]Totals are based on data prior to rounding.



Base map modified from Louisiana Oil Spill Coordinator, Office of the Governor, Louisiana GIS CD: A digital Map of the State, Version 2.0

Figure 2. Generalized potentiometric surface of the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area, southeastern Louisiana, March-April 2003.

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

Louisiana Ground-Water Map No. 17:

Generalized Potentiometric Surface of the Kentwood Aquifer System and the "1,500-foot" and "1,700-foot" Sands of the Baton Rouge Area in Southeastern Louisiana, March-April 2003

By

Lawrence B. Prakken

2004

For additional information, contact:

District Chief
U.S. Geological Survey
3535 S. Sherwood Forest Blvd., Suite 120
Baton Rouge, LA 70816
E-mail: dc_la@usgs.gov
Fax: (225) 298-5490
Telephone: (225) 298-5481
Home page: la.water.usgs.gov

Copies of this report can be purchased from:

U.S. Geological Survey
Branch of Information Services
Box 25286
Denver, CO 80225
E-mail: infoservices@usgs.gov
Fax: (303) 202-4188
Telephone (toll free): 1-888-ASK-USGS

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with the
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Office of Public Works and Intermodal
Public Works and Water Resources Division

SCIENTIFIC INVESTIGATIONS MAP 2862
Water-Level Trends--SHEET 2 OF 2
Prakken, L.B., 2004, Louisiana Ground-Water Map no. 17:
Generalized potentiometric surface of the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands
of the Baton Rouge area in southeastern Louisiana, March-April 2003

Table 2. Water-level data used to construct the potentiometric-surface map of the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area, southeastern Louisiana, March-April 2003.

[NGVD 29, National Geodetic Vertical Datum of 1929; aquifer code: **12115BR, "1,500-foot" sand of the Baton Rouge area**; **12117BR, "1,700-foot" sand of the Baton Rouge area**; **120ABIT, Abita aquifer**; **120CVGN, Covington aquifer**; **120SLDL, Slidell aquifer**; and **120KNTD, Kentwood aquifer**]

Local well number	Aquifer code	Altitude of land surface (feet relative to NGVD 29)	Depth of well (feet)	Date measured	Depth to water level (feet below land surface)[1]	Altitude of water level (feet relative to NGVD 29)
EB-168	12115BR	56	1,496	4-11-2003	148.72	-92.72
EB-392	12115BR	50	1,464	4-11-2003	108.14	-58.14
EB-561	12115BR	71.5	1,361	4-23-2003	133.06	-61.56
EB-655	12115BR	50	1,341	4-16-2003	107.67	-57.67
EB-657	12115BR	59	1,618	4-14-2003	199.67	-140.67
EB-771	12115BR	48.41	1,739	4-14-2003	154.12	-105.71
EB-773	12115BR	57	1,395	4-14-2003	136.41	-79.41
EB-804A	12117BR	46	1,950	4-11-2003	114.35	-68.35
EB-873	12117BR	50	1,884	4-14-2003	142.35	-92.35
EB-917	12115BR	46.56	1,736	4-11-2003	150.70	-104.14
EB-927	12115BR	47	1,511	4-14-2003	156.74	-109.74
EB-961	12115BR	50	1,541	4-14-2003	118.87	-68.87
EB-963	12115BR	80	1,054	4-28-2003	140.00	-60.00
EB-994	12117BR	52	1,710	4-17-2003	79.25	-27.25
EB-996	12115BR	60	1,374	4-11-2003	134.69	-74.69
EB-1152	12115BR	79	1,231	4-17-2003	132.77	-53.77
EF-210	12117BR	230	505	4-15-2003	107.53	122.47
EF-252	12115BR	240	550	4-22-2003	141.16	98.84
EF-295	12115BR	310	450	4-01-2003	174.22	135.78
EF-296	12115BR	280	585	4-01-2003	179.01	100.99
Li-52	12117BR	46	1,865	4-16-2003	-37.20	83.20
Li-83	12117BR	53	1,673	3-27-2003	76.10	-23.10
Li-87	12117BR	52	1,783	3-27-2003	68.29	-16.29
Li-89	12117BR	58	1,620	3-27-2003	47.84	10.16
Li-96	12117BR	38	1,745	4-02-2003	-31.50	69.50
Li-103	12117BR	42	1,796	4-02-2003	24.60	17.40
Li-131	12117BR	56	1,700	3-19-2003	-42.90	98.90
Li-132	12115BR	44	1,360	4-02-2003	-39.60	83.60
Li-137	12117BR	37	1,836	3-20-2003	-48.60	85.60
Li-177	12117BR	35	1,777	3-25-2003	-47.00	82.00
Li-178	12117BR	40	1,900	3-25-2003	-43.00	83.00
Li-193	12117BR	36	1,701	3-20-2003	-48.50	84.50
Li-199	12117BR	40	1,900	4-02-2003	-1.30	41.30
Li-323	12117BR	60	1,602	3-27-2003	78.54	-18.54
Li-327	12117BR	60	1,660	3-26-2003	68.83	-8.83
Li-336	12117BR	67	1,540	3-26-2003	38.45	28.55
Li-6110Z	12117BR	10	1,938	3-20-2003	-41.50	51.50
Or-179	120ABIT	4	2,434	4-17-2003	-48.90	52.90
PC-39	12115BR	41	460	4-14-2003	13.17	27.83
PC-176	12117BR	33	1,256	4-23-2003	81.54	-48.54
PC-195	12115BR	31	880	4-15-2003	28.62	2.38
PC-206	12115BR	34	975	4-17-2003	53.90	-19.90
PC-268	12115BR	36	990	4-23-2003	74.66	-38.66
PC-276	12115BR	25	1,178	4-17-2003	47.91	-22.91
PC-280	12115BR	42	630	4-16-2003	17.51	24.49
PC-325	12117BR	30	1,252	4-17-2003	63.56	-33.56
PC-334B	12117BR	25	1,250	4-16-2003	44.63	-19.63
PC-342B	12117BR	20	1,482	4-11-2003	29.17	-9.17
ST-552	120ABIT	10	1,606	4-03-2003	-50.60	60.60
ST-562	120CVGN	4	1,900	3-26-2003	-64.75	68.75
ST-563	120SLDL	10.24	2,411	4-17-2003	-44.20	54.44
ST-565	120ABIT	5	1,971	4-17-2003	-51.50	56.50
ST-571	120ABIT	30	1,505	3-28-2003	-36.20	66.20
ST-576	120SLDL	17	2,334	4-17-2003	-44.50	61.50
ST-581	120SLDL	22	2,342	4-17-2003	-39.00	61.00
ST-590	120SLDL	6	2,400	4-17-2003	-45.20	51.20
ST-648	120ABIT	22	1,707	3-26-2003	-40.00	62.00
ST-669	120CVGN	33	1,612	3-28-2003	-33.00	66.00
ST-672	120ABIT	13	1,956	4-01-2003	-40.50	53.50
ST-676	120ABIT	35	1,530	4-30-2003	-22.60	57.60
ST-688	120ABIT	25	1,302	3-25-2003	-47.25	72.25
ST-716	120SLDL	12	2,284	4-02-2003	-43.00	55.00
ST-746	120SLDL	12	2,280	4-17-2003	-38.00	50.00
ST-777	120CVGN	22.84	1,743	3-25-2003	-51.50	74.34
ST-790	120SLDL	20	2,132	4-03-2003	-38.40	58.40
ST-792	120SLDL	6.6	2,361	4-03-2003	-50.00	56.60
ST-803	120CVGN	15	1,973	4-22-2003	-46.20	61.20
ST-804	120SLDL	18	2,213	4-03-2003	-38.60	56.60
ST-807	120CVGN	30	1,712	3-28-2003	-35.60	65.60
ST-808	120ABIT	15	1,955	4-02-2003	-39.60	54.60
ST-832	120ABIT	20	1,760	4-22-2003	-36.60	56.60
ST-898	120CVGN	10	2,060	4-03-2003	-47.40	57.40
ST-900	120CVGN	13	1,900	4-03-2003	-43.10	56.10
ST-1000	120SLDL	7	2,322	4-02-2003	-47.30	54.30
ST-1007	120SLDL	15	2,432	4-17-2003	-46.00	61.00
ST-1017	120CVGN	7	1,977	4-03-2003	-49.40	56.40
ST-1093	120CVGN	22	1,910	4-22-2003	-35.10	57.10
ST-1094	120SLDL	15	2,150	4-03-2003	-49.20	64.20
ST-1102	120CVGN	28	1,785	4-02-2003	-33.00	61.00
ST-1106	120CVGN	21	1,920	4-22-2003	-49.50	70.50
ST-1110	120CVGN	20	1,820	4-22-2003	-48.00	68.00
ST-1114	120ABIT	10	1,945	4-03-2003	-45.40	55.40
ST-1124	120CVGN	21	1,865	4-22-2003	-39.60	60.60
ST-1128	120CVGN	25	1,930	4-22-2003	-35.00	60.00
ST-1129	120CVGN	30	1,810	3-28-2003	-24.40	54.40
ST-5012Z	120ABIT	13	1,932	4-01-2003	-38.80	51.80
ST-5059Z	120ABIT	60	1,134	4-16-2003	-6.75	66.75
ST-6345Z	120ABIT	22	1,492	3-25-2003	-42.50	64.50
ST-7296Z	120ABIT	50	1,247	4-30-2003	-8.40	58.40
ST-7807Z	120CVGN	34	1,798	4-30-2003	-24.90	58.90
Ta-244	120ABIT	98	1,300	3-21-2003	-8.20	106.20
Ta-258	120CVGN	22	1,962	4-29-2003	-53.00	75.00
Ta-264	120CVGN	30	1,728	3-21-2003	-56.80	86.80
Ta-278	120CVGN	52	1,430	4-15-2003	-46.60	98.60
Ta-407	120KNTD	210	531	4-15-2003	-15.50	225.50
Ta-420	120CVGN	47	1,650	3-25-2003	-49.50	96.50
Ta-440	120KNTD	220	603	4-15-2003	8.67	211.33
Ta-452	120KNTD	150	775	4-15-2003	-13.50	163.50
Ta-454	120KNTD	288	720	4-15-2003	75.51	212.49
Ta-493	120KNTD	312	647	4-11-2003	90.87	221.13
Ta-772	120CVGN	133	1,355	4-15-2003	13.20	119.80
Ta-833	120KNTD	202	630	4-10-2003	-12.70	214.70
Ta-835	120CVGN	25	1,905	4-16-2003	-56.20	81.20
Ta-9099Z	120CVGN	13	2,030	4-29-2003	-67.00	80.00
Wa-78	120ABIT	150	585	4-23-2003	-9.40	159.40
Wa-91	120KNTD	240	600	4-11-2003	20.62	219.38
Wa-100	120KNTD	125	400	4-24-2003	-2.00	127.00
Wa-5156Z	120KNTD	196	715	4-23-2003	-23.10	219.10
Wa-5210Z	120ABIT	91	752	4-25-2003	-16.30	107.30
Wa-7127Z	120ABIT	90	556	4-24-2003	-27.00	117.00
WBR-11	12117BR	27	1,450	4-04-2003	67.38	-40.38
WBR-100A	12117BR	29	1,888	4-15-2003	120.41	-91.41
WBR-139	12117BR	29	1,375	4-15-2003	71.72	-42.72
WBR-176	12117BR	20	1,458	4-14-2003	55.69	-35.69
WBR-177	12117BR	23	1,444	4-14-2003	55.73	-32.73
WF-254	12117BR	155	793	4-15-2003	109.46	45.54

[1]A negative depth below land surface indicates water levels above land surface.

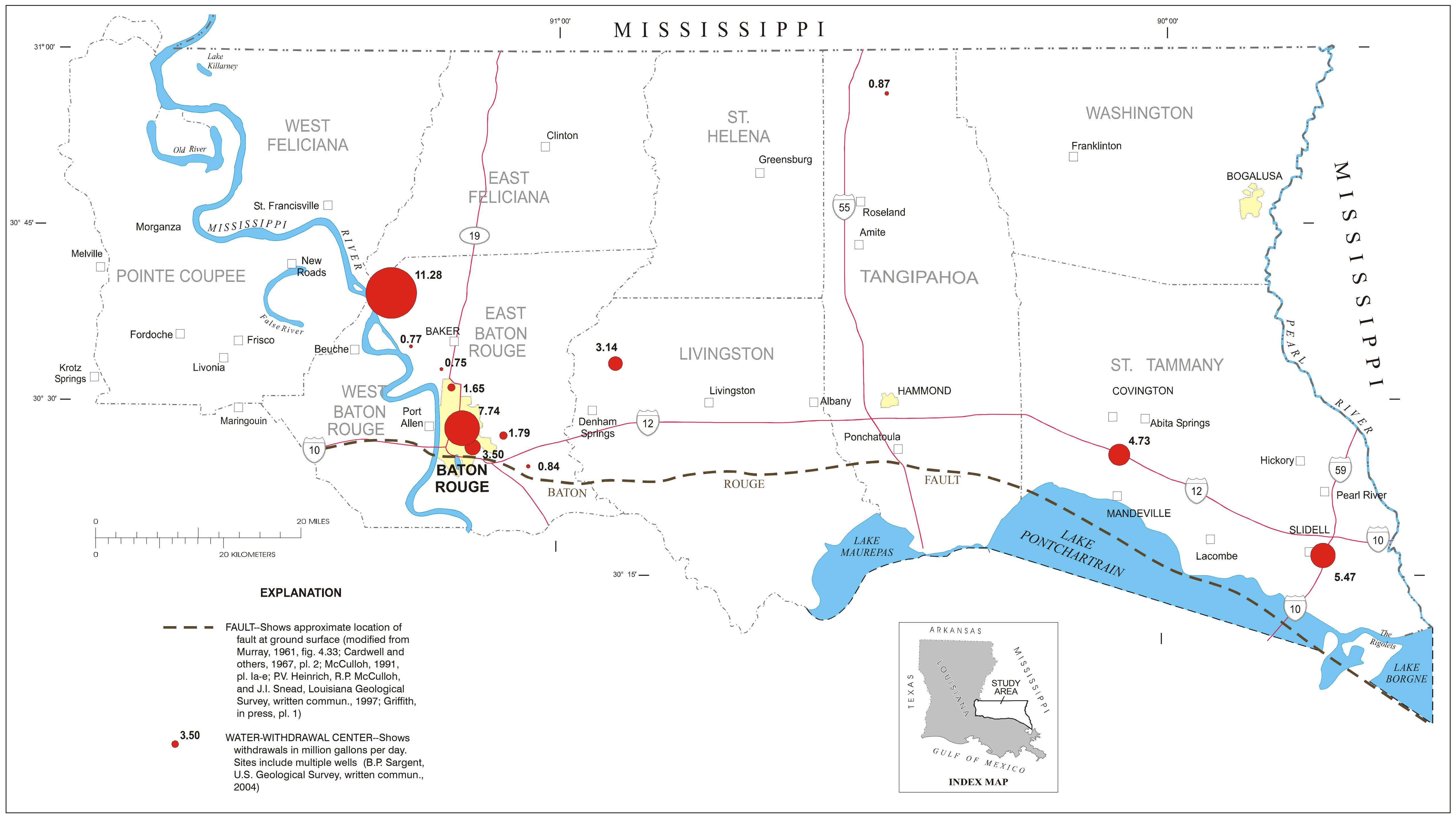


Figure 3. Water-withdrawal centers where average daily withdrawals exceeded 0.5 million gallons per day from the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area, southeastern Louisiana, April 2003.

WATER-LEVEL TRENDS

Long-term water-level declines have occurred within the study area in response to water withdrawals. Hydrographs illustrating water-level trends are shown in figure 4. Average rates of water-level change were computed over the period 1993 to 2003 using ordinary least squares linear regression. The largest rate of decline occurred in East Baton Rouge Parish, where large amounts of water were withdrawn for public-supply and industrial needs. Hydrographs for wells EB-168, EB-392, and EB-917 (fig. 4A) in the "1,500-foot" sand and EB-804A and WBR-100A (fig. 4B) in the "1,700-foot" sand illustrate the declining water levels in the Baton Rouge metropolitan area (fig. 4). From 1993 to 2003, water levels declined 2.9 ft/yr at well EB-392 and 2.3 ft/yr at well WBR-100A.

In southern St. Tammany Parish, water levels declined at a rate of 1.3 ft/yr from 1993 to 2003, as represented by the hydrographs for wells ST-563 in Slidell and ST-576 in the Lacombe area. The water level in northern Orleans Parish, at well Or-179, south of Slidell, declined at a more modest rate of 0.7 ft/yr from 1993 to 2003 (fig. 4C).

Water levels declined at well Ta-278 (northeast of Hammond) at a rate of 1.4 ft/yr from 1993 to 2003 and at well ST-562 (northwest of Mandeville) at a rate of 0.7 ft/yr from 1990 to 2003. The water level near Albany at well Li-52 also declined at a rate of 1.4 ft/yr from 1993 to 2003 (fig. 4D).

Nearest the northern outcrop area and away from the influence of major withdrawal centers to the south, water-level declines were less, and water levels were more likely to fluctuate in response to precipitation than to withdrawals. Hydrographs for wells Ta-440 and Ta-454 (fig. 4E), located in northern Tangipahoa Parish, and well WF-254 (north of St. Francisville) indicate minor declines, probably due to the recent drought during 1998-2001 (Bohr, 2003), and subsequent recovery. Water levels in well PC-39, in northwestern Pointe Coupee Parish, did not change substantially over the period April 1993 to April 2003 (fig. 4F).

SELECTED REFERENCES

Buono, Anthony, 1983, The Southern Hills regional aquifer system of southeastern Louisiana and southwestern Mississippi: U.S. Geological Survey Water-Resources Investigations Report 83-4189, 38 p.

Bohr, G.S., 2003, Recent drought in the Southern Region: Southern Regional Climate Center, accessed December 23, 2003, at URL http://www.srcc.lsu.edu/monitor/drought.html

Cardwell, G.T., Forbes, M.J., Jr., and Gaydos, M.W., 1967, Water resources of the Lake Pontchartrain area, Louisiana: Department of Conservation, Louisiana Geological Survey, and Louisiana Department of Public Works Water Resources Bulletin no. 12, 105 p.

Case, H.L., III, 1979, Ground-water resources of Washington Parish, Louisiana: Louisiana Department of Transportation and Development, Office of Public Works Water Resources Technical Report no. 18, 33 p.

Compton, R.R., 1985, Geology in the field: New York, John Wiley and Sons, 398 p.

Dial, D.C., 1968, Water-level trends in southeastern Louisiana: Department of Conservation, Louisiana Geological Survey, and Louisiana Department of Public Works Water Resources Pamphlet no. 22, 11 p.

Griffith, J.M., in press, Hydrogeologic framework of southeastern Louisiana: Louisiana Department of Transportation and Development Water Resources Technical Report no. 72, 21 p.

Griffith, J.M., and Lovelace, J.K., 2003, Louisiana ground-water map no. 16: Potentiometric surface of the "1,500-foot" sand of the Baton Rouge area, Louisiana, spring 2001: U.S. Geological Survey Water-Resources Investigations Report 03-4021, 2 sheets.

Louisiana State Census Data Center, 2003, Census 2000, accessed October 15, 2003, at www.state.la.us/census/2000/2000countychange.htm

Lovelace, J.K., 1991, Water use in Louisiana, 1990: Louisiana Department of Transportation and Development Water Resources Special Report no. 6, 131 p.

Lovelace, J.K., and Lovelace, W.M., 1995, Hydrogeologic unit nomenclature and computer codes for aquifers and confining units in Louisiana: Louisiana Department of Transportation and Development Water Resources Special Report no. 9, 12 p.

Martin, Angel, Jr., and Whiteman, C.D., Jr., 1985, Map showing generalized potentiometric surface of the Evangeline and equivalent aquifers in Louisiana, 1980: U.S. Geological Survey Water-Resources Investigations Report 84-4359, 1 sheet.

McCulloh, R.P., 1991, Surface faults in East Baton Rouge Parish: Baton Rouge, La., Louisiana Geological Survey Open-File series 91-02, 25 p.

Murray, G.E., 1961, Geology of the Atlantic and Gulf Coastal Province of North America: New York, Harper Brothers, 692 p.

Nyman, D.J., and Fayard, L.D., 1978, Ground-water resources of Tangipahoa and St. Tammany Parishes, southeastern Louisiana: Louisiana Department of Transportation and Development, Office of Public Works Water Resources Technical Report no. 15, 76 p.

Sargent, B. Pierre, 2002, Water use in Louisiana, 2000: Louisiana Department of Transportation and Development Water Resources Special Report no. 15, 133 p.

Stuart, C.G., Knochenmus, Darwin, and McGee, B.D., 1994, Guide to Louisiana's ground-water resources: U.S. Geological Survey Water-Resources Investigations Report 94-4085, 55 p.

Tomaszewski, D.J., 1988, Ground-water hydrology of Livingston, St. Helena, and parts of Ascension and Tangipahoa Parishes, southeastern Louisiana: Louisiana Department of Transportation and Development Water Resources Technical Report no. 43, 54 p.

Tomaszewski, D.J., 1996, Distribution and movement of saltwater in aquifers in the Baton Rouge area, Louisiana, 1990-92: Louisiana Department of Transportation and Development Water Resources Technical Report no. 59, 44 p.

Tomaszewski, D.J., Lovelace, J.K., and Ensminger, P.A., 2002, Water withdrawals and trends in ground-water levels and stream discharge in Louisiana: Louisiana Department of Transportation and Development Water Resources Technical Report no. 68, 30 p.

Walters, D.J., 1992, Louisiana ground-water map no. 5: Potentiometric surface, 1990, and water-level changes, 1974-90, of the Evangeline equivalent/southeast Louisiana aquifer system: U.S. Geological Survey Water-Resources Investigations Report 92-4112, 2 sheets.

Whiteman, C.D., Jr., 1979, Saltwater encroachment in the "600-foot" and "1,500-foot" sands of the Baton Rouge area, Louisiana, 1966-78, including a discussion of saltwater in other sands: Louisiana Department of Transportation and Development, Office of Public Works Water Resources Technical Report no. 19, 49 p.

CONVERSION FACTORS AND DATUMS

Multiply	By	To obtain
foot (ft)	0.3048	meter (m)
foot per year (ft/yr)	0.3048	meter per year (m/yr)
mile (mi)	1.609	kilometer (km)
million gallons per day (Mgal/d)	3,785	cubic meter per day (m^3/d)

Vertical coordinate information in this report is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada.
Horizontal coordinate information in this report is referenced to the North American Datum of 1927.

Louisiana Ground-Water Map No. 17:

Generalized Potentiometric Surface of the Kentwood Aquifer System and the "1,500-foot" and "1,700-foot" Sands of the Baton Rouge Area in Southeastern Louisiana, March-April 2003

By

Lawrence B. Prakken

2004

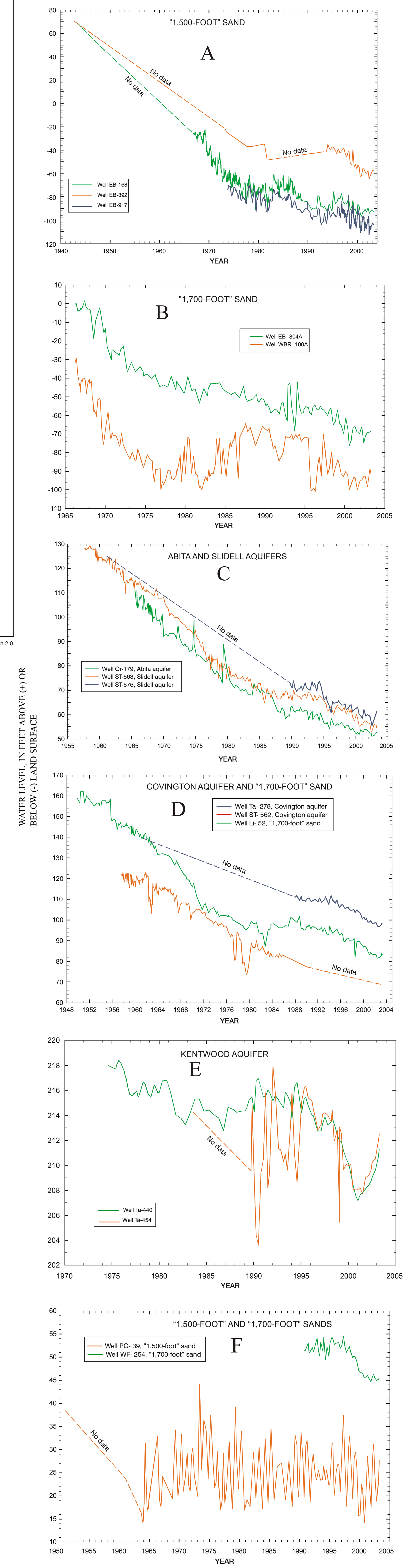


Figure 4. Water-level trends for the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area, southeastern Louisiana.