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Prepared in cooperation with the Louisiana Department of Transportation and Development

Water Resources of Lafourche Parish, Louisiana

Introduction

This fact sheet presents a brief overview of groundwater and surface-water resources in Lafourche Parish, Louisiana (fig. 1). Information on the availability, past and current use trends, and water quality from groundwater and surface-water sources in the parish is discussed. Previously published reports (see References Cited section) and data stored in the U.S. Geological Survey's National Water Information System (http://waterdata.usgs.gov/nwis) are the primary sources of the information presented here.

In 2010, about 42.0 million gallons per day (Mgal/d) of water were withdrawn in Lafourche Parish, including about 37.9 Mgal/d from surface-water sources and 4.09 Mgal/d from groundwater sources[1] (table 1). Public supply accounted for about 54 percent (22.7 Mgal/d) of the total water withdrawn. Other categories of use included industrial, rural domestic, livestock, general irrigation, and aquaculture (table 2). Water-use data collected at 5-year intervals from 1960 to 2010 (fig. 2) indicated that water withdrawals peaked in 1990 at about 65.3 Mgal/d but declined to 36.5 Mgal/d in 1995. This apparent decrease in water withdrawals was mostly due to a change in the calculations used to estimate withdrawals for aquaculture, primarily crawfish farming, which were estimated to be about 36.0 Mgal/d in 1990 and about 9.77 Mgal/d in 1995 (Lovelace and Johnson, 1996).

[1]Tabulation of numbers in text and tables may result in different totals because of rounding; nonrounded numbers are used for calculation of totals.

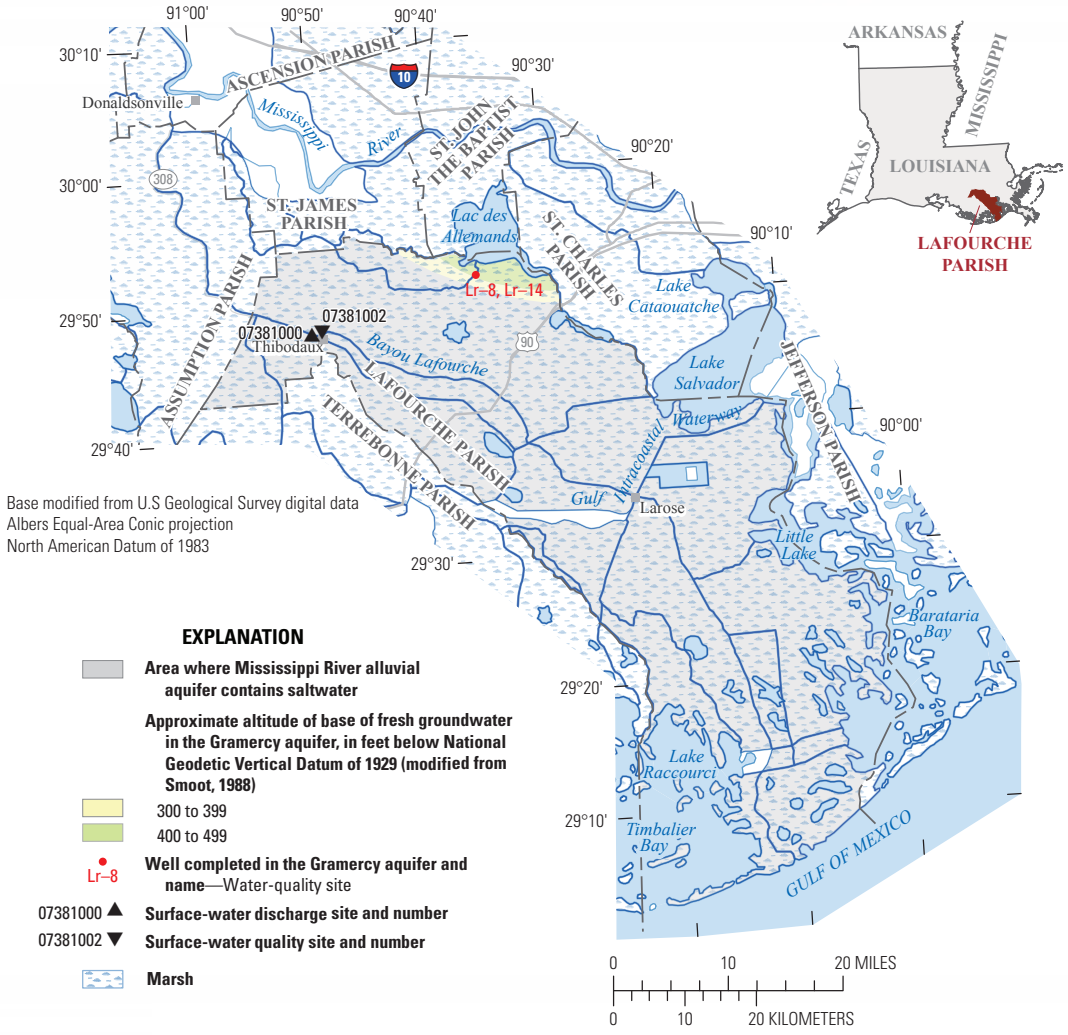

Figure 1. Location of study area, Lafourche Parish, Louisiana.

Table 1. Water withdrawals, in million gallons per day, by source in Lafourche Parish, Louisiana, 2010 (modified from Sargent, 2011).

Aquifer or surface-water body	Groundwater	Surface water
Mississippi River alluvial aquifer	4.09	
Bayou Lafourche		29.96
Gulf Intracoastal Waterway		3.82
Other water bodies		4.10
Total	4.09	37.88

Table 2. Water withdrawals, in million gallons per day, by category in Lafourche Parish, Louisiana, 2010 (modified from Sargent, 2011).

Use category	Groundwater	Surface water	Total
Public supply	0.00	22.69	22.69
Industrial	1.06	3.46	4.51
Rural domestic	0.02	0.00	0.02
Livestock	0.11	0.11	0.23
General irrigation	0.00	0.05	0.05
Aquaculture	2.89	11.57	14.46
Total	4.09	37.88	41.97

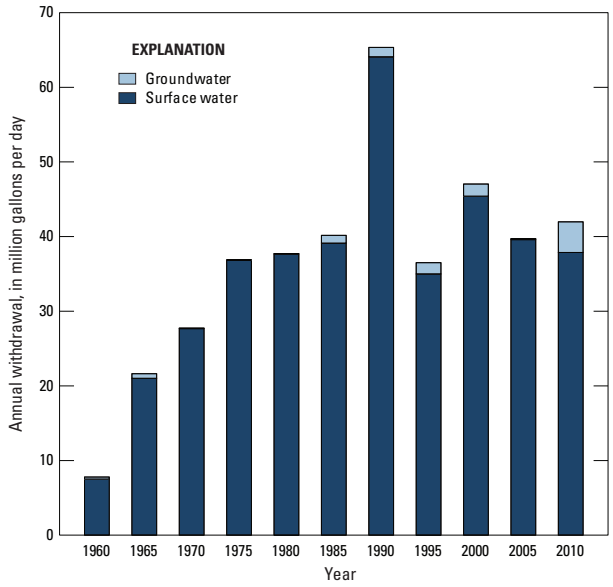

Figure 2. Water withdrawals in Lafourche Parish, Louisiana, 1960–2010.

Groundwater Resources

The primary sources of groundwater in Lafourche Parish include the Mississippi River alluvial aquifer and the Gramercy aquifer. In 2010, 4.09 Mgal/d of groundwater were withdrawn in Lafourche Parish, primarily for industry and aquaculture (table 2). All reported groundwater withdrawals in the parish came from the Mississippi River alluvial aquifer. State well-registration records listed 113 active water wells in Lafourche Parish in 2009, including 89 irrigation, 10 domestic, 7 industrial, and 7 public supply wells (Louisiana Department of Natural Resources, 2009). Although several registered wells had no aquifer designation, well depths indicate that almost all of the active wells in the parish are screened in either the Mississippi River alluvial aquifer or the Gramercy aquifer.

The Mississippi River Alluvial Aquifer

The Mississippi River alluvial aquifer contains saltwater (water with chloride concentrations greater than 250 mg/L) throughout Lafourche Parish. The alluvial aquifer is present throughout Lafourche Parish; the base of the aquifer ranges from a maximum depth of about 450 feet (ft) below the National Geodetic Vertical Datum of 1929 (NGVD 29) in the northwestern corner of the parish to about 50 ft below NGVD 29 near Lac des Allemands. The base of the aquifer is about 400 ft or greater below NGVD 29 in the vicinity of Thibodaux and about 300 ft below NGVD 29 near Larose (Saucier, 1994). The aquifer generally contains fine to medium sand at the top of the aquifer and grades to coarse sand and gravel in the lower part (Tomaszewski, 2003). Overlying the alluvial aquifer is a clayey surficial confining unit.

The Mississippi River alluvial aquifer is hydraulically connected to the Mississippi River; the Mississippi River recharges the alluvial aquifer on a seasonal basis. The aquifer also is recharged by infiltration of rainfall through the surficial confining unit and by vertical leakage from the underlying Gramercy aquifer. Discharge from the aquifer generally is by flow into rivers, canals, and lakes, and withdrawal from wells.

State well-registration records listed 77 active wells that were screened in the Mississippi River alluvial aquifer in Lafourche Parish in 2009, including 58 irrigation, 7 industrial, 6 domestic, and 6 public supply wells. Many of the irrigation wells are probably used for aquaculture and livestock. Depths of these wells ranged from 160 to 285 ft below land surface with a median depth of 207 ft. Reported yields from wells screened in the alluvial aquifer in Lafourche Parish have ranged from 22 to 1,500 gallons per minute (gal/min) for large-capacity industrial wells (Louisiana Department of Natural Resources, 2009).

A statistical summary of selected water-quality characteristics for freshwater samples from 15 wells screened in the Mississippi River alluvial aquifer is listed in table 3. Water from the aquifer is usually very hard[2] and generally exceeds the U.S. Environmental Protection Agency's (USEPA) Secondary Maximum Contaminant Levels (SMCLs)[3] for drinking water for color, chloride, iron, and dissolved solids.

[2]Hardness ranges, expressed as milligrams per liter of calcium carbonate, are as follows: 0–60, soft; 61–120, moderately hard; 121–180, hard; greater than 180, very hard (Hem, 1985).

[3]The SMCLs are nonenforceable Federal guidelines regarding cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. At high concentrations or values, health implications as well as aesthetic degradation might exist. SMCLs were established as guidelines for the states by the U.S. Environmental Protection Agency (1992).

Table 3. Summary of selected water-quality characteristics for the Mississippi River alluvial aquifer in Lafourche Parish, Louisiana, 1946–76 (U.S. Geological Survey, 2012a).

[Values are in milligrams per liter, except as noted. °C, degrees Celsius; PCU, platinum cobalt units; µS/cm, microsiemens per centimeter; SU, standard units; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; NA, not applicable; SMCL, Secondary Maximum Contaminant Level established by the U.S. Environmental Protection Agency, (2011)]

	Temperature (°C)	Color (PCU)	Specific conductance, field (µS/cm at 25 °C)	pH, field (SU)	Hardness (as $CaCO_3$)	Chloride, filtered (as Cl)	Iron, unfiltered (µg/L as Fe)	Dissolved solids, filtered
Mississippi River alluvial aquifer (15 wells)								
Median	20.5	35	5,510	7.1	960	1,500	12,500	3,190
10th percentile	20.5	15	5,000	6.8	740	1,000	1,000	3,080
90th percentile	20.5	54	9,020	7.3	1,600	3,000	36,400	3,980
Number of samples	5	8	14	8	15	15	8	7
Percentage of samples that do not exceed SMCLs	NA	12	NA	100	NA	0	0	0
SMCLs								
	NA	15	NA	6.5–8.5	NA	250	300	500

Gramercy Aquifer

The Gramercy aquifer underlies the Mississippi River alluvial aquifer and contains fresh groundwater (water with chloride concentration of 250 milligrams per liter [mg/L] or less) in a small area of the northeastern tip of the parish (fig. 1), where the base of freshwater extends to about 400 ft below NGVD 29 (Smoot, 1988). This area contains the only known fresh groundwater underlying the parish. The Gramercy aquifer generally ranges in thickness from less than 50 ft in southern Lafourche Parish to about 200 ft in northern parts of the parish. The aquifer consists of fine to coarse sand and may contain gravel (Tomaszewski, 2003). Recharge to the Gramercy aquifer is primarily from rainfall in outcrop areas north of Lafourche Parish and leakage from the overlying Mississippi River alluvial aquifer. Discharge from the aquifer is primarily by leakage into the overlying Mississippi River alluvial aquifer and withdrawals from wells.

State well registration records for Lafourche Parish listed three active wells screened in the Gramercy aquifer in 2009; the well depths ranged from 235 to 284 ft below land surface (Louisiana Department of Natural Resources, 2009). Water-quality data available for two of the wells, Lr-8 and Lr-14 (fig. 1), indicated that chloride concentrations were less than 250 mg/L (U.S. Geological Survey, 2012a).

Surface-Water Resources

Bayou Lafourche is the primary source of fresh surface water in Lafourche Parish. In 2010, about 37.9 Mgal/d of surface water were withdrawn in Lafourche Parish. Bayou Lafourche supplied all of the water used for public supply and accounted for nearly 60 percent (22.7 Mgal/d) of surface-water withdrawals in the parish (table 2). Of this 22.7 Mgal/d, about 12.8 Mgal/d were used for public supply in Lafourche Parish and about 9.93 Mgal/d were used for public supply in neighboring Terrebonne Parish (fig. 1). Most of the surface water withdrawn in Lafourche Parish for industrial use was for cooling purposes and returned to its source after use (Sargent, 2011).

Bayou Lafourche is supplied with water from the Mississippi River at Donaldsonville. The bayou flows through southwestern Ascension Parish and northeastern Assumption Parish and into Lafourche Parish. Bayou Lafourche was a distributary channel of the Mississippi River until February 23, 1904, when flow from the river was cut off by a dam at Donaldsonville to alleviate flooding. However, the dam turned Bayou Lafourche into a stagnant channel and in 1955 a pumping plant at Donaldsonville began diverting about 250 cubic feet per second (ft^3/s) of Mississippi River water into Bayou Lafourche by a combined siphoning and pumping operation (Cardwell and others, 1965). During the period 1984–2013, the average daily discharge for Bayou Lafourche at Thibodaux (station number 07381000) (fig.1) was about 191 ft^3/s (123 Mgal/d) (U. S. Geological Survey, 2013).

Water samples analyzed during the period 1996–99 indicated that water in Bayou Lafourche below the weir at Thibodaux (station number 07381002) (fig. 1) is generally hard and does not exceed the USEPA's SMCLs for pH and concentrations of chloride, sulfate, and iron (table 4). The data indicated that dissolved oxygen concentrations were generally greater than 5 mg/L, which is considered the minimum value for a diversified population of fresh, warmwater biota, including sport fish (Louisiana Department of Environmental Quality, 2008).

Table 4. Summary of selected water-quality characteristics for Bayou Lafourche below weir at Thibodaux, Louisiana, 1996–99 (U.S. Geological Survey, 2012b).

[Values are in milligrams per liter, except as noted. µS/cm, microsiemens per centimeter; ºC, degrees Celsius; SU, standard units; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than; NA, not applicable; SMCL, Secondary Maximum Contaminant Level established by the U.S. Environmental Protection Agency (2011)]

	Specific conductance, field (µS/cm at 25 °C)	Oxygen, dissolved	pH, field (SU)	Hardness (as $CaCO_3$)	Calcium, filtered (as Ca)	Magnesium, filtered (as Mg)	Sodium, filtered (as Na)	Chloride, filtered (as Cl)	Sulfate, filtered (as SO_4)	Iron, filtered (µg/L as Fe)
Bayou Lafourche below weir at Thibodaux, Louisiana[1]										
Median	429	6.5	7.6	150	39	12	21	26	46	<10
10th percentile	337	5.0	7.3	140	36	11	12	14	36	<10
90th percentile	510	10.0	7.9	180	46	15	30	33	58	10
Number of samples	9	8	10	11	11	11	10	10	11	8
Percentage of samples that do not exceed SMCLs	NA	NA	100	NA	NA	NA	NA	100	100	100
SMCLs										
	NA	NA	6.5–8.5	NA	NA	NA	NA	250	250	300

[1]Station number 07381002 (U.S. Geological Survey 2012b; specific data available at http://nwis.waterdata.usgs.gov/la/nwis/qwdata/?site_no=07381002).

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By Lawrence B. Prakken, and John K. Lovelace

For additional information, contact:

Director, USGS Louisiana Water Science Center
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: http://la.water.usgs.gov

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