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LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

Prepared in cooperation with the Louisiana Department of Transportation and Development

Water Resources of Assumption Parish, Louisiana

Introduction

Information concerning the availability, use, and quality of water in Assumption Parish, Louisiana (fig. 1), is critical for proper water-supply management. The purpose of this fact sheet is to present information that can be used by water managers, parish residents, and others for management of this vital resource. Information on the availability, past and current use, use trends, and water quality from groundwater and surface-water sources in the parish is presented. Previously published reports (see Cited References 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In 2010, about 21.4 million gallons per day (Mgal/d) of water were withdrawn in Assumption Parish, including about 12.4 Mgal/d from surface-water sources and 9.03 Mgal/d from groundwater sources[1] (table 1). Withdrawals for industrial use accounted for about 16.4 Mgal/d or 76 percent of the total water withdrawn (table 2). Other categories of use included public supply, rural domestic, livestock, general irrigation, and aquaculture (Sargent, 2011). Water-use data collected at 5-year intervals from 1960 to 2010 (fig. 2) indicated that water withdrawals peaked in 2000 at about 29.7 Mgal/d.

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

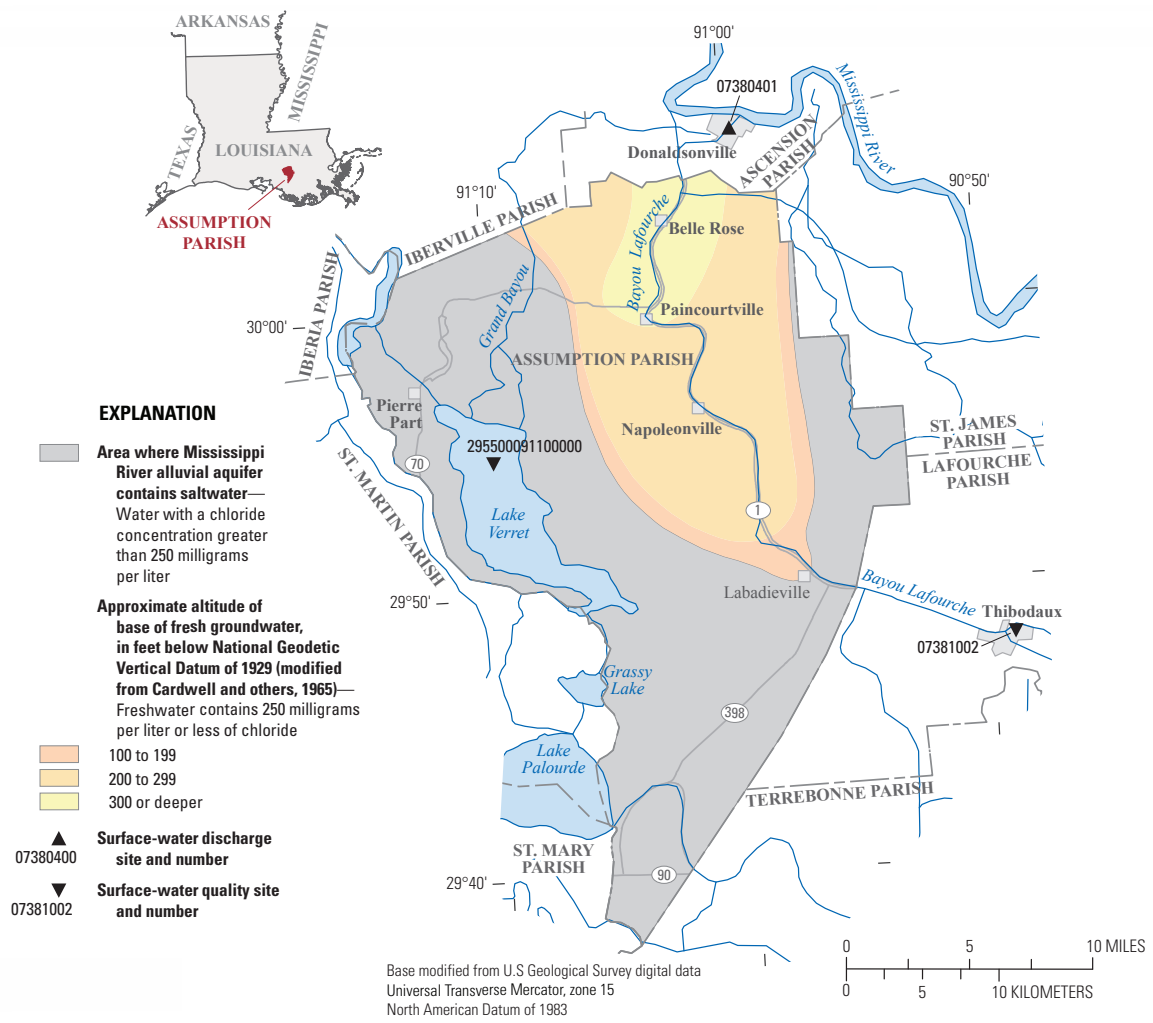

Figure 1. Location of study area, Assumption Parish, Louisiana.

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

Aquifer or surface-water body	Groundwater	Surface water
Mississippi River alluvial aquifer	6.81	
Norco aquifer	2.22	
Bayou Lafourche		10.08
Lake Verret		1.99
Other water bodies		0.31
Total	9.03	12.39

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

Category of use	Groundwater	Surface water	Total
Public supply	0.00	3.90	3.90
Industrial	8.59	7.79	16.37
Rural domestic	0.18	0.00	0.18
Livestock	0.00	0.01	0.01
General irrigation	0.07	0.11	0.19
Aquaculture	0.19	0.58	0.76
Total	9.03	12.39	21.42

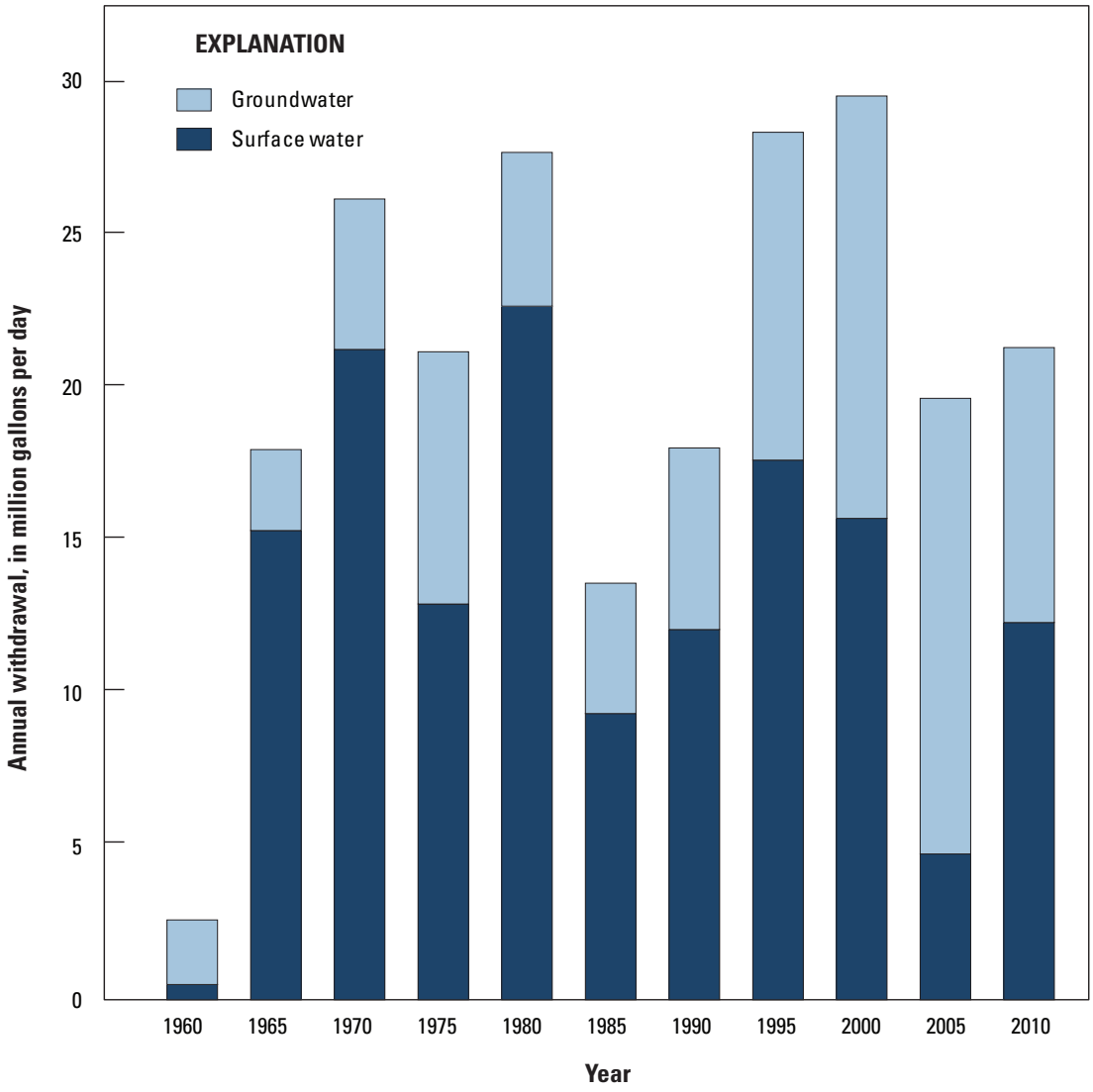

Figure 2. Water withdrawals in Assumption Parish, Louisiana, 1960–2010.

Groundwater Resources

The Mississippi River alluvial aquifer (the shallowest aquifer underlying Assumption Parish) is the primary source of fresh groundwater (water with a chloride concentration of 250 milligrams per liter [mg/L] or less) in the parish. Deeper aquifers underlying the parish, including the Norco aquifer, contain only saltwater (water with a chloride concentration greater than 250 mg/L). Recharge to aquifers in the parish is from infiltration of precipitation; lateral leakage from adjacent aquifers; and seasonal flow from rivers, canals, and lakes to the aquifers. Discharge from the aquifers is by natural flow into rivers, canals, and lakes; lateral leakage into adjacent aquifers; and withdrawals from wells.

State well-registration records listed 72 active water wells in Assumption Parish in 2009, including 33 industrial, 20 general irrigation, and 19 rural-domestic wells. Withdrawals from the Mississippi River alluvial aquifer were about 6.81 Mgal/d and 2.22 Mgal/d came from the deeper Norco aquifer (table 1). Industrial use accounted for about 95 percent of groundwater withdrawals; less than 5 percent was withdrawn for domestic use, general irrigation, and aquaculture (table 2).

Mississippi River Alluvial Aquifer

The Mississippi River alluvial aquifer is present throughout Assumption Parish but contains freshwater only in the north and central parts of the parish in an area extending southward from the northern parish line to the town of Labadieville in the eastern part of the parish (fig. 1). The base of freshwater in the Mississippi River alluvial aquifer extends from about 300 feet (ft) below the National Geodetic Vertical Datum of 1929 (NGVD 29) in the north to about 100 ft below NGVD 29 in the south. The aquifer generally is composed of fine to medium sand at the top and grades to coarse sand and gravel at the base (Tomaszewski, 2003). A clayey surficial confining unit overlies the alluvial aquifer.

North of the town of Paincourtville, along Bayou Lafourche (fig. 1), the Mississippi River alluvial aquifer contains mostly freshwater with only 5–10 ft of saltwater at its base. The proportion of saltwater to freshwater increases southward and laterally away from Bayou Lafourche. Locally, the chloride concentration can increase in wells pumped for prolonged periods at rates of 500 gallons per minute [gal/min] and greater as saltwater is drawn upwards from the base of the aquifer (Cardwell and others, 1965).

State well-registration records listed 68 active water wells screened in the Mississippi River alluvial aquifer in Assumption Parish in 2009, including 29 industrial, 20 general irrigation, and 19 rural-domestic wells. Well depths ranged from 158 to 315 ft below land surface with a median depth of 212 ft. Reported yields from wells screened in the Mississippi River alluvial aquifer underlying Assumption Parish have ranged from about 20 to 2,870 gal/min. In 2010, about 6.81 Mgal/d were withdrawn from the Mississippi River alluvial aquifer in Assumption Parish, including about 6.37 Mgal/d for industrial use, 0.18 Mgal/d for rural-domestic use, 0.07 Mgal/d for general irrigation, and 0.19 Mgal/d for aquaculture.

Regionally throughout its extent, the Mississippi River alluvial aquifer contains water of a calcium bicarbonate type, which is hard to very hard.[2] Iron concentrations in the water usually are high, generally exceeding the U.S. Environmental Protection Agency's (USEPA) Secondary Maximum Contaminant Level (SMCL)[3] of 0.3 µg/L for drinking water (Tomaszewski, 1992). In Assumption Parish, manganese concentrations in water from the alluvial aquifer generally exceed the SMCL of 0.05 mg/L (Tomaszewski, 1992).

A statistical summary of selected water-quality characteristics for freshwater samples collected from 30 wells screened in the Mississippi River alluvial aquifer in Assumption Parish is listed in table 3. Based on median values of constituents, freshwater from the aquifer generally exceeds the SMCL for color. The pH of the water is generally within the SMCL range of 6.5–8.5 standard units. Hardness ranges widely but is generally moderately hard or very hard.

Norco Aquifer

The Norco aquifer contains only saltwater in Assumption Parish but provided water for industrial purposes in 2010. In Assumption Parish, the Norco aquifer is separated from the overlying Mississippi River alluvial aquifer by a clay or silty clay bed ranging from 10 to 50 feet in thickness. The base of the Norco aquifer has an average depth of about 600 ft below NGVD 29 within the parish (Cardwell and others, 1965). The aquifer generally contains fine to coarse sand and may contain fine gravel in some places (Tomaszewski, 2003).

State well-registration records listed four active water wells screened in the Norco aquifer in Assumption Parish in 2009. The four wells, classified for industrial use, have depths ranging from 533 to 561 ft below land surface. Water-quality data available from samples from two of the wells, located about 3 miles west of Paincourtville (fig. 1), indicated that water from the Norco aquifer is very hard and chloride concentrations are greater than 700 mg/L. In 2010, about 2.22 Mgal/d were withdrawn from the Norco aquifer in Assumption Parish for industrial use.

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[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 constituent concentrations or values, health implications as well as aesthetic degradation may be present. 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 freshwater in the Mississippi River alluvial aquifer in Assumption Parish, Louisiana (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; —, insufficient data; NA, not applicable; SMCL, Secondary Maximum Contaminant Level established by the U.S. Environmental Protection Agency (2012)]

	Temperature (°C)	Color, (PCU)	Specific conductance, field (µS/cm at 25 °C)	pH, field (SU)	Hardness (as $CaCO_3$)	Chloride, filtered (as Cl)	Iron, filtered (µg/L as Fe)
Mississippi River alluvial aquifer, 1939–93 (30 wells)							
Median	20.5	30	923	7.3	180	68	654
10th percentile	19.5	14	777	6.8	94	23	—
90th percentile	22.0	95	1,150	7.7	350	150	—
Number of samples	11	16	14	14	30	30	2
Percentage of samples that do not exceed SMCLs	NA	12.5	NA	93	NA	100	50
SMCLs							
	NA	15	NA	6.5 - 8.5	NA	250	300

Surface-Water Resources

In 2010, about 12.4 Mgal/d of surface water were withdrawn in Assumption Parish for public-supply, industrial, livestock, general irrigation, and aquaculture uses (table 2). Most surface water withdrawn by industry is used for cooling purposes and returned to its source after use (Sargent, 2011). Bayou Lafourche and Lake Verret (fig. 1) are principal sources of fresh surface water in Assumption Parish.

Bayou Lafourche is supplied by water from the Mississippi River at Donaldsonville. The bayou flows through southwestern Ascension Parish, northeastern Assumption Parish, and into Lafourche Parish (fig. 1). 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. The dam cut off nourishment and replenishment to a large area of coastal wetlands and turned Bayou Lafourche into a stagnant channel. In 1955, a pumping plant at Donaldsonville began diverting about 250 cubic feet per second (ft^3/s) from the Mississippi River into Bayou Lafourche by a combined siphoning and pumping operation (Cardwell and others, 1965). During the period 1996–2013, the average daily discharge for Bayou Lafourche southwest of Donaldsonville (station 07380401) (fig. 1) was about 224 ft^3/s (145 Mgal/d). The maximum daily discharge was 399 ft^3/s (258 Mgal/d) and the minimum daily discharge was -107 ft^3/s (-69.2 Mgal/d) (U.S. Geological Survey, 2013). In 2010, about 10.1 Mgal/d were withdrawn from Bayou Lafourche in Assumption Parish, including about 3.90 Mgal/d for public supply, 5.99 Mgal/d for industrial use, and 0.19 Mgal/d for aquaculture.

Water samples analyzed during the period 1996–99 indicated that water in Bayou Lafourche below the weir at Thibodaux in neighboring Lafourche Parish is generally hard and does not exceed SMCLs for pH or concentrations of chloride, sulfate, and iron (table 4). Dissolved oxygen concentration is 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).

Lake Verret has an area of about 22 square miles and is primarily used for recreation and commercial fishing (Shampine, 1970). In 2010, about 1.99 Mgal/d were withdrawn from Lake Verret in Assumption Parish, including 1.80 Mgal/d for industrial use and 0.19 Mgal/d for aquaculture.

Water in Lake Verret is a calcium-bicarbonate type and is highly colored (Cardwell and others, 1965). Water samples collected during the period 1975–86 indicated that water in Lake Verret near Pierre Part is generally moderately hard (from 61 to 120 mg/L as calcium carbonate) and does not exceed the SMCLs for chloride, sulfate, and iron concentrations (table 4). The pH of the water usually does not exceed the SMCL but occasionally may exceed 8.5 standard units. Dissolved oxygen concentration is generally greater than 5 mg/L.

Table 4. Summary of selected water-quality characteristics for Bayou Lafourche below weir at Thibodaux, Louisiana, and Lake Verret near Pierre Part, La.

[Values are in milligrams per liter, except as noted. µS/cm, microsiemens per centimeter;°C, 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 (2012)]

	Specific conductance, field (µS/cm at 25 oC)	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 SO4)	Iron, filtered (µg/L as Fe)
Bayou Lafourche below weir at Thibodaux, 1996–99[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
Lake Verret near Pierre Part, 1975–86[2]										
Median	325	9.0	7.8	110	30	9.1	19	25	24	<10
10th percentile	216	5.9	6.8	74	20	5.9	9.9	13	11	<10
90th percentile	382	12.8	8.8	130	35	12	26	33	39	40
Number of samples	34	33	34	34	34	34	34	33	34	5
Percentage of samples that do not exceed SMCLs	NA	NA	79	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).

[2]Station number 295500091100000 (U.S. Geological Survey 2012c; specific data available at http://nwis.waterdata.usgs.gov/la/nwis/qwdata/?site_no=295500091100000).

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