

Prepared in cooperation with the Louisiana Department of Transportation and Development

# Water Resources of Iberville Parish, Louisiana

## Introduction

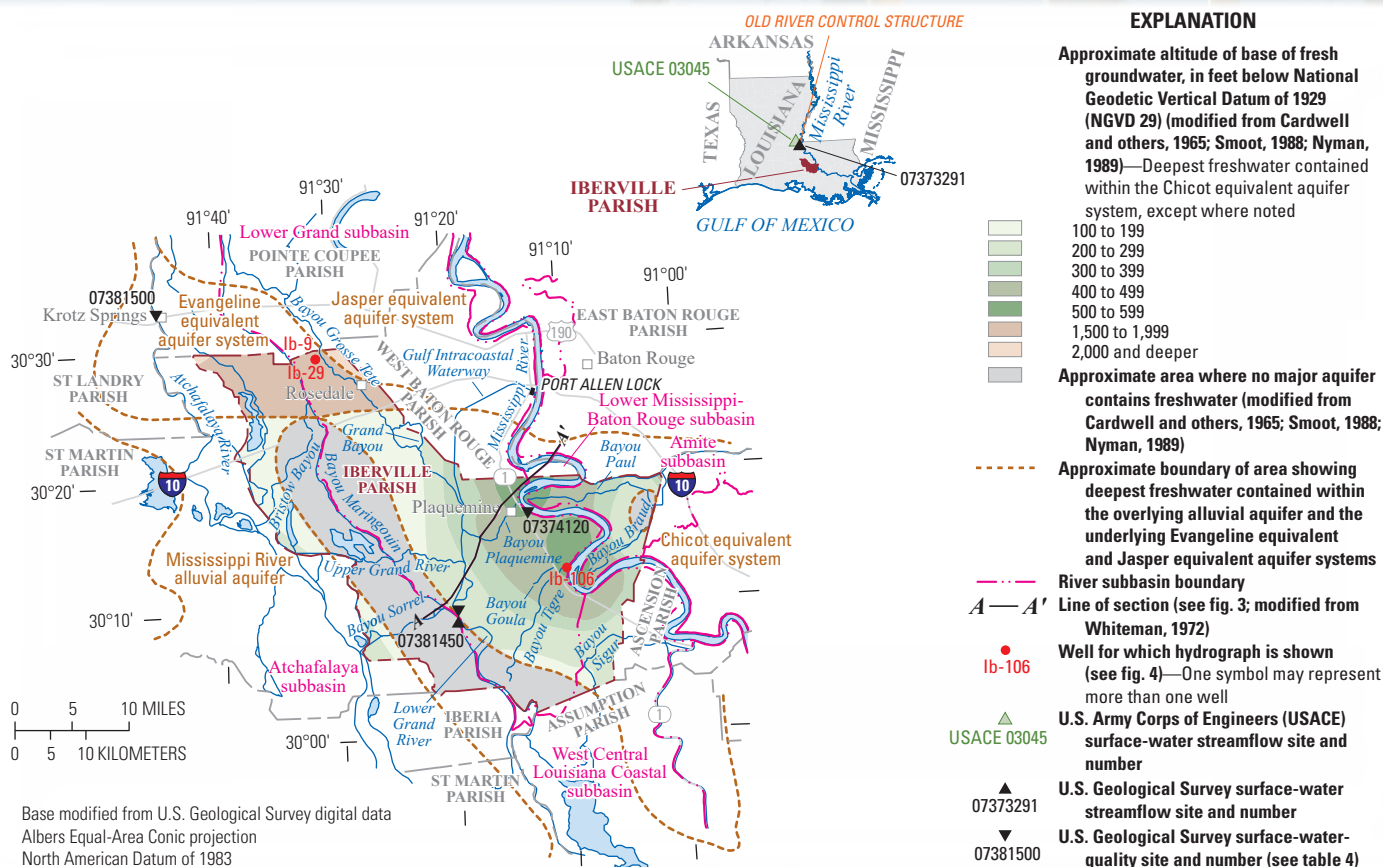
Information concerning the availability, use, and quality of water in Iberville Parish, Louisiana (fig. 1), is critical for proper water-supply management. The purpose of this fact sheet is to present information that can be used by water managers, parish residents, and others for stewardship of this vital resource. In 2014, about 589.87 million gallons per day (Mgal/d) of water were withdrawn in Iberville Parish in southeastern Louisiana: 30.86 Mgal/d from groundwater sources and 559.01 Mgal/d from surface-water sources<sup>1</sup> (table 1). Withdrawals for industrial use accounted for about 77 percent (452.80 Mgal/d) of the total water withdrawn in 2016 (table 2). Other use categories included power generation, which accounted for about 21 percent (124.54 Mgal/d), and aquaculture, which accounted for about 1 percent (7.50 Mgal/d). Water-use data collected at 5-year intervals from 1960 to 2010 and again in 2014 indicate that water withdrawals peaked in 1980 at 1,429.78 Mgal/d (fig. 2; Sargent, 2011; Collier, 2018).

<sup>1</sup>Water-withdrawal data are based on estimated or reported site-specific data and aggregated data, which are distributed to sources. For a full description of water-use estimate methodology, see "Data Collection" in Sargent (2011). Tabulation of numbers in text and tables may result in different totals because of rounding; nonrounded numbers are used for calculation of totals.

## Groundwater Resources

Iberville Parish is located within the Lower Mississippi alluvial valley, which marks the transition zone between the Chicot aquifer system, Evangeline aquifer, and Jasper aquifer system to the west and the Chicot, Evangeline, and Jasper equivalent aquifer systems to the east. In Iberville Parish, the sediments of these aquifer systems extend deep into the subsurface and generally contain saltwater (Smoot, 1989). The primary freshwater aquifer underlying Iberville Parish is the Mississippi River alluvial aquifer (also referred to as the Mississippi River Valley alluvial aquifer in some publications). The Mississippi River alluvial aquifer is composed of sediments that filled an alluvial valley that incised into the older deposits of the Chicot equivalent aquifer system (fig. 3). The Atchafalaya aquifer, which is composed of gravelly deposits that filled channels that were incised into the relict Mississippi River floodplain (Milner and Fisher, 2009), may extend into the westernmost parts of Iberville Parish. The Atchafalaya aquifer is generally considered part of the Mississippi River alluvial aquifer, and the two aquifers are considered in aggregate for the water-use information presented in this fact sheet.

The Chicot equivalent aquifer system is in direct hydraulic connection with the Mississippi River alluvial aquifer in Iberville Parish (Whiteman, 1972). The aquifer system is underlain by the Evangeline equivalent aquifer system, which is underlain by the Jasper equivalent aquifer system.



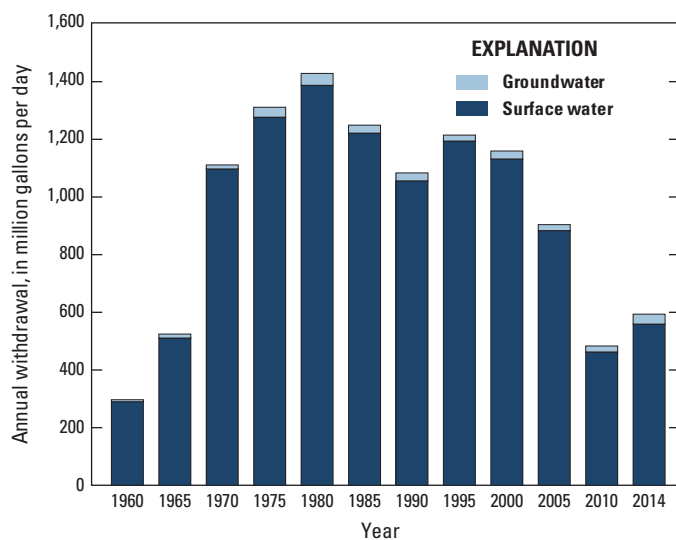
**Figure 1.** Location of study area, Iberville Parish, Louisiana.

**Table 1.** Water withdrawals, in million gallons per day, by source in Iberville Parish, Louisiana, 2014 (Collier, 2018).

Aquifer or surface-water body	Groundwater	Surface water
Chicot equivalent aquifer system	3.68	
Mississippi River alluvial aquifer	26.72	
Jasper equivalent aquifer system	0.46	
Lower Grand River		0.58
Mississippi River		551.28
Miscellaneous streams		7.15
<b>Total</b>	<b>30.86</b>	<b>559.01</b>

**Table 2.** Water withdrawals, in million gallons per day, by use category in Iberville Parish, Louisiana, 2014 (Collier, 2018).

Use category	Groundwater	Surface water	Total
Public supply	1.38	0.58	1.96
Industry	25.09	427.71	452.80
Power generation	0.97	123.58	124.54
Rural domestic	0.15	0.00	0.15
Livestock	0.09	0.03	0.12
General irrigation	1.68	1.12	2.79
Aquaculture	1.50	6.00	7.50
<b>Total</b>	<b>30.86</b>	<b>559.01</b>	<b>589.87</b>



**Figure 2.** Water withdrawals in Iberville Parish, Louisiana, 1960–2014 (Sargent, 2011; Collier, 2018).

The Chicot, Evangeline, and Jasper equivalent aquifer systems contain little available fresh groundwater and are not as heavily pumped as the Mississippi River alluvial aquifer (table 1). Fresh groundwater (water with a chloride concentration of 250 milligrams per liter [mg/L] or less) is present to depths ranging from 145 feet (ft) to greater than 500 ft below the National Geodetic Vertical Datum of 1929 (NGVD 29) in eastern parts of the parish. Outside of the eastern parts of the parish, fresh groundwater is absent from all major aquifers except for the extreme north, where the base of fresh groundwater extends into the Evangeline equivalent aquifer system and upper part of the Jasper equivalent aquifer

system (fig. 1). The abrupt change of the base of fresh groundwater in the far northern part of Iberville Parish may be related to the Baton Rouge–Tepetate fault zone. Because of the limited availability of groundwater of sufficient quality for public supply in Iberville Parish, the City of Plaquemine obtains water from wells located in West Baton Rouge Parish.

## Mississippi River Alluvial Aquifer

The Mississippi River alluvial aquifer extends across Iberville Parish. Its deposits generally grade from silt and clay at the surface to coarse sand and gravel at the base. The sand and gravel section of the alluvium forms the aquifer. The upper silt- and clay-dominated section ranges from 75 to 100 ft thick and acts as a surficial confining unit. In places, the Mississippi River cuts through the surficial confining unit and is hydraulically connected to the alluvial aquifer. The total thickness of the Mississippi River alluvial aquifer is difficult to determine in Iberville Parish because of the similarity of its sediments with those of the underlying Chicot equivalent aquifer system.

Water levels measured in wells screened in the Mississippi River alluvial aquifer are affected by the stage of the Mississippi River, and wells near the river exhibit the largest fluctuation of water levels (Whiteman, 1972). Little data are available for determining current water levels in the Mississippi River alluvial aquifer across Iberville Parish. Water levels measured at 18 wells (27 total measurements) between the period of January 19, 1990, and December 12, 1992, ranged from 7.45 ft below NGVD 29 to 25.54 ft above NGVD 29. Water levels in the Mississippi River alluvial aquifer measured at well Ib-106 (fig. 1) between 1959 and 2016 indicate the influence of the fluctuating stage of the Mississippi River, but no long-term water-level trend is apparent (fig. 4).

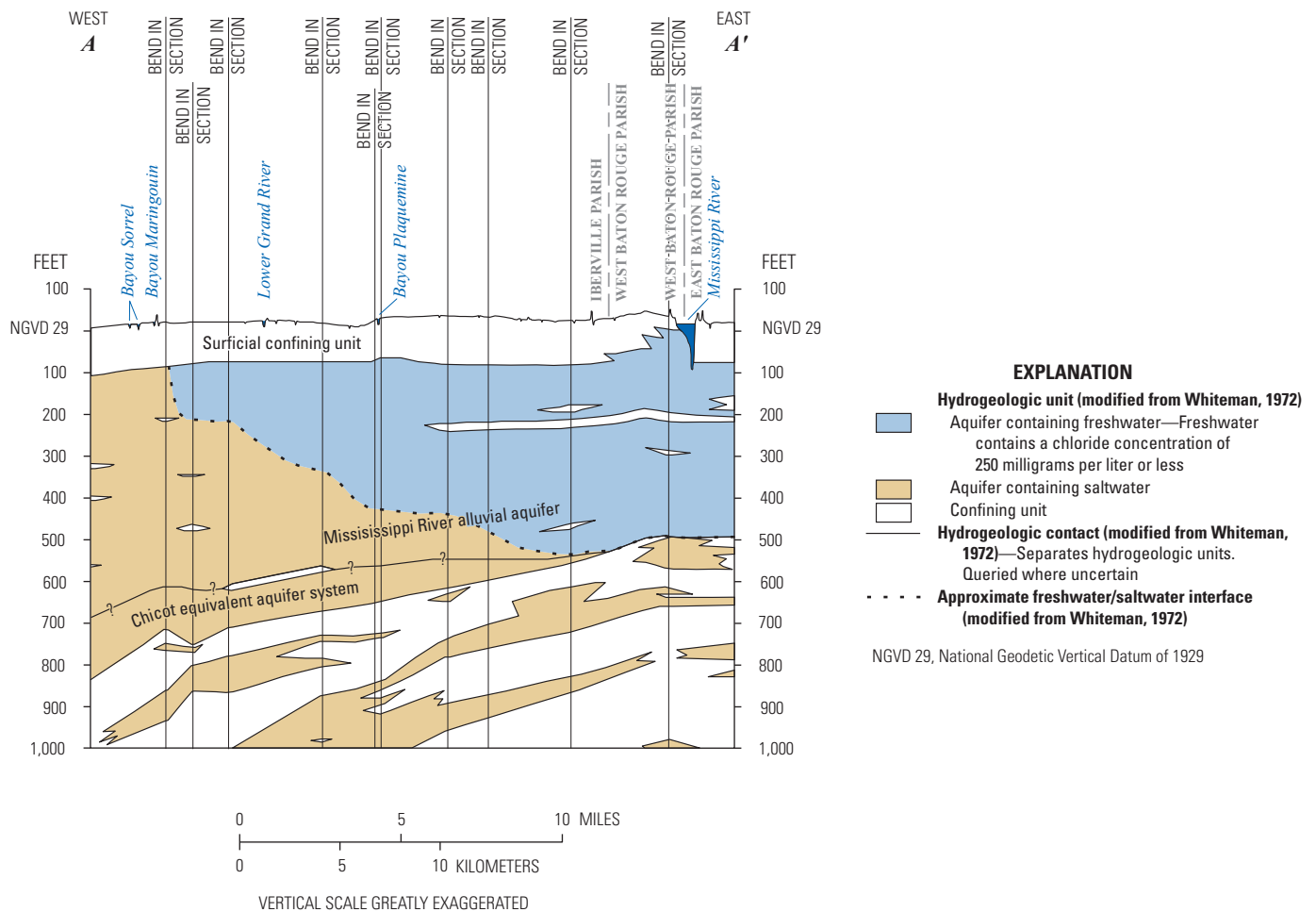
State well-registration records listed 403 active water wells screened in the Mississippi River alluvial aquifer in Iberville Parish in 2017 (including 5 wells from the Atchafalaya aquifer): 217 for domestic use, 79 for irrigation, 70 for industrial use, 34 for public supply, and 3 for power generation. Well depths ranged from 30 to 733 ft below land surface, and reported yields ranged from 4 to 7,198 gallons per minute (gal/min) (Louisiana Department of Natural Resources, 2017). In 2014, about 26.72 Mgal/d were withdrawn from the Mississippi River alluvial aquifer in Iberville Parish: 21.41 Mgal/d for industry, 1.68 Mgal/d for general irrigation, 1.50 Mgal/d for aquaculture, 0.97 Mgal/d for power generation, 0.92 Mgal/d for public supply, 0.15 Mgal/d for rural domestic, and 0.09 Mgal/d for livestock (Collier, 2018).

## Chicot Equivalent Aquifer System

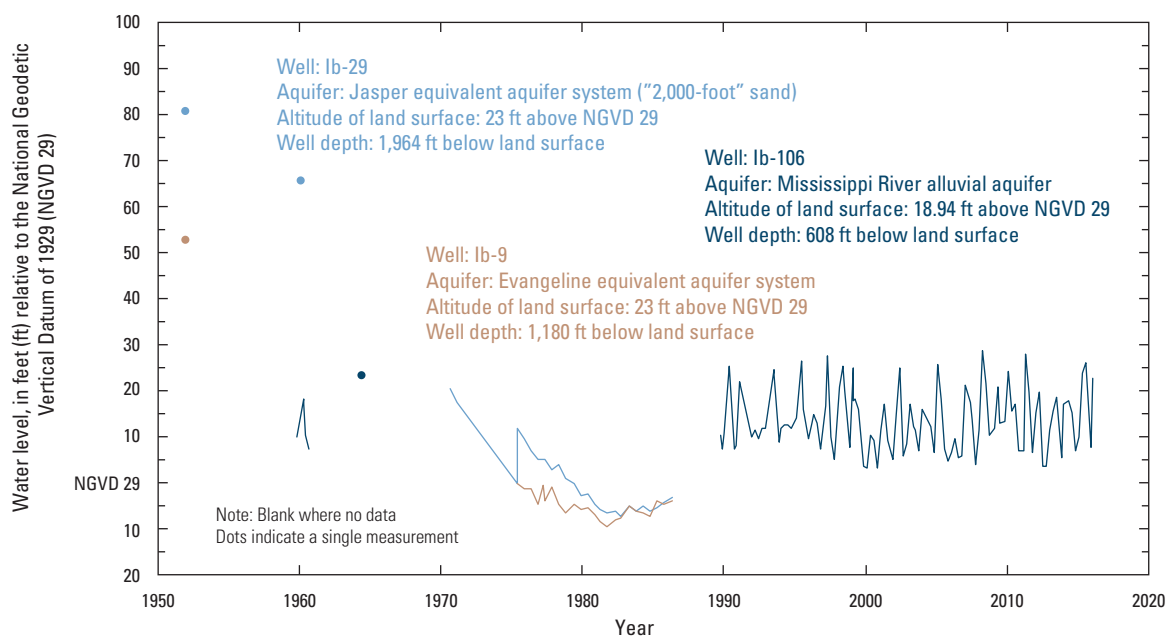
The Chicot equivalent aquifer system is composed of thick alternating beds of sand and clay deposited prior to the incision of the modern Mississippi River alluvial valley (Whiteman, 1972). It is stratigraphically equivalent to the “400-foot” and “600-foot” sands of the Baton Rouge area east of the parish, the Chicot aquifer system west of the parish, and the Gonzales-New Orleans aquifer of the New Orleans area (Lovelace and Lovelace, 1995). Some of the upper sands of the aquifer system are in direct contact with the Mississippi River alluvial aquifer, and the two aquifers function as one hydrologic unit in parts of the parish because of a lack of extensive confining units (Whiteman, 1972). In 2014, a total of 3.68 Mgal/d was withdrawn from the Chicot equivalent aquifer for industrial use (Collier, 2018). State well-registration records list one active industrial well in the Chicot equivalent aquifer system in Iberville Parish in 2017.

## Evangeline Equivalent and Jasper Equivalent Aquifer Systems

In the northern part of Iberville Parish, fresh groundwater is available in the Evangeline equivalent aquifer system and the upper part of the Jasper equivalent aquifer system. The Evangeline and Jasper equivalent aquifer systems correspond to the Evangeline aquifer and Jasper aquifer system defined west of Iberville Parish. East of the parish, the Evangeline equivalent aquifer system corresponds to the “800-foot,” “1,000-foot,” “1,200-foot,” “1,500-foot,” and “1,700-foot” sands of the Baton Rouge area, and the Jasper equivalent aquifer system corresponds to the “2,000-foot,” “2,400-foot,” and “2,800-foot” sands (Griffith, 2003).



**Figure 3.** Idealized west-to-east hydrogeologic section through Iberville Parish, Louisiana, showing aquifers and generalized clay and sand intervals (modified from Whiteman, 1972). Trace of section shown on figure 1.



**Figure 4.** Water levels in well Ib-9 screened in the Evangeline equivalent aquifer system, well Ib-29 screened in the Jasper equivalent aquifer system, and well Ib-106 screened in the Mississippi River alluvial aquifer, Iberville Parish, Louisiana (see fig. 1 for well locations; U.S. Geological Survey, 2018).



Regional mapping suggests that in southeastern Iberville Parish the top of the Evangeline equivalent aquifer system is about 1,000 ft below NGVD 29 and the top of the Jasper equivalent aquifer system is about 2,500 ft below NGVD 29 (Smoot, 1989). Little information on water levels in the Evangeline and Jasper equivalent aquifers across Iberville Parish is available. In the northern part of Iberville Parish where fresh groundwater is available to the depth of the Jasper equivalent aquifer system, water levels in several wells have declined. Water levels measured in well Ib-9 (fig. 1), which is screened in the Evangeline equivalent aquifer system (“1,200-foot” sand), indicate a decline of about 57 ft during 1951–86 (fig. 4). Water levels measured in well Ib-29, which is screened in the Jasper equivalent aquifer system (“2,000-foot sand”), indicate a decline of 84 ft during 1951–86. In 2017, State well-registration records for Iberville Parish listed one active public-supply well screened in the Evangeline equivalent aquifer system (“1,200-foot” sand) and six public-supply wells screened in the Jasper equivalent aquifer system (five in the “2,000-foot” sand and one in the “2,400-foot” sand).

Groundwater Quality

Groundwater samples were collected during 1932–85 from 142 wells screened in the Mississippi River alluvial aquifer in Iberville Parish and during 1942–90 from 36 wells screened in the Jasper equivalent aquifer system in northern Iberville Parish, southern Point Coupee Parish, and western West Baton Rouge Parish as part of an ongoing program to monitor the State’s groundwater resources (U.S. Geological Survey [USGS], 2018). The samples from the Mississippi River alluvial aquifer had a median hardness value of 170 mg/L, which falls within the hard<sup>2</sup> range. Samples from the Jasper equivalent aquifer had a median hardness value of 3 mg/L, which is at the lower end of the soft range (table 3). In the Mississippi River alluvial aquifer, iron concentrations exhibited a

<sup>2</sup>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).

large degree of variability and ranged from 30 micrograms per liter (µg/L) to 16,000 µg/L, with a median of 1,400 µg/L; the U.S. Environmental Protection Agency’s Secondary Maximum Contaminant Level<sup>3</sup> (SMCL) for iron (300 µg/L) was exceeded in about 87 percent of samples. Iron concentrations were lower in the Jasper equivalent aquifer system, with a median value of 125 µg/L. Concentrations of chloride in 83 percent of samples from the Mississippi River alluvial aquifer were below the SMCL of 250 mg/L. Samples from the Jasper equivalent aquifer system were mostly taken from the northern part of the parish and surrounding areas where fresh groundwater is generally present, and concentrations of chloride were below the SMCL for 98 percent of these samples.

Surface-Water Resources

Surface-water resources in Iberville Parish are present in five drainage subbasins: the Lower Mississippi-Baton Rouge subbasin (Hydrologic Unit Code [HUC] 08070100), the Atchafalaya subbasin (HUC 08080101), the Lower Grand subbasin (HUC 08070300), the Amite subbasin (HUC 08070202), and the West Central Louisiana Coastal subbasin (HUC 08090302). The Atchafalaya and Lower Grand subbasins drain most of the parish. The Lower Mississippi-Baton Rouge subbasin encompasses a narrow area centered on the Mississippi River, and the Amite and West Central Louisiana Coastal subbasins drain small areas along the eastern border (fig. 1). In 2014, 559.01 Mgal/d of surface water were withdrawn in Iberville Parish: 427.71 Mgal/d for industry, 123.58 Mgal/d for power generation, 6.00 Mgal/d for aquaculture, 1.12 Mgal/d for general irrigation, 0.58 Mgal/d for public supply, and 0.03 Mgal/d for livestock (table 2) (Collier, 2018).

<sup>3</sup>The SMCLs are Federal guidelines regarding cosmetic effects (such as tooth or skin discoloration), aesthetic effects (such as taste, odor, or color), or technical effects (such as damage to water equipment or reduced effectiveness of treatment for other contaminants) of potential constituents of drinking water. SMCLs were established as guidelines by the U.S. Environmental Protection Agency (2016).

**Table 3.** Summary of selected water-quality characteristics for 142 wells screened in the Mississippi River alluvial aquifer in Iberville Parish, Louisiana, 1932–85, and 36 wells screened in the Jasper equivalent aquifer system (“2,000-foot” sand) in Iberville Parish, southern Point Coupee Parish, and West Baton Rouge Parish, Louisiana, 1942–90 (U.S. Geological Survey, 2018).

[Values are in milligrams per liter, except as noted. °C, degrees Celsius; PCU, platinum cobalt units; µS/cm, microsiemens per centimeter; SU, standard unit; CaCO<sub>3</sub>, calcium carbonate; µg/L, micrograms per liter; SMCL, Secondary Maximum Contaminant Level established by the U.S. Environmental Protection Agency (2016); NA, not applicable]

	Tem- pera- ture (°C)	Color (PCU)	Specific conduct- ance, field (µS/cm at 25 °C)	pH, field (SU)	Hard- ness (as CaCO <sub>3</sub> )	Cal- cium, filtered (as Ca)	Magne- sium, filtered (as Mg)	So- dium, filtered (as Na)	Chlo- ride, filtered (as Cl)	Sul- fate, fil- tered (as SO <sub>4</sub> )	Iron, filtered, in µg/L (as Fe)	Man- ganese filtered, in µg/L (as Mn)	Dis- solved solids, filtered
Mississippi River alluvial aquifer, 142 wells (1932–85)													
Median	20.5	22	745	7.4	170	40.5	11	47	27	0.6	1,400	95	393
10th percentile	18.5	0	362	6.8	97.8	22	2.95	17	8.4	0	200	20	200
90th percentile	21.5	114	2,590	7.8	330	105	28	265	640	15.9	11,100	312	1,512
Number of samples	163	75	235	110	277	44	44	40	329	80	38	22	43
Percentage of samples that do not exceed SMCLs	NA	44	NA	100	NA	NA	NA	NA	83	100	13	27	63
SMCLs	NA	15	NA	6.5–8.5	NA	NA	NA	NA	250	250	300	50	500
Jasper equivalent aquifer system, 36 wells (1942–90)													
Median	30	10	413	8.6	3	0.9	0.2	94	3.4	9.8	125	60	256
10th percentile	25.7	0	310	7.4	0	0	0	58.4	1.4	0.5	20	0	204.9
90th percentile	35.1	43.5	1,024.4	9.1	14.2	4.7	1.2	219	208	13	750	134	589.6
Number of samples	42	30	105	44	127	30	28	26	131	32	29	13	28
Percentage of samples that do not exceed SMCLs	NA	73	NA	48	NA	NA	NA	NA	98	100	72	46	82
SMCLs	NA	15	NA	6.5–8.5	NA	NA	NA	NA	250	250	300	50	500

Atchafalaya Subbasin

The Atchafalaya subbasin covers the western side of Iberville Parish extending east to Bayou Maringouin (fig. 1). The Atchafalaya River, in the center of the Atchafalaya subbasin, defines or runs adjacent to the western border of the parish. The river and its associated swampland contain abundant natural resources that support various commercial and recreational activity, including fishing and hunting. Additionally, its floodplain provides an outlet for the floodwaters of the Mississippi River by way of a series of locks, pumping stations, and drainage structures. A percentage of streamflow (averaging 25 percent for 1984–2007; Kroes and Kraemer, 2013) is diverted from the Mississippi River to the Atchafalaya River through the Old River Control Structure. Springtime flooding of the Atchafalaya River maintains the habitat of diverse plants and wildlife that live in the basin’s wetlands and swamps (U.S. Army Corps of Engineers, 2007). The daily average streamflow of the Atchafalaya River for 1963–2016 was 225,520 cubic feet per second (ft³/s) at Simmesport, Louisiana (U.S. Army Corps of Engineers streamflow site 03045; fig. 1, index map). During this same period, the highest monthly average streamflow was 342,173 ft³/s in May, and the lowest was 108,526 ft³/s in September. Streams within

the Atchafalaya subbasin in the parish include Bristow Bayou and Bayou Sorrel, which flow in a south-southwest direction towards the Atchafalaya River.

Lower Grand Subbasin

The Lower Grand subbasin drains in a southerly direction and covers most of Iberville Parish east of Bayou Maringouin (fig. 1). Streams within the subbasin include Bayou Grosse Tete, Bayou Tigre, and Bayou Goula, all of which drain into the Lower Grand River. For 2013, the annual average streamflow of the Lower Grand River at Bayou Sorrel was 2,103 ft³/s (USGS site number 07381450; fig. 1). In 2014, about 0.58 Mgal/d of water was withdrawn from the Lower Grand River for public supply (Collier, 2018; tables 1 and 2). This subbasin also includes the Gulf Intracoastal Waterway, which intersects the Mississippi River at the Port Allen Lock east-northeast of the parish (fig. 1).

Lower Mississippi-Baton Rouge Subbasin

The Lower Mississippi-Baton Rouge subbasin covers a narrow area centered on the Mississippi River, which crosses through the eastern corner of the parish. Although only a small area of land is drained by

**Table 4.** Summary of selected water-quality characteristics for samples from the Mississippi River at Plaquemine during 1973–93, the Lower Grand River at Bayou Sorrel during 1958–86, and the Atchafalaya River at Krotz Springs during 1952–72, in or near Iberville Parish, Louisiana (U.S. Geological Survey, 2018).

[Values are in milligrams per liter, except as noted. °C, degrees Celsius; PCU, platinum cobalt units; µS/cm, microsiemens per centimeter; SU, standard unit; CaCO<sub>3</sub>, calcium carbonate; µg/L, micrograms per liter; <, less than; SMCL, Secondary Maximum Contaminant Level established by the U.S. Environmental Protection Agency (2016); NA, not applicable; ND, no data]

	Tem- pera- ture (°C)	Color (PCU)	Specific conduc- tance, field (µS/cm at 25 °C)	Dis- solved oxy- gen	pH, field (SU)	Hard- ness (as CaCO <sub>3</sub> )	Cal- cium, fil- tered (as Ca)	Magne- sium, filtered (as Mg)	So- dium, fil- tered (as Na)	Chlo- ride, fil- tered (as Cl)	Sul- fate, fil- tered (as SO <sub>4</sub> )	Iron, fil- tered, in µg/L (as Fe)	Man- ganese, filtered, in µg/L (as Mn)	Dis- solved solids, filtered
Mississippi River at Plaquemine (1973–93) <sup>1</sup>														
Median	18.25	15	384	8.3	7.6	141	39	12	18	22	45	20	20	216
10th percentile	6.5	5	298	6.4	7.1	110	30.4	8.74	12.4	15.1	33	10	12	185.5
90th percentile	29	30	487.6	11.3	8	179.5	46	16	32.2	33	66.4	52.5	44	286
Number of samples	298	297	303	298	298	294	273	273	53	300	295	294	3	64
Percentage of samples that do not exceed SMCLs	NA	62	NA	NA	100	NA	NA	NA	NA	100	100	99	100	100
Lower Grand River at Bayou Sorrel (1958–86) <sup>2</sup>														
Median	23	20	366	6	7.3	130	35	11	19	26	31	40	25	218
10th percentile	10.8	5	242.2	3.8	6.6	85.2	22.6	6.8	14	17	16.9	9.6	10	144
90th percentile	30.9	60	478.9	8.4	7.7	170	43	15	30.7	88	56.4	111	80	351.2
Number of samples	52	58	52	52	58	52	52	52	52	59	58	28	29	58
Percentage of samples that do not exceed SMCLs	NA	36	NA	NA	97	NA	NA	NA	NA	100	100	100	83	97
Atchafalaya River at Krotz Springs (1952–72) <sup>3</sup>														
Median	20.8	15	396	ND	7.7	130	37	9.5	23	36	48	ND	ND	251
10th percentile	9.8	5	280.2	ND	6.9	94.7	28	5.6	14	18	27	ND	ND	169
90th percentile	29.5	40	540.8	ND	8.1	180	49.6	14	40	70	71	ND	ND	357.2
Number of samples	68	194	113	ND	203	116	113	113	87	203	203	ND	ND	196
Percentage of samples that do not exceed SMCLs	NA	61	NA	ND	99	NA	NA	NA	NA	100	100	ND	ND	99
SMCLs	NA	15	NA	NA	6.5–8.5	NA	NA	NA	NA	250	250	300	50	500

<sup>1</sup>U.S. Geological Survey site number 07374120 (see fig. 1).  
<sup>2</sup>U.S. Geological Survey site number 07381450 (see fig. 1).  
<sup>3</sup>U.S. Geological Survey site number 07381500 (see fig. 1).

this subbasin, the Mississippi River is an important source of water. The average streamflow of the Mississippi River near Tarbert and Red River Landings (USGS site number 07373291; fig. 1, index map) was about 460,000 ft<sup>3</sup>/s for 1928–76 (White and Prakken, 2016). In 2014, a total of 551.28 Mgal/d was withdrawn from the Mississippi River in Iberville Parish, with 78 percent used by industry and 22 percent used for power generation (Collier, 2018).

## Amite and West Central Louisiana Coastal Subbasins

The Amite and West Central Louisiana Coastal subbasins drain the far eastern parts of Iberville Parish (fig. 1). The Amite subbasin includes Bayou Paul and Bayou Braud, which both flow east. The West Central Louisiana Coastal subbasin includes Bayou Sigur and Grand Bayou, which flow south.

## Surface-Water Quality

Water samples were collected from the Mississippi River at Plaquemine (USGS site number 07374120) during 1973–93, from the Lower Grand River at Bayou Sorrel (USGS site number 07381450) during 1956–86, and from the Atchafalaya River at Krotz Springs (USGS site number 07381500) during 1952–72 (fig. 1) as part of an ongoing program to monitor the State's surface-water resources (USGS, 2018). The results for the samples were generally within SMCLs for pH, chloride, sulfate, and dissolved solids (table 4). Median hardness values were within the hard range for all three sites. Iron, manganese, and dissolved-oxygen concentrations were measured for the Mississippi River and Lower Grand River sites. At both sites, iron and manganese concentrations were generally below the SMCLs, and the median values for dissolved-oxygen concentration at both sites were greater than 5 mg/L, which is considered the minimum value for a diverse population of fresh, warmwater biota, including sport fish (Louisiana Department of Environmental Quality, 2017). Median values for color were greater than the SMCL (15 platinum cobalt units) for the Lower Grand River site and were at the SMCL for the Mississippi River and Atchafalaya River sites.

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This fact sheet has been prepared by the U.S. Geological Survey (USGS), in cooperation with the Louisiana Department of Transportation and Development (DOTD), as part of a program to document water use, availability, and quality in the parishes of Louisiana. Information on the availability, past and current water use, use trends, and water quality from groundwater and surface-water sources in the parish is presented here. Previously published reports (see References Cited section) and data stored in the USGS National Water Information System (USGS, 2018) are the primary sources of the information presented here. Special thanks are given to Doug Taylor, Director, and Zahir “Bo” Bolourchi (retired), DOTD Cooperative Program with the USGS.

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