

Prepared in cooperation with the Louisiana Department of Transportation and Development

# Water Resources of Jefferson Parish, Louisiana

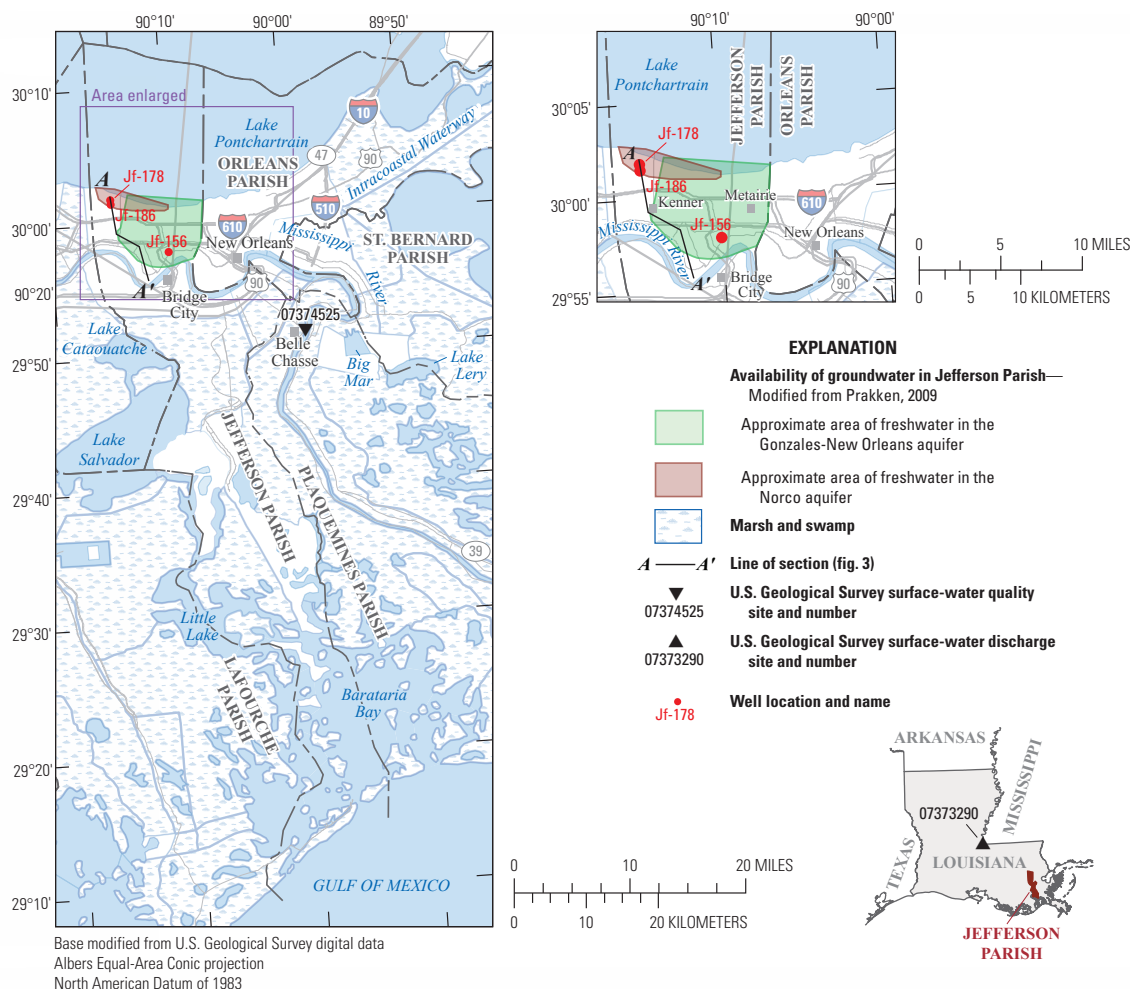
## Introduction

This fact sheet presents a brief overview of groundwater and surface-water resources in Jefferson Parish, Louisiana (fig. 1). Information on the availability, use, and quality of water 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 this information.

In 2010, about 817 million gallons per day (Mgal/d) of water were withdrawn in Jefferson Parish, approximately 810 Mgal/d from surface-water sources and approximately

7.16 Mgal/d from groundwater sources<sup>1</sup> (table 1). Power generation accounted for about 91 percent of the total water withdrawn. Other water-use categories included public supply, industrial, rural domestic, livestock, and general irrigation (table 2). Water-use data collected at 5-year intervals from 1960 to 2010 (fig. 2) indicated that water withdrawals peaked at about 1,600 Mgal/d during 1975 and 1980 in Jefferson Parish. The large increase in surface-water withdrawals from 1970 to 1975 is primarily attributable to withdrawals for power generation.

<sup>1</sup>Tabulation of withdrawals in the text and tables may produce different totals because of rounding; nonrounded numbers are used for calculation of total withdrawals.



**Figure 1.** Location of study area and distribution of fresh groundwater in Jefferson Parish, Louisiana.

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

Aquifer or surface-water body	Groundwater	Surface water
Mississippi River point-bar deposits	0.00	
Shallow aquifers of the New Orleans area	0.00	
Gramercy aquifer	0.02	
Norco aquifer	0.04	
Gonzales-New Orleans aquifer	7.09	
Mississippi River		809.56
Miscellaneous streams		0.04
<b>Total</b>	<b>7.16</b>	<b>809.59</b>

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

Use category	Groundwater	Surface water	Total
Public supply	0.00	64.95	64.95
Industrial	2.24	4.19	6.43
Power generation	4.79	740.42	745.21
Rural domestic	0.04	0.00	0.04
Livestock	0.00	0.04	0.04
General irrigation	0.08	0.00	0.08
<b>Total</b>	<b>7.16</b>	<b>809.59</b>	<b>816.75</b>

## Groundwater Resources

The primary groundwater resources of Jefferson Parish include the Norco and Gonzales-New Orleans aquifers (fig. 3). Other aquifers underlying the area, including Mississippi River point bar deposits, the shallow aquifers of the New Orleans area, and the Gramercy aquifer, contain very hard<sup>2</sup> water that also has high iron concentrations (greater than 300 micrograms per liter [ $\mu\text{g/L}$ ]) or only saltwater (water with chloride concentrations greater than 250 milligrams per liter [ $\text{mg/L}$ ]). These aquifers generally are not utilized for water supply in Jefferson Parish and are not discussed further in this report (Prakken, 2009).

Recharge to aquifers in Jefferson Parish is typically by infiltration of precipitation in outcrop or subcrop areas, leakage from adjacent aquifers, and seasonal flow from rivers and canals. Discharge from aquifers is by natural flow into rivers or canals, leakage into adjacent aquifers, and withdrawals from wells. State well-registration records listed 108 active water wells in Jefferson Parish in 2009, including 50 industrial, 34 irrigation, 10 domestic, 10 public supply, and 4 power generation (Louisiana Department of Natural Resources, 2009).

## Norco Aquifer

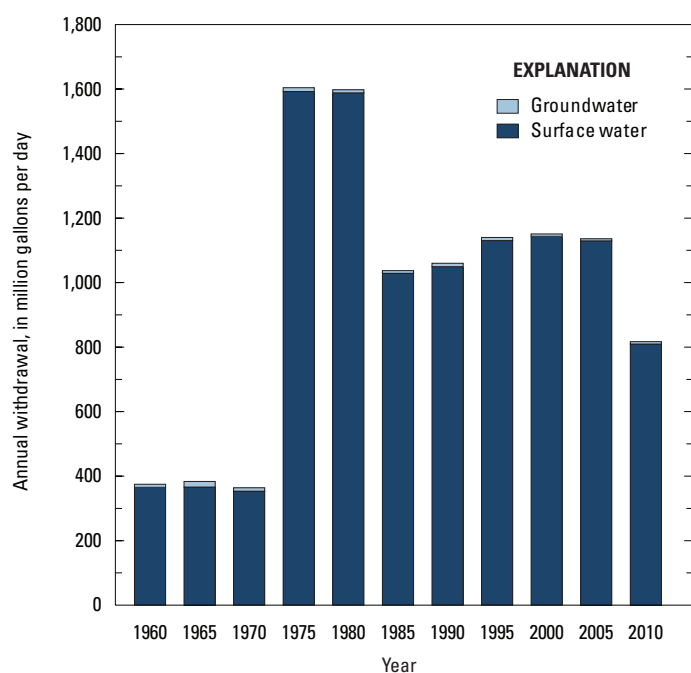
The Norco aquifer is present in most of northern Jefferson Parish, with the exception of a small area west of Metairie, but contains freshwater (water with a chloride concentration of 250 [ $\text{mg/L}$ ] or less) only in a narrow strip along the Lake Pontchartrain shoreline (fig. 1). The Norco aquifer generally ranges from about 50 to 150 feet (ft) in thickness in northern Jefferson Parish and is composed of fine to coarse sand and, possibly, fine gravel present in thin layers a few feet thick in the lower part of the aquifer (Hosman, 1972; Dial and Kilburn, 1980). A clay layer generally separates the Norco aquifer from the underlying Gonzales-New Orleans aquifer.

State well-registration data indicated that in 2009 there were 20 active wells screened in the Norco aquifer in Jefferson Parish, including 10 irrigation, 6 industrial, 3 domestic, and 1 public supply. Depths of these wells ranged from 250 to 480 ft below land surface, with a median depth of 412.5 ft below land surface. The records indicated that yields from wells screened in the Norco aquifer range from 3 to 2,500 gallons per minute ( $\text{gal/min}$ ) (Louisiana Department of Natural Resources, 2009). In 2010, withdrawals from the Norco aquifer in Jefferson Parish totaled about 0.04 Mgal/d (table 1).

In northwestern Jefferson Parish, water levels in the Norco aquifer at well Jf-186 (fig. 1) have fluctuated from about 0 to 9 ft below National Geodetic Vertical Datum of 1929 (NGVD 29) since 1996 (fig. 4). Freshwater in the Norco aquifer at well Jf-186 is moderately hard (Dial and Tomaszewski, 1988). The iron concentration exceeds the U.S. Environmental Protection Agency's Secondary Maximum Contaminant Level (SMCL)<sup>3</sup> for drinking water of 300  $\mu\text{g/L}$  and color exceeds the SMCL of 15 platinum cobalt units. Manganese concentrations are low (less than the SMCL of 50  $\mu\text{g/L}$ ).

<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).

<sup>3</sup>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 and/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).



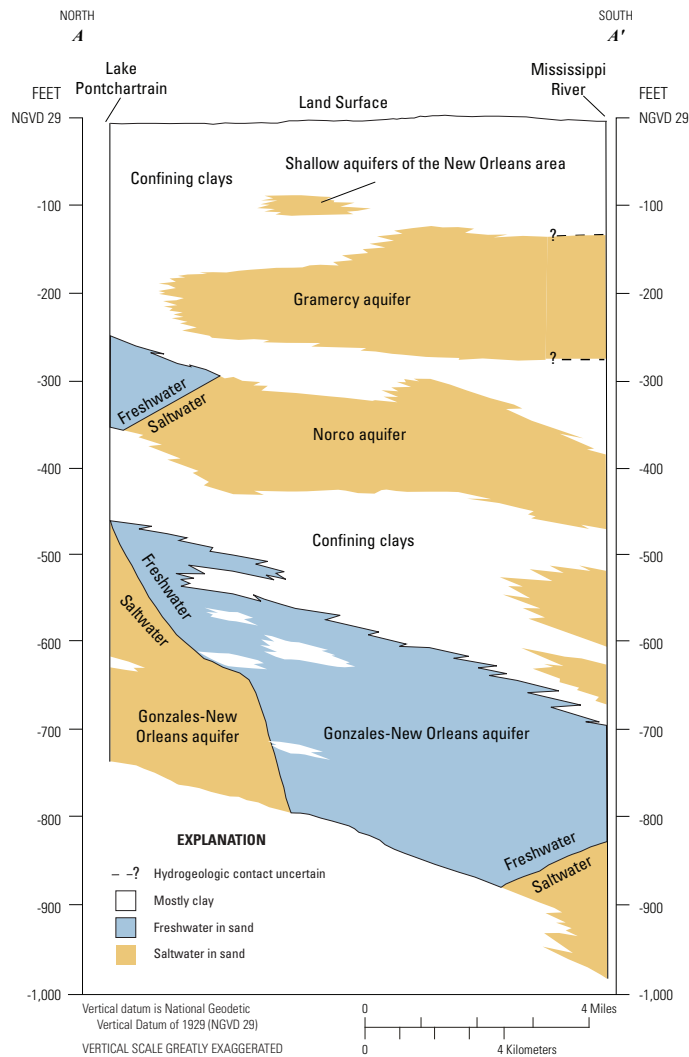
**Figure 2.** Water withdrawals in Jefferson Parish, Louisiana, 1960–2010 (Sargent, 2011).

## Gonzales-New Orleans Aquifer

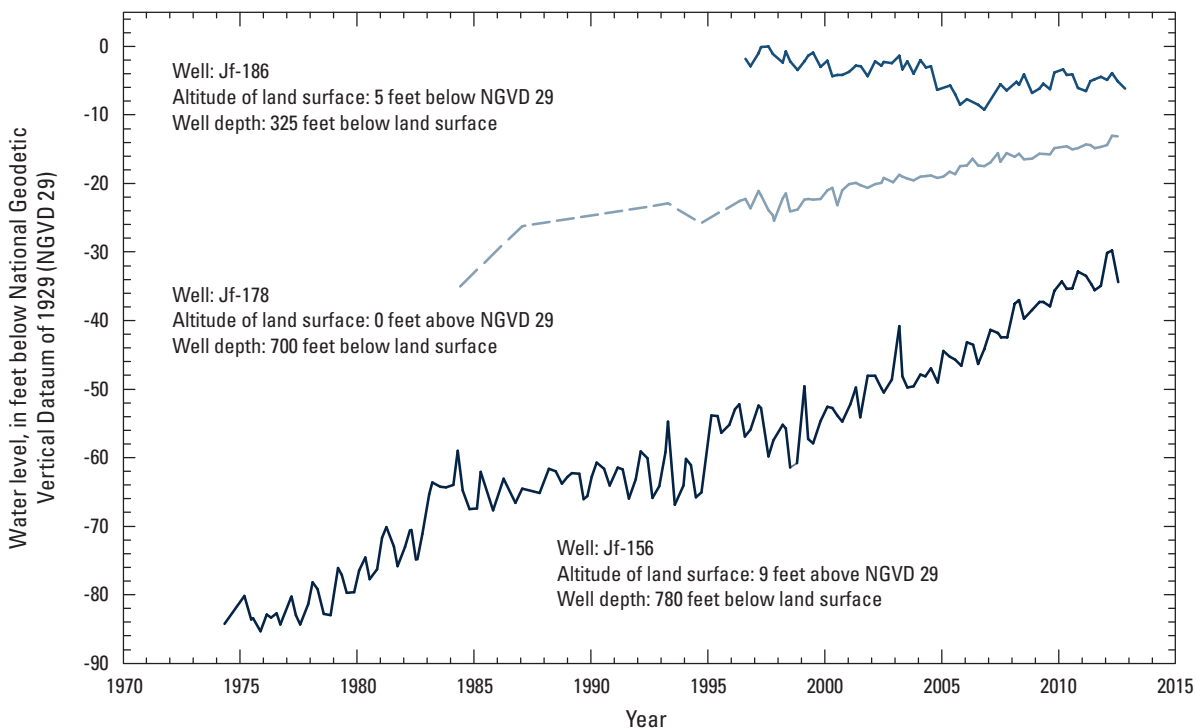
The Gonzales-New Orleans aquifer is continuous throughout northern Jefferson Parish (Tomaszewski, 2003). The top of the aquifer ranges from about 500 ft below NGVD 29 along the shore of Lake Pontchartrain to about 650 ft below NGVD 29 near the Mississippi River. The base of the aquifer ranges from about 700 ft below NGVD 29 near Lake Pontchartrain to about 850 ft below NGVD 29 near the Mississippi River. The thickness of the aquifer is variable but generally is about 200 ft (Prakken, 2009), and sand in the aquifer is fine to medium grained in northern Jefferson Parish (Dial and Tomaszewski, 1988). Fresh groundwater is present in the Gonzales-New Orleans aquifer only in parts of northern Jefferson Parish located north of the Mississippi River and east of Kenner (fig. 1). The aquifer generally contains saltwater south of the Mississippi River and in northwestern Jefferson Parish.

State well registration records listed 54 active water wells screened in the Gonzales-New Orleans aquifer in Jefferson Parish in 2009, including 36 industrial, 10 irrigation, 4 power generation, 3 public supply, and 1 domestic. Depths of these wells ranged from 557 to 878 ft below land surface with a median depth of 764 ft. The records indicated that yields from wells screened in the Gonzales-New Orleans aquifer range from 20 to 2,400 gal/min (Louisiana Department of Natural Resources, 2009). In 2010, groundwater withdrawals from the Gonzales-New Orleans aquifer in Jefferson Parish totaled about 7.09 Mgal/d (table 1) and included 2.24 Mgal/d for industrial, 4.79 Mgal/d for power generation, 0.01 Mgal/d for rural domestic, and 0.04 Mgal/d for general irrigation.

In 2008, there were two major water withdrawal centers in the parish: one center was located about 1 mi southwest of Bridge City (about 1.8 Mgal/d withdrawn in 2007), and the other center was located about 1 mi northeast of Bridge City (an estimated 3.9 Mgal/d withdrawn in 2007). The Gonzales-



**Figure 3.** Generalized north-to-south hydrogeologic section through northern Jefferson Parish, Louisiana (modified from Dial and Tomaszewski, 1988). Trace of section shown on figure 1.



**Figure 4.** Water levels in well Jf-186 screened in the Norco aquifer and wells Jf-156 and Jf-178 screened in the Gonzales-New Orleans aquifer in Jefferson Parish, Louisiana (see fig. 1 for well locations; U.S. Geological Survey, 2012). Land surface is measured in feet above the National Geodetic Vertical Datum of 1929 (NGVD 29).

New Orleans aquifer produced saltwater at both of these centers (Prakken, 2009). In 2008, water levels in the Gonzales-New Orleans aquifer generally ranged from about 16 ft below NGVD 29 in northwestern Jefferson Parish to about 47 ft below NGVD 29 near Bridge City. The general direction of flow in the Gonzales-New Orleans aquifer north of the Mississippi River was toward the east-southeast (Prakken, 2009).

Water levels in the aquifer generally have risen since the 1970s in response to reduced withdrawals. Water levels in the Gonzales-New Orleans aquifer at well Jf-156, located north of Bridge City and the Mississippi River (fig. 1), have risen about 49 ft since the mid 1970s (fig. 4). Water levels in well Jf-178, located in northwestern Jefferson Parish along the shore of Lake Pontchartrain (fig. 1), have risen about 10 ft since 1997 (fig. 4).

A statistical summary of selected water-quality characteristics for freshwater samples from 28 wells screened in the Gonzales-New Orleans aquifer is listed in table 3. Based on median values of chemical constituents, freshwater from the aquifer is generally soft and generally does not exceed SMCLs for drinking water for pH and concentrations of iron and manganese. Dissolved solids concentrations are generally less than the SMCL of 500 mg/L but locally may exceed this level. Freshwater in the aquifer has a yellow color and exceeds the SMCL of 15 platinum cobalt units.

## Surface-Water Resources

The Mississippi River is the primary source of fresh surface water in Jefferson Parish (table 1). In 2010, about 810 Mgal/d of surface water were withdrawn from the Mississippi River in the parish, including about 65.0 Mgal/d

for public-supply, 4.19 Mgal/d for industrial use, and 740 Mgal/d for power generation. Most surface water withdrawn for power generation is used for cooling purposes and is returned to its source after use (Sargent, 2011). In 2010, about 0.04 Mgal/d were withdrawn in Jefferson Parish from miscellaneous streams for livestock. Notable surface-water bodies in or bordering Jefferson Parish include Lake Pontchartrain, Lake Cataouatche, Lake Salvador, Little Lake, Barataria Bay, and the Gulf of Mexico (fig. 1). There were no reported withdrawals from these sources in 2010.

Water samples collected and analyzed during 1977–2009 indicated that water in the Mississippi River at Belle Chasse (fig. 1) is generally hard and generally does not exceed the SMCLs for pH and 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). Mississippi River discharge data are not available for Jefferson Parish, but the average flow of the Mississippi River near Red River Landing, about 200 river miles upstream of the parish (fig. 1, index map), was about 460,000 cubic feet per second (about 298,000 Mgal/d) during the period 1928–76 (Wells, 1980). The flow in the Mississippi River at Red River Landing (07373290) is representative of flows in Jefferson Parish because there are no major tributaries or distributaries, and the river is mostly leveed between the landing and the parish.

**Table 3.** Summary of selected water-quality characteristics for freshwater in the Gonzales-New Orleans aquifer in Jefferson Parish, Louisiana, 1940–2008 (U.S. Geological Survey, 2009).

[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<sub>3</sub>, calcium carbonate; µg/L, micrograms per liter; SMCL, Secondary Maximum Contaminant Level established by the U.S. Environmental Protection Agency, (2012); NA, not applicable]

	Temperature (°C)	Color (PCU)	Specific conductance, field (µS/cm at 25 °C)	pH, field (SU)	Hardness (as CaCO <sub>3</sub> )	Chloride, filtered (as Cl)	Iron, filtered (µg/L as Fe)	Manganese, filtered (µg/L as Mn)	Dissolved solids, filtered
Gonzales-New Orleans aquifer (28 wells)									
Median	25.0	100	786	8.3	16	88	80	20	422
10th percentile	24.0	60	639	7.8	9	56	60	10	381
90th percentile	25.5	190	976	8.5	26	120	120	30	544
Number of samples	21	22	20	21	22	28	10	10	14
Percentage of samples that do not exceed SMCLs	NA	0	NA	90	NA	100	90	100	71
SMCLs									
	NA	15	NA	6.5–8.5	NA	250	300	50	500



**Table 4.** Summary of selected water-quality characteristics for the Mississippi River at Belle Chasse, Louisiana, 1977–2009.

[Values are in milligrams per liter, except as noted.  $\mu\text{S}/\text{cm}$ , microsiemens per centimeter;  $^{\circ}\text{C}$ , degrees Celsius; SU, standard units;  $\text{CaCO}_3$ , calcium carbonate;  $\mu\text{g}/\text{L}$ , micrograms per liter; <, less than; SMCL, Secondary Maximum Contaminant Level established by the U.S. Environmental Protection Agency (2012); NA, not applicable]

	Specific conduct- ance, field ( $\mu\text{S}/\text{cm}$ at 25 $^{\circ}\text{C}$ )	Oxygen, dissolved	pH, field (SU)	Hard- ness (as $\text{CaCO}_3$ )	Mag- nesium, filtered (as Mg)	Sodium, filtered (as Na)	Chlor- ide, filtered (as Cl)	Sulfate, filtered (as $\text{SO}_4$ )	Iron, filtered ( $\mu\text{g}/\text{L}$ as Fe)
Mississippi River at Belle Chasse, Louisiana <sup>1</sup>									
Median	408	8.2	7.7	150	12	22	28	48	15
10th percentile	316	6.1	7.2	120	9.3	13	17	34	<3
90th percentile	521	11.7	7.9	180	16	36	42	70	42
Number of samples	189	184	188	182	182	182	182	182	121
Percentage of samples that do not exceed SMCLs	NA	NA	100	NA	NA	NA	99	100	100
SMCLs									
	NA	NA	6.5–8.5	NA	NA	NA	250	250	300

<sup>1</sup>Station number 07374525 (U.S. Geological Survey, 2009; specific data at [http://nwis.waterdata.usgs.gov/la/nwis/qwdata/?site\\_no=07374525](http://nwis.waterdata.usgs.gov/la/nwis/qwdata/?site_no=07374525)).

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