WATER RESOURCES DATA - LOUISIANA, 2005

INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Louisiana each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Louisiana."

Water-resources data for the 2005 water year for Louisiana consist of records of stage, discharge, and water quality of streams; stage and contents of lakes; and water levels and quality of ground water. This report contains stage and discharge records for 77 stations, stage records for 92 stations, water-quality records for 54 surface-water stations and 137 wells, and water-level records for 277 wells. Also included are data for 158 crest-stage and flood-profile partial-record stations and additional water data collected at miscellaneous sites.

This series of annual reports for Louisiana began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Louisiana were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States, Parts 2, 7, and 8." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperatures, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." The above mentioned Water-Supply Papers may be consulted in the libraries of the principal cities of the United States and may be purchased from U. S. Geological Survey, Books and Open-File Reports Section, Federal Center, Building 810, Box 25425, Denver, CO 80225.

Publications similar to this report are published annually by the Geological Survey for all States. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this volume is identified as "U.S. Geological Survey Water-Data Report LA-02-1." For archiving and general distribution, the reports for 1971-74 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the Water Science Center Director at the address given on back of title page or by telephone (225) 298-5481.

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COOPERATION

The U.S. Geological Survey and organizations of the State of Louisiana have had cooperative agreements for the systematic collection of streamflow records since 1938, for ground-water levels since 1936, and for water-quality records since 1943. Organizations that assisted in collecting data during this water year through joint-funding agreements with the Survey are:

Louisiana Department of Transportation and Development, Johnny B. Bradberry, Secretary.

Louisiana Department of Wildlife and Fisheries, Dwight Landreneau, Jr, Secretary.

Louisiana Department of Environmental Quality, Hall Bahlinger, Secretary.

Louisiana Department of Natural Resources, Scott Angelle, Secretary.

Louisiana Office of Emergency Preparedness, Major General Bennett C. Landreneau, Director

Parish of Ascension, Ronnie Hughes, Parish President; Department of Public Works, Bill Roux, Director.

Caddo-Bossier Office of Emergency Prepardness, Chuck Mazziotti, Director

City of Baton Rouge and Parish of East Baton Rouge, Melvin L. “Kip” Holden, Mayor-President; Department of Public Works, Peter Newkirk, Director.

City of West Monroe, Dave Norris, Mayor; Water Department, Ronnie Turner, Director.

Capital Area Ground Water Conservation Commission, Joey Hebert, Chairman; Don Dial, Director.

Sabine River Compact Administration, composed of Vernon B. Sauer, and William B. Lewis for Louisiana; Danny Choate and Frank Parker for Texas.

Amite River Basin Drainage and Water Conservation District, Patrick Bell, President; Dietmar Rietschier, Executive Director.

Lafayette Parish Bayou Vermilion District, Edmond Mount, President; Kerry Collins, Executive Director.

Bayou D’Arbonne Lake Watershed District, Trout Hunt, President.

Parish of St. Tammany, Kevin Davis, Parish President; Department of Public Works, David deGeneres, Director.

Parish of Tangipahoa, Office of Emergency Preparedness, John G. Ballard.

Terrebonne Levee & Conservation District, Jerome P. Zeringue, Executive Director.

Bayou Lafourche Fresh Water District, Archie P. Chaisson, Jr., Director.

Concordia Parish Police Jury, Charlie Blaney, President.

Assistance in the form of funds or services was provided by the New Orleans District and Vicksburg District of the U.S. Army Corps of Engineers in collection of records for stage and discharge stations and for water-quality stations published in this report.

Organizations that supplied data are acknowledged in the station descriptions.

SUMMARY OF HYDROLOGIC CONDITIONS

Surface-Water Conditions

Throughout the upland non-coastal regions of Louisiana, streamflows are directly related to rainfall runoff patterns. Four index stations were used to indicate flow conditions throughout the State during the 2005 water year. The index stations are Pearl River near Bogalusa, Saline Bayou near Lucky, Amite River near Denham Springs, and Calcasieu River near Oberlin. Period-of-record and streamflow statistics for the 2005 water year are listed in the following table for the four streamflow index stations.

		Statistics of discharge during 2005 water year (cubic feet per second)			Statistics of discharge during period of record (cubic feet per second)		
Station identification	Period of record	Maximum daily mean	Minimum daily mean	Annual mean	Maximum daily mean	Minimum daily mean	Annual mean
02489500							
Pearl River near Bogalusa	1939-2005	41,500	1,910	11,100	127,000	1,020	10,100
07352000							
Saline Bayou near Lucky	1941-2005	4,190	5.70	295	11,100	1.40	177
07378500							
Amite River near Denham Springs	1938-2005	24,600	352	1,650	105,000	230	2,120
08013500							
Calcasieu River near Oberlin	1923-2005	16,600	27.0	1,050	67,600	16.0	1,150

During the 2005 water year, the statewide annual average rainfall was 54.49 inches, which was 4.51 inches below the statewide 30-year average. (Rainfall data were provided by the Louisiana Office of State Climatology, and can be accessed on the Internet at URL http://www.losc.lsu.edu/cgi-bin/newsmonthly.py) This produced below-normal annual mean discharge at two of the four streamflow index stations. At the Amite River near Denham Springs, located in central Louisiana, the annual mean discharge was 22 percent below the period-of-record mean annual discharge (fig. 1b). The annual mean discharge at the Calcasieu River near Oberlin, located in southwest Louisiana, was 9 percent below the period-of-record mean annual discharge (fig. 1b). At the other two index stations, however, the annual mean discharge was above the period-of-record annual mean discharge. Affected by rainfall events in the upper Pearl River Basin, the annual mean discharge at the Pearl River near Bogalusa, located in southeast Louisiana, was 10 percent above the period-of-record annual mean discharge (fig. 1a). Due to regional rainfall events during the first part of the 2005 water year, the annual mean discharge at the Saline Bayou near Lucky, located in north-central Louisiana, was 66 percent above the period-of-record mean annual discharge (fig. 1a).

In February, peak monthly discharges exceeded the long-term monthly discharges for each of the four index stations. At Amite River near Denham Springs and Calcasieu River near Oberlin, peak monthly mean discharges were nearly 50 percent above the respective long-term monthly mean discharges for each station (fig. 1b). At Saline Bayou near Lucky, a new record-high monthly mean discharge occurred in November (fig. 1a).

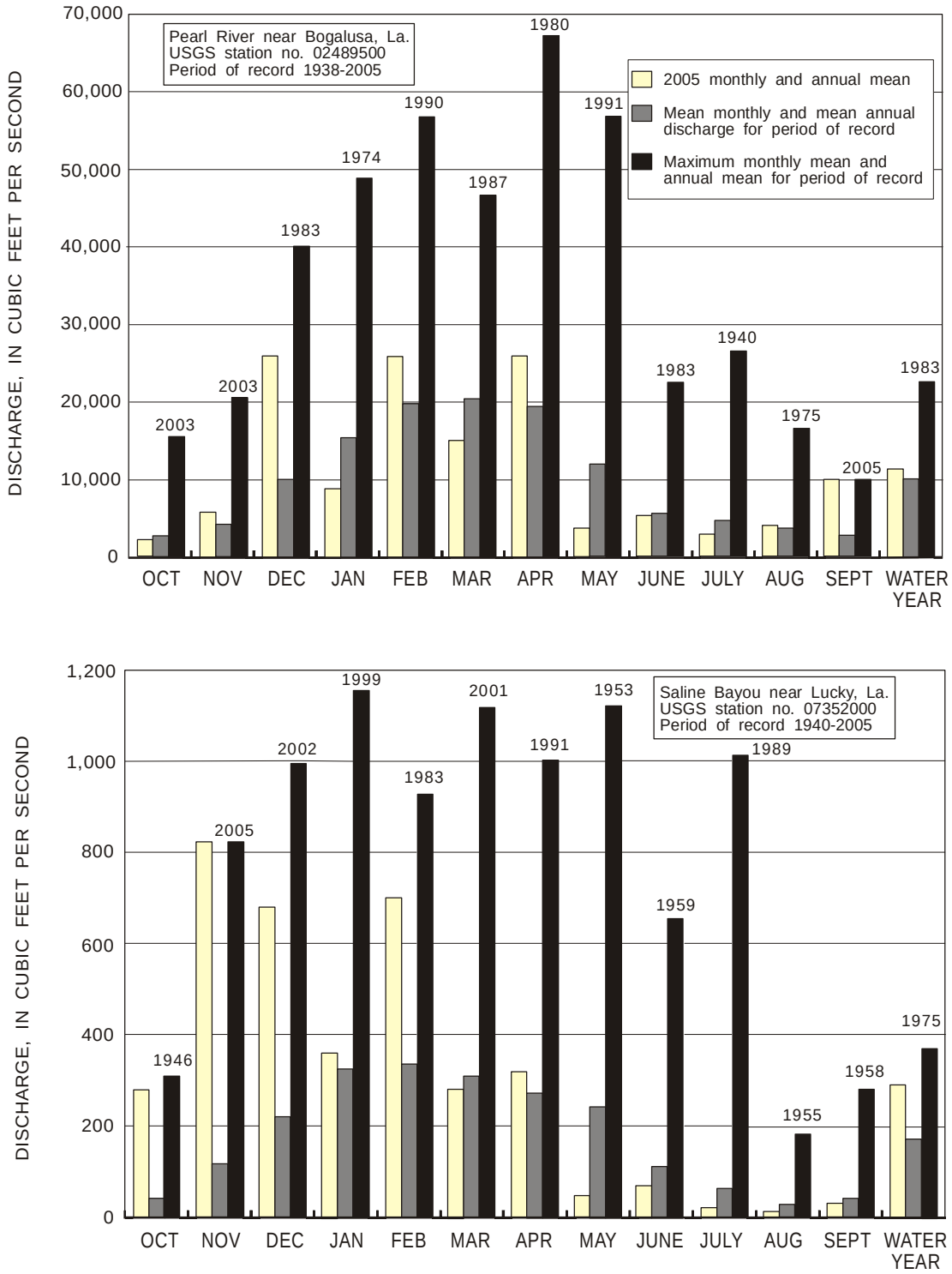
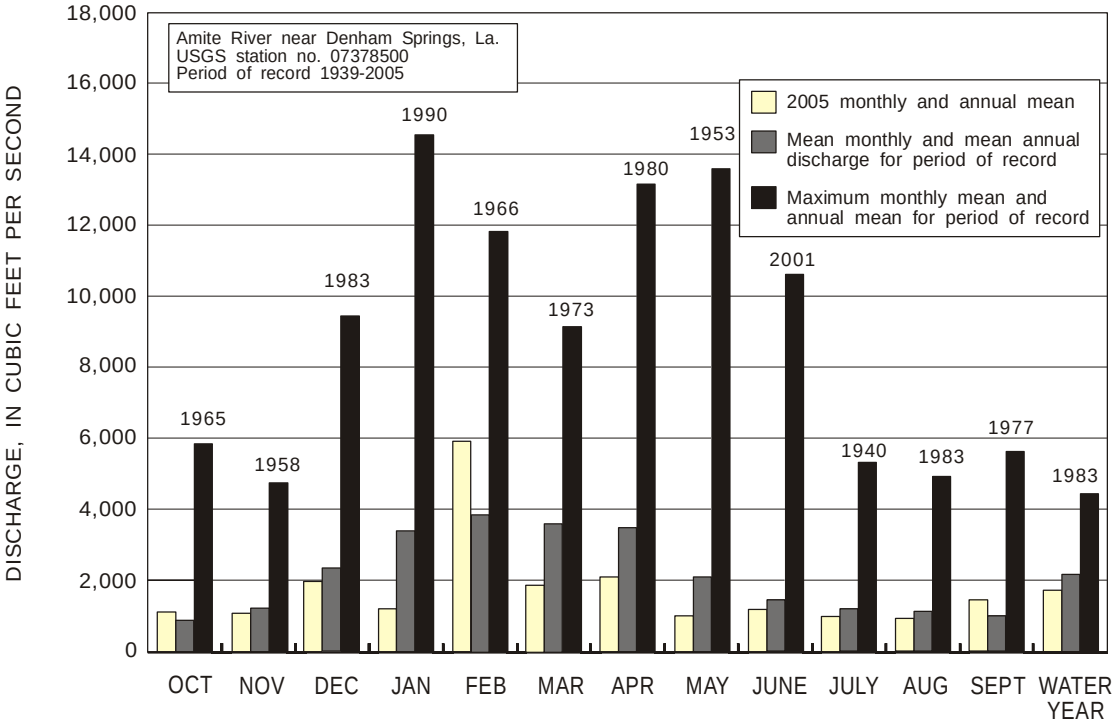


Figure 1a. Comparison of discharge during the 2005 water year with mean and maximum discharge for the period of record at four representative gaging stations.



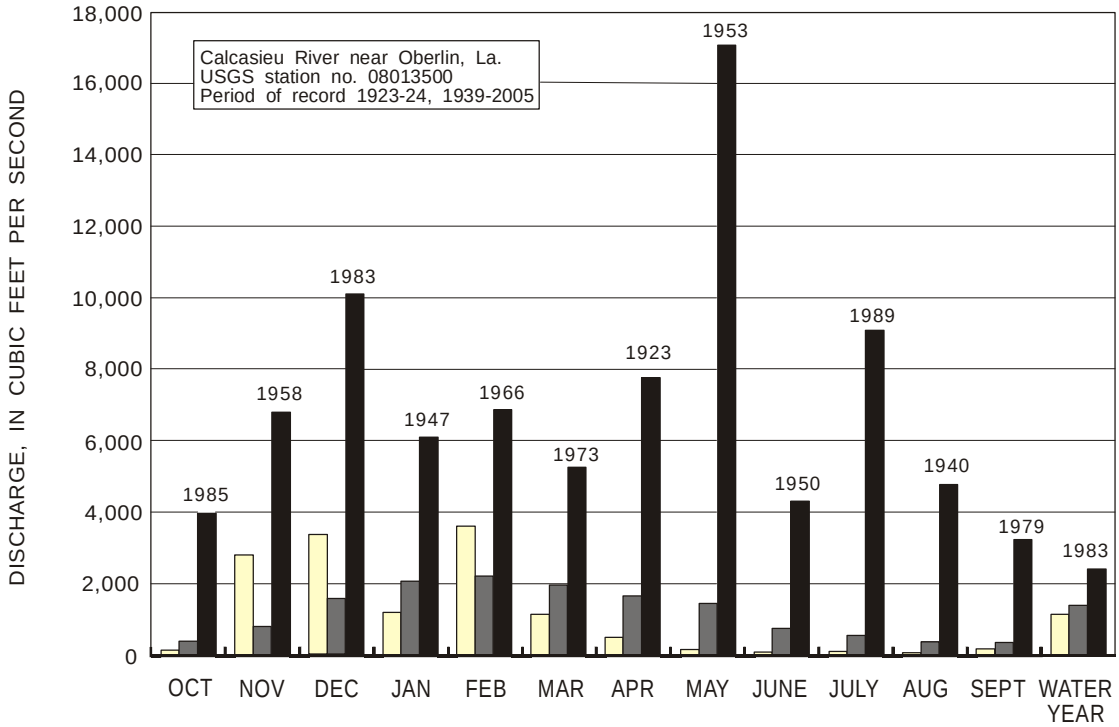


Figure 1b. Comparison of discharge during the 2005 water year with mean and maximum discharge for the period of record at four representative gaging stations--Continued.

Surface-Water Quality

During the 2005 water year, water-quality samples generally were collected bimonthly or monthly at eight sites along six streams and rivers throughout the State. Continuous records of temperature and specific conductance were collected at 42 sites. Suspended-sediment samples were collected bimonthly or monthly from the Mermentau, Mississippi, and Atchafalaya Rivers, and Whisky Chitto Creek (fig. 13).

Measured water temperatures during site visits ranged from 5.4 to 32.6 degrees Celsius; temperatures from continuous monitors ranged from 0.7 to 35.4 degrees Celsius. Dissolved-oxygen concentrations during site visits ranged from 1.1 to 13.0 mg/L. Specific conductance measurements during site visits at discrete sample stations ranged from 22 to 1,250 µS/cm, and measurements from continuous monitors ranged from 118 to 50,500 µS/cm. The pH of water-quality samples during site visits ranged from 5.9 to 8.8 standard units.

Suspended-sediment samples were collected at several sites along the Atchafalaya and Mississippi Rivers (fig. 13) by the U.S. Army Corps of Engineers and analyzed by the U.S. Geological Survey Louisiana Water Science Center Sediment Laboratory. Suspended-sediment load calculations were based on sample concentrations and discharge data (p. 62). The minimum suspended-sediment load was 4,990 T/day (tons per day) at station 07381495, Atchafalaya River near Melville, Louisiana; the maximum sediment load was 1,050,000 T/day at station 310552091361200, Mississippi River near Black Hawk, Louisiana.

In response to Hurricanes Katrina and Rita, water-quality samples were collected between September 22 and October 19, 2005, at 11 sites in or near Lake Pontchartrain. Samples were collected and analyzed for volatile organic compounds, pesticides, selected trace elements, major inorganic ions, chemical oxygen demand and nutrients. Temperature, specific conductance, dissolved oxygen, 5-day biochemical oxygen demand, and pH also were measured.

Ground-Water Levels

During the 2005 water year, water levels were monitored in approximately 300 network wells throughout the State. In Louisiana, water levels in many aquifers fluctuate in response to seasonal variations of pumping, river stage, or climate. Water-level data from some monitored wells show seasonal fluctuations, long-term declines, or a combination of both. Continuous long-term water-level declines (declines over several years) have occurred in aquifers with large sustained withdrawals. Long-term water-level declines continued in some wells screened in the Sparta aquifer, the Chicot aquifer system, and aquifers in southeastern Louisiana.

During the 2005 water year, water levels in many wells completed in the Sparta aquifer, such as well Wb-399, Webster Parish, fluctuated seasonally with no decline. Water levels in some wells, such as Ou-80, Ouachita Parish, and Cl-149, Claiborne Parish, continued a recovery that began around 1999. However, long-term water-level declines in the Sparta aquifer continued in other wells, such as Bi-144, Bienville Parish, and Ou-444, Ouachita Parish.

In the Mississippi River alluvial aquifer, water levels in many wells such as Co-215, Concordia Parish, EC-55, East Carroll Parish, and Fr-721, Franklin Parish, generally fluctuated seasonally with no long-term decline. However, water levels in wells Ri-114 and Ri-124, Richland Parish, showed seasonal fluctuations, but also continued a long-term recovery. Water levels in wells Ct-347, Catahoula Parish, Mo-842, Morehouse Parish, and WC-230, West Carroll Parish, showed seasonal fluctuations and a recovery that began around 2002 after a long period of decline during the 1990's.

Water levels in the Chicot aquifer system showed little change or slight recovery in most of the southwestern Louisiana. Water-level fluctuations of 10 ft or more in the Chicot aquifer system were primarily due to seasonal pumpage for irrigation. In the Lake Charles area, water levels continued to recover in wells Cu-851 and Cu-959, Calcasieu Parish. Water levels in wells Be-430, Beauregard Parish, and JD- 485A, Jefferson Davis Parish, fluctuated seasonally and continued a slight recovery that began around 2001.

In southeastern Louisiana, water levels changed little in most wells screened in the Mississippi River alluvial aquifer and the “400-foot,” “600-foot,” “800-foot,” “1,000-foot,” and “1,200-foot” sands of the Baton Rouge area. Slight water-level increases occurred in several wells, such as EB-933, EB-934, and EB-1019, East Baton Rouge Parish. Water levels declined 1 ft or more per year in some wells screened in the “1,500-foot,” “2,000-foot,” “2,400-foot,” and “2,800-foot” sands of the Baton Rouge area, as shown in hydrographs for EB-367, EB-468, EB-917, EB-944, and EB-1000, East Baton Rouge Parish. Declines also were noted at wells screened in the “2,800-foot” sand, such as wells EF-185 and EF-223, East Feliciana Parish, and WF-274, West Feliciana Parish.

During the water year, continuous water-level data were collected at seven wells in Louisiana. Daily values are presented in the “Ground-Water Levels” section of this report for these sites: Cu-851, Calcasieu Parish; EB-917, EB-1274, and EB-1293, East Baton Rouge Parish; EV-229, Evangeline Parish; JD-485, Jefferson Davis Parish; and Or-42, Orleans Parish.

Ground-Water Quality

During the 2005 water year, chloride concentrations were monitored in 86 network wells located throughout most of Louisiana. Ground-water samples were collected annually or semiannually from the wells. Specific conductance and water temperature were measured in the field. Samples were analyzed for chloride and specific conductance in the National Water Quality Laboratory (NWQL). Concentrations of chloride ranged from 2.1 to 9,050 mg/L in network wells. Chloride concentrations exceeded 250 mg/L in samples collected from 24 wells.

In northern Louisiana, chloride concentrations remained unchanged at most monitored wells in the Sparta aquifer. However, concentrations continued to increase slightly in well W-144B, Winn Parish (fig. 2a). Chloride concentrations also remained unchanged at most monitored wells in the Mississippi River alluvial aquifer. However, concentrations continued to increase slightly in wells Co-205, Concordia Parish, Mo-842, Morehouse Parish, and R-124, Richland Parish (figs. 2a and 2b).

Chloride concentrations continued to increase in areas where large withdrawals have induced saltwater encroachment in southeastern Louisiana. Increasing chloride concentrations have been detected in the “600-ft,” “1,200-ft,” “1,500-ft,” “2,000-ft,” and “2,400-ft” sands of the Baton Rouge area (figs. 2b and 2c).

In the Chicot aquifer system in southwestern Louisiana, chloride concentrations remained unchanged at most monitored wells. However, increasing chloride concentrations have been detected in the wells in St. Martin and Vermilion Parishes (fig. 2c).

In response to Hurricane Katrina, ground-water-quality samples were collected from 12 wells located near the northern shore of Lake Pontchartrain during September and October 2005. Temperature and specific conductance were measured in the field. The samples were analyzed for selected nutrients, selected inorganic ions, and pH.

Additional miscellaneous ground-water analyses collected for the National Water Quality Assessment Program and other programs are presented in separate tables.