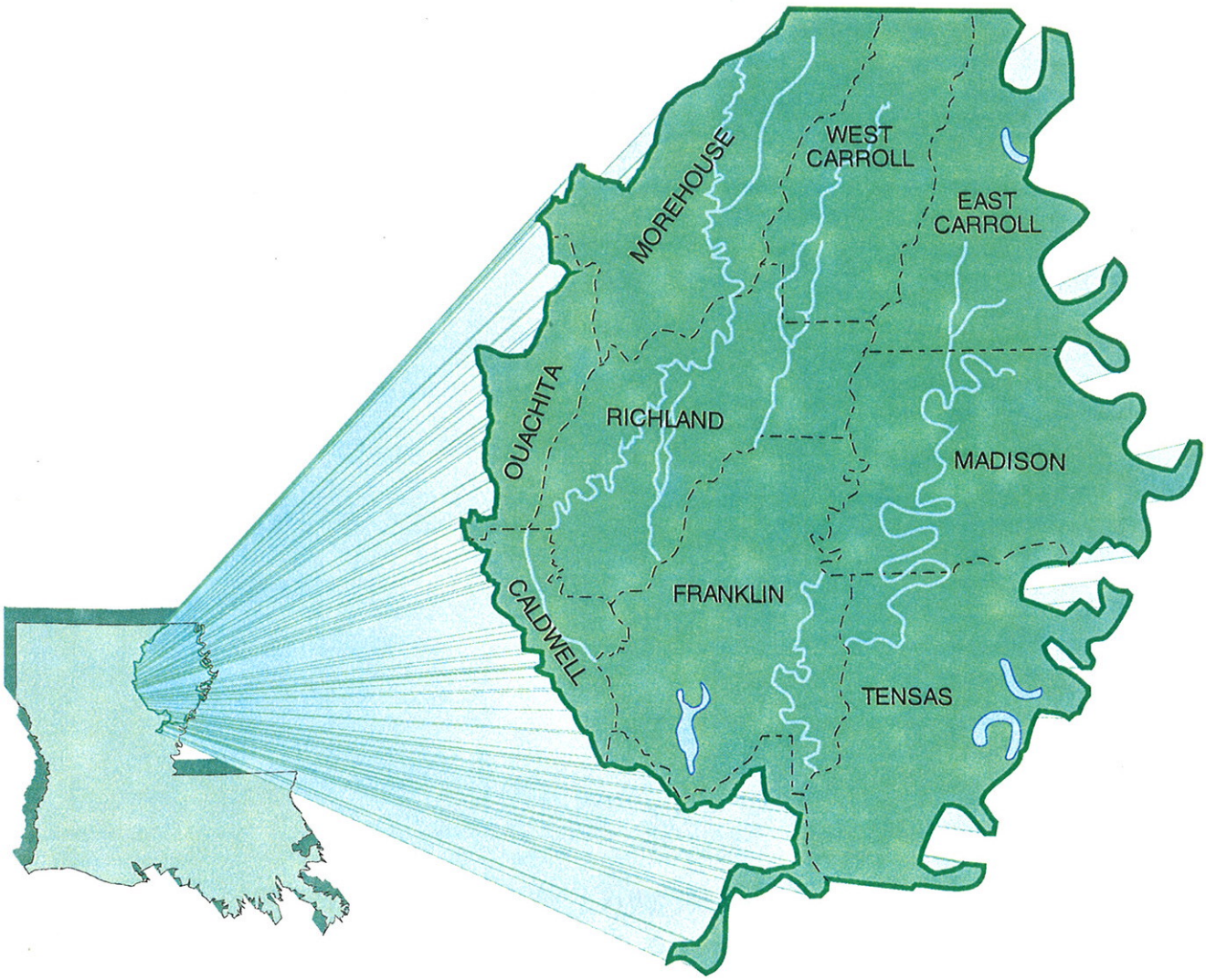
Statistical Summary of Surface-Water Quality in Louisiana--Tensas River Basin, 1943-93

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Water Resources Technical Report No. 55D



STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
PUBLIC WORKS AND FLOOD CONTROL DIRECTORATE
WATER RESOURCES SECTION
in cooperation with the
U.S. GEOLOGICAL SURVEY

1998

STATE OF LOUISIANA

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

PUBLIC WORKS AND FLOOD CONTROL DIRECTORATE

WATER RESOURCES SECTION

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U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

WATER RESOURCES

TECHNICAL REPORT NO. 55D

Statistical Summary of Surface-Water Quality in Louisiana--Tensas River Basin, 1943-93

By

Charles R. Garrison

U.S. GEOLOGICAL SURVEY

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Multiply	By	To obtain
inch (in.)	25.4	millimeter
mile (mi)	1.609	kilometer
acre	0.4047	hectare
cubic foot per second (ft^3/s)	0.0283	cubic meter per second
million gallons per day (Mgal/d)	0.04381	cubic meter per second

Temperature in degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) as follows: $°F = 1.8(°C) + 32$.

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Sea Level Datum of 1929."

Abbreviated water-quality units:

cells per milliliter (cells/mL)
colonies per 100 milliliters (cols/100 mL)
microsiemens per centimeter at 25 degrees Celsius (mS/cm)
micrograms per liter (mg/L)
milligrams per liter (mg/L)
nanograms per liter (ng/L)

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By Charles R. Garrison

ABSTRACT

A statistical summary of surface-water quality in the Tensas River basin was completed using available data from the U.S. Geological Survey Water-Data Storage and Retrieval System (WATSTORE), a computerized data base. Data for 33 water-quality properties and constituents for 18 sites in the Tensas River basin within Louisiana were statistically analyzed for the water years 1943-93. Results are reported as boxplots, linear-regression plots, and tabulated data.

The data were summarized into seven categories: (1) physical properties--specific conductance, pH, water temperature, dissolved oxygen and dissolved solids; (2) major inorganic cations--dissolved calcium, magnesium, sodium, and potassium; (3) major inorganic anions--total alkalinity as calcium carbonate, dissolved sulfate, and dissolved chloride; (4) trace metals--dissolved copper, iron, lead, and zinc; (5) nutrients--nitrogen and phosphorus constituents; (6) organic compounds--pesticides and PCB's; and (7) biological constituents--fecal coliform and fecal streptococcus bacteria and phytoplankton.

The physical properties values varied for surface waters in the Tensas River basin. The specific conductance values ranged from 38 µS/cm (microsiemens per centimeter at 25 degrees Celsius) at Bayou Macon near Delhi, to 1,680 µS/cm at Boeuf River near Fort Necessity. Values for pH ranged from 5.4 at Big Colewa Bayou near Oak Grove, to 9.7 at Lake St. Joseph near Newellton. Values for water temperatures ranged from 1.0 °C (degrees Celsius) at Boeuf River near the Arkansas-Louisiana State line to 39.0 °C at Lake St. Joseph near Newellton.

The dissolved oxygen concentrations were higher than the State's minimum water-quality criterion of 5.0 mg/L (milligrams per liter) in more than 75 percent of the samples analyzed at most sites. Although the statistical data indicated that more than 95 percent of the samples collected at Bayou Macon near Kilbourne, typically had concentrations of dissolved oxygen of more than 5.0 mg/L, there were low concentrations of dissolved oxygen in the oxbow lakes due to high temperatures in shallow still water bodies and to algal blooms.

An analysis of the data for major inorganic cations and anions indicated that concentrations of major ions were well below recommended levels for drinking water, for which such levels have been established. Additional data collection and analysis are needed to understand the cause for increased mineralization in the river.

An analysis of the available data for trace metals indicated that dissolved copper, lead, and zinc were less than the maximum contaminant levels of the U.S. Environmental Protection Agency's primary and secondary drinking water regulations. The iron concentrations in water from the basin occasionally exceeded the Environmental Protection Agency's Secondary Maximum Contaminant Level of 300 µg/L (micrograms per liter) for domestic water supplies at most of the sites but were less than the recommended maximum level of 1,000 µg/L for freshwater aquatic life.

The median concentration of ammonia plus organic nitrogen at Lake St. Joseph near Newellton was the maximum median (2.2 mg/L) for the entire basin, indicating eutrophication. The median concentrations of total phosphorus in the basin ranged from 0.04 to 0.30 mg/L, and generally were lower in the oxbow lakes.

An analysis of available data for selected organic chemical compounds indicated that concentrations of pesticides, except DDT, dieldrin, and 2,4-D, rarely exceeded their detection levels. However, DDT and 2,4-D occurred at 15 of the 16 sites for which data were available. To more completely characterize surface water in the basin in relation to these constituents, additional data collection and analysis are needed.

The median ratios of fecal coliform to fecal streptococcus bacteria were less than 0.7 for most of the sites within the Tensas River basin, indicating that sources of fecal coliform bacteria were probably predominantly livestock or poultry wastes. Additional study is needed to confirm these results. Phytoplankton concentrations varied from 0 to 4,300,000 cells per milliliter due to seasonal influence.

ACKNOWLEDGMENTS

The author extends his appreciation to Zahir "Bo" Bolourchi, Chief, Water Resources Section, of the Louisiana Department of Transportation and Development, for guidance and assistance provided during the study and his substantial contribution to the completion of this report. The Report Preparation Section of the Louisiana District was especially helpful in the completion of this report at early stages of preparation and different stages of review. The final preparation and layout of the report was a team effort. The team members were Sebastian R. Brazelton, Dorothy L. Collier, Cheryl A. Johnson, William C. Martin, and Darlene M. Smothers.

1.0 INTRODUCTION

THIS REPORT IS ORGANIZED INTO THREE PARTS AND PRESENTED IN "STOP" FORMAT[1]

A single topic is presented in text and pictures on facing pages.

This report, **"Statistical Summary of Surface-Water Quality in Louisiana--Tensas River Basin, 1943-93,"** is one of a series of reports in which surface-water-quality data for the major river basins in Louisiana will be statistically summarized. This report is organized into three parts (excluding the "Abstract"): the "Introduction," the "Tensas River Basin in Louisiana," and "Selected References."

The "Introduction" provides background information about the study, describes the hydrologic setting and land use in Louisiana, and presents a brief description of selected water-quality properties and constituents.

The section titled "Tensas River Basin in Louisiana," presents statistical analyses of the surface-water-quality data at selected representative sites in the basin. This basin summary section contains the following information:

- Maps and text giving an overview of the basin, including location, areal extent, drainage area, major drainage and surface-water bodies, land use, and water use.
- Boxplots and text describing statistical summaries of selected physical properties of surface waters at representative sampling sites.
- Graphs and text describing the relation between specific conductance and dissolved solids and specific conductance and dissolved chloride, at representative sampling sites.
- Boxplots, tables, and text describing statistical summaries of major inorganic chemical constituents; selected trace metals, nutrients, and organic chemical concentrations; and selected biological constituents (bacteria and phytoplankton).
- Summary and conclusions, which pertain only to the basin summary.

The "Selected References" lists all references that pertain to the water quality in the basin.

[1]This report is presented in "STOP" (Sequential Thematic Organization of Publications) format (Hobba, Jr., 1981, p. 1). In this format, topics are presented using text and illustrations on two facing pages. Generally, topics are presented on two facing pages in this report, but in a few places the information is continued on additional pages.

1.0 INTRODUCTION--continued

1.1 Background

SURFACE-WATER QUALITY OF THE MAJOR DRAINAGE BASINS IN LOUISIANA

A large amount of water-quality data is available for streams, rivers, and lakes in Louisiana.

Water-quality samples from streams, rivers, and lakes in Louisiana have been collected and analyzed by the U.S. Geological Survey (USGS) since 1905, and the USGS, in cooperation with local, State, and other Federal agencies, systematically has operated water-quality sites on streams, rivers, and lakes in the State since 1943. Results of the analyses are stored in the USGS computerized water-quality files and often are used to answer data requests and provide a large source of information for the managers of Louisiana's surface-water resources. Even though these data have been published in the USGS series of annual reports entitled Water Resources Data for Louisiana (Dantin and others, 1994) and in many other reports that describe surface-water quality, descriptive statistics for these data are needed to make the data more useful for water managers, to allow more complete answers to be given for information requests from the public, to indicate the need for additional water-quality data at existing or new sites, and to indicate problem areas where interpretive studies are needed.

In response to the above needs, the USGS, in cooperation with the Louisiana Department of Transportation and Development, began a study in October 1987 to statistically analyze and summarize water-quality data from about 300 surface-water-quality sites in Louisiana and to present the data in such a manner that trends, overall quality, and basin-wide changes in water quality could be evaluated. The study focused on the surface-water quality of the Mississippi River mainstem and the major drainage basins in Louisiana: the Lake Pontchartrain-Lake Maurepas basin; the Mississippi River Delta basin; the Atchafalaya-Teche-Vermilion basin; and the Calcasieu-Mermentaú, Ouachita, Pearl, Red, Sabine, and Tensas River basins (fig. 1.1-1).

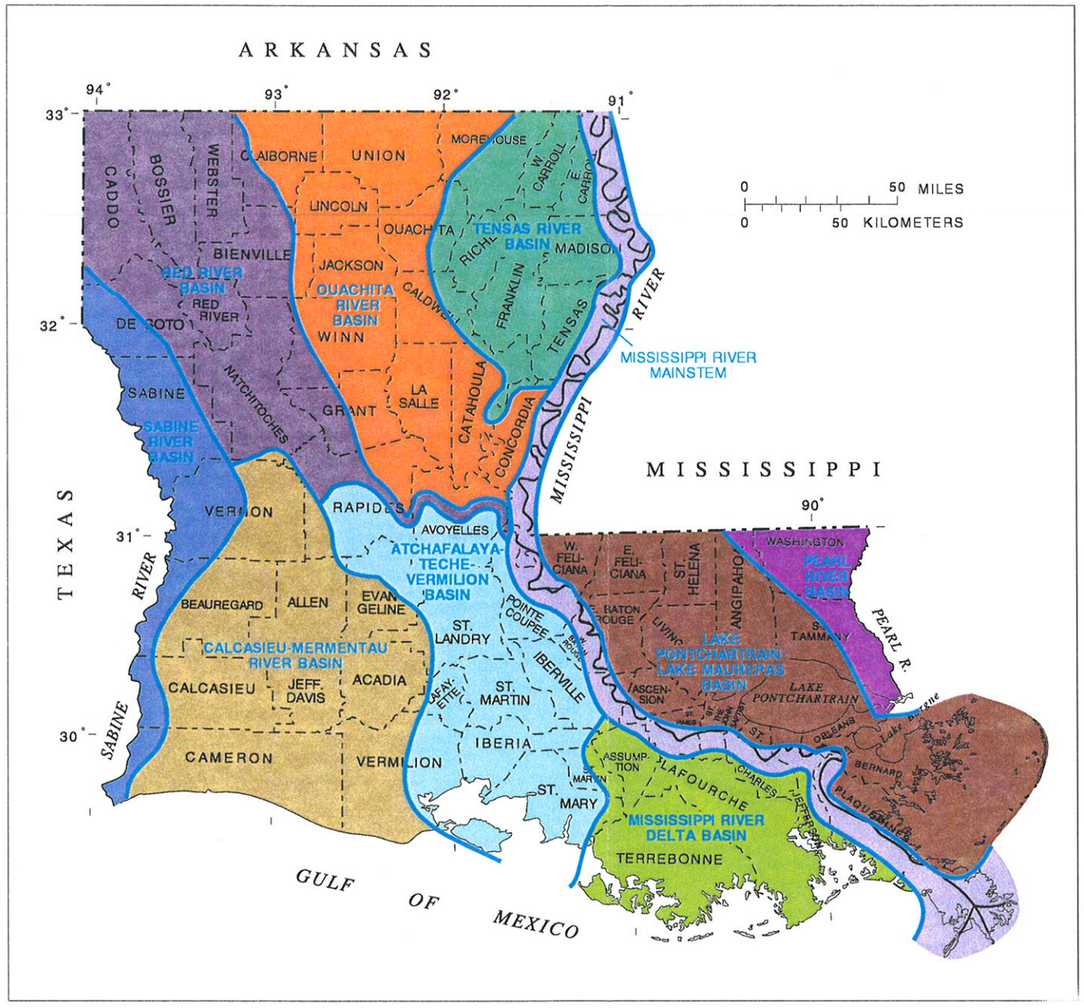

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Figure 1.1-1. Major surface-water basins in Louisiana.

1.2 Purpose and Scope

ANALYZE AND SUMMARIZE SURFACE-WATER-QUALITY DATA

Statistical analyses with illustrations describe water quality of the major drainage basins in Louisiana.

Statistical analyses of water-quality data and corresponding illustrations are presented for each major drainage basin in Louisiana. Nine of the 10 basins described in this study are those delineated by the Louisiana Department of Transportation and Development (1984). The mainstem of the Mississippi River is discussed separately from the Mississippi River Delta basin to preserve continuity of data for the Mississippi River.

Data for about 300 sites in Louisiana for water years 1905-95 were included in these statistical analyses. The number of water-quality sites varied from basin to basin, and the number and type of samples varied from site to site within a given basin. Pesticides, and occasionally, trace metals and nutrients are presented in tables when there are more than 10 samples, and most, or all, of the concentrations are below the largest detection level for the analytical methods used. Daily sediment data were collected at Bayou Grand Cane near Stanley, Bayou Castor near Logansport, and Bayou San Patricio near Benson in the Sabine River basin, and Pearl River near Bogalusa in the Pearl River basin. This information is presented in tables in the Sabine River basin and the Pearl River basin reports. All water-quality data and streamflow data used for the statistical analyses are stored in the USGS Water-Data Storage and Retrieval System (WATSTORE), a computerized data base (fig. 1.2-1). Only WATSTORE data were used for the study.

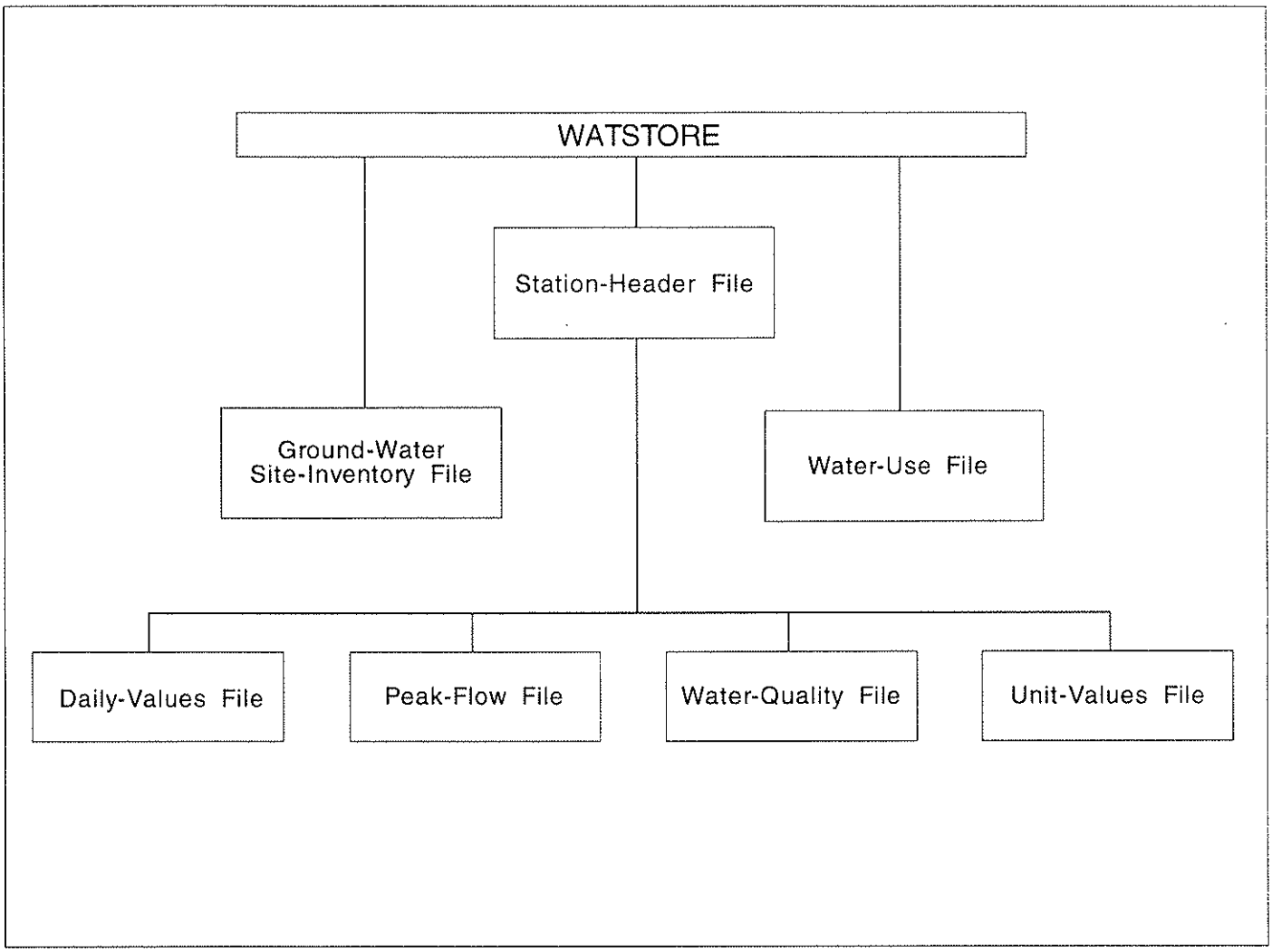

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Figure 1.2-1. Files in the U.S. Geological Survey Water-Data Storage and Retrieval System (WATSTORE).

1.3 Methods of Study

BOXPLOTS AND GRAPHS ILLUSTRATE WATER QUALITY AT SIX REPRESENTATIVE SITES IN A BASIN

Tables list statistical information for selected water-quality properties and constituents.

Data from six representative sites within a basin are presented graphically. Data from all sites within a basin that were sampled 10 or more times are summarized in tables for each basin. These tables list the following information and summary statistics for selected properties and constituents for each site: number of analyses; detection level; maximum, minimum, and mean values or concentrations; and values or concentrations representing the 5th, 25th, 50th, 75th, and 95th percentiles of the total sample population. The data for selected sites were used to generate boxplots and linear regression equations and graphs for selected properties and constituents.

Boxplots illustrate a statistical summary of water-quality data at a site (D.R. Helsel, U.S. Geological Survey, written commun., 1989) (fig. 1.3-1). Boxplots of specific conductance, pH, water temperature, dissolved oxygen, major inorganic cations, major inorganic anions, trace metals, nutrients, bacteria, and phytoplankton (where data were available), were developed for selected sites in each basin.

A boxplot summarizes a data set by displaying the values or concentrations representing the 5th, 25th, 50th, 75th, and 95th percentiles of the data. This format allows comparison among streams in the basin. The term percentile as used in this report refers to a distribution of values in the total data set. For example, the 25th percentile is the data value below which 25 percent of the data values occur (Sokal and Rohlf, 1969, p. 45). The 50th percentile is also the median of the data. The interquartile range is between the 25th and 75th percentiles. Fifty percent of the data are within this range.

A boxplot is constructed so the top and bottom of the box are drawn at the 75th and 25th percentiles. A line across the box indicates the median. The 95th and 5th percentiles are indicated by a vertical line from the top of the box to the 95th percentile and from the bottom of the box to the 5th percentile.

A horizontal dashed line indicates the analytical detection level. Because of changes in analytical procedures, the reporting level may have changed over time. When multiple reporting levels were used for some constituents, a dashed line was drawn across the boxplot at the largest reporting level used.

Another method used to evaluate water-quality data in this series of reports is linear regression (fig. 1.3-2). Linear regression equations were calculated in the form of $Y = aX + b$, where a is the slope of the regression line, b is the Y intercept, and Y and X are the dependent and independent variables (Sokal and Rohlf, 1969, p. 408). The number of data pairs, N, and the correlation coefficient, r, also are presented. The correlation coefficient indicates the degree of association between two variables. The closer the r value is to ± 1, the better the association. Linear regression equations and graphs are presented for specific conductance and dissolved solids and for specific conductance and dissolved chloride. However, extrapolation of the equations beyond the data used to define the equation could result in incorrect values because the relation may not be linear in that range.

Water-quality samples were collected and analyzed using techniques and methods prescribed by the USGS. Collection procedures for chemical constituents are determined by the Office of Water Quality within the USGS. Methods for chemical analyses are presented in "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments" (Fishman and Friedman, 1989). Collection procedures and analytical methods for biological constituents are presented in "Methods for Collection and Analysis of Aquatic Biological and Microbiological Samples" (Britton and Greeson, 1988). Collection procedures and analytical methods for organic constituents are presented in "Methods for the Determination of Organic Substances in Water and Fluvial Sediments" (Wershaw and others, 1983).

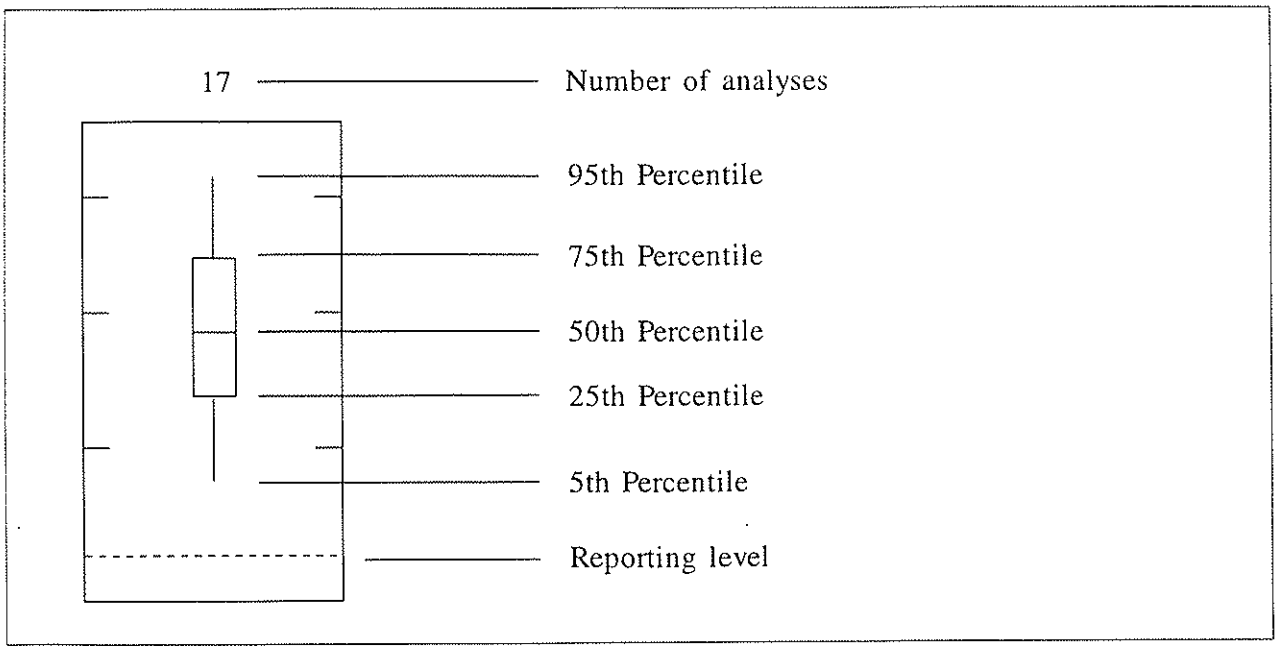

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Figure 1.3-1. Example and definition of boxplot.

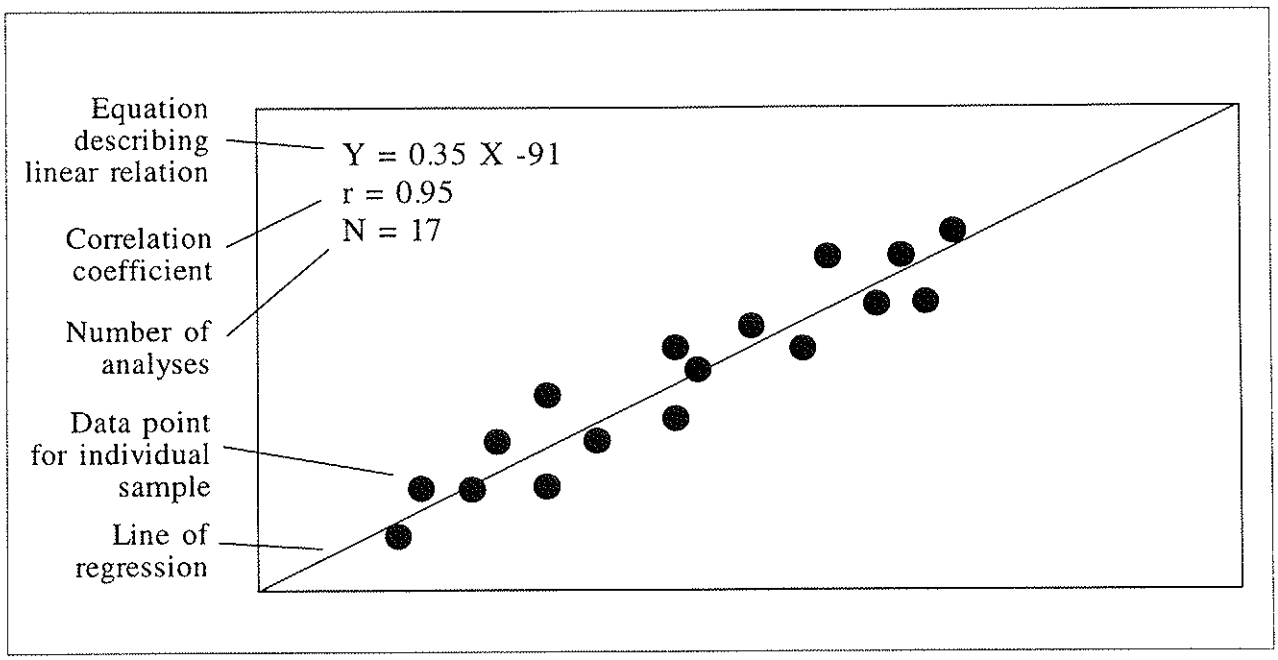

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Figure 1.3-2. Example and definition of linear regression.

1.4 Hydrologic Setting and Land Use in Louisiana

CLIMATE AND PHYSIOGRAPHY INDIRECTLY AFFECT WATER QUALITY

Climate and physiography are the primary factors that affect land use in Louisiana, and "the quality of Louisiana's streams, rivers, and lakes depends in large part on the uses of the land they drain" (U.S. Geological Survey, 1993, p. 293).

1.4.1 Climate

HUMID, SUBTROPICAL CLIMATE PREVAILS IN LOUISIANA

The mean annual precipitation ranges from about 48 inches in the northwestern part of the State to 64 inches in the southeastern part.

The relatively high annual rainfall and the year-round moderate air temperatures account for the humid, subtropical climate in Louisiana (Lee, 1985b, p. 2). Annual rainfall ranges from about 48 in. in the northwestern part of the State to about 64 in. in the southeastern part (fig. 1.4.1-1) (McWreath and Lowe, 1986; Muller and others, 1984). The most intense rainfall occurs during localized thunderstorms that produce large amounts of rainfall but move rapidly through an area.

Other sources of heavy rainfall are tropical storms and hurricanes. These storms intensify over the warm waters of the Gulf of Mexico and move slowly inland. During this inland movement, extremely heavy rainfall can occur over most of the State in a short period of time and can cause major flooding.

Mean annual air temperatures range from 19.0 °C in the northern part of the State to 20.5 °C in the southern part. The lowest temperatures usually occur during January and February and the highest temperatures occur during July and August (Lee, 1985b, p. 2).

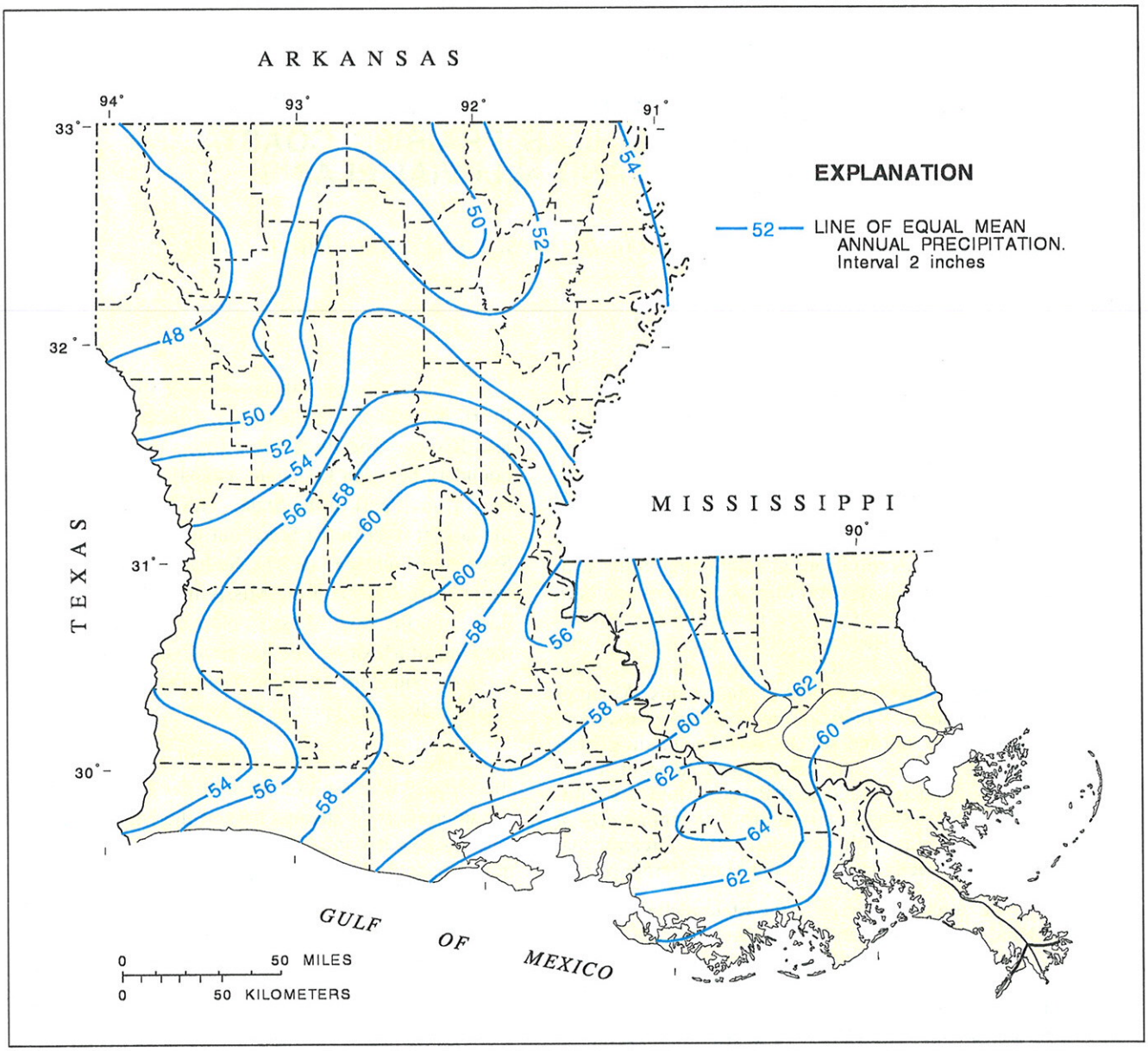

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Figure 1.4.1-1. Mean annual precipitation in Louisiana, 1951-80. (Source: Muller and others, 1984)

1.4.2 Physiography

LOUISIANA INCLUDES PARTS OF FOUR PHYSIOGRAPHIC DIVISIONS--PINE HILLS, PRAIRIES, COASTAL MARSHES, AND ALLUVIAL PLAINS

Major land uses include forests and agricultural lands.

Louisiana lies within the Coastal Plain Physiographic Province, and includes parts of four physiographic divisions--the Pine Hills, the Prairies, the Coastal Marshes, and the Alluvial Plains (Fenneman, 1938). These physiographic divisions are shown in figure 1.4.2-1. Parts of north-central, western, and southeastern Louisiana are in the Pine Hills division. The topography of this division is undulating hills with extensive pine and hardwood forests. Parts of southern and southwestern Louisiana are in the Prairies physiographic division. The land surface elevations in the Prairies range from 20 to 30 ft above sea level. This area generally is treeless except along streams. Much of coastal Louisiana is in the Coastal Marshes division. These areas are flat and subject to tidal flooding from the Gulf of Mexico. The flood plains adjacent to the Mississippi, Ouachita, and Red Rivers are in the Alluvial Plains physiographic division. The topography of these areas is flat with interconnecting streams that allow flow between the river basins (Lee, 1985b, p. 3).

The major land uses in the State include forests, cropland, grazing land, and wetlands (Louisiana Department of Transportation and Development, 1984, p. 24-28). Even though most land is well suited to agriculture, some areas support industry, oil and gas production, and aquaculture (U.S. Geological Survey, 1993, p. 293).

The principal rivers draining the State are the Pearl, Mississippi, Atchafalaya, Ouachita, Sabine, and Red Rivers. The Pearl River forms part of the eastern boundary between Louisiana and Mississippi and drains only a small part of the State. The Mississippi River is the largest river in the State, but few streams within the State are tributary to it. The Atchafalaya River is a controlled distributary of the Mississippi River, and carries flow from the Red, Mississippi, and Ouachita Rivers to the Gulf of Mexico. The Sabine River forms part of the western boundary between Louisiana and Texas and drains only a small part of the State.

All other streams in the State are tributary to these rivers with the exception of two groups. The first group consists of streams east of the Mississippi River and west of the Pearl River. This group includes the Tchefuncte, Tangipahoa, and Amite Rivers. These rivers eventually flow into the Gulf of Mexico by way of Lake Pontchartrain and Lake Maurepas. The second group includes rivers west of the Mississippi River and east of the Sabine River. Major streams in this group are Bayou Teche and the Vermilion, Mermentau, and Calcasieu Rivers. These rivers flow into the Gulf of Mexico.

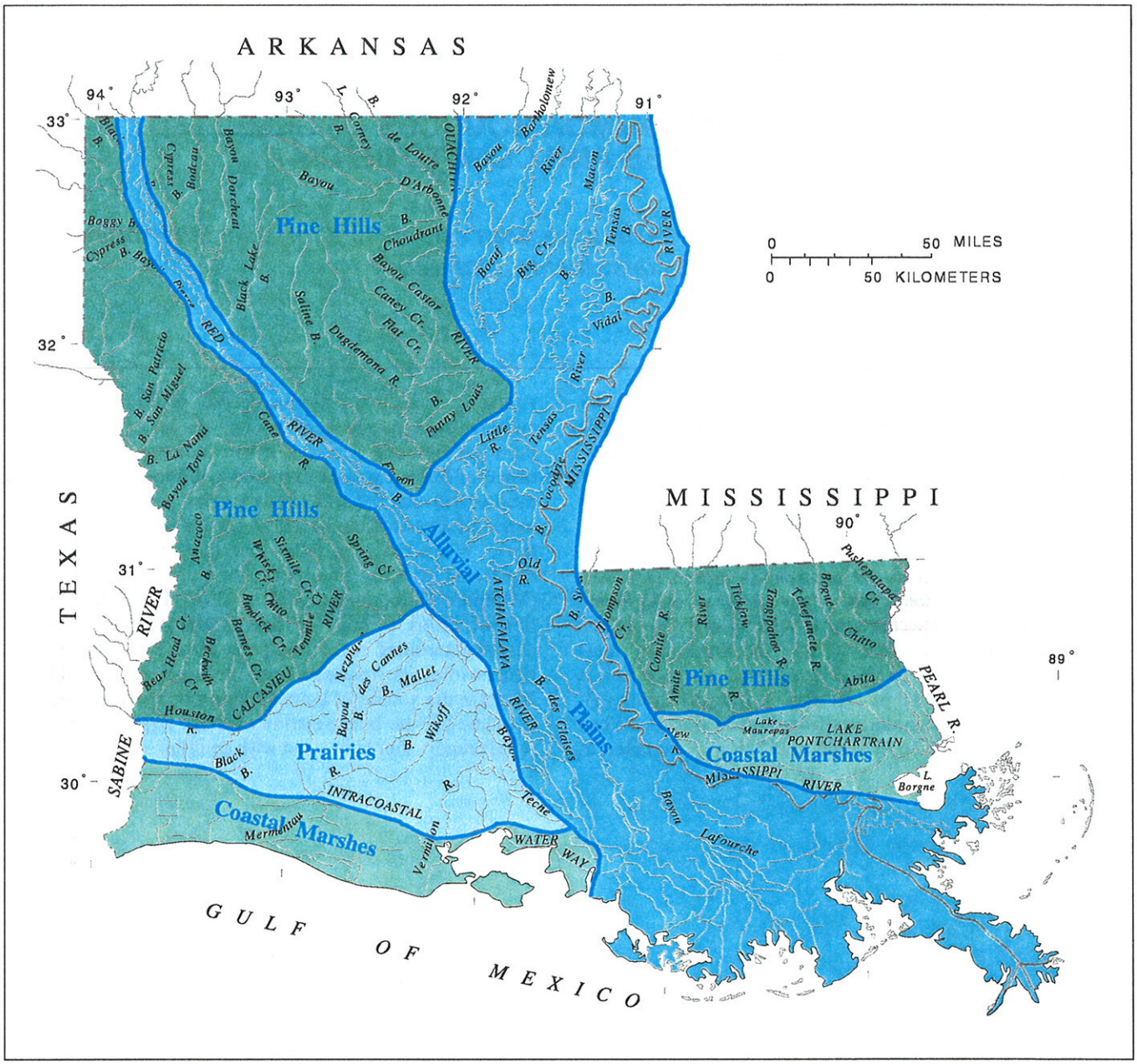

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Figure 1.4.2-1. Physiographic divisions and streams in Louisiana. (Source: Lee, 1985b, p. 4)

1.5 Surface-Water-Quality Properties and Constituents

TABLE INCLUDES COMMON SOURCES OF SELECTED PROPERTIES AND CONSTITUENTS

Federal regulations and State criteria have been established for selected properties and constituents analyzed.

Table 1.5-1 describes selected water-quality properties and constituents discussed in this report. The table lists common sources of the properties and constituents and their environmental significance, and where available, the Federal regulations and State criteria are presented.

In addition to the information presented in this table, it may be noted that values for fecal coliform and fecal streptococcus bacteria have a special importance when compared to each other. "When the ratio (fecal coliform bacteria to fecal streptococcus bacteria) is greater than or equal to 4, it may be taken as strong evidence that pollution derives from human wastes. When the ratio is less than or equal to 0.7, it may be taken as strong evidence that pollution derives predominantly or entirely from livestock or poultry wastes. When the ratio lies between 2 and 4, it can indicate a predominance of human wastes in mixed pollution. When the ratio is between 0.7 and 1.0, it can indicate a predominance of livestock and poultry wastes in mixed pollution. When the ratio falls on values from 1 to 2, it represents a 'grey area' of uncertain interpretation" (Millipore Corporation, 1972, p. 36). This interpretation of ratios is most reliable when the two counts describe samples collected at the same site within 24 hours of flow downstream from the source of pollution. Because the source of contamination in most instances is unknown, the interpretation of these ratios presented in this report should be used with caution.

Table 1.5-1. Common sources of properties and constituents, their environmental significance, and Federal regulations and State criteria

[Source: U.S.Environmental Protection Agency (USEPA), 1976; 1986; 1994; 1996; Louisiana Department of Environmental Quality (DEQ), 1984; Hem, 1985; Tobin and Youger, 1977.
NE, no established criteria; SMCL, secondary maximum contaminant level; °C, degrees Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter;
MCL, maximum contaminant level; Proposed MCL, proposed maximum contaminant level; ng/L, nanograms per liter; cols/100 mL, colonies per 100 milliliters]

Property or constituent	Common source	Environmental significance	USEPA Federal water-quality regulations[1]	DEQ State water-quality criteria
Physical properties				
Specific conductance	Ions within the water.	Indicates the presence of precipitation, dilution, evaporation, and metabolic uptake and release of chemicals.	NE	NE
pH	Hydrogen-ion activity.	May indicate oxidation of some form of sulfur or iron.	SMCL is 6.5-8.5 and 6.5-9.0 is the recommended range for freshwater aquatic life.	6.0-9.0 and no effluent will cause pH to vary by more than 1.0.
Water temperature	Seasonal changes; daily variance outside discharges into waterbody.	Affects migration patterns and colonization characteristics; accelerates biodegradation; decreases maximum oxygen concentration.	See U.S. Environmental Protection Agency (1976, p. 218).	Freshwater: (1) Maximum of 2.8 °C rise above ambient for streams. (2) Maximum of 1.7 °C rise above ambient for lakes. (3) Maximum temperature of 32.2 °C except where otherwise listed. Estuarine and coastal waters: (1) Maximum of 2.2 °C rise above ambient October through May. (2) Maximum of 0.83 °C rise during June through September. (3) Maximum temperature of 35.0 °C except when natural conditions elevate temperature above this level.
Dissolved oxygen	Transferred from the atmosphere; photosynthesis by aquatic plants.	Inadequate dissolved oxygen can have adverse effect on aquatic life.	For freshwater aquatic life and coastal marine water, 5.0 mg/L.	For freshwater and coastal marine water, 5.0 mg/L.
Total dissolved solids.	Inorganic salts and some organic materials.	Excess can cause pipe corrosion or have detrimental effects on sensitive crops if used for irrigation.	SMCL is 500 mg/L. 250 mg/L for chlorides and sulfates in domestic water supplies (welfare).	State criteria vary from stream to stream.
Major inorganic cations				
Calcium, dissolved	Occurs in igneous-rock minerals, silicate minerals, and as carbonates in sedimentary rocks.	Important for animal and plant nutrition.	NE	NE
Magnesium, dissolved	Carbonate sedimentary rock forms such as limestone.	Important for animal and plant nutrition.	NE	NE
Sodium, dissolved	Occurs in igneous and sedimentary rocks, especially evaporites.	Excessive sodium in drinking or irrigation water can have detrimental effects on plants and consumers.	No water-quality contaminant level is recommended for home drinking water.	NE
Potassium, dissolved	More abundant in sedimentary rocks than igneous rocks.	Essential plant nutrient.	NE	NE
Major inorganic anions				
Alkalinity, as calcium carbonate	Caused by the presence of bicarbonates, carbonates, and hydroxides. Function of pH and temperature.	Buffers water against pH changes.	For freshwater aquatic life, 20 mg/L.	NE
Sulfate, dissolved	Can be dissolved from gypsum, sodium sulfate, and some types of shales. Mining activities, industrial waste, and organic matter.	Concentrations exceeding a natural, background level indicate contamination from human activity; in sufficient quantity, can cause water to be unsuitable for public supply; can harm aquatic organisms.	SMCL is 250 mg/L.	Maximum contaminant level is 250 mg/L.
Chloride, dissolved	Common in brine and a primary constituent in seawater; evaporite sediment.	Associated with sodium and, if present in excess, can be detrimental in water used for drinking or irrigation.	SMCL is 250 mg/L	For instream concentration, 250 mg/L.
Trace metals				
Copper, dissolved	Malachite and cuprite. Oxides and sulfates are used in algicides, pesticides, and fungicides.	Important for the synthesis of chlorophyll.	SMCL is 1,000 µg/L.	NE
Iron, dissolved	Present in igneous-rock minerals and in sedimentary rocks.	Important for plant and animal nutrition.	SMCL is 300 µg/L.	NE
Lead, dissolved	Often result from mining, smelting, and other industrial operations. May occur naturally as lead sulfide.	Toxic, bioaccumulative. Has no nutritional value.	MCL is 15 µg/L at the tap. For sensitive freshwater resident species, 0.01 times the 96-hour LC_{50} value, using the receiving or comparable water as the diluent and soluble lead measurements (using an 0.45 micron filter).	NE
Zinc, dissolved	Used in the metallurgy, paint, rubber, and photo-engraving industries.	Important for animal metabolism. However, small quantities can be toxic to aquatic plants, animals, and bacteria.	SMCL is 5,000 µg/L.	NE
Nutrients				
Ammonia plus organic nitrogen, total	Sewerage or industrial contamination.	Ammonia reactions with chlorine can result in the formation of chloramine compounds. Organic nitrogen can be an indicator of organic pollution.	NE	NE
Nitrite plus nitrate, nitrate, and nitrite as nitrogen, total.	Fertilizers and animal and human wastes.	Plant nutrient that can be an indication of wastes.	MCL for nitrite plus nitrate is 10 mg/L, nitrate is 10 mg/L, and nitrite 1.0 mg/L.	NE
Phosphorus, total	Results from leaching of rocks and soil, decomposition of plants and animals, from fertilizers, sewerage, and industrial waste.	Although it is not toxic to man, it is bioaccumulative and toxic to certain forms of aquatic life. High concentrations promote undesirable plant growth causing eutrophication of lakes.	NE	NE
Pesticides and other organics				
DDT, total	Insecticides.	Bioaccumulative and toxic.	For freshwater and marine aquatic life, 0.001 µg/L.	For freshwater, 1.1 µg/L. For public water supply, 0.24 ng/L.
PCB, total	Found in capacitors and transformers used in the electrical industry.	Bioaccumulative and toxic.	For freshwater aquatic life, 0.014 µg/L. Ingestion of contaminated water and aquatic organisms should be zero.	For freshwater, 2.0 µg/L. For public water supply, 0.79 ng/L.
Diazinon, total	Insecticides.	Bioaccumulative and toxic.	NE	NE
Lindane, total	Insecticides.	Bioaccumulative and toxic.	For domestic water supply, 0.2 µg/L. For freshwater aquatic life, 0.01 µg/L.	NE
Chlordane, total	Insecticides.	Bioaccumulative and toxic.	For freshwater aquatic life, 2.4 µg/L.	For freshwater, 2.4 µg/L. For public water supply, 4.6 ng/L.
Malathion, total	Insecticides.	Bioaccumulative and toxic.	For freshwater and marine aquatic life, 0.1 µg/L.	NE
Endrin, total	Insecticides.	Bioaccumulative and toxic.	For freshwater aquatic life, 0.18 µg/L. MCL is 2.0 µg/L.	For freshwater, 0.18 µg/L. For public water supply, 1.0 µg/L.
Parathion, total	Insecticides.	Bioaccumulative and toxic.	For freshwater and marine aquatic life, 0.04 µg/L.	NE
Endosulfan, total	Insecticides.	Bioaccumulative and toxic.	For freshwater aquatic life, 0.22 µg/L. To protect public health, 74 µg/L.	NE
2,4-D, total	Herbicides.	Bioaccumulative and toxic.	For domestic water supply, 70 µg/L.	For public water supply, 100 µg/L.
Biological constituents				
Fecal coliform	Human wastes	Indicator of pathogens.	Based on minimum of 5 samples collected over a 30-day period, the level should not exceed a log mean of 200 cols/100 mL, nor should more than 10 percent of the total samples collected during any 30-day period exceed 400 cols/100 mL.	Based on a minimum of 5 samples collected over a 30-day period, the level should not exceed a log mean of 200 cols/100 mL, nor should more than 10 percent of the total samples collected during any 30-day period exceed 400 cols/100 mL.
Fecal streptococcus	Livestock and poultry wastes.	Indicator of pathogens.	NE	NE
Suspended sediment				
Suspended sediment	Sand, silt, clay, and organic material which enter a stream either from hillslope erosion or directly from the streambed.	Long periods of high concentrations of sediment can interfere with photosynthesis, bury benthic organisms, inhibit respiration of gilled organisms, and ultimately alter the aquatic ecosystem.	NE	NE

[1] *Primary Drinking-Water Regulations maximum contaminant level (February 1996):* Enforceable, health-based regulation that is to be set as close to the maximum contaminant level goal as is feasible. The definition of feasible means the use of best technology, treatment techniques, and other means that the Administrator of USEPA finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are generally available (taking cost into consideration).

Proposed maximum contaminant level: Not enforceable.

Secondary Drinking-Water Regulations secondary maximum contaminant level: Contaminants that affect the aesthetic quality of drinking water. At high concentrations or values, health implications as well as aesthetic degradation may also exist. SMCLs are not federally enforced, but are intended as guidelines for the states.

2.0 TENSAS RIVER BASIN IN LOUISIANA

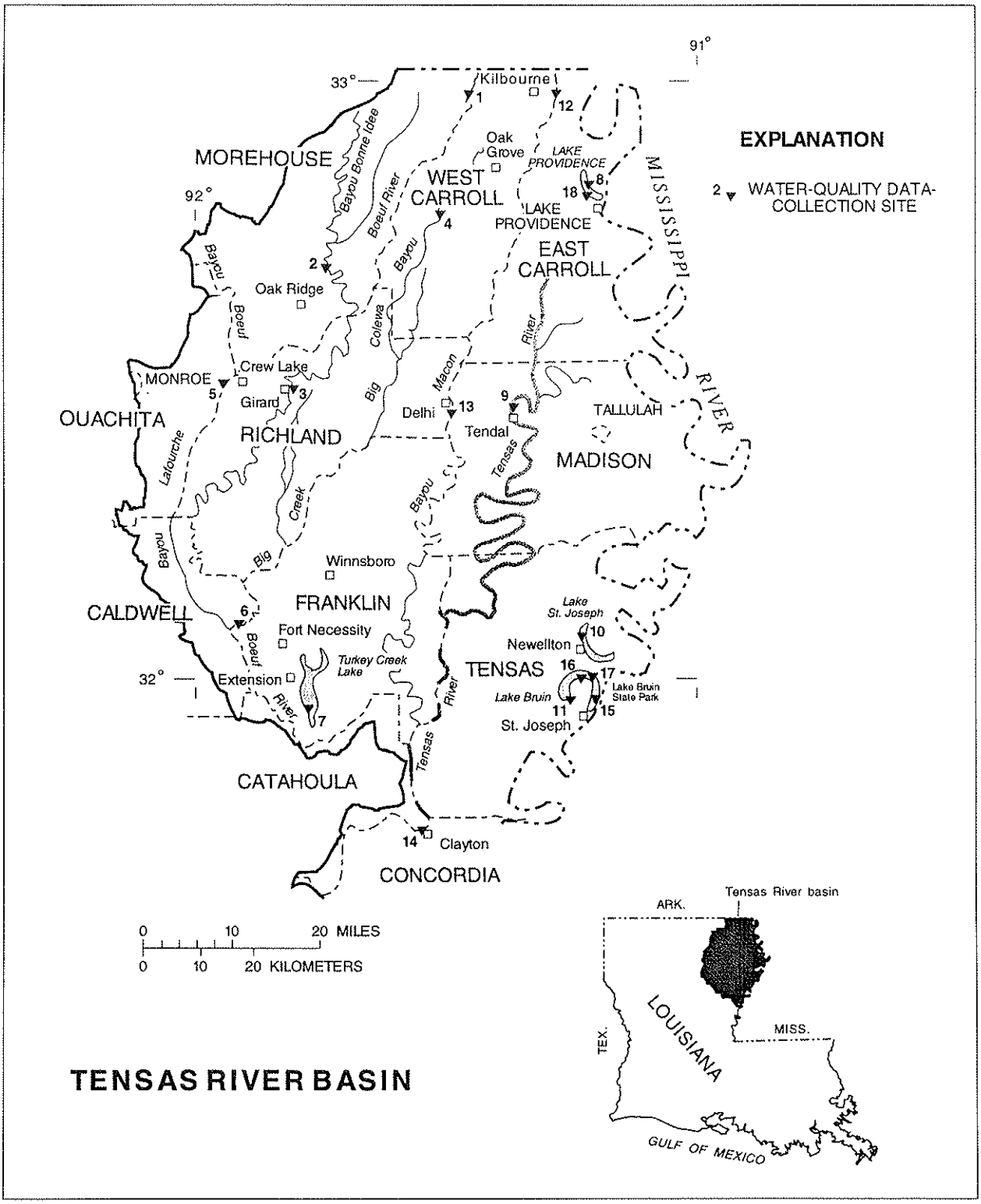
STATISTICAL SUMMARY OF SURFACE-WATER QUALITY IN THE TENSAS RIVER BASIN

Data from 18 sites are presented.

Statistical analyses of surface-water-quality data for the Tensas River basin are presented in this part of the report. Text, maps, boxplots, graphs, and tables are used to describe the surface-water quality. Data are presented for 33 water-quality properties and constituents for analyses stored in the USGS WATSTORE files. The data were collected from 18 sites (table 2.0-1 and fig. 2.0-1) in the basin during water years 1943-93. This information is useful to Federal, State, and local planners; hydrologists; engineers; scientists; and others who have water-resources management responsibilities for the Tensas River basin.

Table 2.0-1. Surface-water-quality data-collection sites in the Tensas River basin, Louisiana, 1943-93

Map no. (fig. 2.0-1)	Site name and location	Map no. (fig. 2.0-1)	Site name and location
1	Boeuf River near Arkansas-Louisiana State Line	10	Lake St. Joseph near Newellton
2	Bayou Bonne Idee near Oak Ridge	11	Lake Bruin at southwest end near St. Joseph
3	Boeuf River near Girard	12	Bayou Macon near Kilbourne
4	Big Colewa Bayou near Oak Grove	13	Bayou Macon near Delhi
5	Bayou Lafourche near Crew Lake	14	Tensas River at Clayton
6	Boeuf River near Fort Necessity	15	Lake Bruin at Lake Bruin State Park, near St. Joseph
7	Turkey Creek Lake near Extension	16	Lake Bruin, south, near Newellton
8	Lake Providence north of Lake Providence	17	Lake Bruin, in center, near Newellton
9	Tensas River at Tendal	18	Lake Providence near Lake Providence



Louisiana Department of Transportation and Development-U.S. Geological Survey Water Resources Cooperative Program

Figure 2.0-1. Surface-water-quality data-collection sites in the Tensas River basin, Louisiana, 1943-93.

2.1 Overview

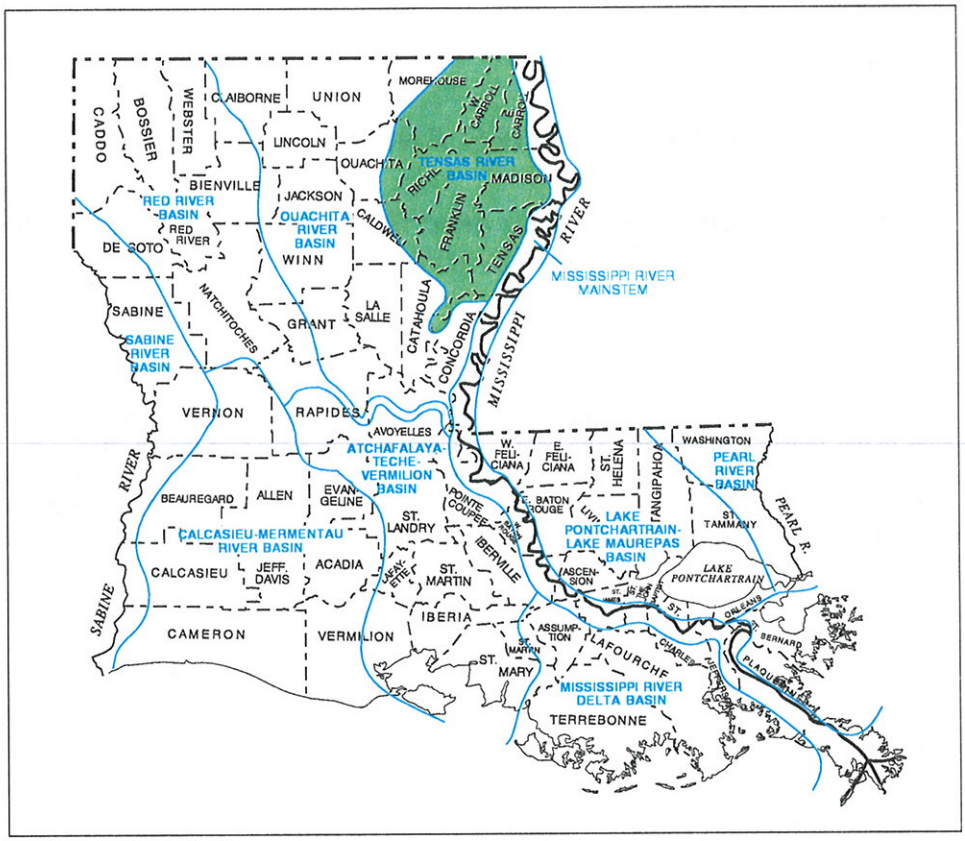
TENSAS RIVER, BAYOU LAFOURCHE, BOEUF RIVER, BAYOU MACON, AND THREE OXBOW LAKES ARE PRINCIPAL SOURCES OF SURFACE WATER

Surface water within the Tensas River basin is mainly used for irrigation, public supply, and industry.

The Tensas River basin in Louisiana (fig. 2.0-1) is about 88 mi long and 65 mi wide at its widest point. Most of the Tensas River basin is being used for agriculture. Water-resource problems include inadequate quantities of surface water for irrigation (Louisiana Department of Transportation and Development, 1984). Surface waters in the basin are used mainly for irrigation, public supply, and industry (fig. 2.1-1) (Lovelace, 1991, p. 133).

The principal sources of fresh surface water in the basin are the Tensas River, Bayou Lafourche, Boeuf River, Bayou Macon, Lake Bruin, Lake Providence, and Lake St. Joseph. The minimum average discharge within the basin was 51.1 ft^3/s at Big Colewa Bayou near Oak Grove for the period 1949-77 (U.S. Geological Survey, 1977, p. 139), and the maximum average discharge was 1,850 ft^3/s at Bayou Lafourche near Crew Lake for the period 1938-93 (Dantin and others, 1994, p. 119). The oxbow lakes have surface areas that range from 1,200 acres at Lake St. Joseph to 2,340 acres at Lake Bruin (Louisiana Department of Transportation and Development, 1984, p.189). Other bodies of fresh surface water in the basin include Bayou Bonne Idee and Turkey Creek Lake.

Two concerns for water quality in the basin are low (less than 5.0 mg/L) concentrations of dissolved oxygen in deeper parts of the lakes because of stratification, and the occurrence of pesticides within the basin.



Louisiana Department of Transportation and Development-U.S. Geological Survey Water Resources Cooperative Program

Withdrawals by Category

Category	Amount (Mgal/d)
Public supply	11.11
Industry	6.68
Power generation	.00
Rural domestic	.00
Livestock	.11
Rice irrigation	14.56
General irrigation	4.48
Aquaculture	.05
TOTAL	36.99

Withdrawals by Parish

Parish	Amount (Mgal/d)
Caldwell	1.35
East Carroll	1.44
Franklin	1.11
Madison	.68
Morehouse	8.23
Ouachita	18.73
Richland	2.22
Tensas	2.10
West Carroll	1.12

Withdrawals by Major Water Body

Water Body	Amount (Mgal/d)
Bayou Macon	2.23
Boeuf River	3.34
Tensas River	1.36

Figure 2.1-1. Surface-water withdrawals (in million gallons per day) from the Tensas River basin, Louisiana, 1990. (Source: Lovelace, 1991, p. 114)

2.2 Surface-Water Quality

SELECTED PROPERTIES AND CONSTITUENTS

Physical, chemical, and biological data describe the surface-water quality of the Tensas River basin.

Figure 2.2-1 shows one of the 18 water-quality data-collection sites in the Tensas River basin. The data for this and other water-quality sites in the basin are presented in table 2.2-1 at the back of this report. The table includes selected water-quality properties and constituents, number of analyses, reporting levels, and values or concentrations for the percentiles used to generate the boxplots shown for 6 of the 18 sites in the Tensas River basin. The format of the data in these tables allows easy comparison among sites within the basin. Results of analyses used for statistical computations are in the files of the USGS.

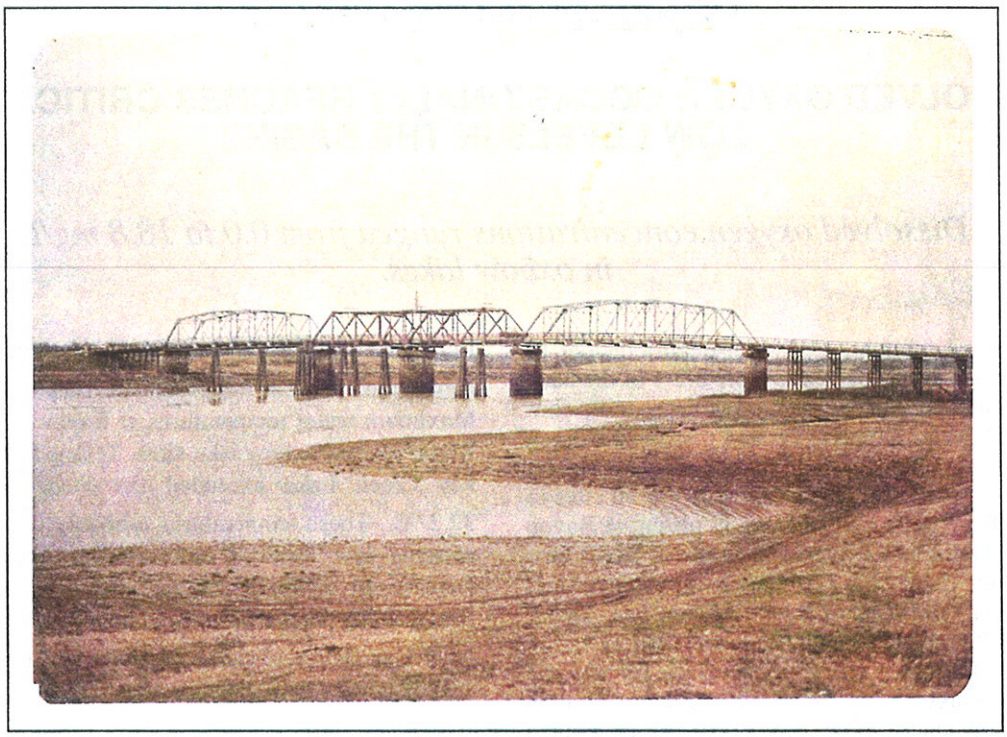


Figure 2.2-1. Water-quality data collection site at Boeuf River near Fort Necessity, Louisiana. (Photograph from U.S. Geological Survey files.)

2.2 Surface-Water Quality--continued

2.2.1 Physical Properties--Specific Conductance, pH, Water Temperature, and Dissolved Oxygen

DISSOLVED OXYGEN OCCASIONALLY REACHES CRITICALLY LOW LEVELS IN THE BASIN

Dissolved oxygen concentrations ranged from 0.0 to 18.8 mg/L in oxbow lakes.

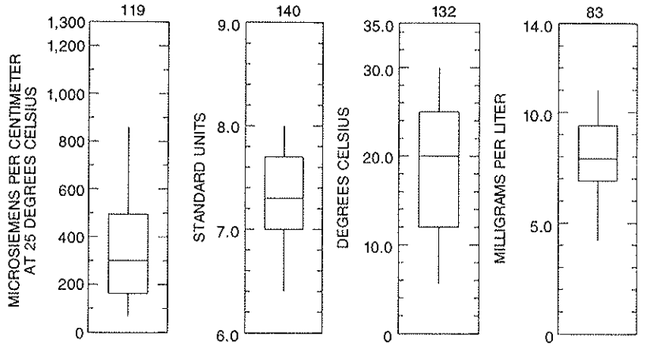
Statistical summaries of water-quality data at 18 sites in the basin are presented in table 2.2-1 in the back of the report and boxplots summarizing the specific conductance, pH, water temperature, and dissolved oxygen concentration data are presented in figure 2.2.1-1 for six of the sites. Specific conductance values for all sites in the Tensas River basin ranged from 38 µS/cm at Bayou Macon near Delhi to 1,680 µS/cm at Boeuf River near Fort Necessity (table 2.2-1). The lower values (less than 40 µS/cm) occurred at Bayou Macon near Delhi, Big Colewa Bayou near Oak Grove, and Turkey Creek Lake near Extension. The median values for specific conductance ranged from 58 to 395 µS/cm. Median specific conductance values on Boeuf River ranged from 249 µS/cm near Girard to 395 µS/cm at the site near Fort Necessity. Interquartile ranges for specific conductance were 163 to 495 µS/cm at Boeuf River near the Arkansas-Louisiana State line and 167 to 699 µS/cm at Boeuf River near Fort Necessity.

Values for pH in water from all sites in the basin ranged from 5.4 at Big Colewa Bayou near Oak Grove to 9.7 at Lake St. Joseph near Newellton. Lakes St. Joseph, Bruin, and Providence occasionally exceeded the Secondary Maximum Contaminant Level (SMCL) range of 5.0 to 9.0 for domestic water supply (U.S. Environmental Protection Agency, 1976; 1986). Median pH values in the Tensas River basin ranged from 6.3 to 8.3. The boxplots indicate that pH rarely was less than 6.5 or greater than 9.0 at the selected sites, the limits of the U.S. Environmental Protection Agency recommended range for freshwater aquatic life (U.S. Environmental Protection Agency, 1976; 1986). Interquartile ranges for pH were 7.0 to 7.7 at Boeuf River near Arkansas-Louisiana State line and 6.8 to 7.6 at Boeuf River near Fort Necessity.

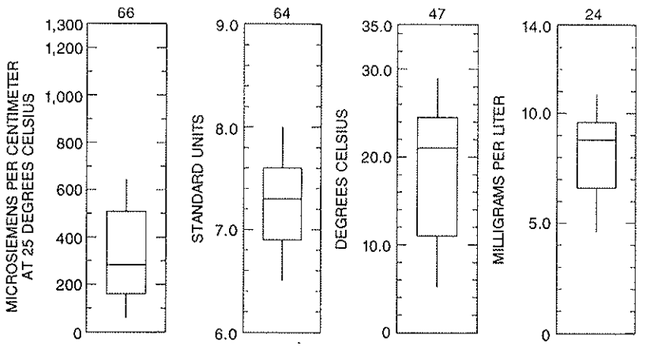
Values for water temperatures at all sites in the basin ranged from 1.0 °C at Boeuf River near Arkansas-Louisiana State line to 39.0 °C at Lake St. Joseph near Newellton. Median values ranged from 18.0 to 27.5 °C. Maximum water temperatures at Bayou Macon, Boeuf River, several oxbow lake sites, Tensas River, and Turkey Creek Lake exceeded the State's criterion of 32.2 °C. These temperatures probably occurred during extreme low flow or on very hot days (Louisiana Department of Environmental Quality, 1984, p. 12). Interquartile ranges for water temperature were 11.0 to 24.5 °C at Bayou Macon near Delhi and 10.1 to 24.8 °C at Bayou Macon near Kilbourne.

Dissolved oxygen concentrations in water from the basin ranged from 0.0 mg/L at three sites in Lake Bruin and two sites in Lake Providence to 18.8 mg/L at Lake St. Joseph near Newellton. The median concentrations for dissolved oxygen ranged from 5.5 to 11.8 mg/L. The dissolved oxygen concentrations differed seasonally in the lakes due to temperature and algal blooms. Dissolved oxygen concentrations were greater than the State's minimum water-quality criterion of 5.0 mg/L in more than 75 percent of the samples analyzed at most sites. At Bayou Macon near Kilbourne, 95 percent of the dissolved oxygen values were greater than the minimum criterion of the U.S. Environmental Protection Agency and the State. The U.S. Environmental Protection Agency's criterion for dissolved oxygen is 5.0 mg/L for freshwater aquatic life (U.S. Environmental Protection Agency, 1976; 1986). The boxplots for dissolved oxygen concentrations in figure 2.2.1-1 indicate that less than 25 percent of the measured values were less than 5.0 mg/L. Interquartile ranges for dissolved oxygen concentrations were 7.0 to 10.6 mg/L at Lake Providence north of Lake Providence and 6.1 to 9.4 mg/L at Boeuf River near Fort Necessity.

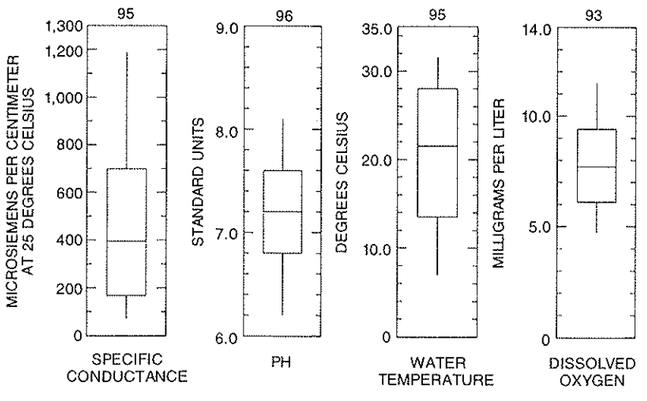
1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE

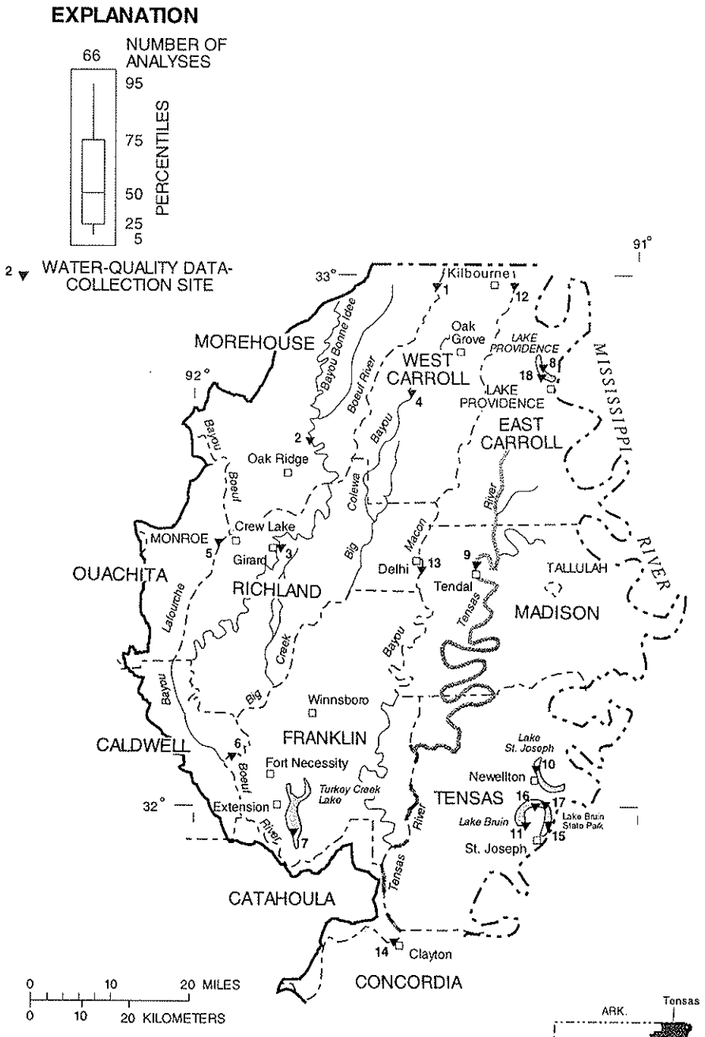


13 BAYOU MACON NEAR DELHI

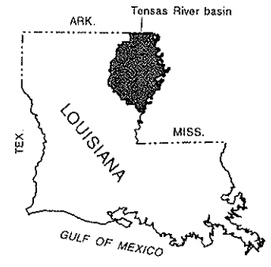


6 BOEUF RIVER NEAR FORT NECESSITY

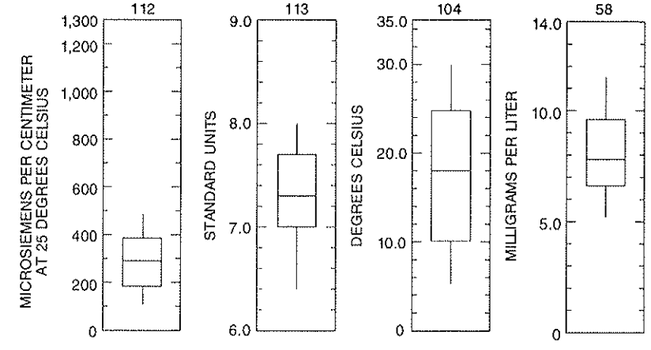




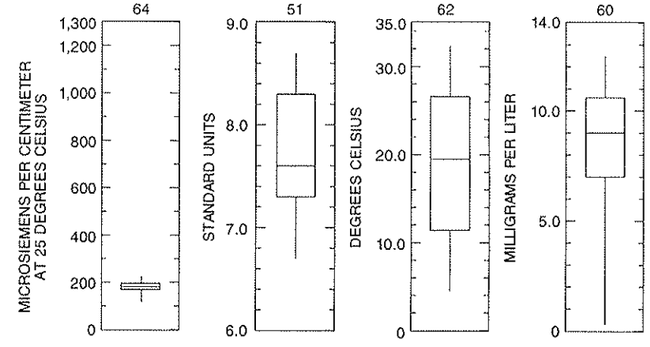
TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE



8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE



9 TENSAS RIVER AT TENDAL

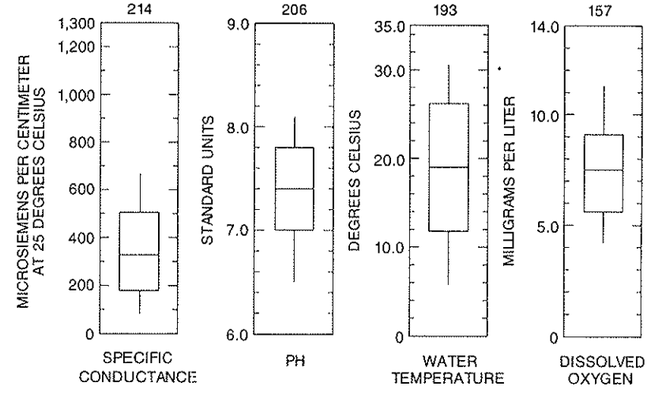


Figure 2.2.1-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and boxplots summarizing specific conductance, pH, water temperature, and dissolved-oxygen data for selected sites.

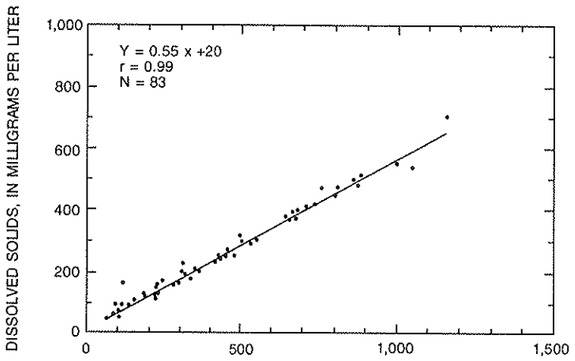
DISSOLVED SOLIDS CONCENTRATIONS CAN BE ESTIMATED FROM SPECIFIC CONDUCTANCE VALUES

Dissolved solids concentrations in water from the Tensas River basin met the U.S. Environmental Protection Agency's regulations for dissolved solids in irrigation water.

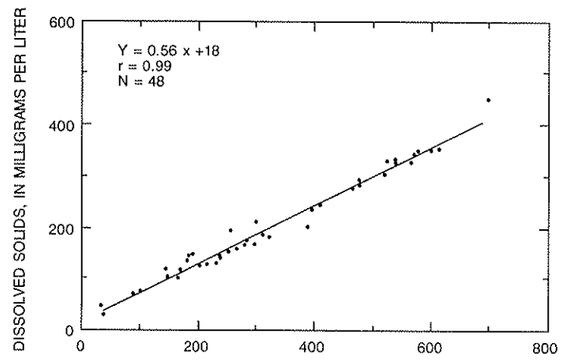
Linear regression equations relating dissolved solids concentrations to specific conductance were calculated for six sites in the Tensas River basin (fig. 2.2.2-1). The correlation coefficient values, r, ranged from 0.81 at Lake Providence north of Lake Providence to 0.99 at Boeuf River near Arkansas-Louisiana State line, Bayou Macon near Delhi, and Tensas River at Tendal. The relatively strong correlation between specific conductance and dissolved solids concentrations indicates that dissolved solids concentrations can be estimated from specific conductance values with a reasonable degree of accuracy.

The regression equation for Boeuf River near Arkansas-Louisiana State line, which was based on 83 chemical analyses, indicates that dissolved solids concentrations at that site can exceed 500 mg/L when specific conductance values exceed 873 µS/cm. The boxplot for specific conductance for Boeuf River near Arkansas-Louisiana State line (fig. 2.2.1-1) indicates that 873 µS/cm was exceeded in less than 5 percent of the samples analyzed. Although no State criteria for the quality of irrigation water are established for these streams or for the other streams for which regression equations were developed, the regression equations indicated that the streams in the basin generally met the U.S. Environmental Protection Agency's (1976) criterion for dissolved solids in irrigation water (500 mg/L).

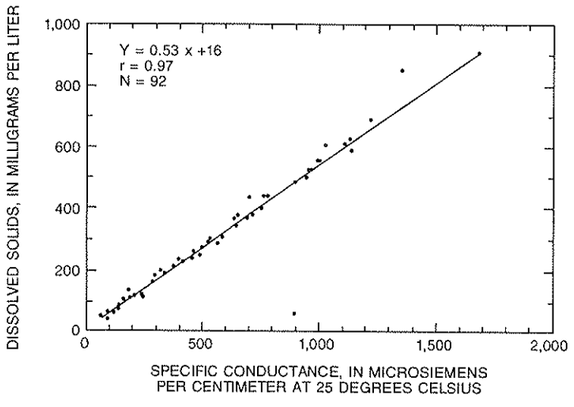
1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE

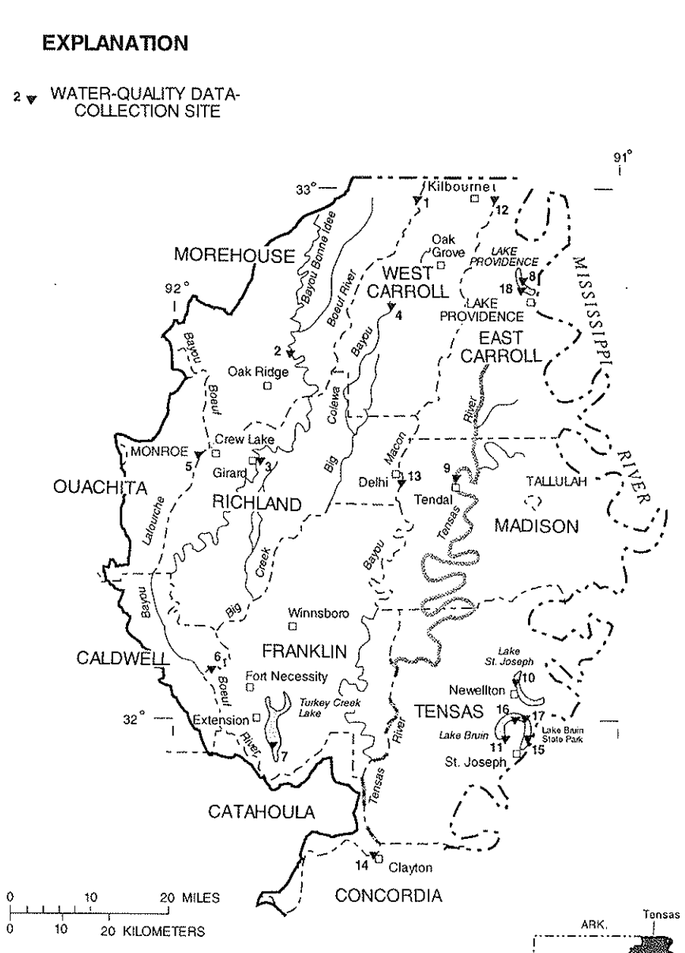


13 BAYOU MACON NEAR DELHI

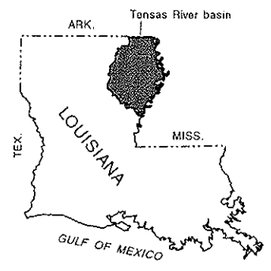


6 BOEUF RIVER NEAR FORT NECESSITY

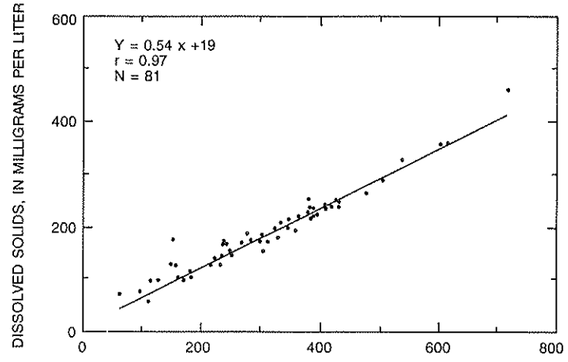




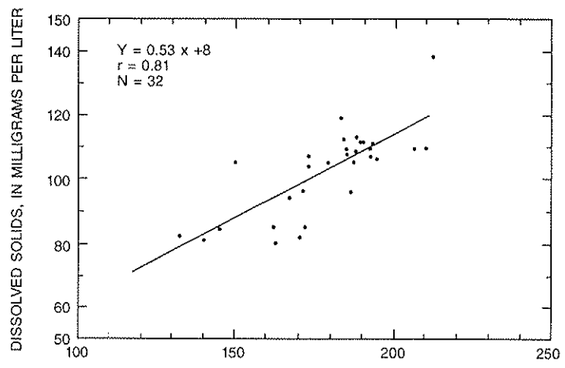
TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE



8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE



9 TENSAS RIVER AT TENDAL

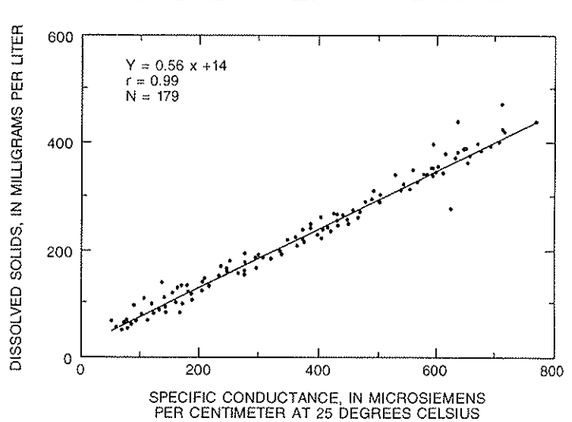


Figure 2.2.2-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and graphs showing relation between specific conductance and dissolved solids in water from selected sites.

2.2.3 Major Inorganic Cations--Dissolved Calcium, Magnesium, Sodium, and Potassium

CONCENTRATIONS OF DISSOLVED SODIUM ARE HIGH IN WATER FROM BOEUF RIVER NEAR FORT NECESSITY

Boeuf River near Fort Necessity had a maximum sodium concentration of 250 mg/L.

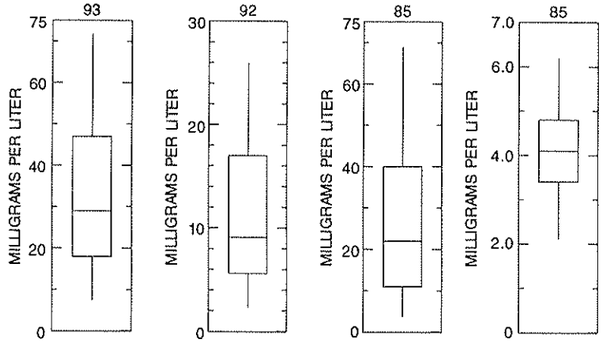
The data for major inorganic cations in water from the basin indicated that concentrations of major cations were below the recommended maximum levels for drinking water, for which such levels have been established. Calcium concentrations at all sites in the Tensas River basin ranged from 1.1 mg/L at Bayou Macon near Delhi to 110 mg/L at Boeuf River near Arkansas-Louisiana State line. Boxplots for six representative sites in the basin (fig. 2.2.3-1) show that calcium concentrations generally were less than 70 mg/L, except at Boeuf River near Arkansas-Louisiana State line where less than 25 percent of the values were greater than 70 mg/L. More than 95 percent of the calcium concentrations in samples from Lake Providence north of Lake Providence were less than 30 mg/L.

Magnesium concentrations in the basin ranged from 0.2 mg/L at Big Colewa Bayou near Oak Grove to 38 mg/L at Boeuf River near Arkansas-Louisiana State line. The lowest median magnesium concentration (1.4 mg/L) occurred at Big Colewa Bayou near Oak Grove. Boxplots from six representative sites (fig. 2.2.3-1) show that magnesium concentrations in 75 percent or more of the samples collected at these sites were less than or equal to 18 mg/L. Magnesium concentrations in samples from Lake Providence north of Lake Providence were less than 10 mg/L in at least 95 percent of the samples.

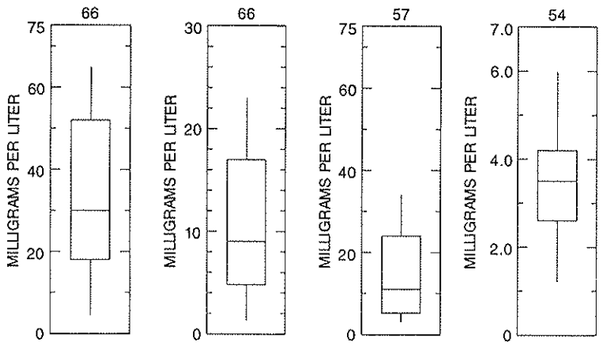
The sodium concentration in water from the basin was highest at Boeuf River near Fort Necessity, which had a maximum concentration of 250 mg/L. The minimum sodium concentration (1.2 mg/L) occurred at Big Colewa Bayou near Oak Grove and Lake St. Joseph near Newellton. Boxplots for six representative sites shown in fig. 2.2.3-1 show that at least 95 percent of the samples collected had sodium concentrations less than 70 mg/L, except at Boeuf River near Fort Necessity. The boxplot for Lake Providence north of Lake Providence shows little variance and lower sodium concentrations than the stream sites in the basin.

Concentrations of potassium in water from the basin ranged from 0.1 mg/L at Boeuf River near Fort Necessity to 11 mg/L at Big Colewa Bayou near Oak Grove. The minimum median concentration (2.4 mg/L) occurred at Big Colewa Bayou near Oak Grove. Boxplots for six representative sites (fig. 2.2.3-1) show that at least 95 percent of the concentrations of potassium were less than 7.0 mg/L at all of these sites.

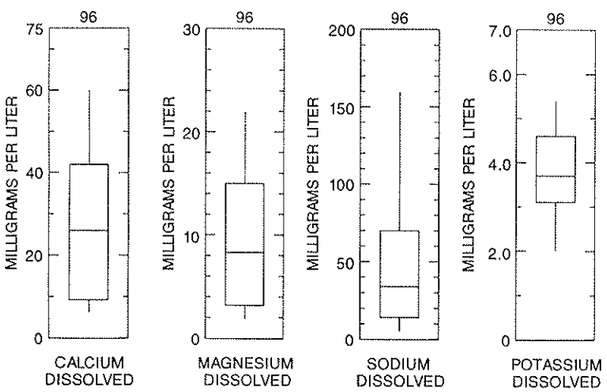
1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE

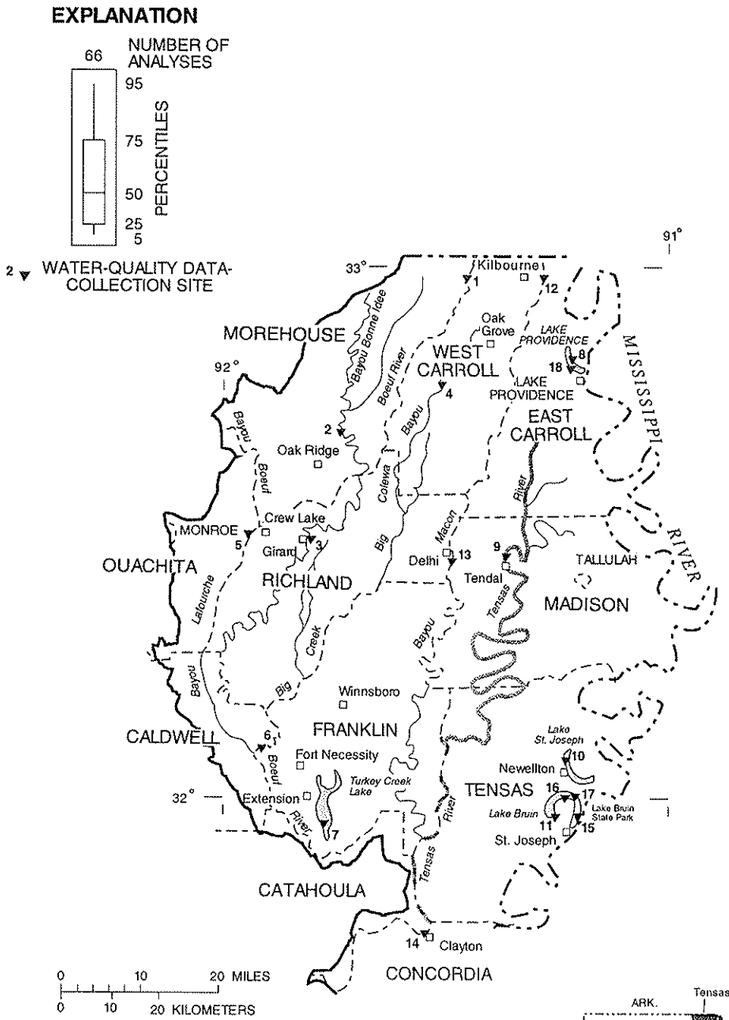


13 BAYOU MACON NEAR DELHI

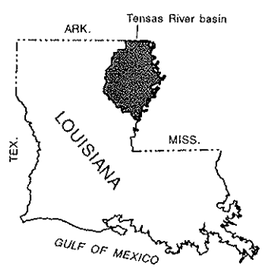


6 BOEUF RIVER NEAR FORT NECESSITY

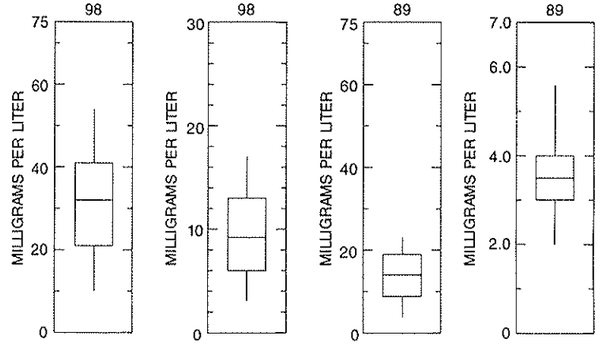




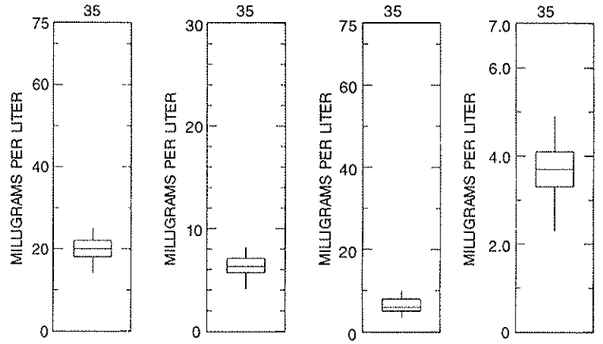
TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE



8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE



9 TENSAS RIVER AT TENDAL

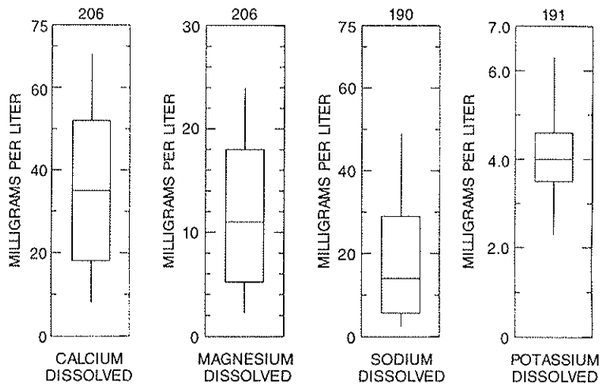


Figure 2.2.3-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and boxplots summarizing data for dissolved calcium, magnesium, sodium, and potassium concentrations in water from selected sites.

2.2.4 Major Inorganic Anions--Total Alkalinity as Calcium Carbonate, Dissolved Sulfate, and Dissolved Chloride

CHLORIDE CONCENTRATIONS AT BOEUF RIVER EXCEED THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S SECONDARY MAXIMUM CONTAMINANT LEVEL

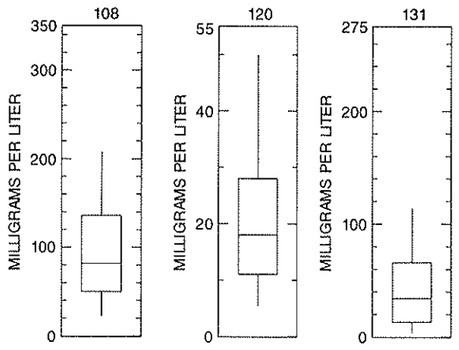
Maximum chloride concentration of 410 mg/L occurred at Boeuf River near Fort Necessity.

The data for major inorganic anions in water from the basin indicated that concentrations of major anions were below recommended maximum levels for drinking water, for which such levels have been established. Alkalinity as calcium carbonate in water from the Tensas River basin ranged from 8 mg/L at Bayou Macon near Delhi to 372 mg/L at Boeuf River near Arkansas-Louisiana State line. The lowest median concentration (14 mg/L) occurred at Big Colewa Bayou near Oak Grove. The maximum median alkalinity in the basin was 146 mg/L, which occurred at Tensas River at Tendal. The boxplots for six representative sites (fig. 2.2.4-1) show that alkalinity values in 75 percent of the samples analyzed were generally 20 mg/L or greater. The U.S. Environmental Protection's Agency's minimum alkalinity criterion for freshwater aquatic life is 20 mg/L except where alkalinities for natural waters commonly are less (U.S. Environmental Protection Agency, 1976).

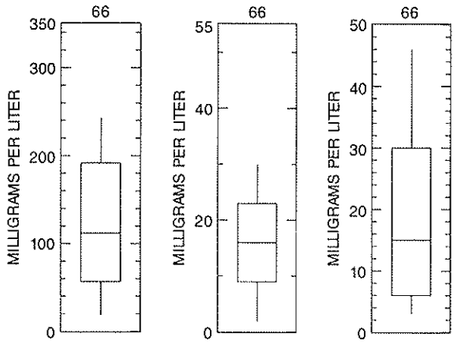
Concentrations of sulfate in water from the basin ranged from less than 0.1 mg/L at Lake St. Joseph near Newellton and Lake Bruin at Lake Bruin State Park near St. Joseph to 98 mg/L at Boeuf River near Fort Necessity, and were substantially less than the SMCL for drinking water of 250 mg/L (U.S. Environmental Protection Agency, 1986; Louisiana Department of Environmental Quality, 1984). Median concentrations in the oxbow lake sites (2.6 - 3.4 mg/L) were less than at most of the stream sites in the basin. The boxplots for six representative sites (fig. 2.2.4-1) show that the median concentration of sulfate at Lake Providence north of Lake Providence was less than one-half the median concentrations at the other sites. The maximum median concentration (18 mg/L) occurred at Boeuf River near Arkansas-Louisiana State line.

Chloride concentrations in water from the basin ranged from 0.6 mg/L at Lake Providence north of Lake Providence and Tensas River at Tendal to 410 mg/L at Boeuf River near Fort Necessity. The SMCL for drinking water is 250 mg/L (U.S. Environmental Protection Agency, 1986; Louisiana Department of Environmental Quality, 1984). Median concentrations ranged from less than 2.1 mg/L at the center of Lake Bruin near Newellton to 53 mg/L at Boeuf River near Fort Necessity. The boxplots summarizing the data for six representative sites in the basin (fig. 2.2.4-1) show that more than 75 percent of the samples analyzed had chloride concentrations less than or equal to 30 mg/L at all of these sites except the two Boeuf River sites, which had significantly higher concentrations.

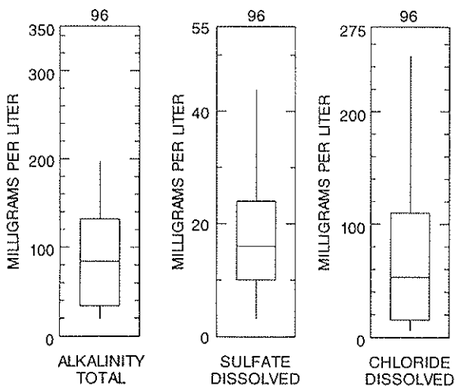
1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE

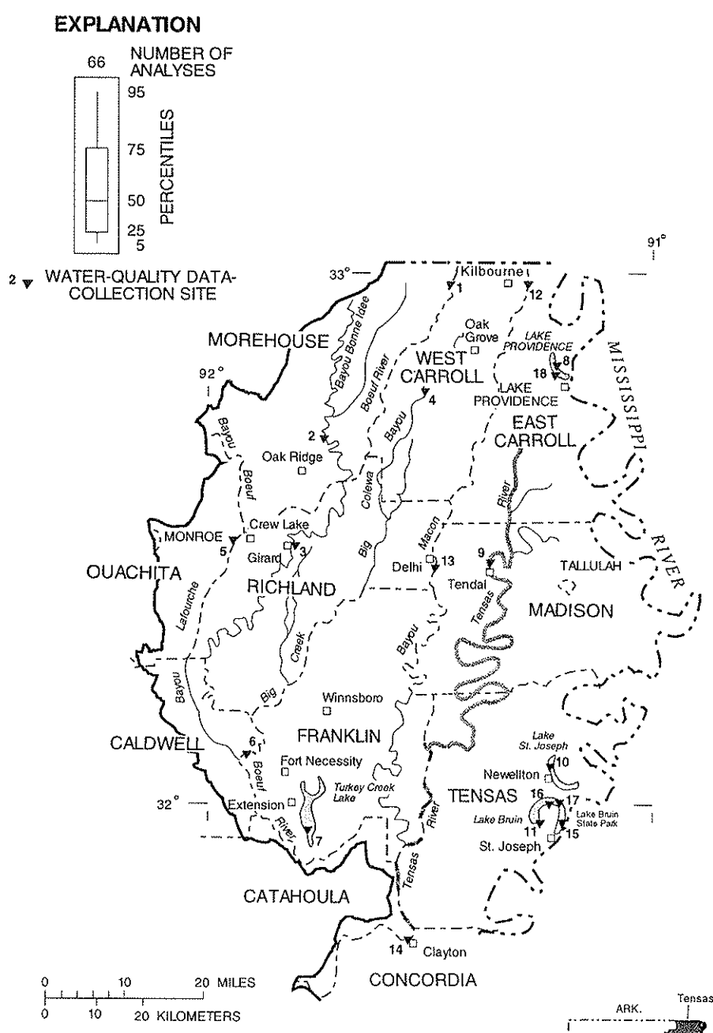


13 BAYOU MACON NEAR DELHI

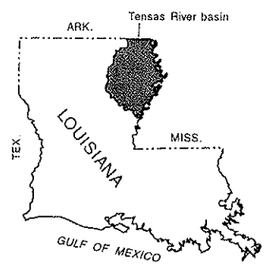


6 BOEUF RIVER NEAR FORT NECESSITY

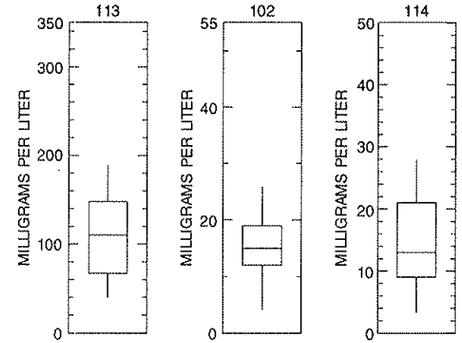




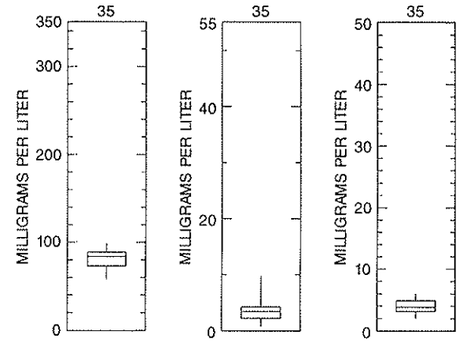
TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE



8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE



9 TENSAS RIVER AT TENDAL

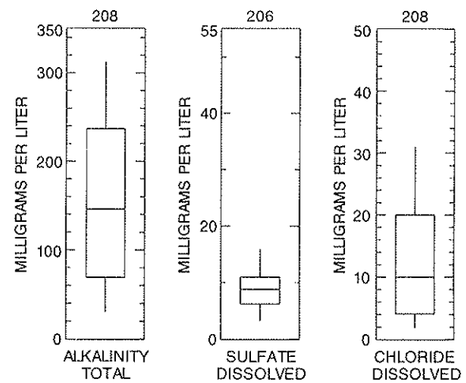


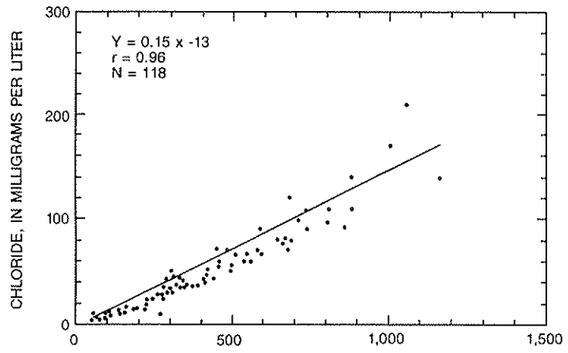
Figure 2.2.4-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and boxplots summarizing data for total alkalinity as calcium carbonate and dissolved sulfate and chloride concentrations in water from selected sites.

A DIRECT RELATION EXISTS BETWEEN SPECIFIC CONDUCTANCE AND DISSOLVED CHLORIDE

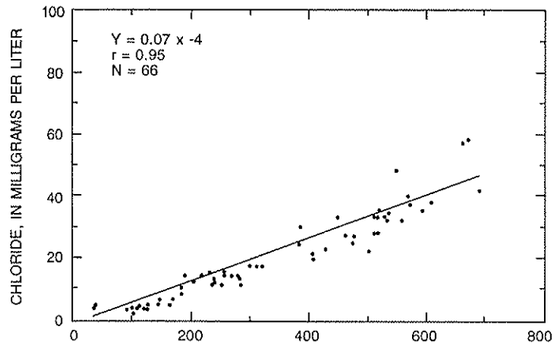
Linear regression equations indicate that dissolved chloride can be estimated from specific conductance for selected streams in the Tensas River basin.

Regression equations relating chloride concentrations to specific conductance values were calculated for six sites in the Tensas River basin (fig. 2.2.5-1). The correlation coefficient values, r, ranged from 0.53 at Lake Providence north of Lake Providence to 0.96 at Boeuf River near Fort Necessity and Boeuf River near Arkansas-Louisiana State line. These equations can be used to estimate chloride concentrations from specific conductance for water uses such as irrigation of chloride-sensitive crops. The regression equations indicate that chloride constitutes a greater percentage of the dissolved solids in water from the Boeuf River sites than in water from the other four sites. For example, application of the regression equations to specific conductance of 400 µS/cm yields an estimated chloride concentration of 47 mg/L for Boeuf River near Arkansas-Louisiana State line but only 21 mg/L for Bayou Macon near Kilbourne.

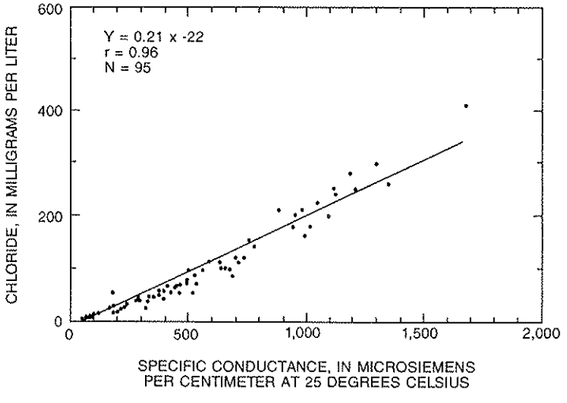
1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE



13 BAYOU MACON NEAR DELHI

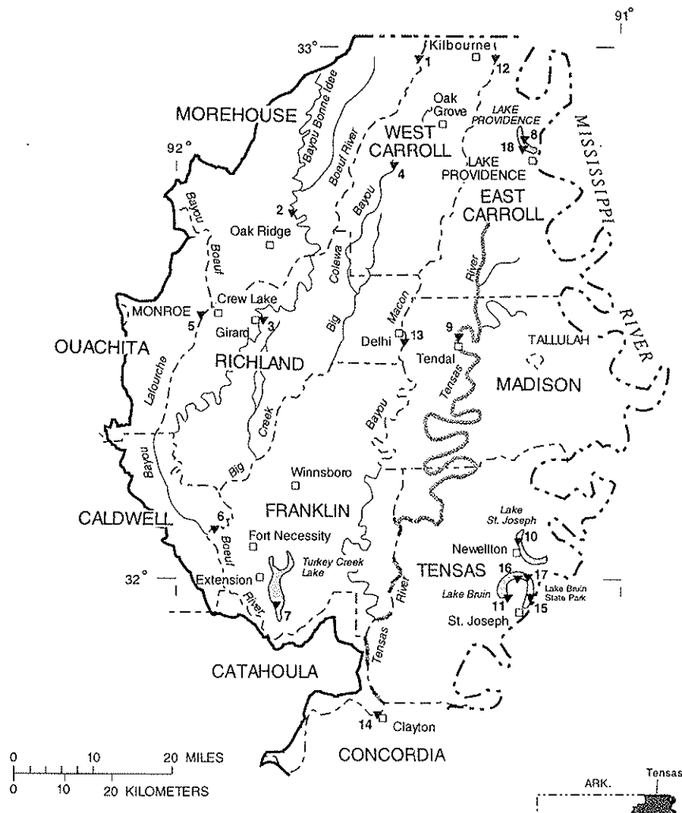


6 BOEUF RIVER NEAR FORT NECESSITY

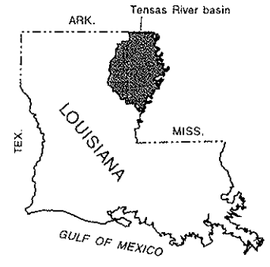


EXPLANATION

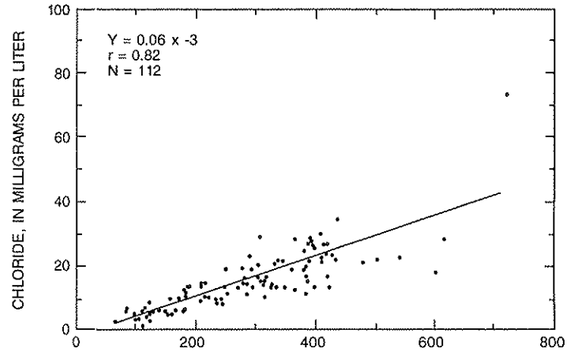
2 ▼ WATER-QUALITY DATA-COLLECTION SITE



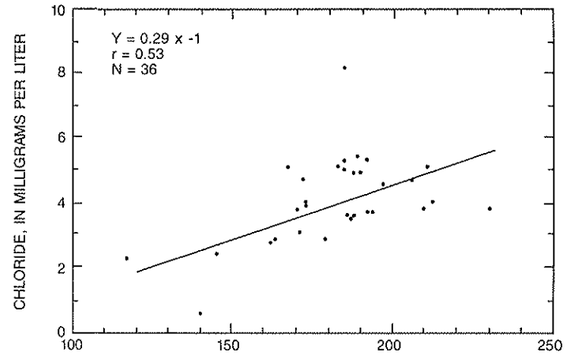
TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE



8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE



9 TENSAS RIVER AT TENDAL

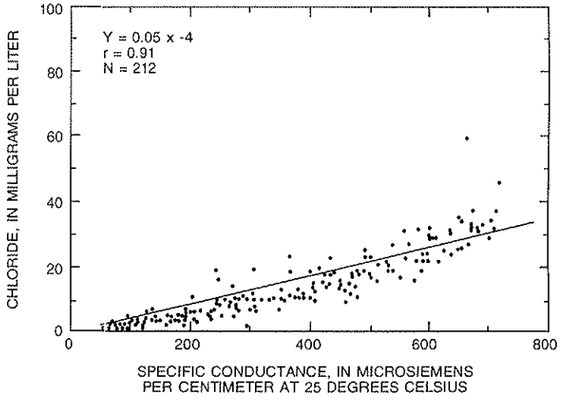


Figure 2.2.5-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and graphs showing relation between specific conductance and dissolved chloride in water from selected sites.

2.2.6 Trace Metals[2]--Dissolved Copper, Iron, Lead, and Zinc

CONCENTRATIONS OF SELECTED DISSOLVED TRACE METALS WERE WITHIN THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S RECOMMENDED LEVELS

Median concentrations of dissolved iron ranged from 15 to 90 µg/L.

The available data for trace metals indicated that concentrations of dissolved copper, lead, and zinc were less than the maximum contaminant levels of the U.S. Environmental Protection Agency's primary and secondary drinking water regulations (1976; 1986; 1994; 1996). Iron concentrations in water from the basin occasionally exceeded 300 µg/L, which is the criterion for domestic water supplies. However, iron concentrations were less than the criterion of 1,000 µg/L of the U.S. Environmental Protection Agency for freshwater aquatic life.

Concentrations of copper in water samples collected in the Tensas River basin ranged from less than 1 µg/L at Bayou Macon near Kilbourne, Boeuf River near Fort Necessity, Lake Providence near Lake Providence, Lake Providence north of Lake Providence, and Lake St. Joseph near Newellton to 21 µg/L at Lake St. Joseph near Newellton and Tensas River at Tendal. The median copper concentrations that occurred above the detection levels were 3 and 6 µg/L at Tensas River at Clayton and Boeuf River near Fort Necessity. Copper concentrations for six representative sites are summarized using boxplots and tables in figure 2.2.6-1. Tables are presented instead of boxplots when less than 10 analyses were available for a site. The boxplots (fig. 2.2.6-1) illustrate that at the three sites with 10 or more analyses, at least 95 percent of the samples analyzed had copper concentrations of 25 µg/L or less.

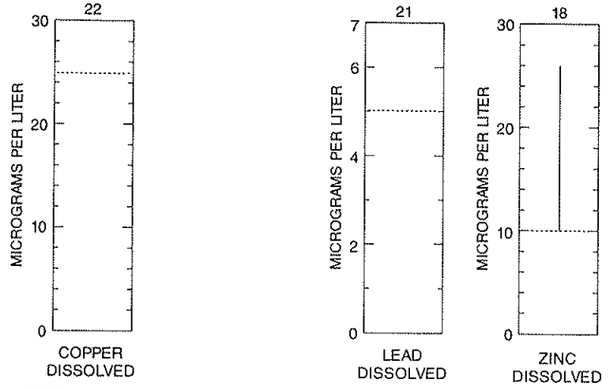
Iron concentrations ranged from less than 3 µg/L at Lake Providence north of Lake Providence to 570 µg/L at Boeuf River near Fort Necessity. Median iron concentrations in the basin ranged from 15 to 90 µg/L. Boxplots and tables (fig. 2.2.6-1) summarizing data for six representative sites within the basin show that iron concentrations generally were less than 200 µg/L.

Concentrations of lead in water from the basin were low at all sites. The concentrations ranged from less than the reporting level at all sites except Bayou Bonne Idee near Oak Ridge, which had a minimum lead concentration of 3 µg/L, to 15 µg/L at Boeuf River near Fort Necessity. The median concentrations were less than the reporting levels at the four sites for which 10 or more samples were analyzed. Boxplots and tables for six representative sites (fig. 2.2.6-1) show that at least 95 percent of all analyses were less than the reporting level.

Zinc concentrations in water from the Tensas River basin were less than the maximum contaminant levels of the U.S. Environmental Protection Agency's primary and secondary drinking water regulations, ranging from less than 1 µg/L at Boeuf River near Girard to 340 µg/L at Boeuf River near Fort Necessity. Median zinc concentrations were less than the reporting level at the four sites for which 10 or more samples were analyzed. Boxplots and tables for six representative sites (fig. 2.2.6-1) show that zinc concentrations in most of the samples analyzed were less than 30 µg/L.

[2]"Traditionally, dissolved trace-element concentrations have been reported at the micrograms per liter level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elements are within the range of 10's to 100's of nanograms per liter (ng/L). Present data above the micrograms per liter level should be viewed with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey began using new trace-element protocols after the period of record associated with this report."

1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE

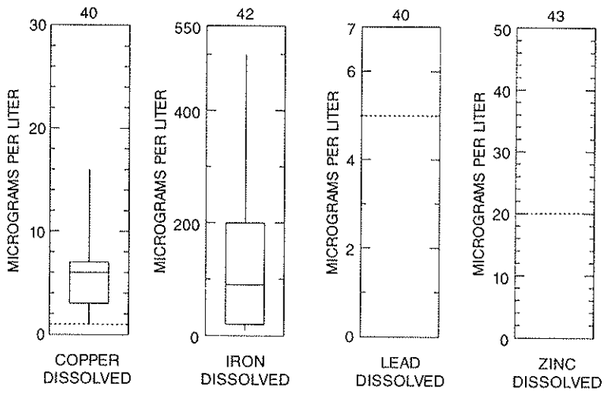


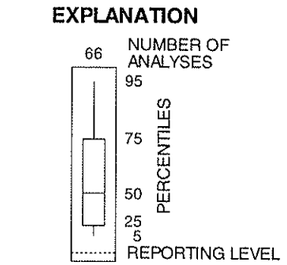
DISSOLVED CONSTITUENT	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
IRON	9	10	7

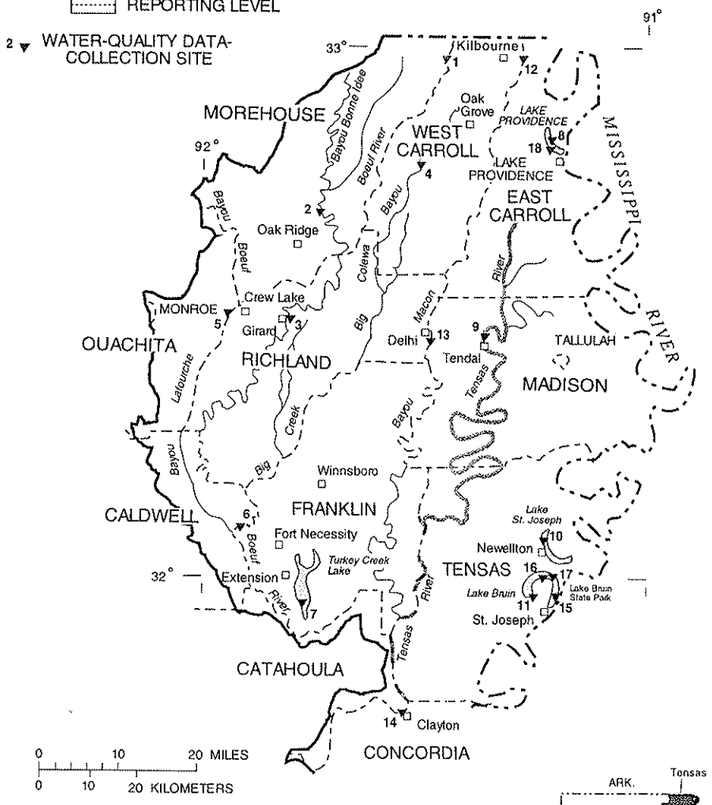
13 BAYOU MACON NEAR DELHI

DISSOLVED CONSTITUENT	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
COPPER	4	4	1
IRON	5	10	5
LEAD	4	5	0
ZINC	4	20	0

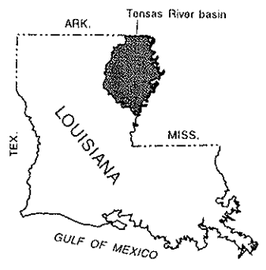
6 BOEUF RIVER NEAR FORT NECESSITY







TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE

DISSOLVED CONSTITUENT	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
COPPER	9	1	8
IRON	9	10	7
LEAD	9	5	0
ZINC	9	20	1

8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE

DISSOLVED CONSTITUENT	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
COPPER	7	1	4
IRON	7	3	6
LEAD	7	1	4
ZINC	7	4	6

9 TENSAS RIVER AT TENDAL

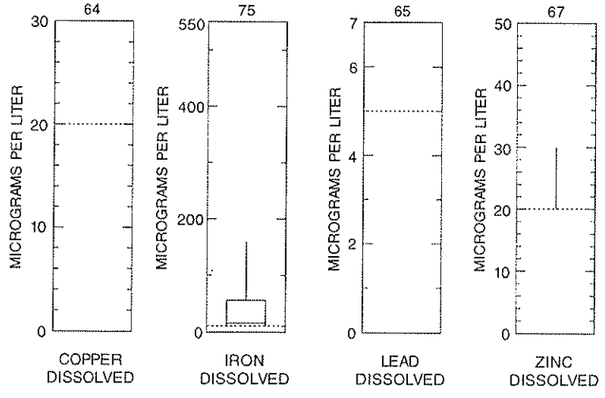


Figure 2.2.6-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and boxplots and tables summarizing data for dissolved copper, iron, lead, and zinc concentrations in water from selected sites.

PHOSPHORUS CONCENTRATIONS LOWER AT OXBOW LAKE SITES THAN AT STREAM SITES

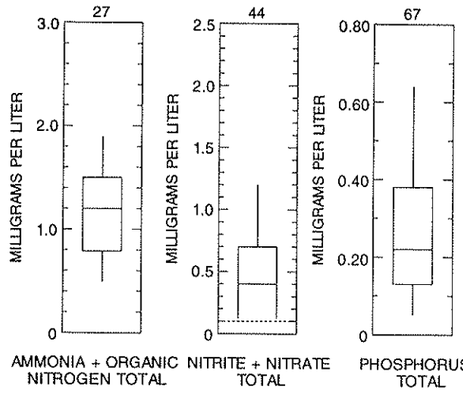
Phosphorus concentrations in at least 95 percent of the samples at Lake Providence north of Lake Providence were less than 0.30 mg/L.

Concentrations of ammonia plus organic nitrogen as nitrogen in water from the basin ranged from 0.09 mg/L at Bayou Macon near Kilbourne to 4.9 mg/L at Boeuf River near Fort Necessity. The median concentration of ammonia plus organic nitrogen at Lake St. Joseph near Newellton was the maximum (2.2 mg/L) for the entire basin, indicating eutrophication. Concentrations of ammonia plus organic nitrogen in water from the five representative sites for which boxplots are shown generally were less than 2.0 mg/L (fig. 2.2.7-1). However, concentrations of ammonia plus organic nitrogen were less than 1.6 mg/L in 75 percent or more of the samples analyzed at all sites.

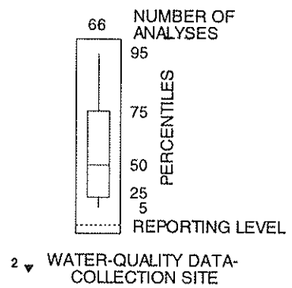
Concentrations of nitrite plus nitrate as nitrogen in the Tensas River basin ranged from 0.01 mg/L at several sites to 2.9 mg/L at Tensas River at Tendal. Median nitrite plus nitrate as nitrogen concentrations ranged from 0.04 to 0.48 mg/L. Boxplots at six representative sites show that concentrations in 75 percent of all samples analyzed were less than 0.8 mg/L (fig. 2.2.7-1).

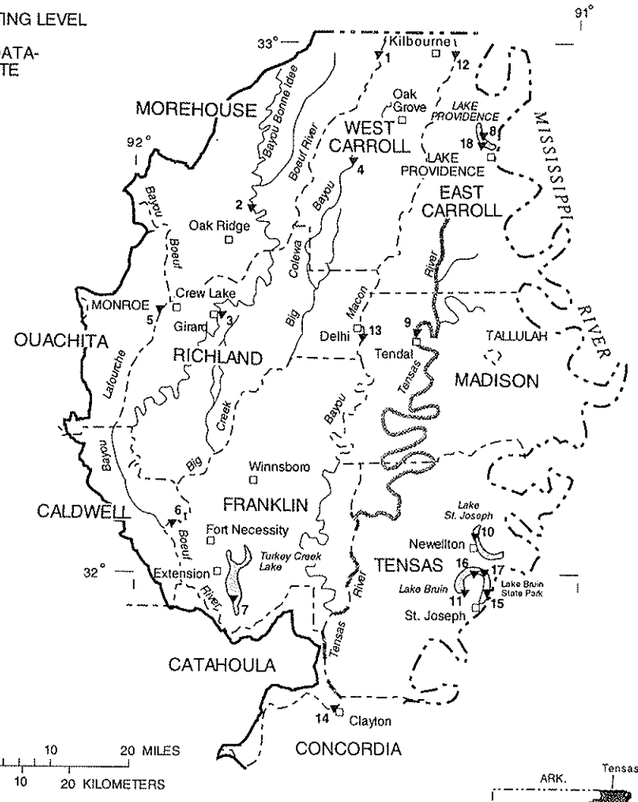
Concentrations of total phosphorus in water in the Tensas River basin ranged from less than 0.01 mg/L at the center of Lake Bruin near Newellton to 1.9 mg/L at Lake St. Joseph near Newellton. The median phosphorus concentrations in the basin ranged from 0.04 to 0.30 mg/L, and generally were lower at the oxbow lake sites. Boxplots for six representative sites show that phosphorus concentrations in 75 percent of all samples analyzed were less than 0.40 mg/L, and at least 95 percent of the samples at Lake Providence north of Lake Providence were less than 0.30 mg/L (fig. 2.2.7-1).

1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE



EXPLANATION

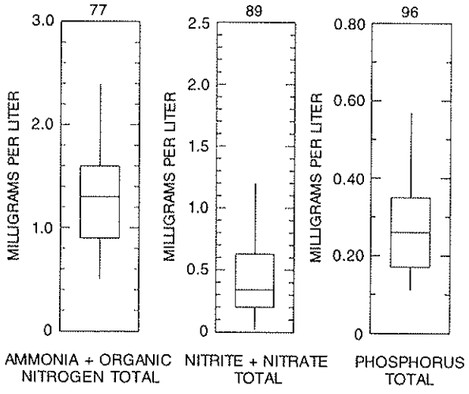




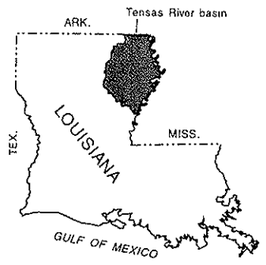
13 BAYOU MACON NEAR DELHI

TOTAL CONSTITUENT	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (mg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
NITRITE + NITRATE	3	0.01	3
PHOSPHORUS	3	0.01	3

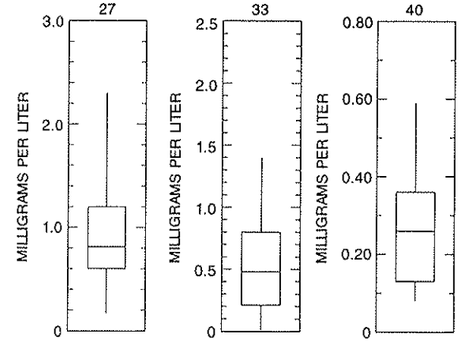
6 BOEUF RIVER NEAR FORT NECESSITY



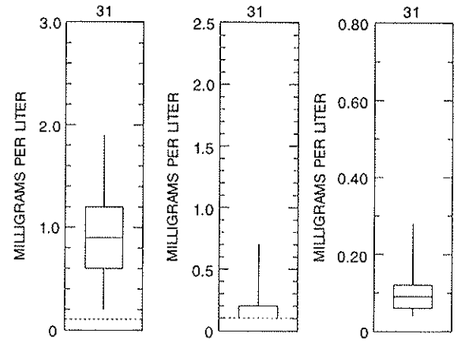
TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE



8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE



9 TENSAS RIVER AT TENDAL

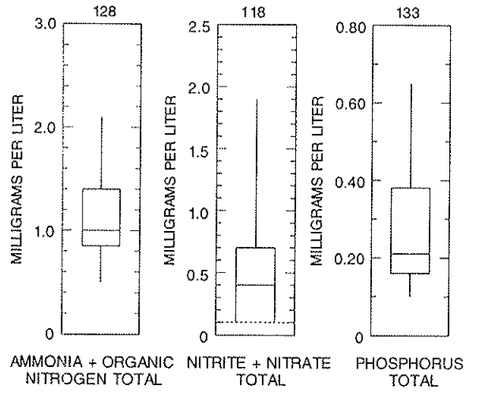


Figure 2.2.7-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and boxplots and a table summarizing data for concentrations of nutrients in water from selected sites.

THREE ORGANIC COMPOUNDS DETECTED IN SURFACE WATERS IN THE BASIN

The most commonly occurring organic compounds in the Tensas River basin were DDT, dieldrin, and 2,4-D.

DDT, dieldrin, and 2,4-D were detected at more sites and with greater frequency than any of the other organic compounds that were analyzed. The highest DDT concentration was 0.14 µg/L in a sample collected at the center of Lake Bruin near Newellton. DDT was detected at least once at 15 of the 16 sites for which water samples were analyzed for organic compounds. Tables rather than boxplots are used to summarize occurrences of DDT at six representative sites in figure 2.2.8-1, because the total number of samples analyzed for each site was less than 10 or the number of samples that contained DDT in concentrations greater than the reporting level was less than 10.

Dieldrin was detected at 10 of the sites in the Tensas River basin. A maximum concentration of 0.03 µg/L was detected at Bayou Macon near Kilbourne, Lake Providence north of Lake Providence, and Tensas River at Tendal.

The herbicide 2,4-D was detected at least once at 15 of the 16 sites for which water samples were analyzed for organic compounds. The maximum concentration of 2,4-D in water from the basin was 0.54 µg/L, at Tensas River at Clayton. The tables listing the number of samples in which organic compounds were detected for six representative sites in the basin indicate that 2,4-D was detected in at least 17 percent of the samples collected at these sites (fig. 2.2.8-1).

1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE

ORGANIC COMPOUND TOTAL	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
DDT	17	0.02	1
PCB	8	0.1	0
DIAZINON	8	0.01	1
LINDANE	9	0.01	0
CHLORDANE	8	0.1	0
MALATHION	8	0.01	0
ENDRIN	8	0.01	0
PARATHION	8	0.01	0
DIELDRIN	17	0.01	5
ENDOSULFAN	15	0.01	0
2,4-D	7	0.01	5

13 BAYOU MACON NEAR DELHI

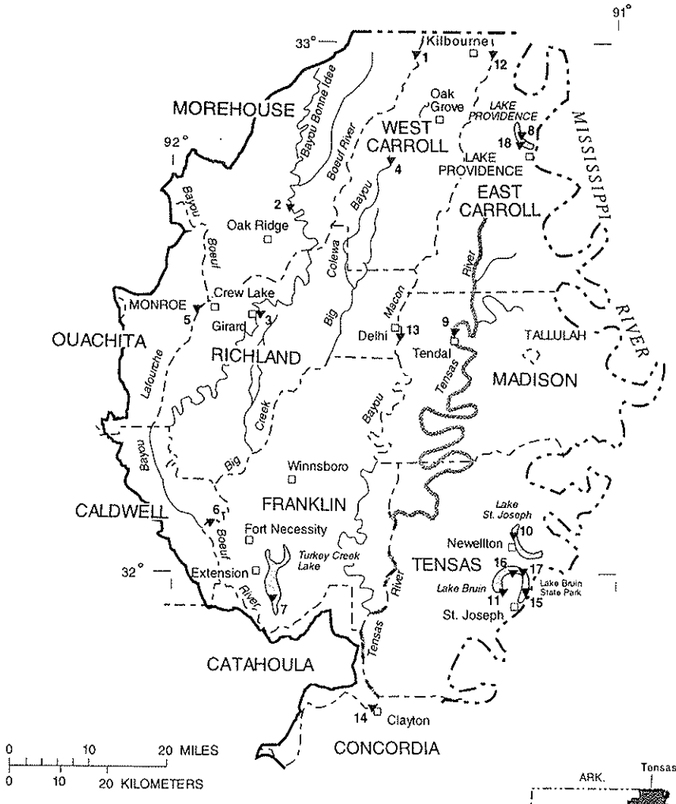
ORGANIC COMPOUND TOTAL	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
DDT	2	0.01	1
PCB	2	0.01	0
DIAZINON	2	0.01	0
LINDANE	2	0.01	0
MALATHION	2	0.01	0
ENDRIN	1	0.01	0
PARATHION	2	0.01	0
DIELDRIN	2	0.01	1
2,4-D	2	0.01	1

6 BOEUF RIVER NEAR FORT NECESSITY

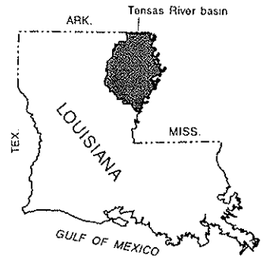
ORGANIC COMPOUND TOTAL	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
DDT	6	0.001	1
PCB	6	0.1	0
DIAZINON	6	0.01	1
LINDANE	6	0.001	1
CHLORDANE	6	0.1	0
MALATHION	6	0.01	0
ENDRIN	6	0.001	0
PARATHION	6	0.01	0
DIELDRIN	6	0.001	1
2,4-D	6	0.01	4

EXPLANATION

2 ▼ WATER-QUALITY DATA-COLLECTION SITE



TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE

ORGANIC COMPOUND TOTAL	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
DDT	10	0.02	1
PCB	8	0.1	0
DIAZINON	8	0.01	2
LINDANE	2	0.01	0
CHLORDANE	8	0.1	0
MALATHION	8	0.01	0
ENDRIN	8	0.01	0
PARATHION	8	0.01	0
DIELDRIN	10	0.01	3
ENDOSULFAN	8	0.01	0
2,4-D	8	0.01	3

8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE

ORGANIC COMPOUND TOTAL	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
DDT	19	0.01	3
PCB	19	0.1	0
DIAZINON	19	0.01	0
LINDANE	19	0.01	1
CHLORDANE	19	0.1	0
MALATHION	19	0.01	0
ENDRIN	19	0.01	0
PARATHION	19	0.01	0
DIELDRIN	19	0.01	5
ENDOSULFAN	18	0.01	0
2,4-D	18	0.01	10

9 TENSAS RIVER AT TENDAL

ORGANIC COMPOUND TOTAL	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
DDT	16	0.01	1
PCB	11	0.1	0
DIAZINON	18	0.01	1
LINDANE	18	0.01	0
CHLORDANE	17	0.1	0
MALATHION	18	0.01	0
ENDRIN	18	0.01	1
PARATHION	18	0.01	0
DIELDRIN	18	0.01	1
ENDOSULFAN	2	0.01	0
2,4-D	12	0.01	2

Figure 2.2.8-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and tables listing organic compounds detected in water from selected sites.

FECAL COLIFORM AND FECAL STREPTOCOCCUS BACTERIA CONCENTRATIONS VARIED GREATLY THROUGHOUT THE BASIN

Median fecal coliform concentrations ranged from less than 5 to 110 cols/100 mL.

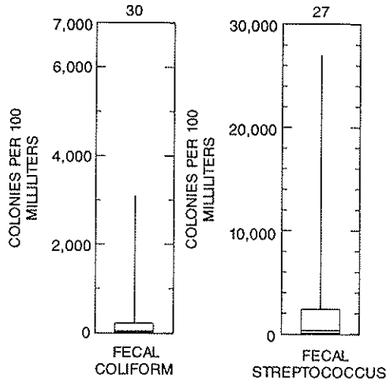
Concentrations of fecal coliform bacteria varied greatly at the 16 sites in the Tensas River basin for which data were available. Concentrations ranged from 1 col/100 mL at Boeuf River near Fort Necessity to 14,000 cols/100 mL at the same site. Median concentrations ranged from less than 5 to 110 cols/100 mL. Although fecal coliform concentrations exceeded 200 cols/100 mL some of the time at most of the sites, additional data are needed to determine if the U.S. Environmental Protection Agency's (1976; 1986; 1996) maximum contaminant level is being exceeded. Boxplots of fecal coliform and fecal streptococcus bacteria concentrations at five representative sites in the basin show that at least 75 percent of all samples analyzed had fecal coliform concentrations of less than 500 cols/100 mL, and most of the samples collected at Lake Providence north of Lake Providence had concentrations less than 100 cols/100 mL (fig. 2.2.9-1).

Concentrations of fecal streptococcus bacteria also varied greatly at sites in the basin. Concentrations ranged from less than 4 cols/100 mL at two sites on Lake Bruin to greater than 60,000 cols/100 mL at Tensas River at Tendal. Median fecal streptococcus concentrations, which ranged from 12 to 620 cols/100 mL, generally were higher than the median fecal coliform concentrations. Boxplots of fecal streptococcus concentrations at five representative sites show that 75 percent of the samples analyzed had concentrations less than 4,000 cols/100 mL, and at least 95 percent of the analyses at Lake Providence north of Lake Providence were less than 4,500 cols/100 mL (fig. 2.2.9-1).

The median ratio of fecal coliform to fecal streptococcus bacteria was less than 0.7 at most of the sites sampled for analysis of bacteria concentrations within the Tensas River basin, indicating that sources of fecal coliform bacteria probably were predominantly livestock or poultry wastes (Millipore Corporation, 1972, p. 36). Additional study is needed to confirm these results.

Concentrations of phytoplankton varied greatly at sites in the basin due to the seasonal influence. Concentrations ranged from 0 cells/mL at Boeuf River near Fort Necessity to 4,300,000 cells/mL at Lake St. Joseph near Newellton. Median concentrations ranged from 1,700 to 500,000 cells/mL. Boxplots of phytoplankton concentrations at two representative sites show that 75 percent of the samples analyzed had concentrations less than or equal to 20,000 cells/mL (fig. 2.2.9-1).

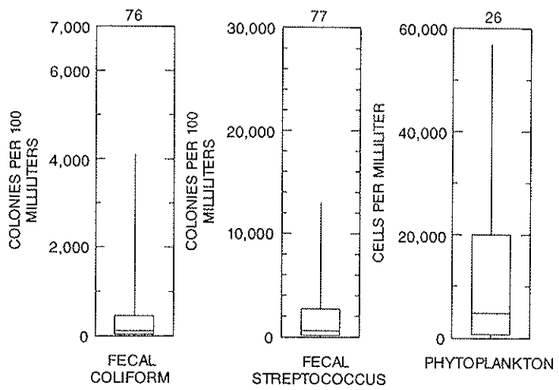
1 BOEUF RIVER NEAR ARKANSAS-LOUISIANA STATE LINE

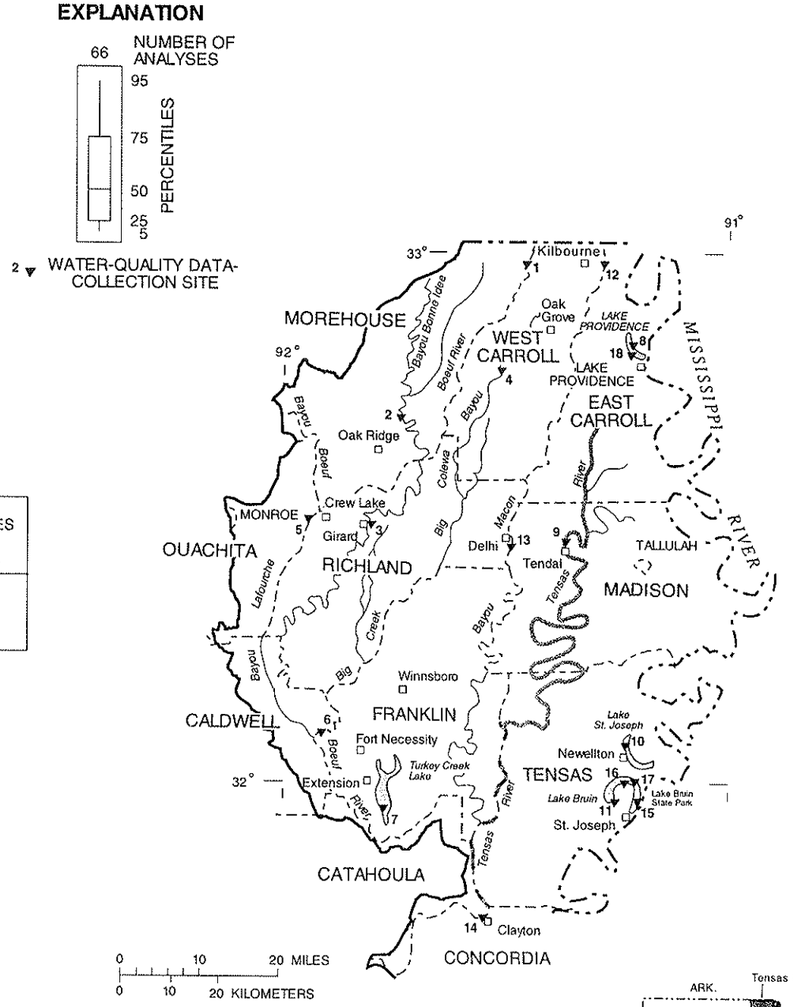


13 BAYOU MACON NEAR DELHI

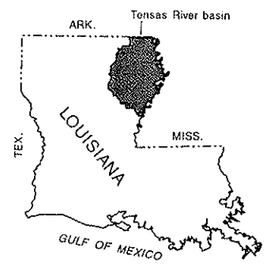
CONSTITUENT	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (COLONIES PER 100 MILLILITERS)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
FECAL COLIFORM	3	5	1
FECAL STREPTOCOCCUS	3	1	3

6 BOEUF RIVER NEAR FORT NECESSITY

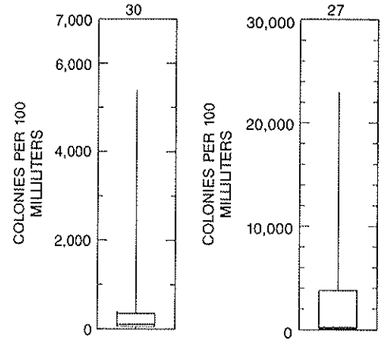




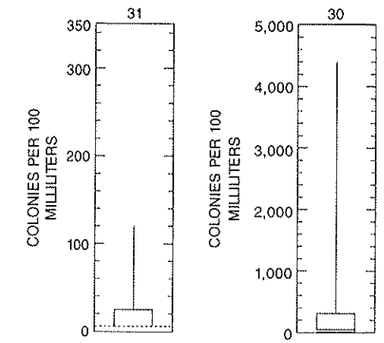
TENSAS RIVER BASIN



12 BAYOU MACON NEAR KILBOURNE



8 LAKE PROVIDENCE NORTH OF LAKE PROVIDENCE



9 TENSAS RIVER AT TENDAL

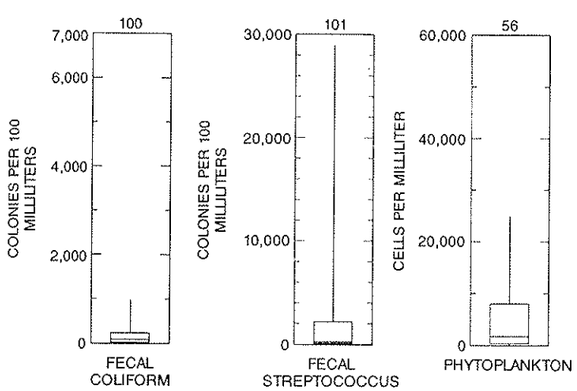


Figure 2.2.9-1. Water-quality data-collection sites in the Tensas River basin, Louisiana, and boxplots and tables summarizing data for concentrations of fecal coliform and fecal streptococcus bacteria and phytoplankton in water from selected sites.

2.3 Summary and Conclusions

PESTICIDES DETECTED IN THE TENSAS RIVER BASIN IN LOUISIANA

DDT and 2,4-D were detected at 15 of the 16 sites for which water was analyzed for organic compounds.

The Tensas River basin in Louisiana lies in the northern part of the State along the boundary between Louisiana and Arkansas. The basin is about 88 miles long and 65 miles wide at its widest point. The streams, rivers, and lakes are used primarily for irrigation, public supply, and industry. The principal sources of fresh water in the basin are the Tensas River, Bayou Lafourche, Boeuf River, Bayou Macon, Lake Bruin, Lake Providence, and Lake St. Joseph.

Water quality in the Tensas River basin in Louisiana was investigated as part of a statewide investigation to evaluate water-quality conditions in the major surface-water drainage basins in Louisiana. The water-quality conditions in the Tensas River basin were evaluated using data collected from 18 sites during the water years 1943-93. Data for 33 water-quality properties and constituents for analyses stored in the U.S. Geological Survey Water-Data Storage and Retrieval System (WATSTORE), a computerized data base, were used for the evaluation. Results are reported as boxplots, linear-regression plots, and tabulated data.

The data were statistically analyzed and summarized into seven categories of water-quality properties and constituents: (1) physical properties--specific conductance, pH, water temperature, dissolved oxygen, and dissolved solids; (2) major inorganic cations--dissolved calcium, magnesium, sodium, and potassium; (3) major inorganic anions--total alkalinity as calcium carbonate, dissolved sulfate, and dissolved chloride; (4) trace metals--dissolved copper, iron, lead, and zinc; (5) nutrients--nitrogen and phosphorus constituents; (6) organic compounds--pesticides and PCB's; and (7) biological constituents--fecal coliform and fecal streptococcus bacteria and phytoplankton.

The physical properties varied for waters in the basin. The specific conductance values ranged from 38 µS/cm (microsiemens per centimeter at 25 degrees Celsius) at Bayou Macon near Delhi, to 1,680 µS/cm at Boeuf River near Fort Necessity. The median values for specific conductance ranged from 58 to 395 µS/cm, which indicated low concentrations of dissolved solids.

The values for pH were rarely less than 6.5 or greater than 9.0, the U.S. Environmental Protection Agency's recommended range for freshwater aquatic life. Values for pH ranged from 5.4 at Big Colewa Bayou near Oak Grove, to 9.7 at Lake St. Joseph near Newellton.

Values for water temperatures ranged from 1.0 °C (degrees Celsius) at Boeuf River near the Arkansas-Louisiana State line to 39.0 °C at Lake St. Joseph near Newellton. Median values for water temperature ranged from 18.0 to 27.5 °C.

Dissolved oxygen concentrations were higher than the State's minimum water-quality criterion of 5.0 mg/L (milligrams per liter) in more than 75 percent of the samples analyzed at most sites. However, the statistical data indicated that 95 percent of the samples collected at Bayou Macon near Kilbourne, typically had dissolved oxygen concentrations of more than 5.0 mg/L. Dissolved oxygen concentrations in water from the oxbow lakes ranged from 0.0 mg/L at three sites in Lake Bruin and two sites in Lake Providence to 18.8 mg/L at Lake St. Joseph near Newellton. The dissolved oxygen concentrations differed seasonally in the lakes due to temperature and algal blooms.

The data for major inorganic cations and anions in water from the basin indicated that concentrations of major ions were below recommended maximum levels for drinking water, for which such levels have been established. However, there were periodic high concentrations of sodium (250 mg/L) and chloride (410 mg/L) ions in Boeuf River. Additional data collection and analysis are needed to understand the cause for increased mineralization in the river.

The available data for trace metals indicated that dissolved copper, lead, and zinc were less than the maximum contaminant levels of the U.S. Environmental Protection Agency's primary and secondary drinking water regulations. Iron concentrations in water from the basin occasionally exceeded 300 µg/L (micrograms per liter), which is the criterion for domestic water supplies. However, iron concentrations were less than the criterion of 1,000 µg/L of the U.S. Environmental Protection Agency for freshwater aquatic life.

The median concentration of ammonia plus organic nitrogen as nitrogen at Lake St. Joseph near Newellton was 2.2 mg/L, the maximum median concen-

tration within the basin, indicating eutrophication. Median concentrations of total phosphorus at the rivers and bayous ranged from 0.04 to 0.30 mg/L. However, the median concentrations of total phosphorus in the oxbow lakes generally were lower than those at the rivers and bayous.

Analysis of the available data for selected organic chemical compounds indicated that concentrations of pesticides, except DDT, dieldrin, and 2,4-D, rarely exceeded their detection levels. DDT (maximum concentration, 0.14 µg/L) was detected at 15 of the 16 sites for which data were available. Dieldrin (maximum concentration, 0.03 µg/L) was detected at ten of the sites, and 2,4-D (maximum concentration, 0.54 µg/L) was detected at 15 of the 16 sites. To more completely characterize surface water in the basin in relation to these constituents, additional data collection and analysis are needed.

Median concentrations of fecal coliform bacteria ranged from less than 5 to 110 colonies per 100 milliliters. Median fecal streptococcus bacteria concentrations, which ranged from 12 to 620 cols/100 mL, generally were higher than the median fecal coliform bacteria concentrations. The median ratios of fecal coliform to fecal streptococcus bacteria were less than 0.7 for most of the sites within the basin, indicating that sources of fecal coliform bacteria probably were predominantly livestock or poultry wastes. However, additional samples closer to the potential sources of contamination need to be collected and analyzed to confirm these results.

Concentrations of phytoplankton varied greatly at sites in the basin due to the seasonal influence. Concentrations ranged from 0 to 4,300,000 cells per milliliter. Median concentrations ranged from 1,700 to 500,000 cells per milliliter.

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TABLE 2.2-1. STATISTICAL SUMMARY OF WATER-QUALITY DATA FOR THE TENSAS RIVER BASIN IN LOUISIANA, 1943-93

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93

[Number in parentheses with the site name is the map number shown in figure 2.0-1. Specific conductance is in microsiemens per centimeter at 25 degrees Celsius, water temperature is in degrees Celsius, and other units are given. <, less than; >, greater than.]

Bayou Bonne Idee near Oak Ridge, Louisiana (2)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	12	(a)	(a)	495	119	299	119	159	282	442	495
pH (standard units)	12	(a)	(a)	7.6	6.0	6.6	6.0	6.2	6.5	7.0	7.6
Water temperature	12	(a)	(a)	31.0	5.0	21.0	5.0	12.5	23.8	29.1	31.0
Dissolved oxygen (milligrams per liter)	11	(a)	(a)	8.3	.6	4.3	.6	1.4	5.5	6.8	8.3
Dissolved solids (milligrams per liter)	11	(a)	(a)	262	93	184	93	137	173	257	262
Major inorganic cations (milligrams per liter)											
Calcium, dissolved	1	0.01	1	47	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Magnesium, dissolved	1	.01	1	15	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Sodium, dissolved	1	.01	1	20	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Potassium, dissolved	1	.01	1	7.6	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	12	1	12	185	29	108	29	53	106	158	185
Sulfate, dissolved	1	.1	1	4.8	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Chloride, dissolved	1	.1	1	36	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	12	0.1	12	3.2	0.8	1.5	0.8	1.1	1.4	1.6	3.2
Nitrogen, nitrite plus nitrate, total as nitrogen	12	.01	12	.28	.01	.07	.01	.01	.04	.09	.28
Phosphorus, total as phosphorus	12	.01	12	.80	.07	.32	.07	.14	.30	.45	.80

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Bayou Bonne Idee near Oak Ridge, Louisiana (2)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	12	10	10	2,200	<10	(c)	<10	10	100	360	2,200
Fecal streptococcus	6	1	6	32,000	170	(b)	(b)	(b)	(b)	(b)	(b)
Trace metals (micrograms per liter)											
Copper, dissolved	3	1	3	12	5	(b)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	4	10	3	300	10	(b)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	3	1	3	6	3	(b)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	3	1	3	22	7	(b)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Bayou Lafourche near Crew Lake, Louisiana (5)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	54	(a)	(a)	816	95	367	113	210	314	526	738
pH (standard units)	54	(a)	(a)	8.3	6.1	7.2	6.4	7.0	7.2	7.5	8.2
Water temperature	53	(a)	(a)	31.0	7.0	18.2	7.7	11.0	19.0	24.5	29.6
Dissolved oxygen (milligrams per liter)	5	(a)	(a)	10.4	6.2	(b)	(b)	(b)	(b)	(b)	(b)
Dissolved solids (milligrams per liter)	53	(a)	(a)	463	72	228	98	138	198	314	426
Major cations (milligrams per liter)											
Calcium, dissolved	54	0.01	54	74	7.7	31	10	16	26	44	62
Magnesium, dissolved	54	.01	54	26	1.8	10	2.2	4.0	6.8	15	24
Sodium, dissolved	54	.01	54	80	4.4	29	5.4	13	27	43	65
Potassium, dissolved	54	.01	54	7.0	.80	4.0	2.2	3.4	3.8	4.7	6.2
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	53	1	53	253	30	108	33	62	97	138	221
Sulfate, dissolved	54	.1	54	38	4.6	19	5.8	11	16	26	36
Chloride, dissolved	54	.1	54	94	2.8	38	5.3	15	30	62	87
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	1	0.01	1	0.95	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Phosphorus, total as phosphorus	1	.01	1	.23	(d)	(b)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Bayou Lafourche near Crew Lake, Louisiana (5)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	1	1	1	120	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Fecal streptococcus	1	1	1	220	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Trace metals (micrograms per liter)											
Copper, dissolved	3	3	1	3	<3	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	4	10	4	140	40	(b)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	3	1	1	5	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	3	10	0	<10	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	2	0.001	1	0.004	<0.001	(b,c)	(b)	(b)	(b)	(b)	(b)
PCB, total	2	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	2	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	2	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	2	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	2	.001	1	.010	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Endosulfan, total	1	.001	0	<.001	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	2	.01	1	.06	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Bayou Macon near Delhi, Louisiana (13)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	66	(a)	(a)	692	38	325	58	160	283	509	645
pH (standard units)	64	(a)	(a)	8.2	6.3	7.3	6.5	6.9	7.3	7.6	8.0
Water temperature	47	(a)	(a)	30.0	4.0	18.5	5.2	11.0	21.0	24.5	29.0
Dissolved oxygen (milligrams per liter)	24	(a)	(a)	11.0	4.4	8.2	4.6	6.6	8.8	9.6	10.9
Dissolved solids (milligrams per liter)	48	(a)	(a)	447	33	201	42	127	174	300	353
Major cations (milligrams per liter)											
Calcium, dissolved	66	0.01	66	75	1.1	34	4.5	18	30	52	65
Magnesium, dissolved	66	.01	66	25	.30	11	1.3	4.8	9.0	17	23
Sodium, dissolved	57	.01	57	42	2.3	15	2.9	5.2	11	24	34
Potassium, dissolved	54	.01	54	7.1	1.0	3.5	1.2	2.6	3.5	4.2	6.0
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	66	1	66	271	8	124	19	57	112	192	243
Sulfate, dissolved	66	.1	66	39	.7	16	1.8	9.0	16	23	30
Chloride, dissolved	66	.1	66	58	2.0	19	3.0	6.0	15	30	46
Nutrients (milligrams per liter)											
Nitrogen, nitrite plus nitrate, total as nitrogen	3	0.01	3	0.38	0.10	(b)	(b)	(b)	(b)	(b)	(b)
Phosphorus, total as phosphorus	3	.01	3	.06	.02	(b)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Bayou Macon near Delhi, Louisiana (13)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	3	5	1	530	<5	(b,c)	(b)	(b)	(b)	(b)	(b)
Fecal streptococcus	3	1	3	210	20	(b)	(b)	(b)	(b)	(b)	(b)
Trace metals (micrograms per liter)											
Copper, dissolved	4	4	1	4	<4	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	5	10	5	200	50	(b)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	4	5	0	<5	<5	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	4	20	0	<20	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	2	0.01	1	0.02	<0.01	(b,c)	(b)	(b)	(b)	(b)	(b)
PCB, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	1	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	2	.01	1	.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	2	.01	1	.31	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Bayou Macon near Kilbourne, Louisiana (12)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical Properties											
Specific conductance	112	(a)	(a)	718	66	288	107	183	290	386	488
pH (standard units)	113	(a)	(a)	8.3	5.7	7.3	6.4	7.0	7.3	7.7	8.0
Water temperature	104	(a)	(a)	32.5	3.0	17.9	5.2	10.1	18.0	24.8	30.0
Dissolved oxygen (milligrams per liter)	58	(a)	(a)	12.4	4.9	8.1	5.2	6.6	7.8	9.6	11.5
Dissolved solids (milligrams per liter)	82	(a)	(a)	459	58	192	98	150	186	231	318
Major cations (milligrams per liter)											
Calcium, dissolved	98	0.01	98	76	5.9	32	10	21	32	41	54
Magnesium, dissolved	98	.01	98	23	1.9	9.5	3.1	6.0	9.2	13	17
Sodium, dissolved	89	.01	89	45	2.2	13.9	3.6	8.8	14	19	23
Potassium, dissolved	89	.01	89	7.0	.90	3.6	2.0	3.0	3.5	4.0	5.6
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	113	1	113	303	24	111	40	67	110	148	189
Sulfate, dissolved	102	.1	102	54	.8	16	4.1	12	15	19	26
Chloride, dissolved	114	.1	114	73	1.1	15	3.3	9.0	13	21	28
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	27	0.01	27	2.9	0.09	0.96	0.17	0.60	0.81	1.2	2.3
Nitrogen, nitrite plus nitrate, total as nitrogen	33	.01	33	1.5	.01	.52	.01	.21	.48	.80	1.4
Phosphorus, total as phosphorus	40	.01	40	.87	.06	.26	.08	.13	.26	.36	.59

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Bayou Macon near Kilbourne, Louisiana (12)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	30	1	30	7,200	5	620	8	49	100	350	5,400
Fecal streptococcus	27	1	27	24,000	12	3,800	20	88	210	3,800	23,000
Trace metals (micrograms per liter)											
Copper, dissolved	9	1	8	8	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	9	10	7	360	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	9	5	0	<5	<5	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	9	20	1	24	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	10	0.02	1	0.06	<0.02	(c)	<0.02	<0.02	<0.02	<0.02	0.06
PCB, total	8	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	8	.01	2	.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	8	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	8	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	8	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	8	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	10	.01	3	.03	<.01	(c)	<.01	<.01	<.01	<.01	.03
Endosulfan, total	8	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	8	.01	3	.09	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Big Colewa Bayou near Oak Grove, Louisiana (4)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	17	(a)	(a)	164	39	62	39	45	58	68	164
pH (standard units)	17	(a)	(a)	7.2	5.4	6.2	5.4	5.8	6.3	6.6	7.2
Water temperature	3	(a)	(a)	21.0	8.5	(b)	(b)	(b)	(b)	(b)	(b)
Dissolved solids (milligrams per liter)	3	(a)	(a)	93	74	(b)	(b)	(b)	(b)	(b)	(b)
Major cations (milligrams per liter)											
Calcium, dissolved	15	0.1	15	10	3.3	4.8	3.3	3.7	4.0	5.9	10
Magnesium, dissolved	15	.1	15	2.5	.2	1.4	.2	1.0	1.4	2.0	2.5
Sodium, dissolved	16	.1	16	10	1.2	2.8	1.2	1.6	2.6	3.0	10
Potassium, dissolved	15	.1	15	11	.4	3.0	.4	1.2	2.4	3.8	11
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	17	1	17	25	9	16	9	12	14	22	25
Sulfate, dissolved	17	.1	17	8.4	.6	3.4	.6	1.5	2.0	5.8	8.4
Chloride, dissolved	15	.1	15	25	.8	4.5	.8	1.8	3.1	4.7	25

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Boeuf River near Arkansas-Louisiana State Line (1)

	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	119	(a)	(a)	1,160	53	359	68	163	300	495	861
pH (standard units)	140	(a)	(a)	8.5	6.0	7.3	6.4	7.0	7.3	7.7	8.0
Water temperature	132	(a)	(a)	33.5	1.0	18.9	5.6	12.0	20.0	25.0	30.0
Dissolved oxygen (milligrams per liter)	83	(a)	(a)	13.8	.2	7.9	4.2	6.9	7.9	9.4	11.0
Dissolved solids (milligrams per liter)	103	(a)	(a)	708	52	240	75	139	206	321	498
Major cations (milligrams per liter)											
Calcium, dissolved	93	0.01	93	110	5.8	33	7.3	18	29	47	72
Magnesium, dissolved	92	.01	92	38	1.0	11	2.3	5.6	9.1	17	26
Sodium, dissolved	85	.01	85	95	3.1	28	3.6	11	22	40	69
Potassium, dissolved	85	.01	85	7.2	1.7	4.2	2.1	3.4	4.1	4.8	6.2
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	108	1	108	372	16	99	23	50	82	136	208
Sulfate, dissolved	120	.1	120	61	1.0	21	5.4	11	18	28	50
Chloride, dissolved	131	.1	131	210	2.4	43	3.4	13	34	66	114
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	27	0.01	27	1.9	0.48	1.2	0.49	0.79	1.2	1.5	1.9
Nitrogen, nitrite plus nitrate, total as nitrogen	44	.1	33	1.3	<.1	(c)	<.1	<.1	.4	.7	1.2
Phosphorus, total as phosphorus	67	.01	67	.76	.02	.26	.05	.13	.22	.38	.64

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Boeuf River near Arkansas-Louisiana State Line (1)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	30	5	26	4,000	<5	(c)	<5	14	48	220	3,100
Fecal streptococcus	27	1	27	28,000	4	3,500	6	70	340	2,400	27,000
Trace metals (micrograms per liter)											
Copper, dissolved	22	25	0	<25	<25	(c)	<25	<25	<25	<25	<25
Iron, dissolved	9	10	7	180	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	21	5	0	<5	<5	(c)	<5	<5	<5	<5	<5
Zinc, dissolved	18	10	4	26	<10	(c)	<10	<10	<10	<10	26
Organic compounds (micrograms per liter)											
DDT, total	17	0.02	1	0.13	<0.02	(c)	<0.02	<0.02	<0.02	<0.02	0.13
PCB, total	8	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	8	.01	1	.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	9	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	8	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	8	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	8	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	8	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	17	.01	5	.02	<.01	(c)	<.01	<.01	<.01	<.01	.02
Endosulfan, total	15	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
2,4-D, total	7	.01	5	.40	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Boeuf River near Fort Necessity, Louisiana (6)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	95	(a)	(a)	1,680	62	474	71	167	395	699	1,190
pH (standard units)	96	(a)	(a)	8.2	5.7	7.2	6.2	6.8	7.2	7.6	8.1
Water temperature	95	(a)	(a)	34.0	4.0	20.2	6.9	13.5	21.5	28.0	31.6
Dissolved oxygen (milligrams per liter)	93	(a)	(a)	13.2	2.3	7.7	4.7	6.1	7.7	9.4	11.5
Dissolved solids (milligrams per liter)	93	(a)	(a)	902	43	266	57	101	227	375	644
Major cations (milligrams per liter)											
Calcium, dissolved	96	0.01	96	69	4.7	26	6.2	9.2	26	42	60
Magnesium, dissolved	96	.01	96	27	1.4	9.3	1.8	3.2	8.3	15	22
Sodium, dissolved	96	.01	96	250	3.6	52	4.9	14	34	70	160
Potassium, dissolved	96	.01	96	7.4	.1	3.8	2.0	3.1	3.7	4.6	5.4
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	96	1	96	222	17	88	19	34	84	132	197
Sulfate, dissolved	96	.1	96	98	1.9	19	3.0	10	16	24	44
Chloride, dissolved	96	.1	96	410	3.4	80	5.2	15	53	110	250
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	77	0.1	77	4.9	0.2	1.3	0.5	0.9	1.3	1.6	2.4
Nitrogen, nitrite plus nitrate, total as nitrogen	89	.01	89	1.6	.01	.43	.02	.20	.34	.63	1.2
Phosphorus, total as phosphorus	96	.01	96	.61	.08	.28	.11	.17	.26	.35	.57

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Boeuf River near Fort Necessity, Louisiana (6)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents											
Fecal coliform bacteria (colonies per 100 milliliters)	76	1	76	14,000	1	650	8	26	110	450	4,100
Fecal streptococcus bacteria (colonies per 100 milliliters)	77	1	77	19,000	4	2,300	17	140	600	2,700	13,000
Phytoplankton (cells per milliliter)	26	0	26	58,000	0	13,000	35	660	4,800	20,000	57,000
Trace metals (micrograms per liter)											
Copper, dissolved	40	1	39	16	<1	(c)	1	3	6	7	16
Iron, dissolved	42	1	42	570	3	130	9	20	90	200	500
Lead, dissolved	40	5	3	15	<5	(c)	<5	<5	<5	<5	<5
Zinc, dissolved	43	20	10	340	<20	(c)	<20	<20	<20	<20	<20
Organic compounds (micrograms per liter)											
DDT, total	6	0.001	1	0.030	<0.001	(b,c)	(b)	(b)	(b)	(b)	(b)
PCB, total	6	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	6	.01	1	.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	6	.001	1	.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	6	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	6	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	6	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	6	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	6	.001	1	.010	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	6	.01	4	.33	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Boeuf River near Girard, Louisiana (3)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	45	(a)	(a)	872	54	305	74	120	249	414	810
pH (standard units)	80	(a)	(a)	8.8	6.1	7.2	6.4	6.8	7.2	7.7	8.2
Water temperature	43	(a)	(a)	30.0	3.0	18.0	5.5	11.0	18.5	23.5	29.2
Dissolved oxygen (milligrams per liter)	20	(a)	(a)	10.4	3.8	7.3	3.8	5.6	7.0	9.1	10.4
Dissolved solids (milligrams per liter)	58	(a)	(a)	628	71	255	74	108	216	373	545
Major cations (milligrams per liter)											
Calcium, dissolved	45	0.01	45	88	4.9	30	6.0	13	27	40	83
Magnesium, dissolved	45	.01	45	28	1.4	9.0	2.1	3.2	7.2	12	26
Sodium, dissolved	45	.01	45	60	2.0	18	2.5	4.8	12	27	53
Potassium, dissolved	45	.01	45	6.8	1.7	3.9	2.0	3.2	3.9	4.6	6.5
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	45	1	45	251	16	98	23	42	82	134	239
Sulfate, dissolved	80	.1	80	88	2.8	25	4.2	7.4	17	39	78
Chloride, dissolved	82	.1	82	140	1.8	38	3.0	5.9	20	62	110

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Boeuf River near Girard, Louisiana (3)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Trace metals (micrograms per liter)											
Iron, dissolved	5	10	5	340	60	(b)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	2	5	0	<5	<5	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	2	1	0	<1	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	1	0.01	1	0.02	(d)	(b)	(b)	(b)	(b)	(b)	(b)
PCB, total	1	.01	0	<.01	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	1	.01	1	.01	(d)	(b)	(b)	(b)	(b)	(b)	(b)
Lindane, total	1	.01	0	<.01	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	1	.01	0	<.01	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	1	.01	0	<.01	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	1	.01	0	<.01	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	1	.01	0	<.01	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	1	.01	0	<.01	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	1	.01	1	.07	(d)	(b)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Bruin at Lake Bruin State Park, near St. Joseph, Louisiana (15)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	32	(a)	(a)	212	130	168	133	155	170	180	197
pH (standard units)	34	(a)	(a)	9.2	6.5	8.0	6.7	7.2	8.0	8.7	9.1
Water temperature	32	(a)	(a)	30.5	7.0	20.8	7.0	14.5	20.0	28.4	30.2
Dissolved oxygen (milligrams per liter)	31	(a)	(a)	12.2	.0	7.7	.0	5.4	8.6	11.1	12.2
Dissolved solids (milligrams per liter)	15	(a)	(a)	131	72	91	72	78	89	98	131
Major cations (milligrams per liter)											
Calcium, dissolved	15	0.01	15	26	13	20	13	17	19	23	26
Magnesium, dissolved	15	.01	15	7.1	4.5	5.6	4.5	5.2	5.6	6.3	7.1
Sodium, dissolved	15	.01	15	3.7	2.1	2.7	2.1	2.4	2.7	3.0	3.7
Potassium, dissolved	15	.01	15	4.4	1.3	3.8	1.3	3.6	4.0	4.2	4.4
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	15	1	15	97	57	76	57	69	74	82	97
Sulfate, dissolved	15	.1	13	4.5	<.1	(c)	<.1	1.4	2.6	3.3	4.5
Chloride, dissolved	15	.1	15	3.2	2.2	2.6	2.2	2.4	2.6	2.8	3.2
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	9	0.1	9	0.8	0.5	0.6	0.5	0.6	0.6	0.7	0.8
Nitrogen, nitrite plus nitrate, total as nitrogen	12	.1	8	1.5	<.1	(c)	<.1	<.1	.3	.6	1.5
Phosphorus, total as phosphorus	12	.01	12	1.3	.01	.15	.01	.02	.04	.06	1.3

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Bruin at Lake Bruin State Park, near St. Joseph, Louisiana (15)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	11	5	5	9,200	<5	(c)	<5	< 5	< 5	47	9,200
Fecal streptococcus	11	4	9	1,500	<4	(c)	<4	10	40	240	1,500
Trace metals (micrograms per liter)											
Copper, dissolved	3	20	0	<20	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	3	10	1	30	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	3	1	1	4	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	3	20	0	<20	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	3	0.001	1	0.010	<0.001	(b,c)	(b)	(b)	(b)	(b)	(b)
PCB, total	3	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	3	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	3	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	3	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	3	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	3	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	3	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	3	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Endosulfan, total	1	.001	0	<.001	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	3	.01	2	.06	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Bruin at southwest end near St. Joseph, Louisiana (11)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	20	(a)	(a)	166	131	145	131	141	144	150	165
pH (standard units)	20	(a)	(a)	8.6	6.7	7.7	6.7	7.3	7.6	8.3	8.6
Water temperature	20	(a)	(a)	33.0	8.6	24.1	8.7	18.6	27.5	31.0	33.0
Dissolved oxygen (milligrams per liter)	20	(a)	(a)	12.0	3.0	8.6	3.0	7.2	9.2	9.8	12.0
Major cations (milligrams per liter)											
Calcium, dissolved	4	0.01	4	21	15	(b)	(b)	(b)	(b)	(b)	(b)
Magnesium, dissolved	4	.01	4	5.6	4.4	(b)	(b)	(b)	(b)	(b)	(b)
Sodium, dissolved	4	.01	4	2.7	2.3	(b)	(b)	(b)	(b)	(b)	(b)
Potassium, dissolved	4	.01	4	4.3	3.7	(b)	(b)	(b)	(b)	(b)	(b)
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	12	1	12	81	61	68	61	67	68	70	81
Sulfate, dissolved	3	.1	3	1.8	.8	(b)	(b)	(b)	(b)	(b)	(b)
Chloride, dissolved	7	.1	7	2.7	1.9	(b)	(b)	(b)	(b)	(b)	(b)
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	15	0.1	15	1.3	0.5	0.8	0.5	0.5	0.8	0.9	1.3
Nitrogen, nitrite plus nitrate, total as nitrogen	15	.1	6	.5	<.1	(c)	<.1	<.1	<.1	.3	.5
Phosphorus, total as phosphorus	14	.01	14	.09	.03	.05	.03	.04	.05	.05	.09

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Bruin at southwest end near St. Joseph, Louisiana(11)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents											
Fecal coliform bacteria (colonies per 100 milliliters)	13	10	3	60	<10	(c)	<10	< 10	< 10	10	60
Fecal streptococcus bacteria (colonies per 100 milliliters)	13	10	80	84	<10	(c)	<10	< 10	12	56	84
Phytoplankton (cells per milliliter)	14	1	14	710,000	5,200	180,000	5,200	15,000	130,000	340,000	710,000
Trace metals (micrograms per liter)											
Copper, dissolved	5	1	5	3	2	(b)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	6	10	5	560	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	6	1	1	4	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	6	1	6	82	3	(b)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	14	0.001	2	0.012	<0.001	(c)	<0.001	< 0.001	<0.001	<0.001	0.012
PCB, total	14	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Diazinon, total	14	.01	5	.02	<.01	(c)	<.01	< .01	<.01	.01	.01
Lindane, total	14	.001	0	<.001	<.001	(c)	<.001	< .001	<.001	<.001	<.001
Chlordane, total	14	.1	0	<.1	<.1	(c)	<.1	< .1	<.1	<.1	<.1
Malathion, total	14	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endrin, total	14	.001	0	<.001	<.001	(c)	<.001	<.001	<.001	<.001	<.001
Parathion, total	14	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Dieldrin, total	14	.001	4	.020	<.001	(c)	<.001	<.001	<.001	.001	.020
Endosulfan, total	14	.001	0	<.001	<.001	(c)	<.001	<.001	<.001	<.001	<.001
2,4-D, total	12	.01	12	.10	.01	.04	.01	.02	.04	.06	.10

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Bruin, in center, near Newellton, Louisiana (17)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	36	(a)	(a)	258	130	152	132	139	148	156	201
pH (standard units)	36	(a)	(a)	9.2	6.2	7.6	6.4	7.0	7.6	8.3	8.8
Water temperature	36	(a)	(a)	33.5	5.0	22.5	8.3	16.6	23.5	30.8	33.5
Dissolved oxygen (milligrams per liter)	36	(a)	(a)	12.3	.0	7.4	.1	5.4	9.0	10.0	12.0
Dissolved solids (milligrams per liter)	11	(a)	(a)	97	76	90	76	85	91	96	97
Major cations (milligrams per liter)											
Calcium, dissolved	16	0.01	16	21	1.2	17	1.2	17	18	19	21
Magnesium, dissolved	16	.01	16	5.7	.27	4.8	.27	4.6	5.0	5.4	5.7
Sodium, dissolved	16	.01	16	4.8	1.9	2.6	1.9	2.2	2.4	2.6	4.8
Potassium, dissolved	16	.01	16	4.3	1.4	3.4	1.4	3.3	3.5	3.8	4.3
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	22	1	22	90	59	71	59	67	70	75	88
Sulfate, dissolved	15	.1	15	7.0	1.3	3.0	1.3	2.1	2.7	3.6	7.0
Chloride, dissolved	19	.1	19	4.8	1.8	2.5	1.8	2.0	2.1	2.7	4.8
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	28	0.1	28	2.8	0.4	0.9	0.4	0.5	0.9	1.0	10
Nitrogen, nitrite plus nitrate, total as nitrogen	28	.1	12	.4	<.1	(c)	<.1	<.1	<.1	.2	.3
Phosphorus, total as phosphorus	28	.01	27	.62	<.01	(c)	.01	.03	.05	.06	.48

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Bruin, in center, near Newellton , Louisiana (17)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents											
Fecal coliform bacteria (colonies per 100 milliliters)	24	20	2	36	<20	(c)	<20	<20	<20	<20	32
Fecal streptococcus bacteria (colonies per 100 milliliters)	24	20	5	170	<20	(c)	<20	<20	<20	<20	140
Phytoplankton (cells per milliliter)	17	0	17	740,000	1,800	130,000	1,800	13,000	40,000	210,000	740,000
Trace metals (micrograms per liter)											
Copper, dissolved	8	1	8	5	1	(b)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	7	10	5	180	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	8	1	3	3	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	8	10	3	40	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	19	0.01	1	0.14	<0.01	(c)	<0.01	<0.01	<0.01	<0.01	0.14
PCB, total	19	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Diazinon, total	18	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Lindane, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Chlordane, total	19	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Malathion, total	18	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endrin, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Parathion, total	18	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Dieldrin, total	19	.01	0	.02	<.01	(c)	<.01	<.01	<.01	<.01	.02
Endosulfan, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
2,4-D, total	17	.01	16	.08	<.01	(c)	<.01	.02	.03	.06	.08

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Bruin, south, near Newellton, Louisiana (16)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	26	(a)	(a)	195	136	168	139	160	170	180	191
pH (standard units)	27	(a)	(a)	9.2	7.1	8.1	7.1	7.2	8.3	8.7	9.2
Water temperature	27	(a)	(a)	31.5	7.0	22.2	7.0	19.5	21.5	29.0	31.1
Dissolved oxygen (milligrams per liter)	27	(a)	(a)	12.0	.0	7.5	.0	4.9	8.5	11.0	12.0
Dissolved solids (milligrams per liter)	6	(a)	(a)	92	71	(b)	(b)	(b)	(b)	(b)	(b)
Major cations (milligrams per liter)											
Calcium, dissolved	8	0.01	8	23	16	(b)	(b)	(b)	(b)	(b)	(b)
Magnesium, dissolved	8	.01	8	6.0	4.4	(b)	(b)	(b)	(b)	(b)	(b)
Sodium, dissolved	8	.01	8	3.3	2.0	(b)	(b)	(b)	(b)	(b)	(b)
Potassium, dissolved	8	.01	8	5.6	3.6	(b)	(b)	(b)	(b)	(b)	(b)
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	8	1	8	82	60	(b)	(b)	(b)	(b)	(b)	(b)
Sulfate, dissolved	8	.1	8	4.5	1.5	(b)	(b)	(b)	(b)	(b)	(b)
Chloride, dissolved	8	.1	8	2.8	1.9	(b)	(b)	(b)	(b)	(b)	(b)
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	8	0.1	8	0.8	0.4	(b)	(b)	(b)	(b)	(b)	(b)
Nitrogen, nitrite plus nitrate, total as nitrogen	8	.01	8	.7	.01	(b)	(b)	(b)	(b)	(b)	(b)
Phosphorus, total as phosphorus	8	.01	8	.18	.02	(b)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Bruin, south, near Newellton, Louisiana (16)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	7	5	2	380	<5	(b,c)	(b)	(b)	(b)	(b)	(b)
Fecal streptococcus	8	4	7	390	<4	(b,c)	(b)	(b)	(b)	(b)	(b)
Trace metals (micrograms per liter)											
Copper, dissolved	2	20	0	<20	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	2	10	1	30	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	2	2	1	4	<2	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	2	20	0	<20	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	2	0.001	1	0.010	<0.001	(b,c)	(b)	(b)	(b)	(b)	(b)
PCB, total	2	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	2	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	2	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	2	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	2	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Endosulfan, total	1	.001	0	<.001	(d)	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	2	.01	2	.05	.05	(b)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Providence near Lake Providence, Louisiana (18)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	54	(a)	(a)	230	124	181	131	165	182	209	230
pH (standard units)	47	(a)	(a)	9.1	6.2	8.0	7.0	7.5	8.0	8.4	9.1
Water temperature	54	(a)	(a)	33.5	4.5	19.3	5.0	11.2	18.0	26.5	31.6
Dissolved oxygen (milligrams per liter)	54	(a)	(a)	16.8	.0	9.3	4.1	7.6	9.7	11.4	13.0
Dissolved solids (milligrams per liter)	36	(a)	(a)	135	68	102	76	94	103	112	122
Major cations (milligrams per liter)											
Calcium, dissolved	36	0.01	36	26	14	20	14	17	20	21	25
Magnesium, dissolved	36	.01	36	8.4	3.8	6.4	4.1	5.8	6.4	7.2	8.2
Sodium, dissolved	36	.01	36	9.0	3.5	6.5	3.6	5.2	6.4	7.9	8.9
Potassium, dissolved	36	.01	36	4.8	1.0	3.6	2.4	3.4	3.8	4.0	4.5
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	37	1	37	114	53	84	60	77	85	93	110
Sulfate, dissolved	36	.1	36	9.3	.4	3.4	1.5	2.3	3.0	4.1	7.2
Chloride, dissolved	36	.1	36	5.7	2.4	4.0	2.4	3.2	4.0	4.8	5.4
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	33	0.1	33	1.6	0.3	0.9	0.4	0.7	0.8	1.0	1.5
Nitrogen, nitrite plus nitrate, total as nitrogen	36	.1	11	.8	<.1	(c)	<.1	<.1	<.1	.2	.7
Phosphorus, total as phosphorus	36	.01	36	.45	.03	.10	.03	.06	.08	.11	.35

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Providence near Lake Providence, Louisiana (18)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents											
Fecal coliform bacteria (colonies per 100 milliliters)	36	5	24	600	<5	(c)	<5	<5	7	36	190
Fecal streptococcus bacteria (colonies per 100 milliliters)	34	5	27	4,100	<5	(c)	<5	5	36	340	3,200
Phytoplankton (cells per milliliter)	8	1	8	100,000	7,000	(b)	(b)	(b)	(b)	(b)	(b)
Trace metals (micrograms per liter)											
Copper, dissolved	9	1	6	9	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	9	10	5	60	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	9	2	2	3	<2	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	9	20	0	<20	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	19	0.01	4	0.04	<0.01	(c)	<0.01	<0.01	<0.01	<0.01	<0.01
PCB, total	19	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Diazinon, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Lindane, total	19	.01	1	.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Chlordane, total	19	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Malathion, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endrin, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Parathion, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Dieldrin, total	19	.01	4	.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endosulfan, total	17	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
2,4-D, total	20	.01	12	.04	<.01	(c)	<.01	<.01	.01	.02	.04

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Providence north of Lake Providence, Louisiana (8)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	64	(a)	(a)	235	116	180	116	170	181	196	228
pH (standard units)	51	(a)	(a)	9.0	6.5	7.7	6.7	7.3	7.6	8.3	8.7
Water temperature	62	(a)	(a)	33.5	4.5	19.9	5.0	11.4	19.5	26.6	32.4
Dissolved oxygen (milligrams per liter)	60	(a)	(a)	14.3	.0	8.3	.3	7.0	9.0	10.6	12.6
Dissolved solids (milligrams per liter)	32	(a)	(a)	138	71	101	77	87	106	110	126
Major cations (milligrams per liter)											
Calcium, dissolved	35	0.01	35	26	13	19	14	18	20	22	25
Magnesium, dissolved	35	.01	35	9.7	3.6	6.3	4.1	5.7	6.3	7.1	8.2
Sodium, dissolved	35	.01	35	11	3.3	6.3	3.4	5.0	5.9	7.9	10
Potassium, dissolved	35	.01	35	4.9	.80	3.6	2.3	3.3	3.7	4.1	4.9
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	35	1	35	100	49	82	58	73	84	89	99
Sulfate, dissolved	35	.1	35	13	.4	3.8	.7	2.2	3.4	4.2	9.7
Chloride, dissolved	35	.1	35	8.2	.6	4.0	2.0	3.1	3.8	4.9	6.0
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	31	0.1	31	2.3	0.1	0.9	0.2	0.6	0.9	1.2	1.9
Nitrogen, nitrite plus nitrate, total as nitrogen	31	.1	10	.7	<.1	(c)	<.1	<.1	<.1	.2	.7
Phosphorus, total as phosphorus	31	.01	31	.34	.03	.11	.04	.06	.09	.12	.28

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake Providence north of Lake Providence, Louisiana (8)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents											
Fecal coliform bacteria (colonies per 100 milliliters)	31	5	15	210	<5	(c)	<5	<5	<5	25	120
Fecal streptococcus bacteria (colonies per 100 milliliters)	30	5	22	4,400	<5	(c)	<5	<5	45	310	4,400
Phytoplankton (cells per milliliter)	7	1	7	380,000	4,700	(b)	(b)	(b)	(b)	(b)	(b)
Trace metals (micrograms per liter)											
Copper, dissolved	7	1	4	9	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	7	3	6	60	<3	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	7	1	4	3	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	7	4	6	15	<4	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	19	0.01	3	0.02	<0.01	(c)	<0.01	<0.01	<0.01	<0.01	<0.01
PCB, total	19	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Diazinon, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Lindane, total	19	.01	1	.05	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Chlordane, total	19	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Malathion, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endrin, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Parathion, total	19	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Dieldrin, total	19	.01	5	.03	<.01	(c)	<.01	<.01	<.01	.01	.03
Endosulfan, total	18	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
2,4-D, total	18	.01	10	.05	<.01	(c)	<.01	<.01	.01	.01	.05

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake St. Joseph near Newellton, Louisiana (10)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	46	(a)	(a)	241	78	161	79	140	160	181	230
pH (standard units)	45	(a)	(a)	9.7	6.5	7.9	6.6	7.2	7.9	8.8	9.4
Water temperature	44	(a)	(a)	39.0	4.5	20.6	7.0	11.5	21.0	29.0	34.5
Dissolved oxygen (milligrams per liter)	40	(a)	(a)	18.8	6.9	11.4	7.2	9.7	11.8	12.9	12.9
Dissolved solids (milligrams per liter)	44	(a)	(a)	158	53	102	58	87	102	118	153
Major cations (milligrams per liter)											
Calcium, dissolved	44	0.01	44	30	8.6	19	8.8	15	19	22	26
Magnesium, dissolved	44	.01	44	8.5	2.4	5.3	2.4	4.4	5.4	6.0	8.2
Sodium, dissolved	44	.01	44	10	1.2	3.4	1.4	2.6	3.2	4.0	5.7
Potassium, dissolved	44	.01	44	7.0	1.3	4.6	3.0	4.1	4.6	5.1	6.7
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	44	1	44	115	29	72	32	58	72	86	105
Sulfate, dissolved	44	.1	43	10	<.1	(c)	.3	1.6	3.4	4.9	8.6
Chloride, dissolved	44	.1	44	13	1.0	3.2	1.2	2.1	3.0	3.6	8.7
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	36	0.1	36	4.8	.8	2.2	1.2	1.5	2.2	2.9	3.8
Nitrogen, nitrite plus nitrate, total as nitrogen	39	.1	9	.9	<.1	.1	<.1	<.1	<.1	<.1	.5
Phosphorus, total as phosphorus	39	.01	39	1.9	.04	.32	.06	.17	.23	.34	1.3

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Lake St. Joseph near Newellton, Louisiana (10)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents											
Fecal coliform bacteria (colonies per 100 milliliters)	38	20	15	1,500	<20	(c)	<20	<20	<20	36	810
Fecal streptococcus bacteria (colonies per 100 milliliters)	36	20	22	4,600	<20	(c)	<20	<20	43	260	2,300
Phytoplankton (cells per milliliter)	13	1	13	4,300,000	8,000	1,100,000	8,000	130,000	500,000	1,600,000	4,300,000
Trace metals (micrograms per liter)											
Copper, dissolved	9	1	6	21	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	9	10	6	400	<10	(b,c)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	9	1	3	9	<1	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	9	20	1	20	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	10	0.01	1	0.05	<0.01	(c)	<0.01	<0.01	<0.01	<0.01	0.05
PCB, total	10	.1	1	.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Diazinon, total	10	.01	1	.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Lindane, total	10	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Chlordane, total	10	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Malathion, total	10	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endrin, total	10	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Parathion, total	10	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Dieldrin, total	10	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endosulfan, total	9	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	10	.01	8	.17	<.01	(c)	<.01	.02	.04	.05	.17

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Tensas River at Clayton, Louisiana (14)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	58	(a)	(a)	637	67	302	87	155	292	444	616
pH (standard units)	58	(a)	(a)	8.6	6.2	7.4	6.3	6.9	7.3	7.8	8.4
Water temperature	55	(a)	(a)	34.0	4.0	19.8	6.5	12.0	20.0	27.0	32.1
Dissolved oxygen (milligrams per liter)	35	(a)	(a)	11.8	4.5	8.1	4.9	6.7	7.9	9.8	11.3
Dissolved solids (milligrams per liter)	58	(a)	(a)	369	50	183	66	103	168	252	357
Major cations (milligrams per liter)											
Calcium, dissolved	58	0.01	58	60	6.9	30	9.3	16	28	45	59
Magnesium, dissolved	58	.01	58	28	2.1	9.3	2.5	4.0	8.6	12	21
Sodium, dissolved	58	.01	58	43	3.0	16	3.1	6.1	14	25	37
Potassium, dissolved	58	.01	58	5.0	.70	3.7	2.3	3.2	3.8	4.1	4.7
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	58	1	58	243	21	113	27	56	106	172	226
Sulfate, dissolved	58	.1	58	26	3.8	11	4.4	8.0	11	13	18
Chloride, dissolved	58	.1	58	61	2.9	20	3.2	6.8	18	28	55
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	22	0.1	22	1.6	0.1	1.0	0.1	0.8	0.9	1.3	1.6
Nitrogen, nitrite plus nitrate, total as nitrogen	35	.01	35	1.5	.01	.39	.01	.03	.37	.62	1.2
Phosphorus, total as phosphorus	35	.01	35	.63	.05	.23	.05	.11	.21	.34	.54

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Tensas River at Clayton, Louisiana (14)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	24	5	18	560	<5	(c)	<5	<5	35	110	530
Fecal streptococcus	21	1	21	13,000	10	1,800	11	78	620	1,900	12,000
Trace metals (micrograms per liter)											
Copper, dissolved	10	2	8	15	<2	(c)	<2	2	3	6	15
Iron, dissolved	10	10	8	60	<10	(c)	<10	20	20	40	60
Lead, dissolved	10	2	2	3	<2	(c)	<2	<2	<2	<2	3
Zinc, dissolved	10	20	1	20	<20	(c)	<20	<20	<20	<20	20
Organic compounds (micrograms per liter)											
DDT, total	9	0.01	2	0.03	<0.01	(b,c)	(b)	(b)	(b)	(b)	(b)
PCB, total	9	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	9	.01	1	.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	9	.001	1	.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	9	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	9	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	9	.001	1	.006	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	9	.01	1	.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	9	.001	4	.011	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Endosulfan, total	3	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	9	.01	6	.54	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Tensas River at Tendal, Louisiana (9)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	214	(a)	(a)	769	55	351	82	178	328	506	672
pH (standard units)	206	(a)	(a)	9.1	5.8	7.4	6.5	7.0	7.4	7.8	8.1
Water temperature	193	(a)	(a)	35.0	2.0	18.9	5.8	11.8	19.0	26.2	30.6
Dissolved oxygen (milligrams per liter)	157	(a)	(a)	17.4	3.2	7.6	4.2	5.6	7.5	9.1	11.3
Dissolved solids (milligrams per liter)	175	(a)	(a)	469	45	208	56	116	186	300	392
Major cations (milligrams per liter)											
Calcium, dissolved	206	0.01	206	76	5.8	36	8.0	18	35	52	68
Magnesium, dissolved	206	.01	206	27	1.4	12	2.2	5.2	11	18	24
Sodium, dissolved	190	.01	190	76	1.4	19	2.4	5.6	14	29	49
Potassium, dissolved	191	.01	191	8.2	1.2	4.1	2.3	3.5	4.0	4.6	6.3
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	208	1	208	352	20	157	30	69	146	237	313
Sulfate, dissolved	206	.1	206	24	1.0	9.2	3.2	6.2	8.8	11	16
Chloride, dissolved	208	.1	208	58	.6	13	1.8	4.1	10	20	31
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	128	0.01	128	2.5	0.18	1.2	0.50	0.85	1.0	1.4	2.1
Nitrogen, nitrite plus nitrate, total as nitrogen	118	.1	95	2.9	<.1	(c)	<.1	.1	.4	.7	1.9
Phosphorus, total as phosphorus	133	.01	133	.94	.05	.29	.10	.16	.21	.38	.65

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Tensas River at Tendal, Louisiana (9)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents											
Fecal coliform bacteria (colonies per 100 milliliters)	100	5	92	5,200	<5	(c)	<5	20	85	240	1,000
Fecal streptococcus) bacteria (colonies per 100 milliliters)	101	1	101	>60,000	5	4,200	15	80	240	2,200	29,000
Phytoplankton (cells per milliliter)	56	0	56	53,000	54	6,100	120	300	1,700	8,000	25,000
Trace metals (micrograms per liter)											
Copper, dissolved	64	20	1	21	<20	(c)	<20	<20	<20	<20	<20
Iron, dissolved	75	10	47	360	<10	(c)	<10	<10	15	56	160
Lead, dissolved	65	5	2	12	<5	(c)	<5	<5	<5	<5	<5
Zinc, dissolved	67	20	9	50	<20	(c)	<20	<20	<20	<20	30
Organic compounds (micrograms per liter)											
DDT, total	16	0.01	1	0.10	<0.01	(c)	<0.01	<0.01	<0.01	<0.01	0.10
PCB, total	11	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Diazinon, total	18	.01	1	.01	<.01	(c)	<.01	<.01	<.01	<.01	.01
Lindane, total	18	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Chlordane, total	17	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Malathion, total	18	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endrin, total	18	.01	1	.05	<.01	(c)	<.01	<.01	<.01	<.01	.05
Parathion, total	18	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Dieldrin, total	18	.01	1	.03	<.01	(c)	<.01	<.01	<.01	<.01	.03
Endosulfan, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	12	.01	2	.43	<.01	(c)	<.01	<.01	<.01	<.01	.43

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Turkey Creek Lake near Extension, Louisiana (7)

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Physical properties											
Specific conductance	16	(a)	(a)	179	39	118	39	90	120	158	179
pH (standard units)	16	(a)	(a)	8.6	6.1	6.9	6.1	6.4	6.8	7.1	8.6
Water temperature	16	(a)	(a)	34.5	6.0	19.1	6.0	9.6	19.5	29.8	34.5
Dissolved oxygen (milligrams per liter)	16	(a)	(a)	11.4	5.7	8.7	5.7	7.3	9.1	10.2	11.4
Dissolved solids (milligrams per liter)	16	(a)	(a)	103	27	69	27	57	70	84	103
Major cations (milligrams per liter)											
Calcium, dissolved	16	0.01	16	12	3.1	8.0	3.1	6.5	8.4	9.6	12
Magnesium, dissolved	16	.01	16	4.1	1.0	2.8	1.0	2.2	3.0	3.4	4.1
Sodium, dissolved	16	.01	16	15	1.6	8.5	1.6	5.7	8.4	13	15
Potassium, dissolved	16	.01	16	3.7	2.0	2.9	2.0	2.6	3.0	3.3	3.7
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	16	1	16	40	12	26	12	20	26	33	40
Sulfate, dissolved	16	.1	16	10	.9	3.2	.9	1.6	2.6	4.4	10
Chloride, dissolved	16	.1	16	31	2.6	17	2.6	11	15	25	31
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	13	0.1	13	3.8	0.5	1.1	0.5	0.6	0.9	1.2	3.8
Nitrogen, nitrite plus nitrate, total as nitrogen	16	.1	8	2.6	<.1	(c)	<.1	<.1	<.1	.2	2.6
Phosphorus, total as phosphorus	16	.01	16	.24	.05	.13	.05	.09	.14	.18	.24

Table 2.2-1. Statistical summary of water-quality data for the Tensas River basin in Louisiana, 1943-93--Continued

Turkey Creek Lake near Extension, Louisiana (7)--continued

Water-quality property or constituent	Number of analyses	Reporting level	Number of analyses greater than or equal to reporting level	Maximum	Minimum	Mean	Percentiles				
							5th	25th	50th (median)	75th	95th
Biological constituents--bacteria (colonies per 100 milliliters)											
Fecal coliform	14	5	10	460	<5	(c)	<5	<5	13	16	460
Fecal streptococcus	14	1	14	14,000	6	1,700	6	61	240	1,400	14,000
Trace metals (micrograms per liter)											
Copper, dissolved	4	2	3	12	<2	(b,c)	(b)	(b)	(b)	(b)	(b)
Iron, dissolved	4	10	4	130	20	(b)	(b)	(b)	(b)	(b)	(b)
Lead, dissolved	4	2	1	2	<2	(b,c)	(b)	(b)	(b)	(b)	(b)
Zinc, dissolved	4	20	1	20	<20	(b,c)	(b)	(b)	(b)	(b)	(b)
Organic compounds (micrograms per liter)											
DDT, total	4	0.001	0	<0.001	<0.001	(b,c)	(b)	(b)	(b)	(b)	(b)
PCB, total	4	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	4	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	4	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Chlordane, total	4	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Malathion, total	4	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Endrin, total	4	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	4	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	4	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
Endosulfan, total	2	.001	0	<.001	<.001	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	4	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

a Not applicable.

b Not calculated because sample size was less than 10.

c Not calculated because data base contained remarked values.

d Only one sample in data base.

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Water Resources Cooperative Program

The Louisiana Department of Transportation and Development-U.S. Geological Survey (DOTD-USGS) Water Resources Cooperative Program is comprehensive and responsive to the needs and concerns of Louisiana-- providing hydrologic information to aid in the management, development, and protection of the State's water resources and transportation system.

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