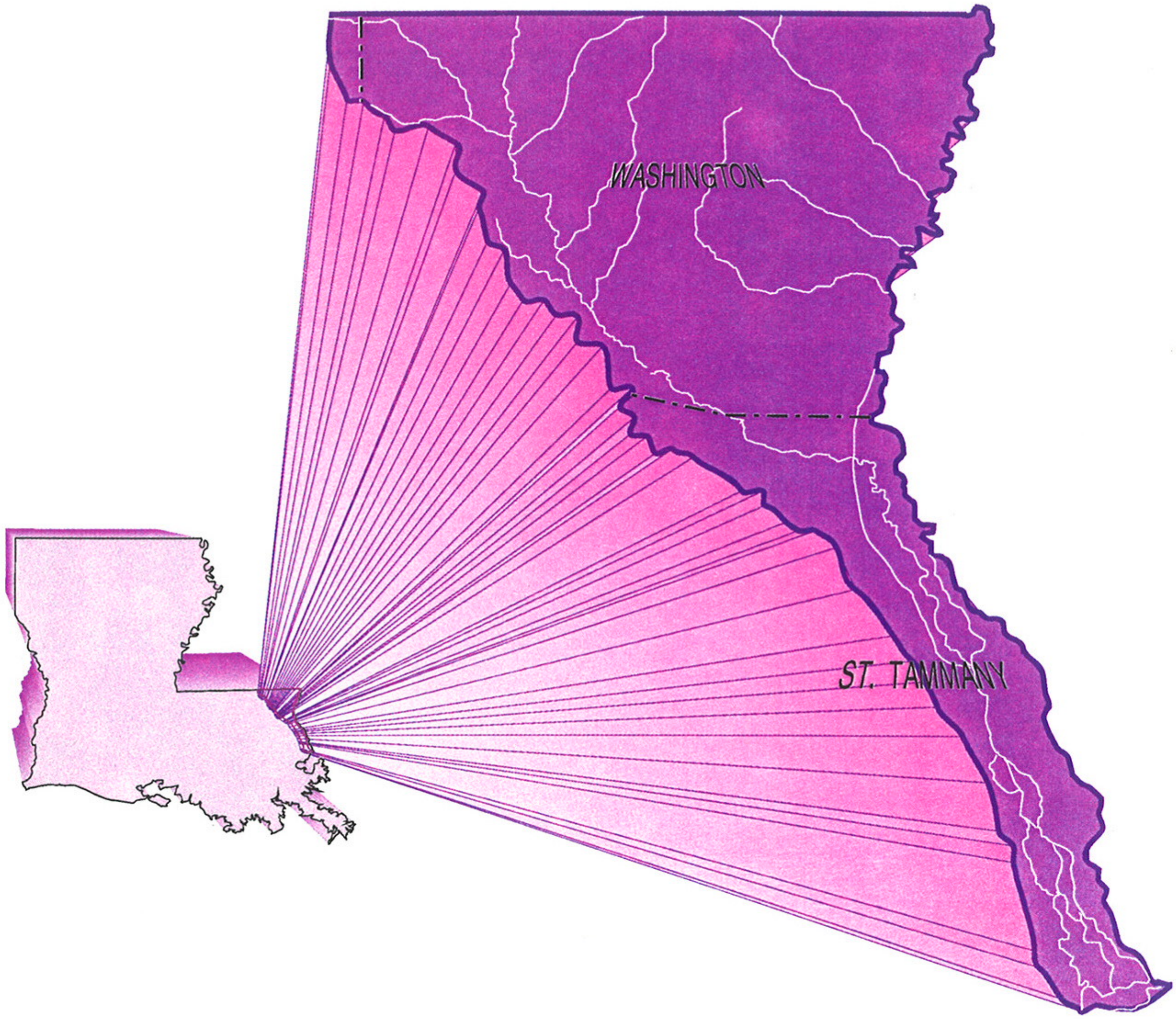
Statistical Summary Of Surface-Water Quality In Louisiana--Pearl River Basin, 1943-95

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Water Resources Technical Report No. 55J



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

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By

Charles R. Garrison

U.S. GEOLOGICAL SURVEY

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Multiply	By	To obtain
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
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
ton (t) short	0.9072	metric tonne
tons (t) short	0.9072	megagram

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 (µS/cm)
micrograms per liter (µg/L)
milligrams per liter (mg/L)
nanograms per liter (ng/L)

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ABSTRACT

A statistical summary of surface-water quality in the Pearl River basin was completed using available data from the U.S. Geological Survey's Water-Data Storage and Retrieval System (WATSTORE), a computerized data base. Data for 33 water-quality properties and constituents for four sites in the Pearl River basin within Louisiana were statistically analyzed for the water years 1943-95. Results are reported as boxplots, linear-regression plots, and tabulated data.

The data were summarized into eight 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; (7) biological constituents--fecal coliform and fecal streptococcus bacteria and phytoplankton; and (8) suspended sediment.

The physical properties varied for surface waters in the Pearl River basin. The median values for specific conductance ranged from 44 to 83 microsiemens per centimeter at 25 degrees Celsius. Values for pH in water from the basin were less than 6.5, the lower limit of the U.S. Environmental Protection Agency's recommended range for freshwater aquatic life, in greater than 50 percent of the samples from Pearl River near Bogalusa, Louisiana, and Bogue Chitto River near Bush, Louisiana. Median values for water temperature ranged from 20.2 to 20.5 degrees Celsius. Dissolved oxygen concentrations were greater than the State's minimum water quality criterion of 5.0 mg/L (milligrams per liter) in more than 95 percent of the samples analyzed at the sites.

An analysis of the data for major inorganic cations and anions indicated that concentrations of major ions were below recommended levels for drinking water, where such levels have been established.

An analysis of the available data for trace metals indicated that dissolved copper, lead, and zinc concentrations 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 were greater than the Environmental Protection Agency's Secondary Maximum Contaminant Level of 300 µg/L (micrograms per liter) for domestic water supplies at some of the sites.

An analysis of the nutrient data indicated that the median concentrations of ammonia plus organic nitrogen as nitrogen at the sites ranged from 0.5 to 0.70 mg/L. However, the maximum concentration of ammonia plus organic nitrogen as nitrogen in the Pearl River basin (5.9 mg/L) occurred at Pearl River at Pools Bluff near Bogalusa. Median concentrations of total phosphorus in the basin ranged from 0.06 mg/L to 0.09 mg/L.

An analysis of the available organic-chemical data indicated that diazinon was detected at more sites and with greater frequency than any of the other organic compounds that were analyzed.

The median ratios of fecal coliform to fecal streptococcus bacteria were less than 0.7 for most of the sites in the Pearl 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 ranged from 0 to 50,000 cells per milliliter due to seasonal influence.

Daily mean suspended-sediment discharges at Pearl River near Bogalusa, which were available, ranged from 111 tons per day when the corresponding daily mean discharge was 1,470 cubic feet per second to 80,600 tons per day when the corresponding daily mean discharge was 109,000 cubic feet per second.

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--Pearl River Basin, 1943-95,"** 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 "Pearl 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 "Pearl 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; selected biological constituents, (bacteria and phytoplankton); and suspended sediment (where available) at the representative sampling sites.
- Summary and conclusions, which pertain only to the basin summary.

The "Selected References" lists 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.

1.1 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 (Garrison and others, 1996) 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-Mermentau, Ouachita, Pearl, Red, Sabine, and Tensas River basins (fig. 1.1-1).

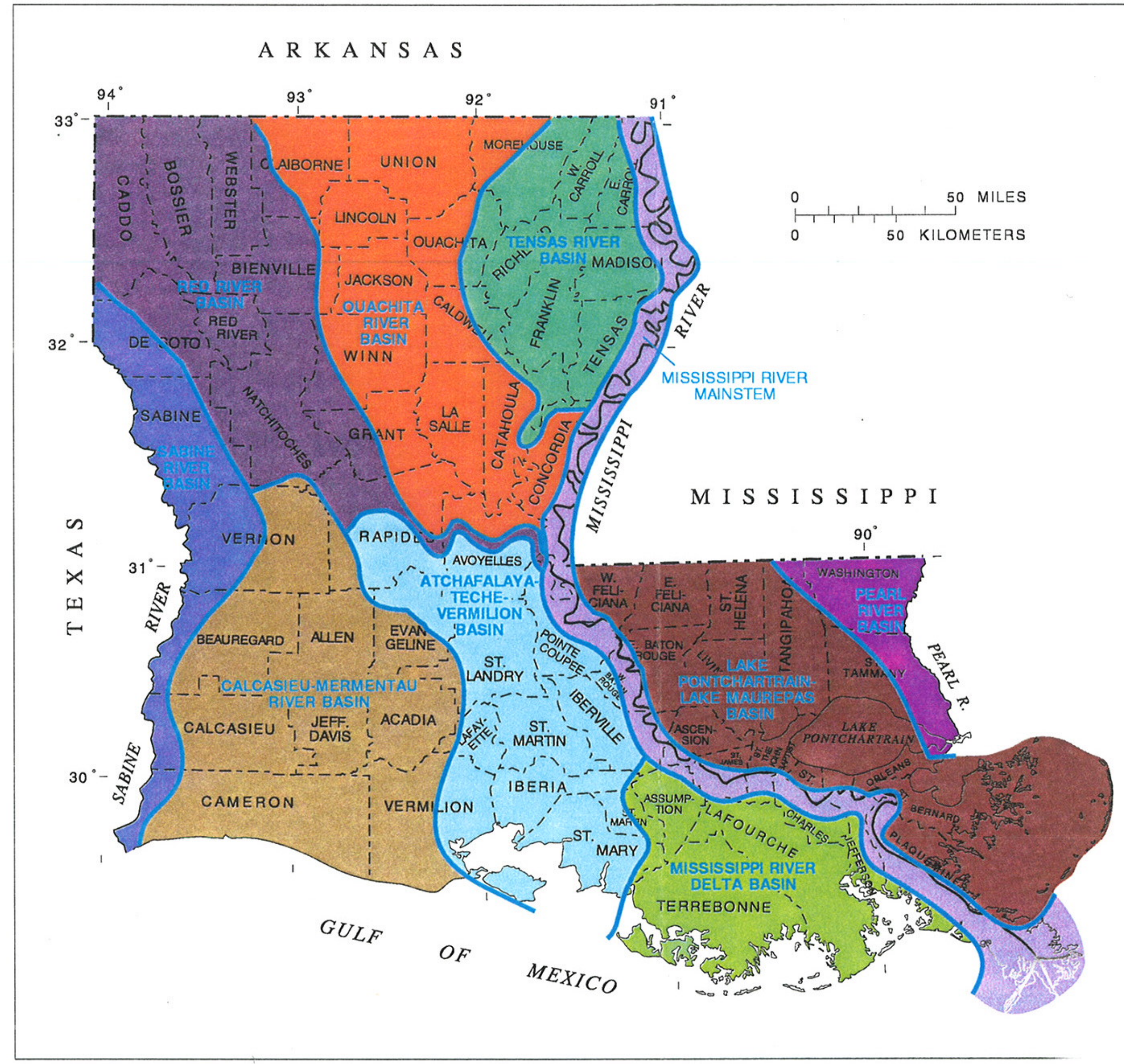

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Figure 1.1-1. Major surface-water basins in Louisiana.

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.

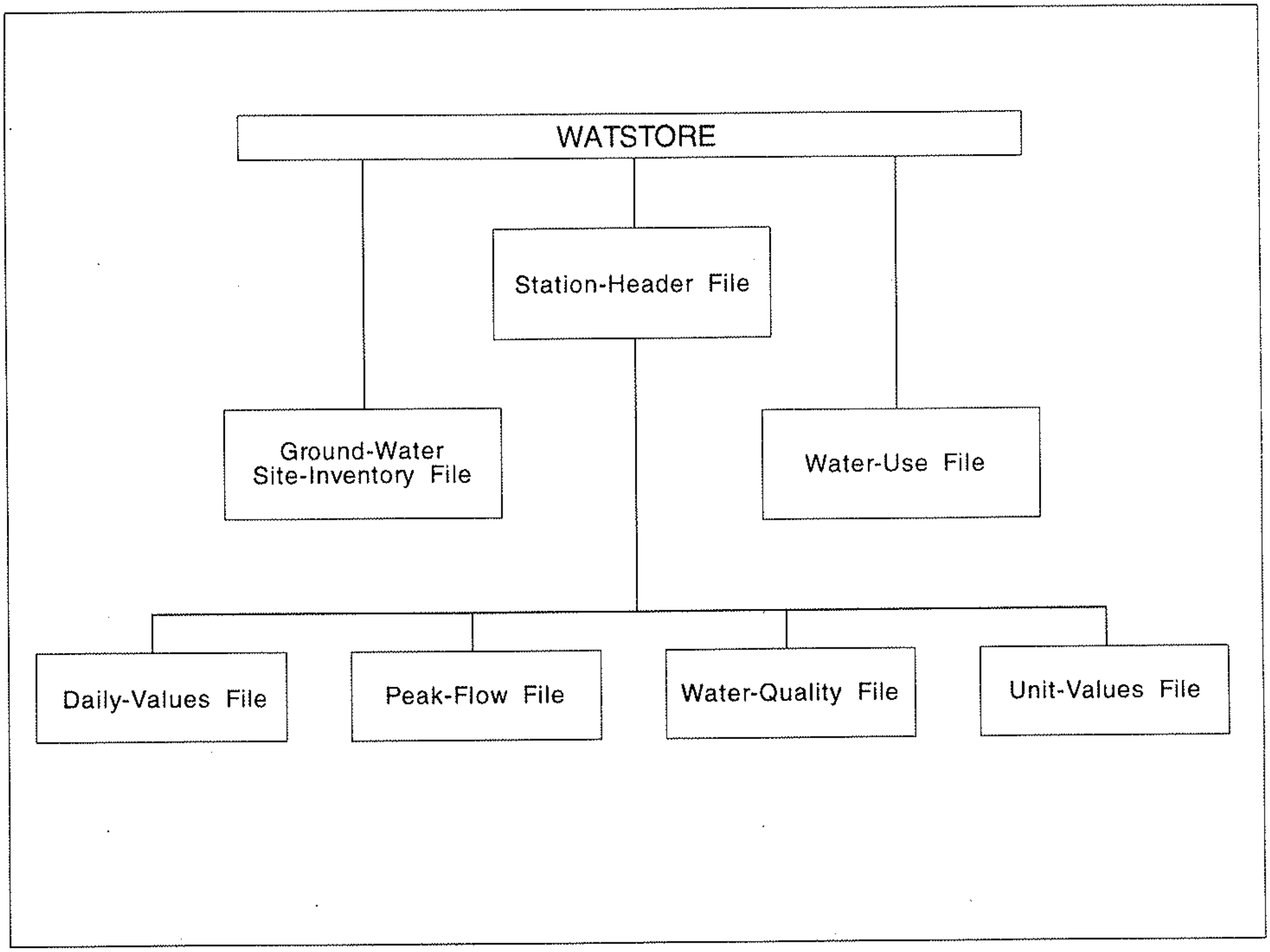

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Figure 1.2-1. Files in the U.S. Geological Survey Water-Data Storage and Retrieval System (WATSTORE).

1.3 Methods of Study

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

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

Data from selected 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).

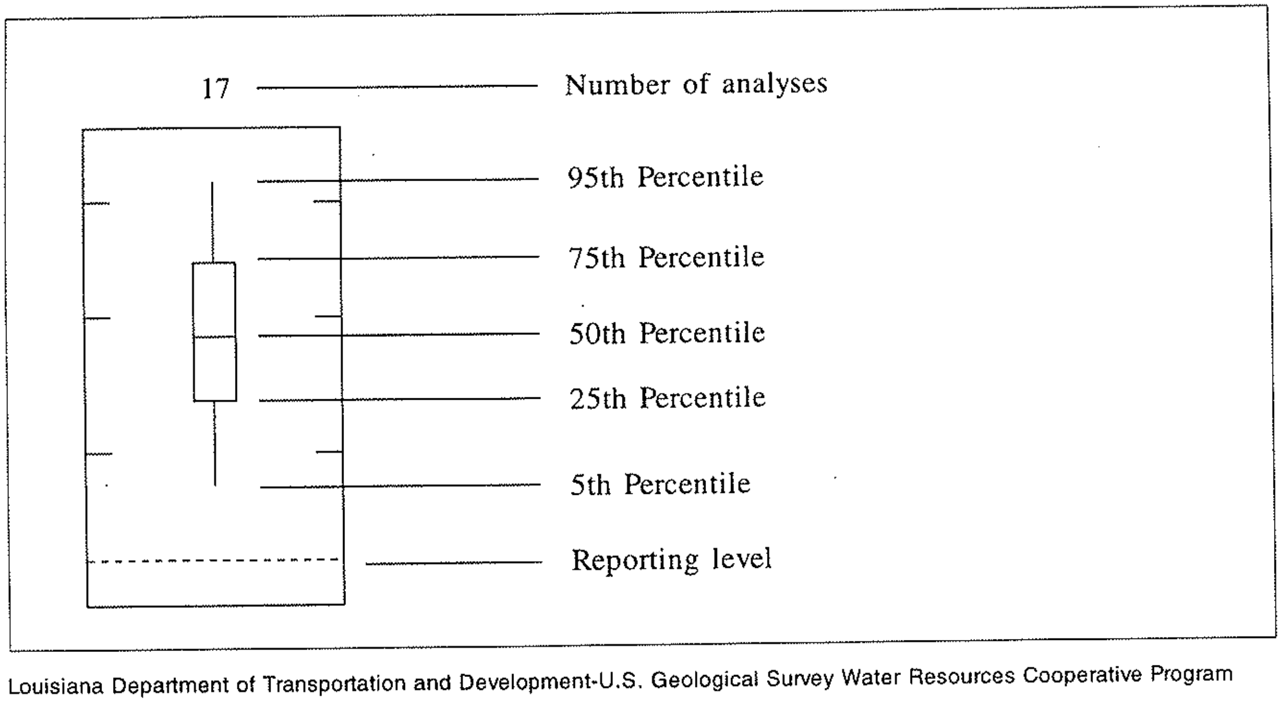

Figure 1.3-1. Example and definition of boxplot.

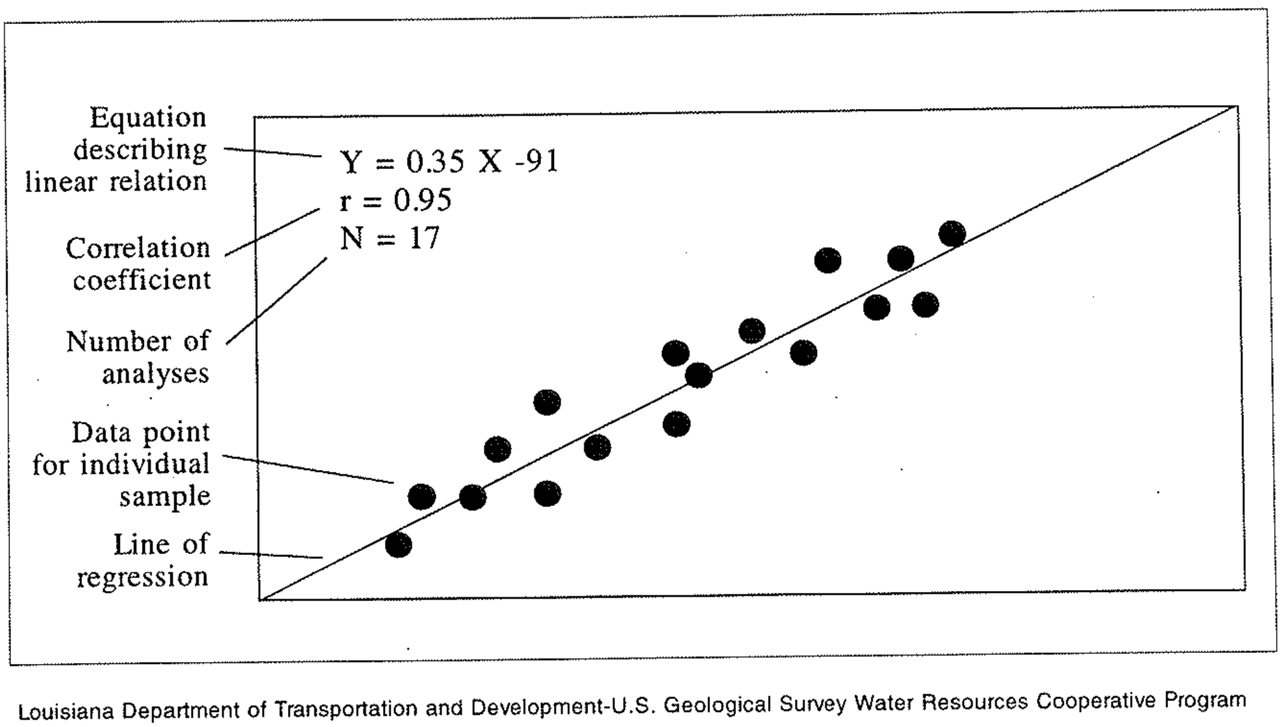

Figure 1.3-2. Example and definition of linear regression.

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) (Muller and others, 1984; McWreath and Lowe, 1986). 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).

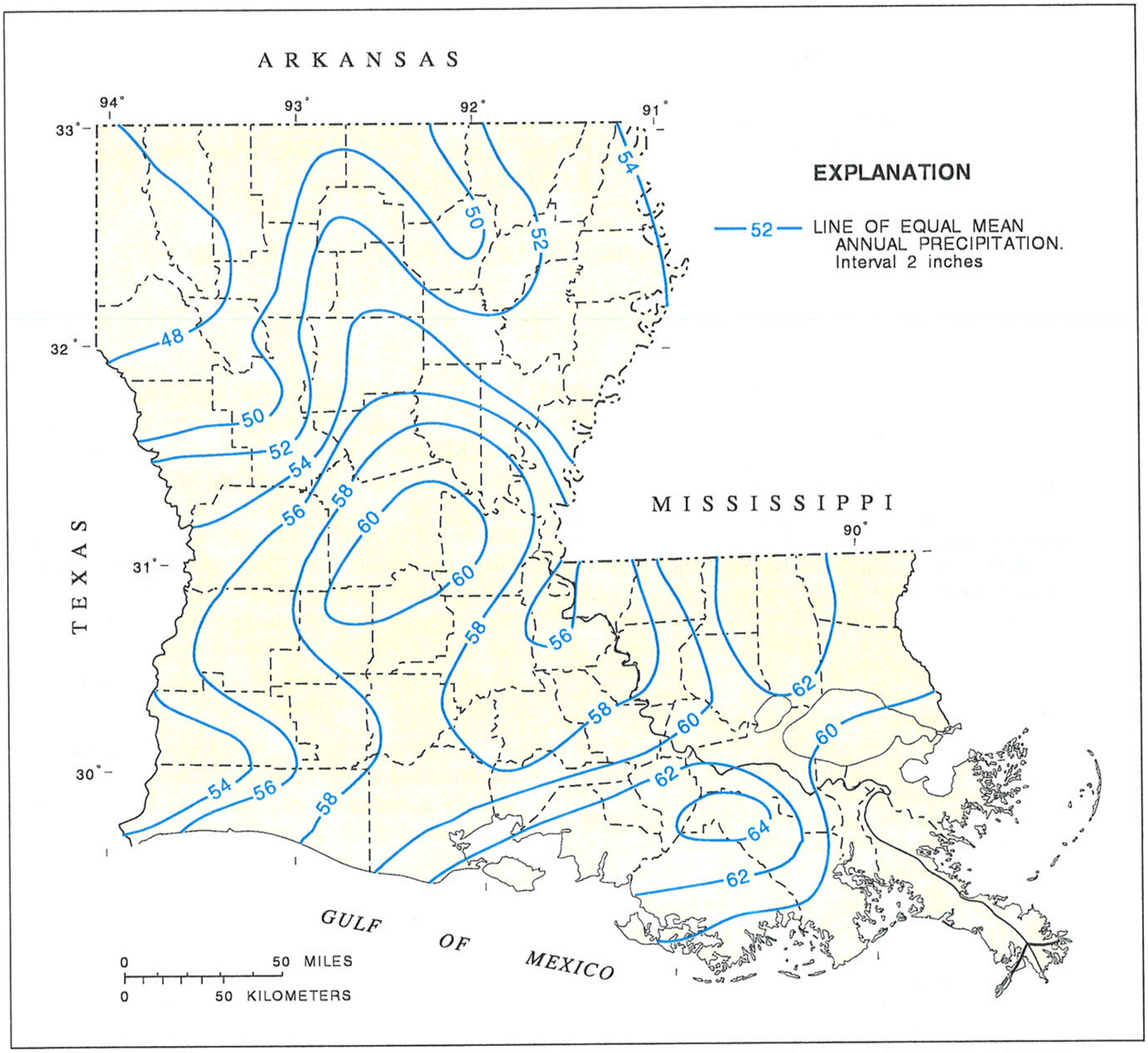

Figure 1.4.1-1. Mean annual precipitation in Louisiana, 1951-80. (Source: Muller and others, 1984)

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, Natalbany, 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 established, 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.

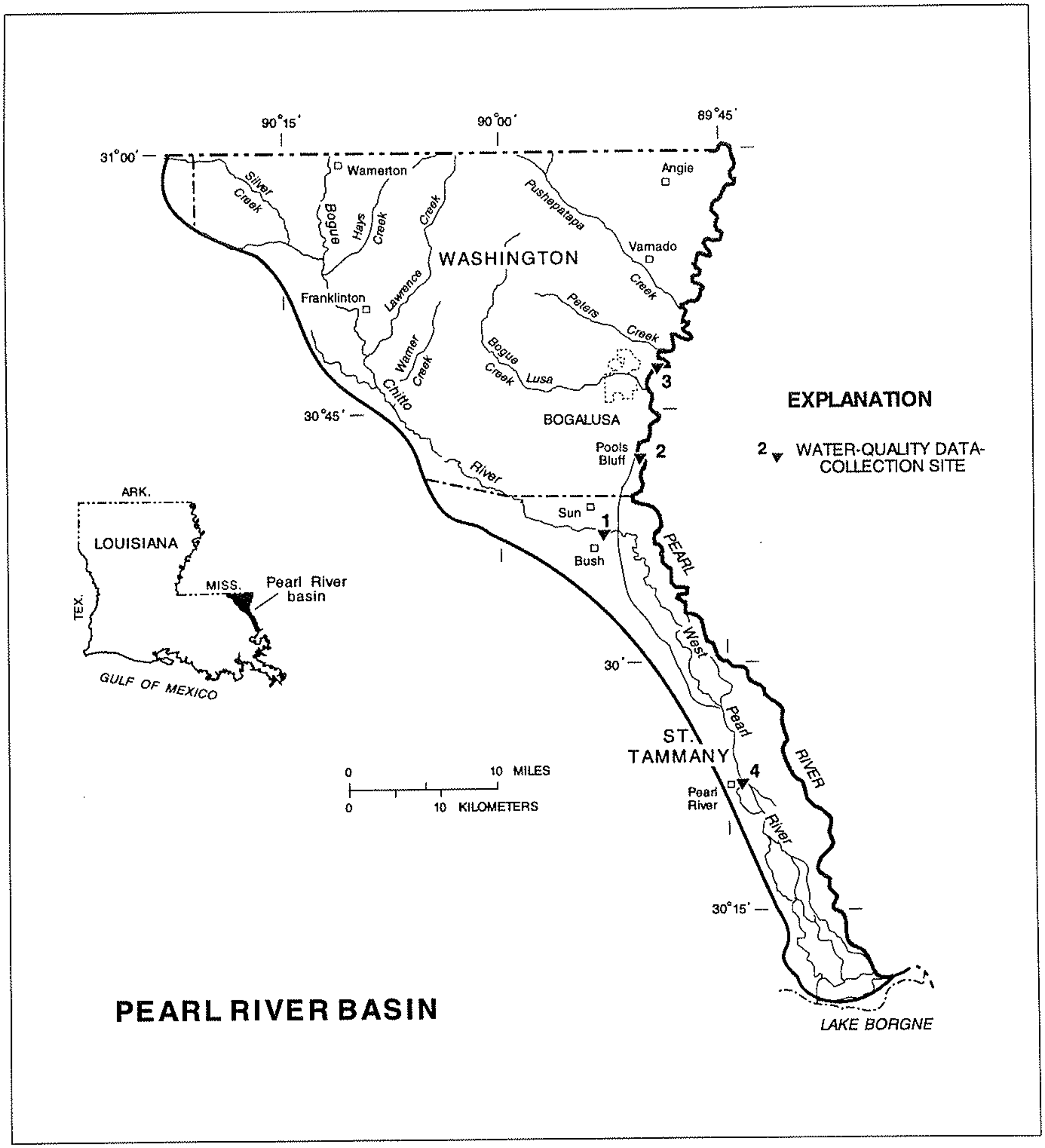
STATISTICAL SUMMARY OF SURFACE-WATER QUALITY IN THE PEARL RIVER BASIN

Data from four sites are presented.

Statistical analyses of surface-water-quality data for the Pearl 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 four sites (table 2.0-1 and fig. 2.0-1) in the basin during water years 1943-95. This information is useful to Federal, State, and local planners; hydrologists; engineers; scientists; and others who have water-resources management responsibilities for the Pearl River basin.

***Table 2.0-1.** Surface-water-quality data-collection sites in the Pearl River basin, Louisiana, 1943-95*

Map no (fig. 2.0-1)	Site name and location	Map no. (fig. 2.0-1)	Site name and location
1	Bogue Chitto River near Bush	3	Pearl River near Bogalusa
2	Pearl River at Pools Bluff near Bogalusa	4	West Pearl River at Pearl River



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 Pearl River basin, Louisiana, 1943-95.

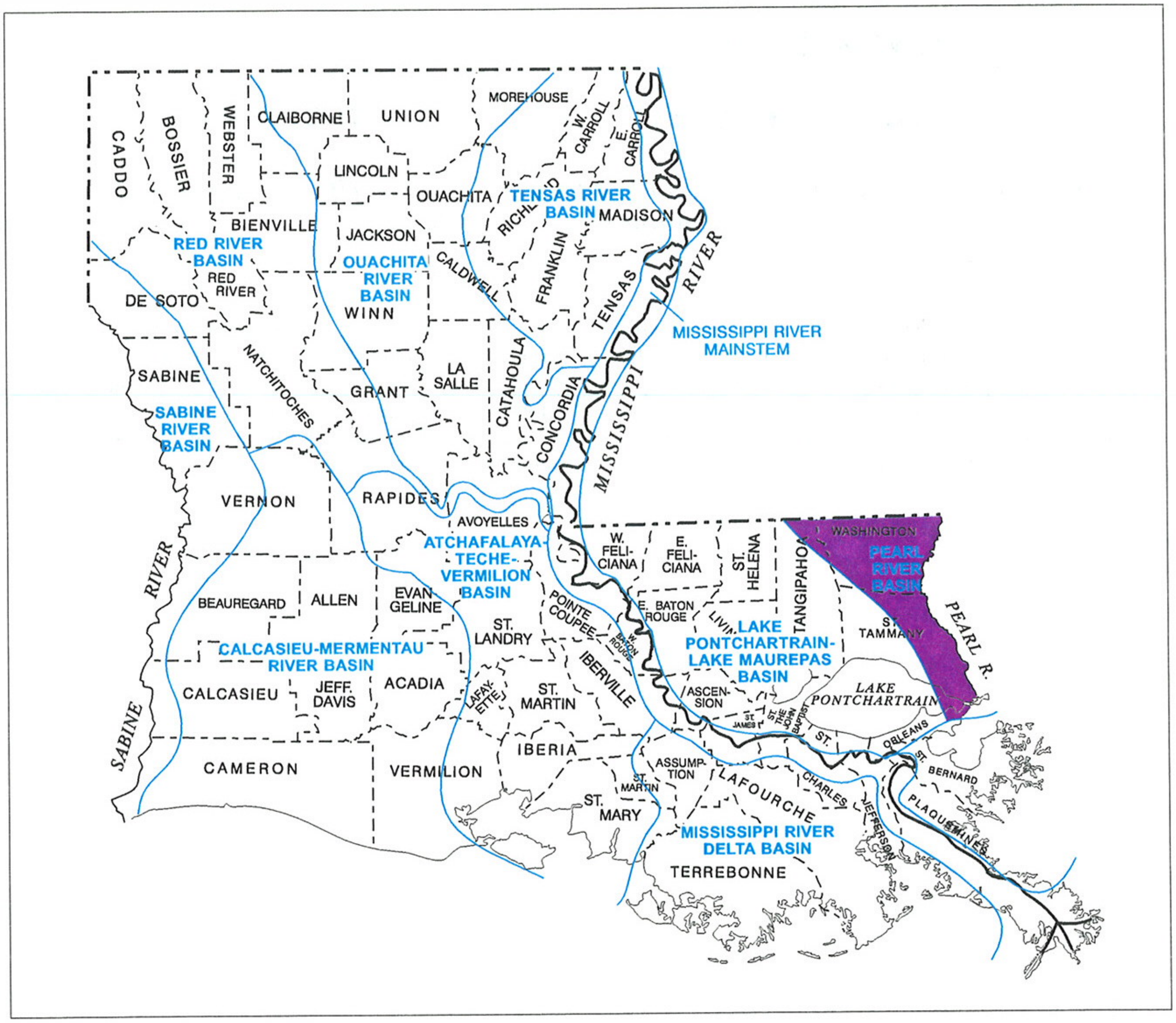
2.1 Overview

CROPLAND AND PASTURE OCCUPY ABOUT ONE-FIFTH OF THE BASIN

Surface water within the Pearl River basin is used mainly for livestock.

The Pearl River basin in Louisiana (fig. 2.0-1) is about 60 mi long and 40 mi wide, at its widest point, and most of the water is used for livestock (fig. 2.1-1) (Lovelace and Johnson, 1996, p. 109). The minimum average discharge for sites where data are available within the basin is 2,020 ft^3/s at Bogue Chitto River near Bush for the period, 1938-95 (Garrison and others, 1996); and the maximum average discharge is 10,090 ft^3/s at Pearl River near Bogalusa for the period, 1939-95 (Garrison and others, 1996).

The basin is primarily forested. Evergreen forests and mixed forests predominate in the uplands. Much of the evergreen forestland is in managed pine plantations. Cropland and pasture occupy about one-fifth of the basin in a scattered pattern within forestlands. A somewhat greater concentration of farmland occurs on the flatter valley areas of the Pearl River and its major tributaries, with marshes occurring only in the estuarine part of the river valley (Louisiana Department of Transportation and Development, 1984).



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

Withdrawals by Category

Category	Amount (Mgal/d)
Public supply	0.00
Industry	.00
Power generation	.00
Rural domestic	.00
Livestock	11.92
Rice irrigation	.00
General irrigation	.00
Aquaculture	.00
TOTAL	11.92

Withdrawals by Parish

Parish	Amount (Mgal/d)
Washington	11.92

Withdrawals by Major Water Body

Water Body	Amount (Mgal/d)
Bogue Lusa Creek	11.86

Figure 2.1-1. Surface-water withdrawals (in million gallons per day) from the Pearl River basin, Louisiana, 1995. (Source: Lovelace and Johnson, 1996, p. 109)

2.2 Surface-Water Quality

SELECTED PROPERTIES AND CONSTITUENTS

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

Figure 2.2-1 shows one of the four water-quality data-collection sites in the Pearl 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 three of the four sites in the Pearl 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.

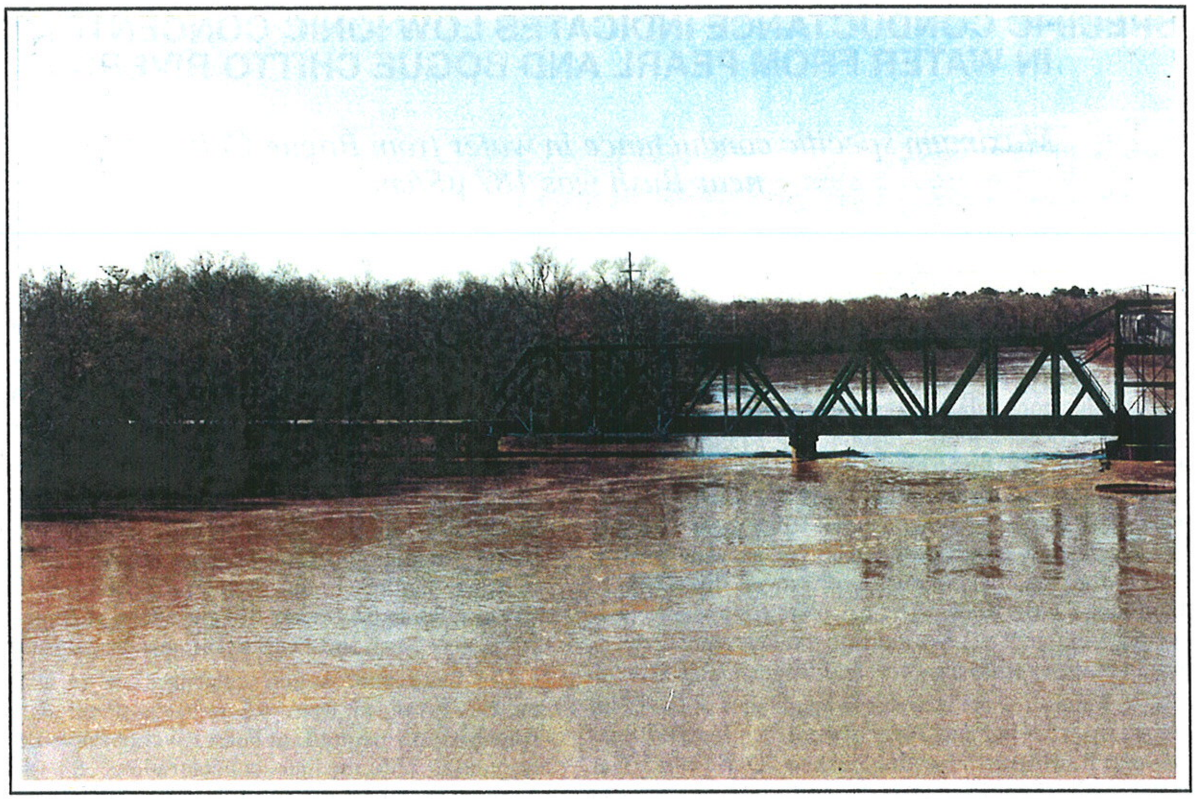


Figure 2.2-1. Water-quality data-collection site at West Pearl River at Pearl River, Louisiana. (Photograph by Daniel S. Strohman, U.S. Geological Survey.)

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

SPECIFIC CONDUCTANCE INDICATES LOW IONIC CONCENTRATION IN WATER FROM PEARL AND BOGUE CHITTO RIVERS

Maximum specific conductance in water from Bogue Chitto River near Bush was 187 μS/cm.

Statistical summaries of water-quality data at four sites in the basin are presented in table 2.2-1 at 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 three of the sites. Specific conductance values for all sites in the Pearl River basin ranged from 19 μS/cm at Bogue Chitto River near Bush to 187 μS/cm at the same site (table 2.2-1). The median values for specific conductance ranged from 44 to 83 μS/cm for the sites. The boxplots for specific conductance in figure 2.2.1-1 indicate the low ionic concentration in water from the Pearl and Bogue Chitto Rivers.

Values for pH in water from all sites in the basin ranged from 5.3 at Pearl River at Pools Bluff near Bogalusa and Pearl River near Bogalusa to 7.9 at Pearl River at Pools Bluff near Bogalusa. All of the sites in the basin were within 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 Pearl River basin ranged from 6.3 to 6.6. The boxplots indicate that pH was less than 6.5, the lower limit of the U.S. Environmental Protection Agency's recommended range for freshwater aquatic life (U.S. Environmental Protection Agency, 1976; 1986), in greater than 50 percent of the samples from Pearl River near Bogalusa and Bogue Chitto River near Bush.

Values for water temperatures at all sites in the basin ranged from 1.0 °C at Bogue Chitto River near Bush to 31.5 °C at Bogue Chitto River near Bush, Pearl River at Pools Bluff near Bogalusa, and Pearl River near Bogalusa. Median values ranged from 20.2 to 20.5 °C. Maximum recorded water temperatures did not exceed the State's criterion of 32.2 °C at any of the sites in the basin. Boxplots for water temperatures in figure 2.2.1-1 indicate slightly higher water temperatures at Pearl River at Pools Bluff near Bogalusa than at Bogue Chitto River near Bush and Pearl River near Bogalusa.

Dissolved oxygen concentrations in water from the basin ranged from 4.7 mg/L at Pearl River near Bogalusa to 12.1 mg/L at Pearl River at Pools Bluff near Bogalusa. The median concentrations for dissolved oxygen ranged from 7.7 to 8.2 mg/L. Dissolved oxygen concentrations were greater than the State's minimum water-quality criterion of 5.0 mg/L in more than 95 percent of the samples analyzed at the sites. 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 the high dissolved oxygen concentrations at the Pearl and Bogue Chitto Rivers.

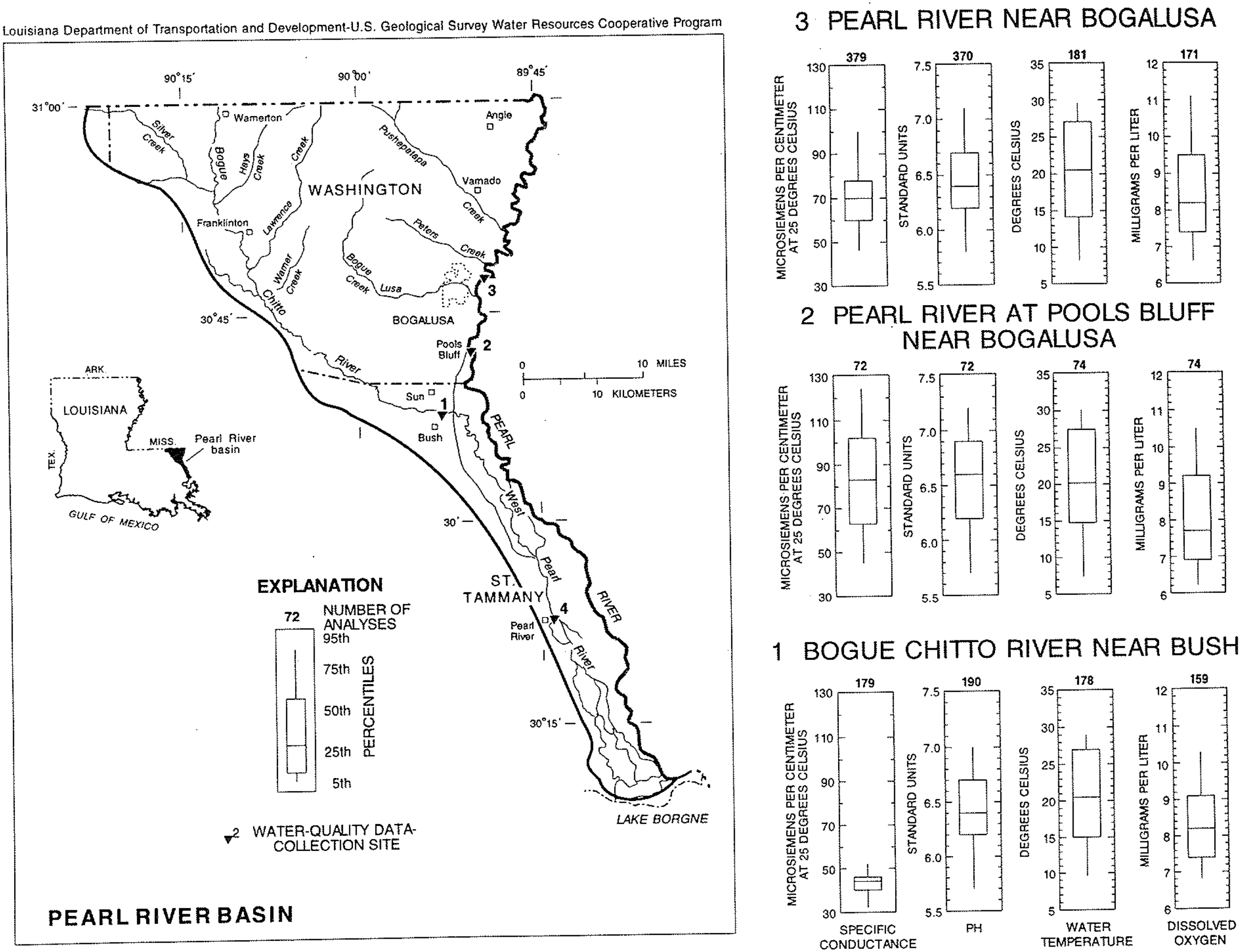


Figure 2.2.1-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and boxplots summarizing specific conductance, pH, water temperature, and dissolved oxygen data for selected sites.

2.2.2 Relation Between Specific Conductance and Dissolved Solids

LOW CORRELATION BETWEEN SPECIFIC CONDUCTANCE AND DISSOLVED SOLIDS

The correlation coefficient between specific conductance and dissolved solid for Bogue Chitto River near Bush was 0.71.

Linear regression equations relating dissolved solids concentrations to specific conductance were calculated for three sites in the Pearl River basin (fig. 2.2.2-1). The dissolved solids concentrations did not include silica. The correlation coefficient values, r, ranged from 0.70 at Pearl River near Bogalusa to 0.89 at Pearl River at Pools Bluff near Bogalusa. The relatively weak correlation between specific conductance and dissolved solids concentrations at the sites is probably due to the extremely low (less than 100 µS/cm) specific conductances at those sites.

The regression equation for Bogue Chitto River near Bush, which was based on 168 chemical analyses, indicates that dissolved solids concentrations at that site can exceed 500 mg/L when specific conductance values exceed 767 µS/cm. However, the boxplot for specific conductance for Bogue Chitto River near Bush (fig. 2.2.1-1) indicates that the maximum specific value was 187 µS/cm. Although no State criteria for irrigation water quality are available 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).

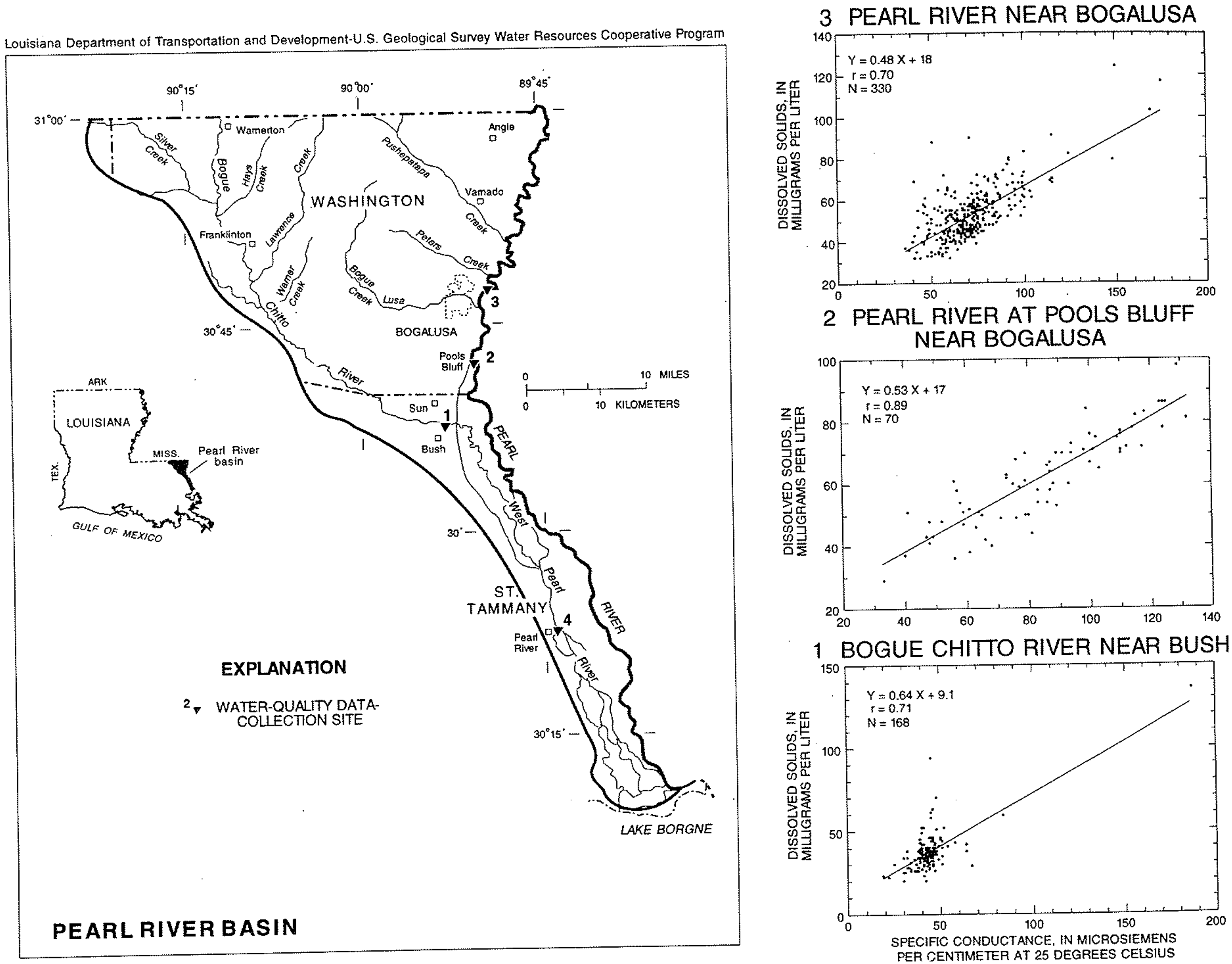


Figure 2.2.2-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and graphs showing relation between specific conductance and dissolved solids in water from selected sites.

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

SODIUM CONCENTRATIONS IN WATER FROM THE BASIN GENERALLY WERE LOW

Maximum sodium concentration in the Pearl River basin (22 mg/L) occurred at Pearl River at Pools Bluff near Bogalusa.

Calcium concentrations at all sites in the Pearl River basin ranged from 0.90 mg/L at Bogue Chitto River near Bush to 26 mg/L at Pearl River near Bogalusa. Boxplots for three representative sites in the basin (fig. 2.2.3-1) show the median calcium concentration at Bogue Chitto River near Bush was approximately one-half the median concentrations at the Pearl River sites. For example, the median concentration at Bogue Chitto River near Bush was 2.0 mg/L, and the median concentration at Pearl River at Pools Bluff near Bogalusa was 3.8 mg/L.

Magnesium concentrations in the basin ranged from less than 0.01 mg/L at Pearl River near Bogalusa to 3.0 mg/L at the same site. Boxplots from three representative sites (fig. 2.2.3-1) show slightly lower magnesium concentrations at Bogue Chitto River near Bush than at the Pearl River sites.

The highest sodium concentration in water from the basin was at Pearl River at Pools Bluff near Bogalusa (22 mg/L). The minimum sodium concentration (0.38 mg/L) was at Bogue Chitto River near Bush. Boxplots for three representative sites shown in fig. 2.2.3-1 show that sodium concentrations in water from the basin were low (less than 25 mg/L).

Concentrations of potassium in water from the basin ranged from 0.08 mg/L at Bogue Chitto River near Bush to 3.9 mg/L at Pearl River near Bogalusa. Boxplots for three representative sites (fig. 2.2.3-1) show slightly lower potassium concentrations at Bogue Chitto River near Bush than at the Pearl River sites.

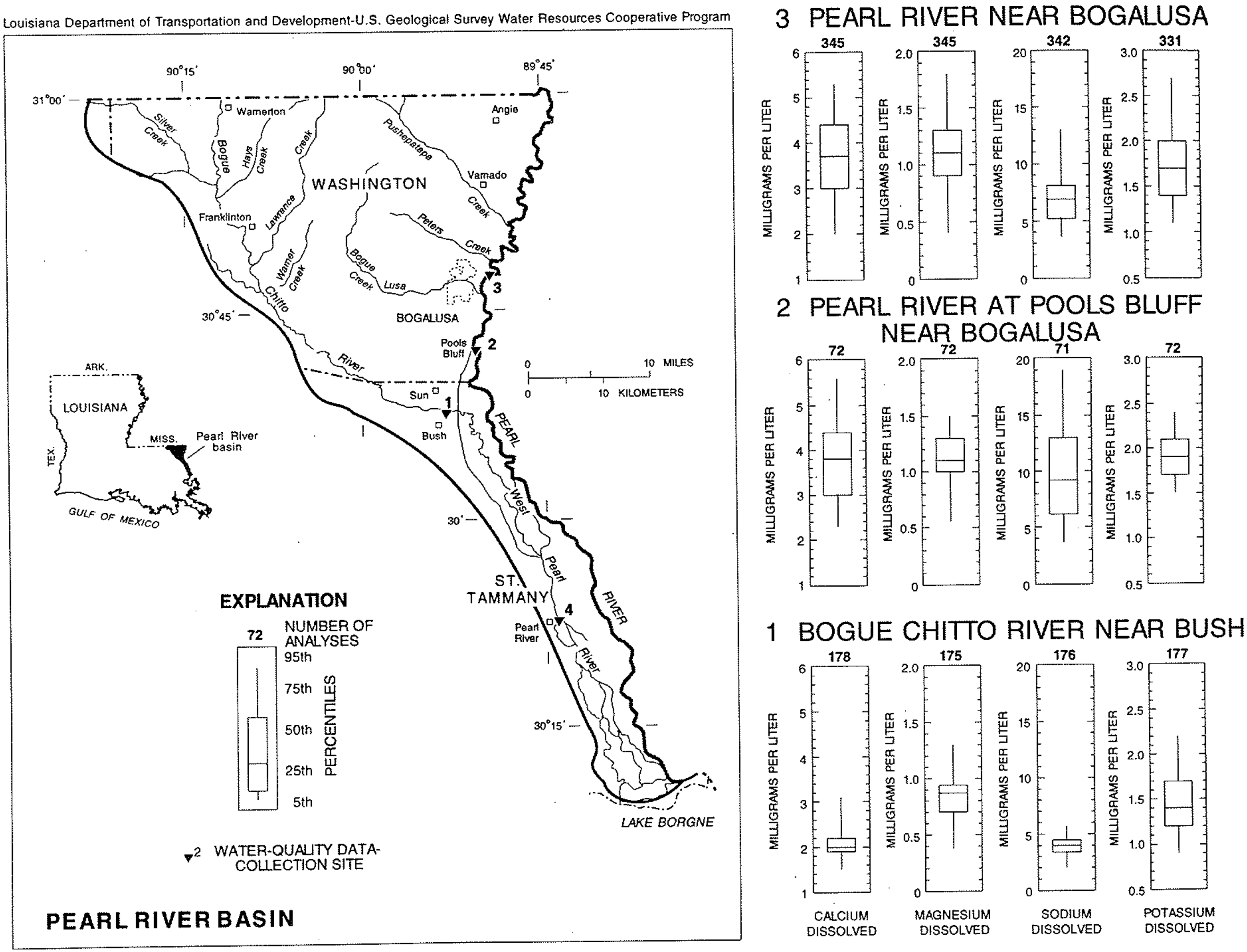


Figure 2.2.3-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and boxplots summarizing data for dissolved calcium, magnesium, sodium, and potassium concentrations in water from selected sites.

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

TOTAL ALKALINITY CONCENTRATIONS IN WATER FROM THE BASIN GENERALLY WERE LESS THAN OR EQUAL TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S MINIMUM CRITERION FOR FRESHWATER AQUATIC LIFE

Alkalinity values in 95 percent of the samples analyzed at Bogue Chitto River near Bush were less than or equal to 11 mg/L.

The data for major inorganic anions in water from the basin indicated that concentrations of major ions were below recommended levels for drinking water, for which such levels have been established. Alkalinity as calcium carbonate in water from the Pearl River basin ranged from 2 mg/L at Pearl River near Bogalusa to 64 mg/L at the same site. The lowest median concentration (8 mg/L) occurred at Bogue Chitto River near Bush. The maximum median alkalinity in the basin was 16 mg/L, which occurred at Pearl River at Pools Bluff near Bogalusa. The boxplots for three representative sites (fig. 2.2.4-1) show that alkalinity concentrations in water from the basin generally were less than or equal to 20 mg/L. For example, 95 percent of the alkalinity samples analyzed from Bogue Chitto River near Bush were less than or equal to 11 mg/L. The U.S. Environmental Protection 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 Bogue Chitto River near Bush and Pearl River near Bogalusa to 22 mg/L at Pearl River at Pools Bluff near Bogalusa. The SMCL for sulfate in drinking water is 250 mg/L (U.S. Environmental Protection Agency, 1986; Louisiana Department of Environmental Quality, 1984). The boxplots for three representative sites (fig. 2.2.4-1) show slightly lower sulfate concentrations at Bogue Chitto River near Bush than at the Pearl River sites.

Chloride concentrations in water from the basin ranged from less than 0.1 mg/L at Bogue Chitto River near Bush to 39 mg/L at Pearl River near Bogalusa. The SMCL for chloride in drinking water is 250 mg/L (U.S. Environmental Protection Agency, 1986; Louisiana Department of Environmental Quality, 1984). Median concentrations ranged from 6.0 mg/L at Bogue Chitto River near Bush to 8.9 mg/L at West Pearl River at Pearl River. The boxplots summarizing the data for three representative sites in the basin (fig. 2.2.4-1) show low chloride concentrations.

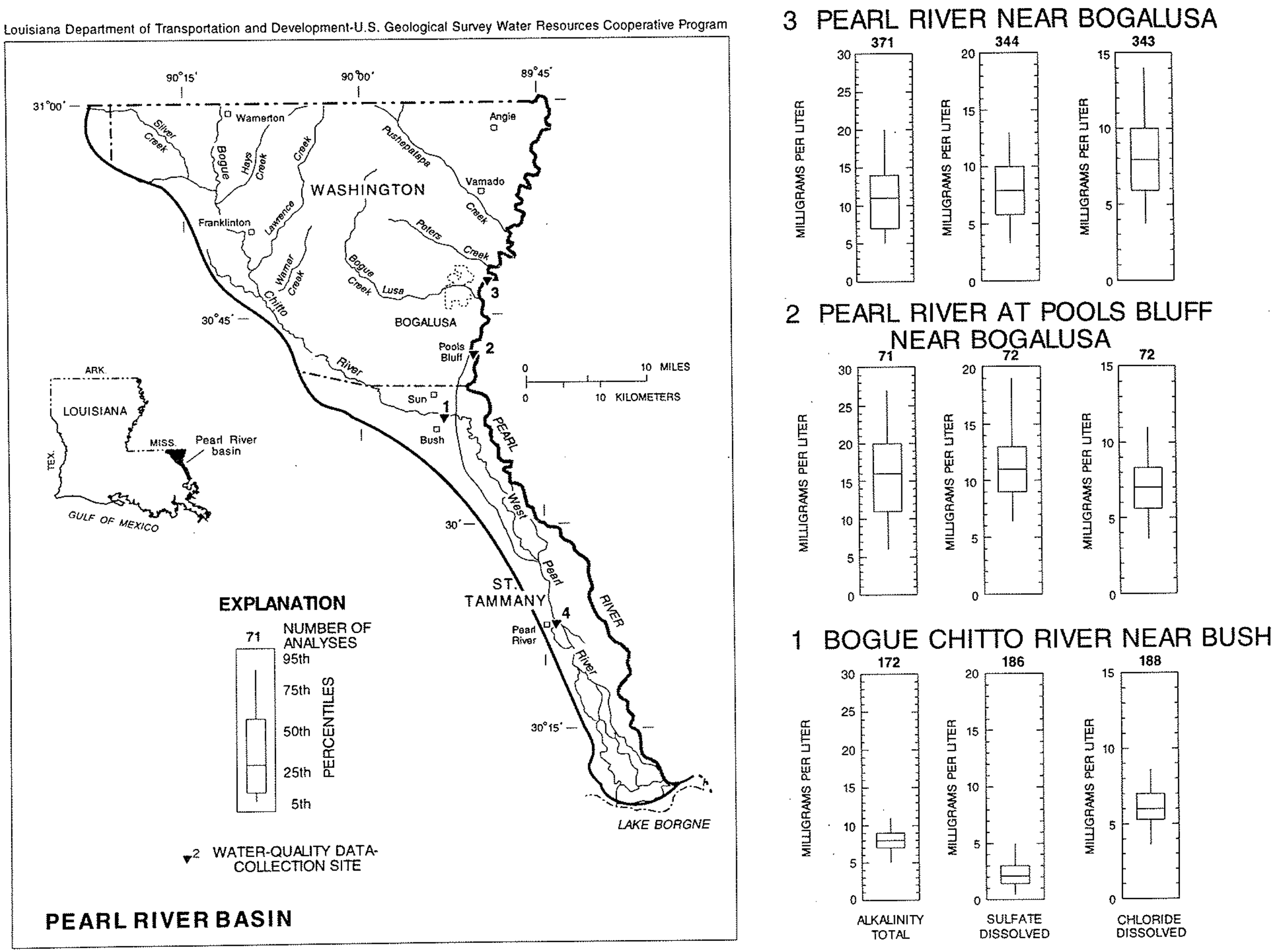


Figure 2.2.4-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and boxplots summarizing data for total alkalinity as calcium carbonate and dissolved sulfate and chloride concentrations in water from selected sites.

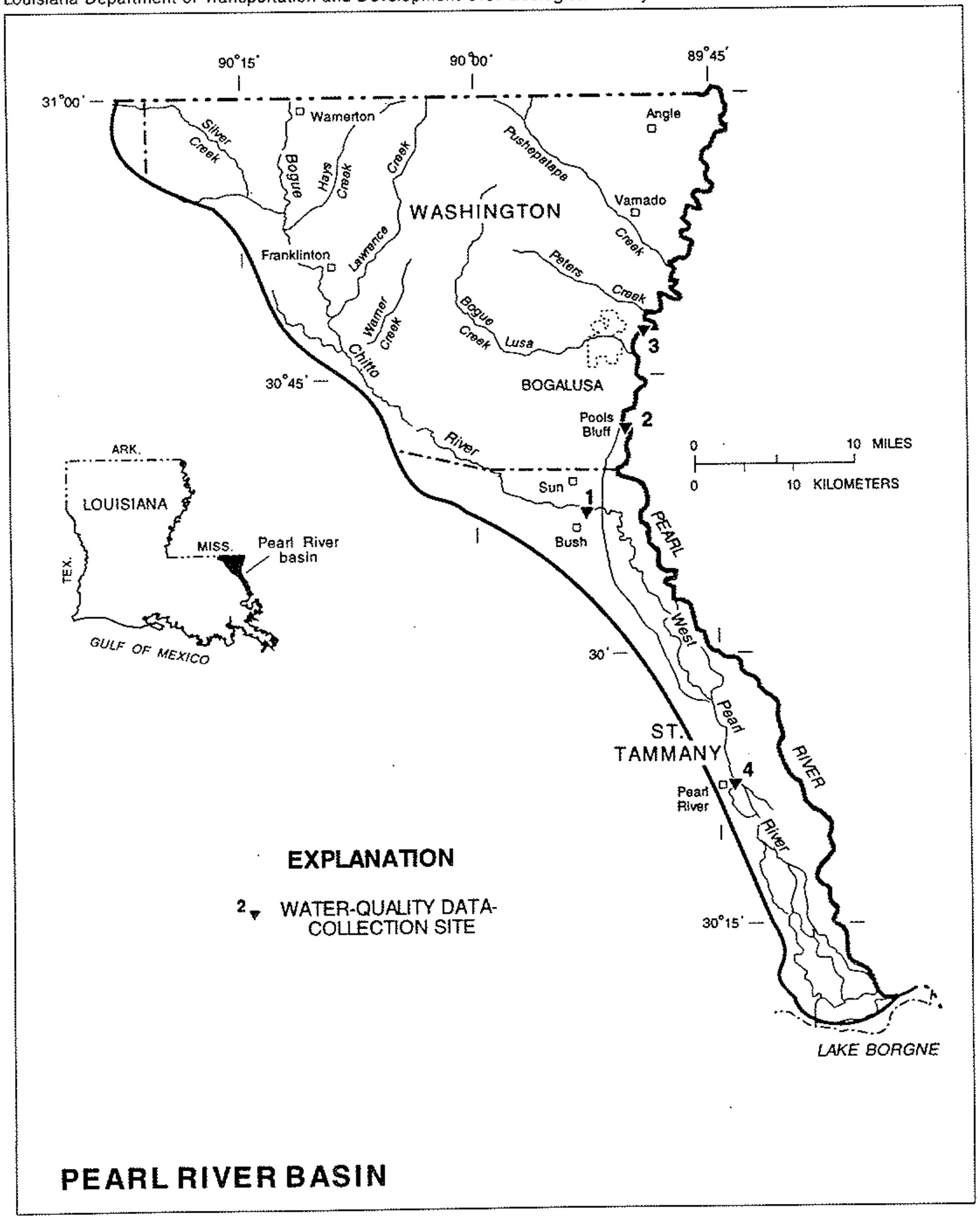
2.2.5 Relation between Specific Conductance and Dissolved Chloride

LOW CORRELATION BETWEEN SPECIFIC CONDUCTANCE AND DISSOLVED CHLORIDE AT PEARL RIVER BASIN SITES

The correlation coefficient between dissolved chloride and specific conductance for Bogue Chitto River near Bush was 0.44.

Regression equations relating chloride concentrations to specific conductance values were calculated for three sites in the Pearl River basin (fig. 2.2.5-1). The correlation coefficient values, r, ranged from 0.44 at Bogue Chitto River near Bush to 0.78 at Pearl River at Pools Bluff near Bogalusa.

The regression equations indicate a low correlation between specific conductance and dissolved chloride at the sites due to the low specific conductance (less than 100 µS/cm). They also indicate that chloride constitutes a higher percentage of the dissolved solids in water from Pearl River near Bogalusa than at the other sites. For example, application of the regression equations to a specific conductance of 500 µS/cm yields an estimated chloride concentration of 77 mg/L for Pearl River near Bogalusa, 36 mg/L for Pearl River at Pools Bluff near Bogalusa, and 34 mg/L for Bogue Chitto River near Bush.



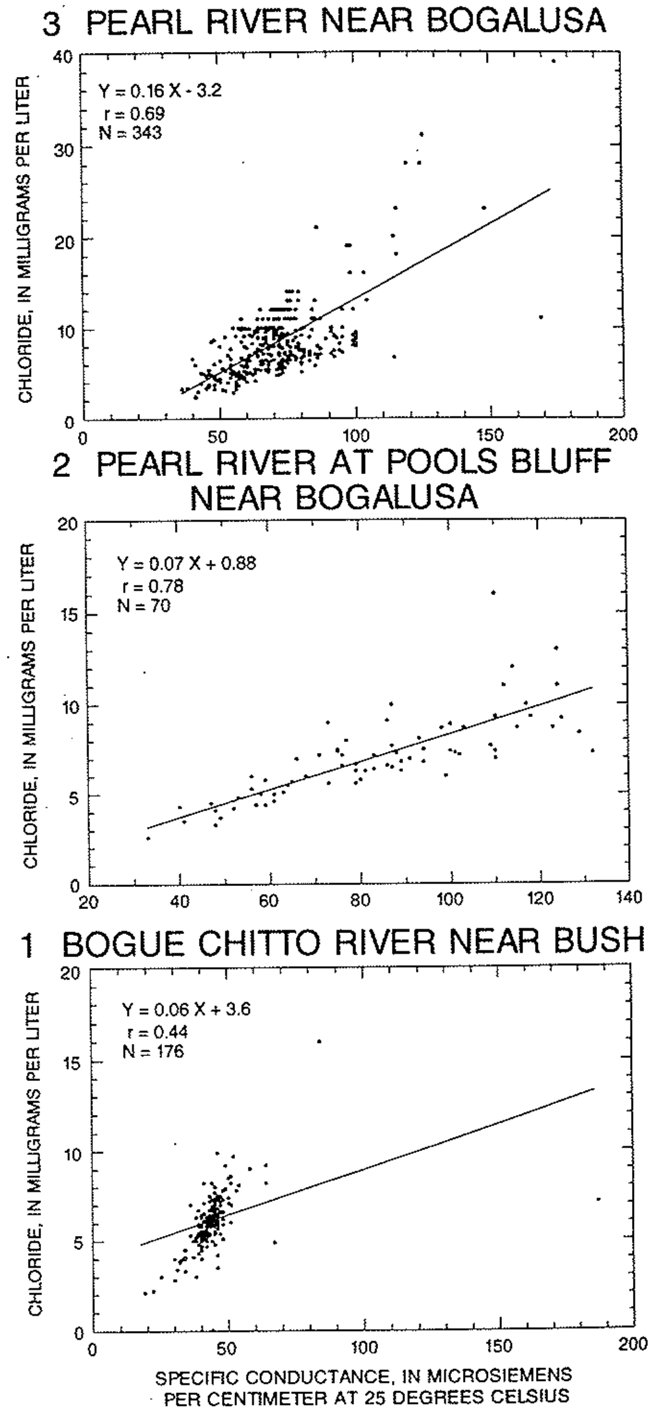


Figure 2.2.5-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and graphs showing relation between specific conductance and dissolved chloride in water from selected sites.

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

DISSOLVED COPPER, LEAD, AND ZINC WERE WITHIN THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S RECOMMENDED LEVELS

Median concentrations of dissolved iron ranged from 170 to 200 μg/L.

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 (1976; 1986; 1994; 1996). Iron concentrations in water from the basin occasionally were greater than 300 μg/L which is the criterion for domestic water supplies.

Concentrations of copper in water samples collected in the Pearl River basin ranged from less than the detection level at all sites to 25 μg/L at Pearl River at Bogalusa. The median copper concentrations were less than the detection level at all sites for which 10 or more samples were analyzed. Copper concentrations for three representative sites are summarized using boxplots in figure 2.2.6-1. The boxplots (fig. 2.2.6-1) illustrate that, at the sites, at least 95 percent of the samples analyzed had copper concentrations of less than the detection level of 20 μg/L.

Iron concentrations ranged from 20 μg/L at Bogue Chitto River near Bush to 550 μg/L at Pearl River near Bogalusa. Median iron concentrations in the basin ranged from 170 to 200 μg/L. Boxplots and tables (fig. 2.2.6-1) summarizing data for three representative sites within the basin show that 95 percent of iron concentrations were less than 500 μg/L.

Concentrations of lead in water from the basin were generally low at all sites. The concentrations ranged from less than the detection level at all sites to 28 μg/L at Pearl River near Bogalusa. The median concentrations were less than 5 μg/L at all of the sites for which 10 or more samples were analyzed. Boxplots for three representative sites (fig. 2.2.6-1) show that at least 95 percent of the samples analyzed had lead concentrations of less than or equal to 9 μg/L.

Zinc concentrations in water from the Pearl River basin generally were low at all sites. Zinc concentrations in the basin ranged from less than the detection level at all sites to 47 μg/L at Bogue Chitto River near Bush. Median zinc concentrations were less than the detection level at all of the sites. Boxplots for three representative sites (fig. 2.2.6-1) show that less than 25 percent of the zinc concentrations were greater than 20 μg/L in samples analyzed at Pearl River near Bogalusa.

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[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."

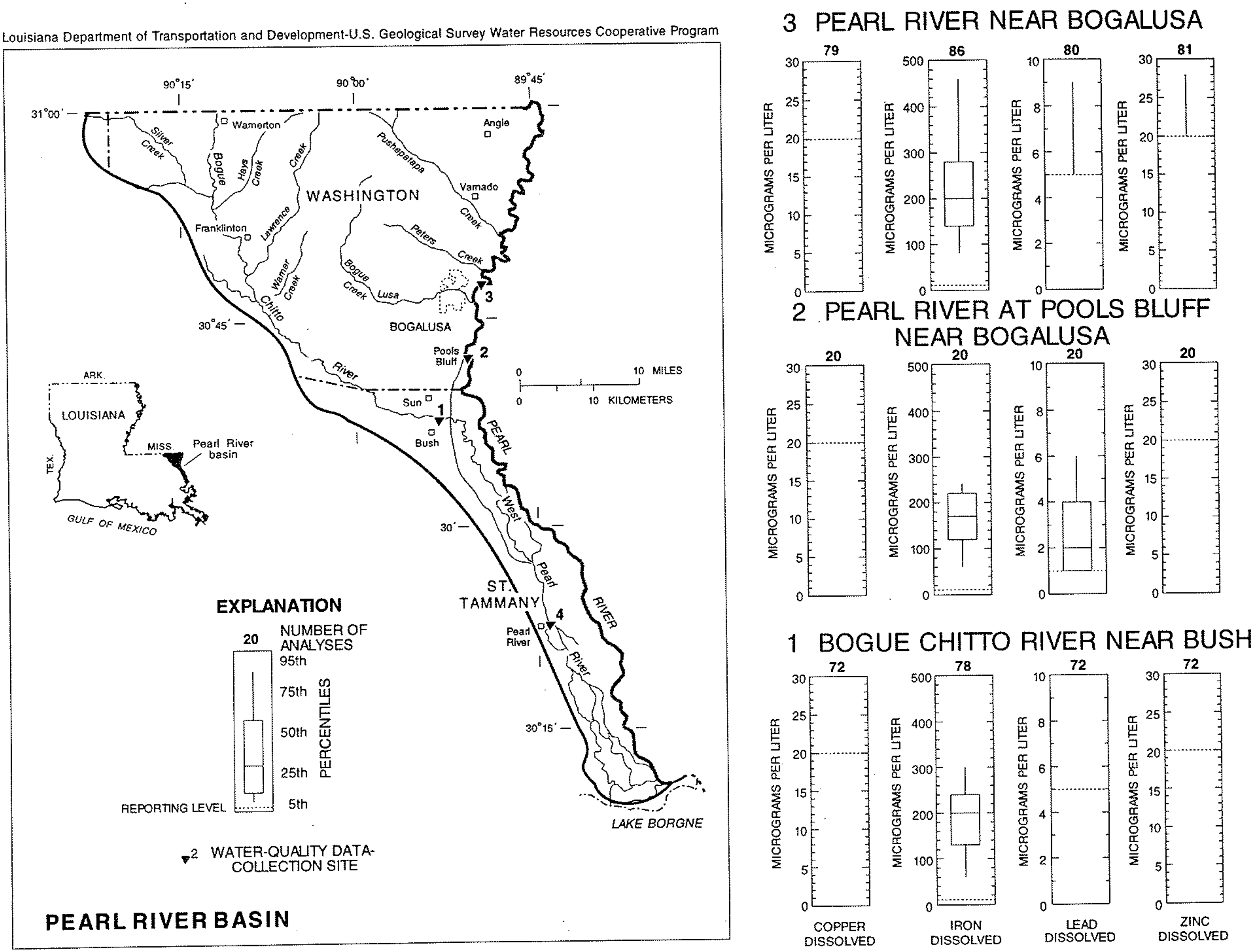


Figure 2.2.6-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and boxplots summarizing data for dissolved copper, iron, lead, and zinc concentrations in water from selected sites.

2.2.7 Nutrients--Nitrogen and Phosphorus Constituents

LOW NUTRIENT CONCENTRATIONS AT PEARL RIVER BASIN SITES

Maximum phosphorus concentration in the Pearl River basin (0.65 mg/L) occurred at Pearl River near Bogalusa.

Concentrations of ammonia plus organic nitrogen in water from the basin ranged from 0.09 mg/L at Pearl River at Pools Bluff near Bogalusa to 5.9 mg/L at the same site. Median concentrations ranged from 0.5 to 0.70 mg/L. Boxplots indicate that concentrations of ammonia plus organic nitrogen were less than 1.0 mg/L in at least 75 percent of the samples analyzed (fig. 2.2.7-1).

Concentrations of nitrite plus nitrate as nitrogen in the Pearl River basin ranged from less than the detection level at all sites to 1.5 mg/L at Pearl River near Bogalusa. Median nitrite plus nitrate nitrogen concentrations ranged from 0.20 to 0.25 mg/L. Boxplots at three representative sites show that median concentrations at the sites were comparable (fig. 2.2.7-1).

Concentrations of total phosphorus in water in the Pearl River basin ranged from less than 0.01 mg/L at all sites to 0.65 mg/L at Pearl River near Bogalusa. Median concentrations ranged from 0.06 to 0.09 mg/L. Boxplots for three representative sites show that phosphorus concentrations at the sites generally were low (fig. 2.2.7-1).

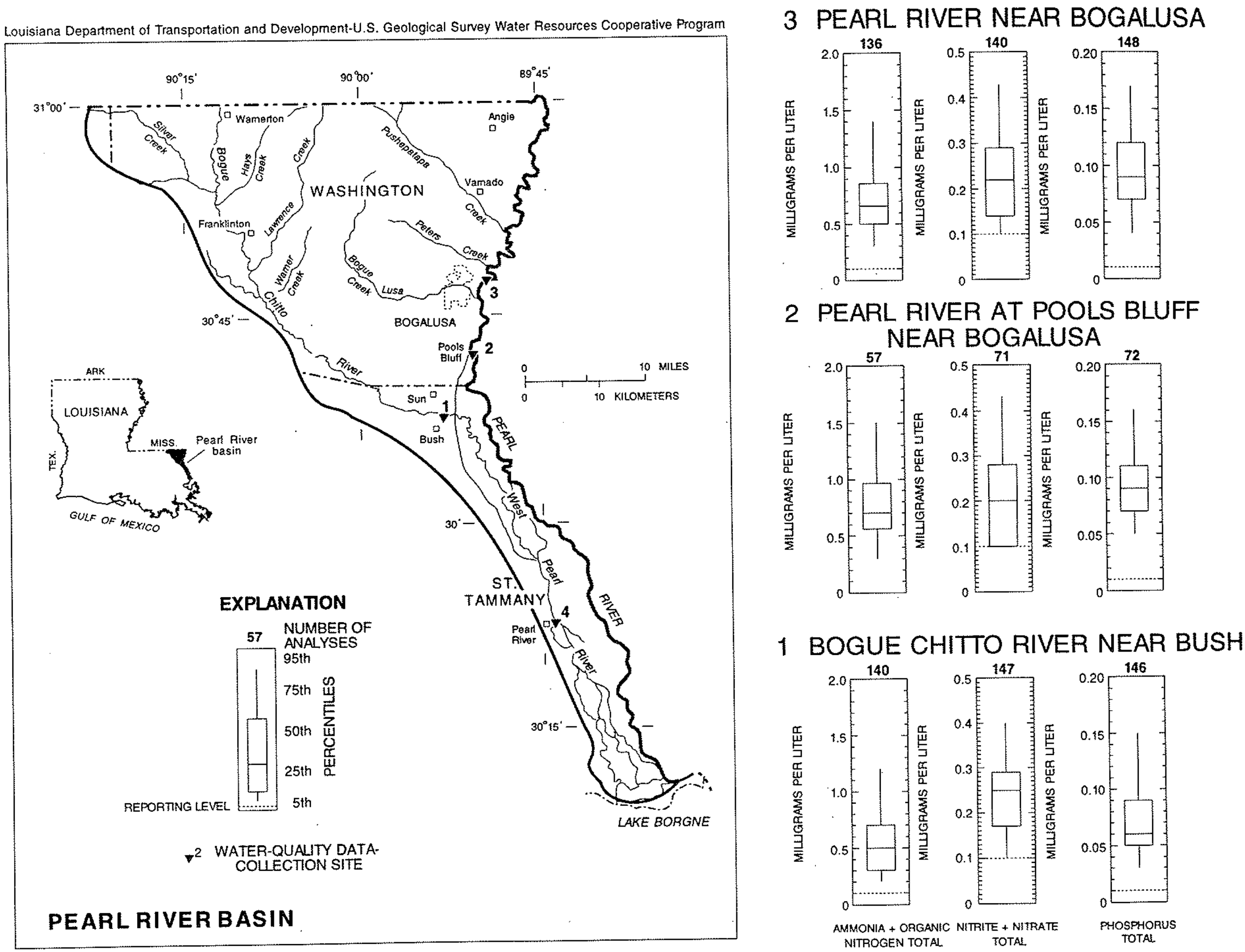


Figure 2.2.7-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and boxplots summarizing data for concentrations of nutrients in water from selected sites.

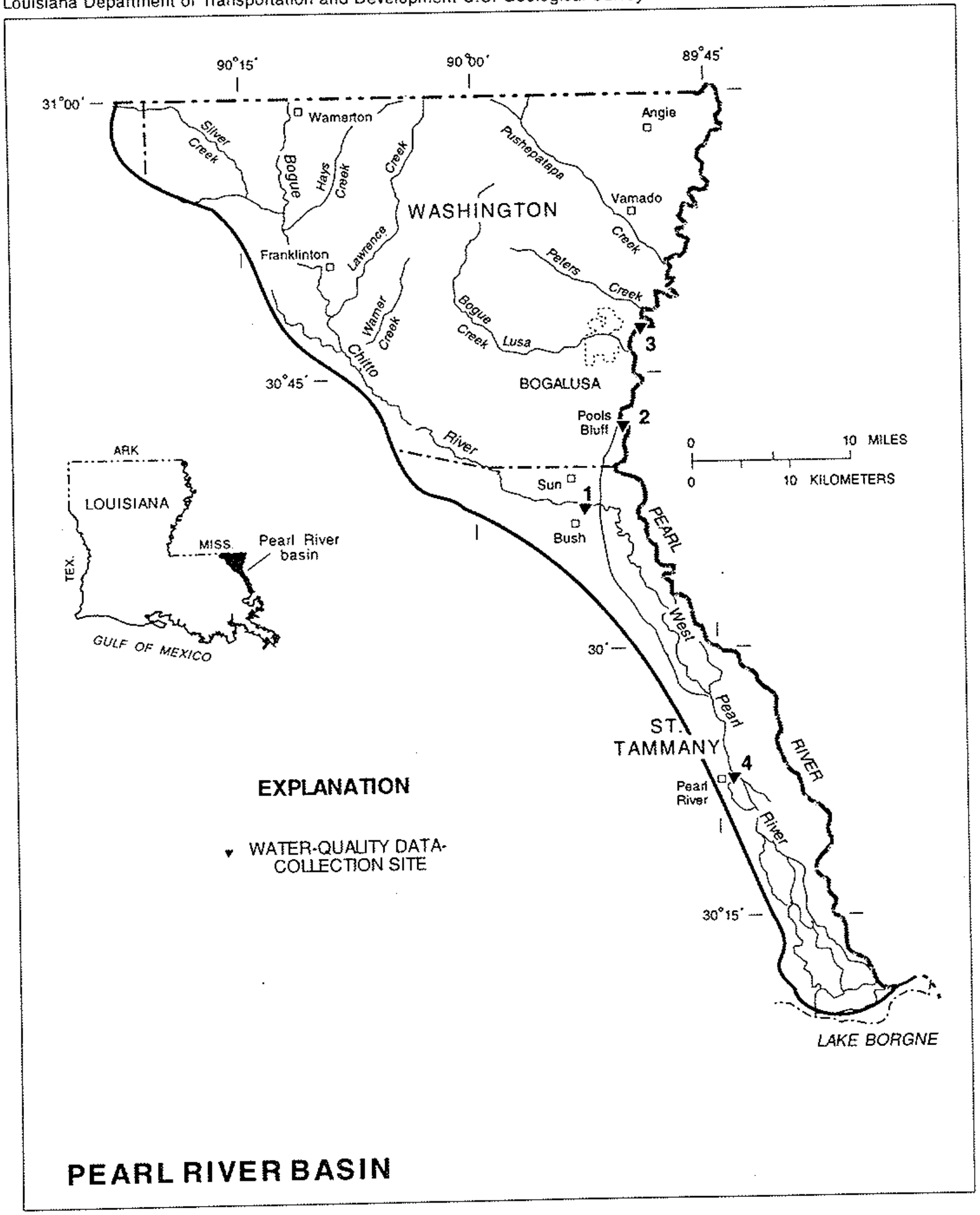
2.2.8 Organic Compounds--Pesticides and PCB's

ORGANIC COMPOUNDS WERE DETECTED OCCASIONALLY IN SURFACE WATERS IN THE BASIN

The most commonly occurring organic compound in the Pearl River basin was diazinon.

Low-level concentrations of organic compounds were detected occasionally in the Pearl River basin, diazinon was detected at more sites and with greater frequency than any of the other organic compounds that were analyzed. The highest diazinon concentration was 0.12 μg/L in a sample collected at Bogue Chitto River near Bush. Tables are used to summarize occurrences of diazinon at three 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 organic compounds in concentrations greater than the reporting level was equal to or less than 10. Of these three sites, diazinon was detected at all sites for which it was analyzed.

The herbicide 2,4-D was detected at most of the other sites throughout the State, it was only detected at Pearl River at Pools Bluff near Bogalusa in the Pearl River basin. The maximum concentration of 2,4-D in water from that site was 0.03 μg/L. The tables listing the number of samples in which organic compounds were detected for three representative sites in the basin indicate that almost 50 percent of the samples analyzed at Pearl River at Pools Bluff near Bogalusa contained low-level concentrations of 2,4-D (fig. 2.2.8-1).



3 PEARL RIVER NEAR BOGALUSA

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

2 PEARL RIVER AT POOLS BLUFF NEAR BOGALUSA

ORGANIC COMPOUND TOTAL	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
DDT	16	0.01	0
PCB	16	0.1	0
DIAZINON	16	0.01	7
LINDANE	16	0.01	0
CHLORDANE	16	0.1	1
MALATHION	16	0.01	0
ENDRIN	16	0.01	0
PARATHION	16	0.01	0
DIELDRIN	16	0.01	0
ENDOSULFAN	9	0.01	0
2,4-D	16	0.01	7

1 BOGUE CHITTO RIVER NEAR BUSH

ORGANIC COMPOUND TOTAL	TOTAL NUMBER OF ANALYSES	REPORTING LEVEL (µg/L)	NUMBER OF ANALYSES AT OR ABOVE REPORTING LEVEL
DDT	15	0.01	0
PCB	9	0.1	0
DIAZINON	14	0.01	4
LINDANE	15	0.01	0
CHLORDANE	15	0.1	0
MALATHION	15	0.01	0
ENDRIN	15	0.01	0
PARATHION	14	0.01	0
DIELDRIN	15	0.01	1
ENDOSULFAN	2	0.01	0
2,4-D	12	0.01	0

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

2.2.9 Biological Constituents--Fecal Coliform and Fecal Streptococcus Bacteria and Phytoplankton

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

Median fecal coliform bacteria concentrations ranged from 70 to 260 cols/100 mL.

Concentrations of fecal coliform bacteria varied greatly at the three sites in the Pearl River basin for which data are available. Concentrations ranged from less than 5 cols/100 mL at all sites to 38,000 cols/100 mL at Bogue Chitto River near Bush. Median concentrations ranged from 70 to 260 cols/100 mL. Although fecal coliform concentrations were greater than 200 cols/100 mL some of the time at the sites, additional data are needed to determine if the U.S. Environmental Protection Agency's (1976; 1986) maximum contaminant level is being exceeded. Boxplots of fecal coliform concentrations at three representative sites in the basin show that approximately 50 percent of the fecal coliform samples were greater than 200 cols/100 mL at Bogue Chitto River near Bush (fig. 2.2.9-1).

Concentrations of fecal streptococcus bacteria also varied greatly at sites in the basin. Concentrations ranged from 2 to 60,000 cols/100 mL at Bogue Chitto River near Bush. Median fecal streptococcus concentrations, which ranged from 280 to 500 cols/100 mL, generally were higher than the median fecal coliform concentrations. Boxplots of fecal streptococcus concentrations at three representative sites show that greater than 75 percent of the samples collected at sites had fecal streptococcus concentrations less than 2,000 cols/100 mL (fig. 2.2.9-1).

The median ratio of fecal coliform to fecal streptococcus bacteria was usually less than 0.7 at most of the sites sampled for analysis of bacteria concentrations in the Pearl 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 47 cells/mL at Bogue Chitto River near Bush to 150,000 cells/mL at Pearl River near Bogalusa. Median concentrations ranged from 1,100 to 2,500 cells/mL. Boxplots of phytoplankton concentrations at two representative sites show that although the maximum phytoplankton concentration at Pearl River near Bogalusa was 150,000 cells/mL, less than 25 percent of the samples had concentrations greater than 11,000 cells/mL (fig. 2.2.9-1).

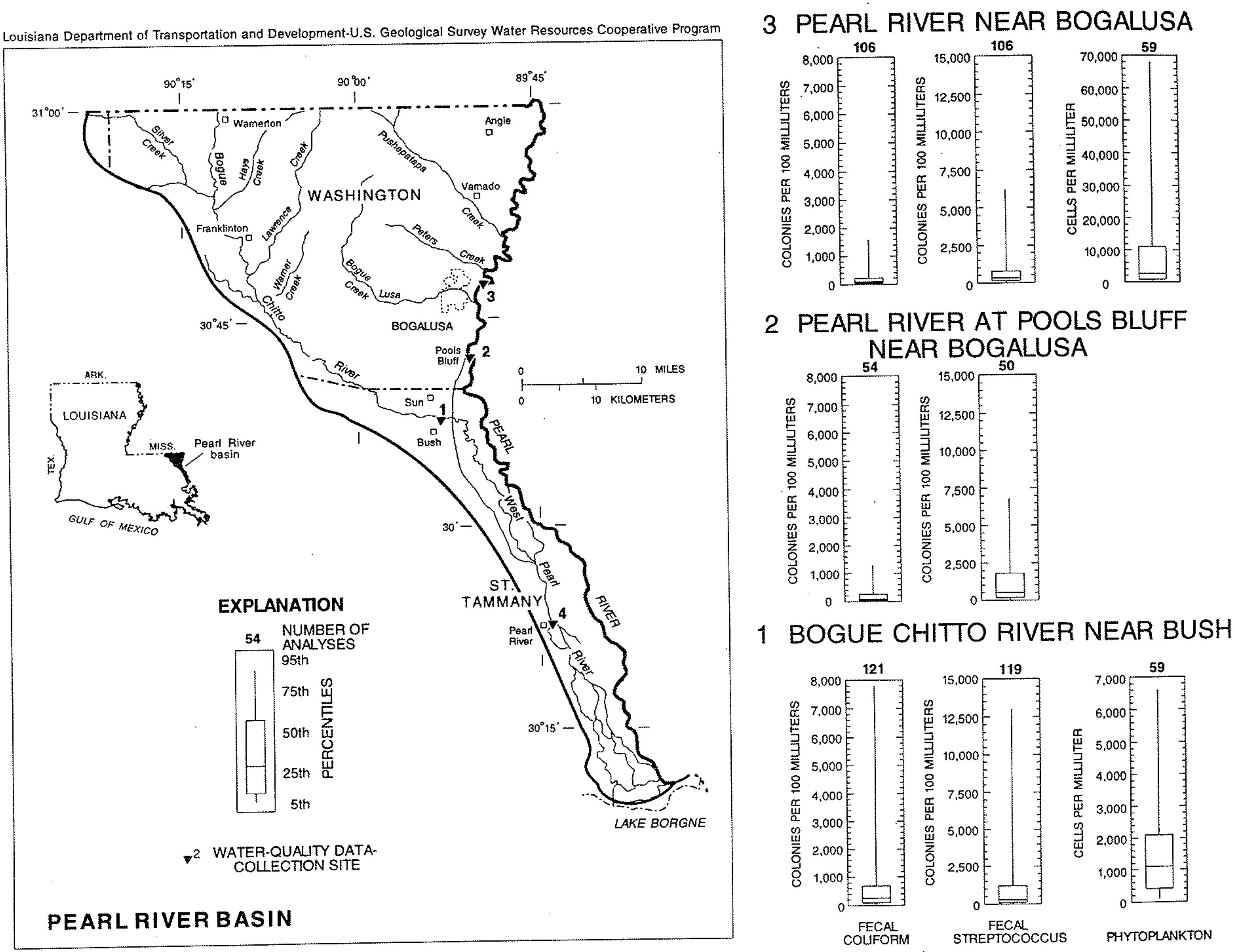


Figure 2.2.9-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and boxplots summarizing data for concentrations of fecal coliform and fecal streptococcus bacteria and phytoplankton in water from selected sites.

2.2.10 Suspended Sediment

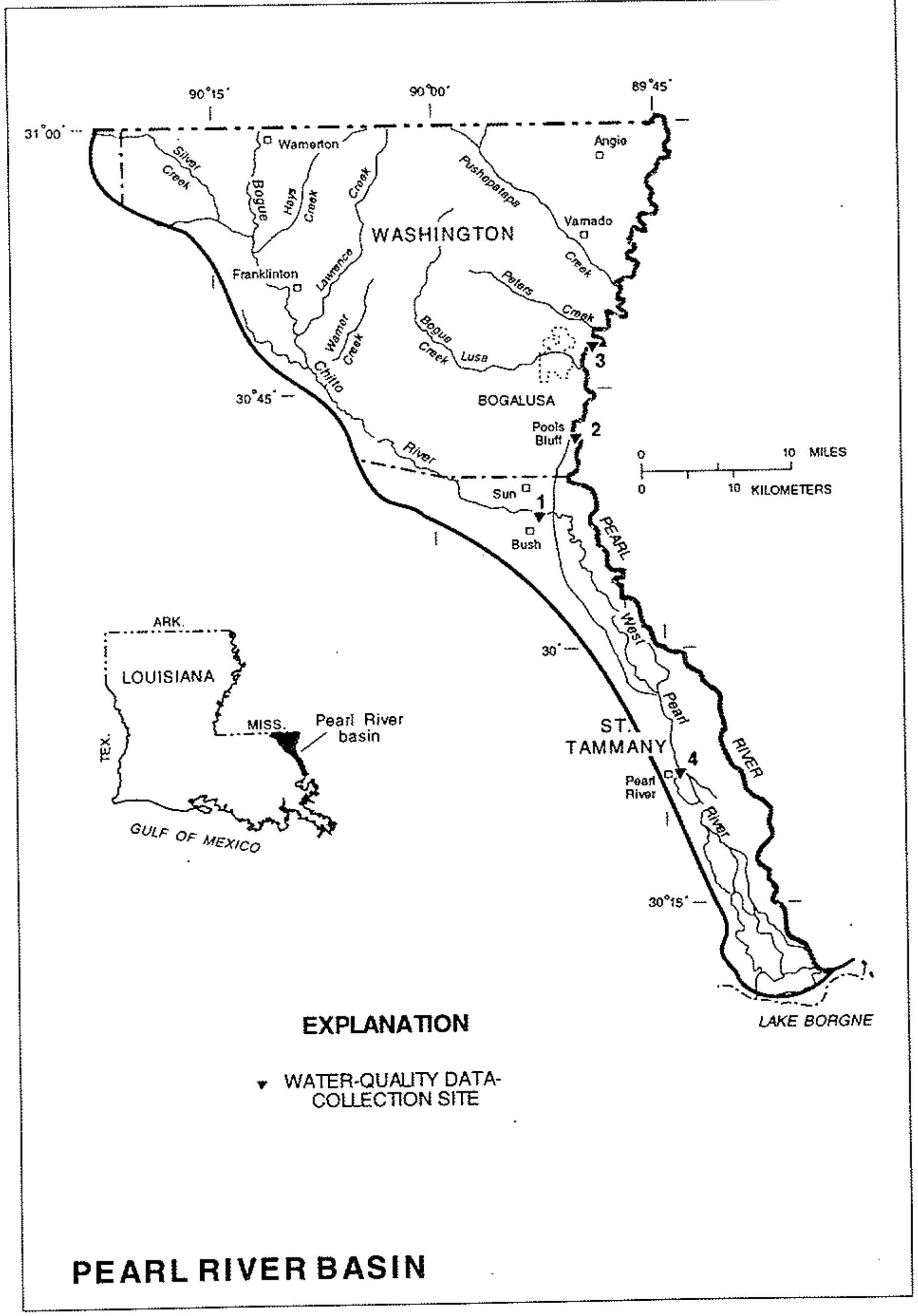
SUSPENDED-SEDIMENT DATA WERE EVALUATED FOR PEARL RIVER NEAR BOGALUSA

The maximum daily mean suspended-sediment discharge at Pearl River near Bogalusa was 80,600 t/d for a water discharge of 109,000 ft^3/s.

Daily mean suspended-sediment data were available for twelve water years during the period 1981-93 at Pearl River near Bogalusa. The minimum and maximum daily mean suspended-sediment concentrations, daily mean suspended-sediment discharge, and corresponding streamflow for the site are shown in figure 2.2.10-1.

The daily mean suspended-sediment concentration ranged from 12 mg/L twice in the water year 1985 to 860 mg/L in the water year 1993. The streamflow values corresponding to the minimum concentration were 3,790 ft^3/s and 3,760 ft^3/s. The streamflow corresponding to the maximum concentration of 860 mg/L was 14,900 ft^3/s.

Daily mean suspended-sediment discharges ranged from 111 t/d with a corresponding discharge of 1,470 ft^3/s to 80,600 t/d when the discharge was 109,000 ft^3/s.



3 PEARL RIVER NEAR BOGALUSA

[Drainage area is 6,573 square miles; mg/L, milligrams per liter; t/d, tons per day; --, not computed]

Water year	Concentration		Sediment discharge		
	Minimum daily mean (mg/L)	Maximum daily mean (mg/L)	Minimum daily mean (mg/L)	Maximum daily mean (mg/L)	Yearly total (t/d)
1981	18 (3,560)[1]	418 (16,600)[1]	163 (1,630)[1]	18,600 (16,600)[1]	--
1982	28 (1,470)[1] 28 (1,500)[1]	439 (28,400)[1]	111 (1,470)[1]	33,700 (28,400)[1]	--
1983	24 (5,310)[1] 24 (3,560)[1]	448 (37,500)[1]	152 (1,820)[1]	80,600 (109,000)[1]	3,850,000
1984	23 (2,370)[1]	356 (19,700)[1]	147 (2,370)[1]	32,200 (34,200)[1]	1,280,000
1985	12 (3,790)[1] 12 (3,760)[1]	576 (23,500)[1]	122 (3,760)[1]	39,400 (23,500)[1]	--
1986	15 (4,680)[1] 15 (3,750)[1]	459 (21,600)[1]	152 (3,750)[1]	44,200 (38,800)[1]	662,000
1987	25 (2,840)[1]	632 (32,700)[1]	143 (1,960)[1]	54,200 (32,700)[1]	2,610,000
1988	20 (3,390)[1]	433 (25,600)[1]	112 (1,880)[1]	49,400 (47,200)[1]	984,000
1989	--	--	--	--	--
1990	--	--	--	--	--
1991	21 (2,020)[1]	479 (29,400)[1]	114 (2,020)[1]	25,900 (29,400)[1]	1,510,000
1992	22 (2,440)[1] 22 (2,800)[1] 22 (2,790)[1]	534 (18,700)[1]	145 (2,440)[1]	21,400 (18,700)[1]	719,000
1993	16 (3,040)[1]	860 (14,900)[1]	112 (2,100)[1] 112 (2,080)[1]	33,200 (62,400)[1]	1,270,000

[1] Number in parentheses is the corresponding daily mean water discharge, in cubic feet per second.

Figure 2.2.10-1. Water-quality data-collection sites in the Pearl River basin, Louisiana, and a table summarizing suspended-sediment concentrations and suspended-sediment discharges at selected sites.

2.3 Summary and Conclusions

SPECIFIC CONDUCTANCE VALUES WITHIN THE BASIN WERE LOW

The median values for specific conductance ranged from 44 to 83 μS/cm

The Pearl River basin in Louisiana is about 60 miles long and 40 miles wide. Most of the water from the basin is primarily used for livestock. The Pearl and Bogue Chitto Rivers are the primary sources of surface water in the basin.

Water quality in the Pearl 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 Pearl River basin were evaluated using data collected from four sites during the water years 1943-95. Data for 33 water-quality properties and constituents for analyses stored in the U.S. Geological Survey's 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 eight 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; (7) biological constituents--fecal coliform and fecal streptococcus bacteria and phytoplankton; and (8) suspended sediment.

The physical properties varied for surface waters in the basin. The median values for specific conductance ranged from 44 μS/cm (microsiemens per centimeter at 25 degrees Celsius) to 83 μS/cm. For pH, values were less than 6.5, the lower limit of the U.S. Environmental Protection Agency's recommended range for freshwater aquatic life, in greater than 50 percent of the samples from Pearl River near Bogalusa, Louisiana, and Bogue Chitto River near Bush, Louisiana. Median values for water temperature ranged from 20.2 to 20.5 °C (degrees Celsius). Dissolved oxygen concentrations were greater than the State's minimum water quality criterion of 5.0 mg/L (milligrams per liter) in more than 95 percent of the samples analyzed at the sites.

The data for major inorganic cations and anions in water from the basin indicated that concentrations of major ions were below recommended levels for drinking water, for which such levels have been established. The maximum sodium concentration in water from the basin was 22 mg/L at Pearl River at Pools Bluff near Bogalusa, and the maximum chloride concentration was 39 mg/L at Pearl River near Bogalusa. Alkalinity values in water from the basin were commonly less than or equal to 20 mg/L, the U.S. Environmental Protection Agency's minimum alkalinity criterion for freshwater aquatic life.

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 were greater than 300 μg/L (micrograms per liter), which is the criterion for domestic water supplies.

Nutrient concentrations in the Pearl River basin generally were low. Median concentrations of ammonia plus organic nitrogen as nitrogen ranged from 0.5 to 0.70 mg/L. However, the maximum concentration of ammonia plus organic nitrogen as nitrogen in the Pearl River basin (5.9 mg/L) occurred at Pearl River at Pools Bluff near Bogalusa. Median concentrations of total phosphorus in the basin ranged from less than 0.06 to 0.09 mg/L.

Analysis of the available organic-chemical data indicated that diazinon was detected at more sites and with greater frequency than any of the other organic compounds that were analyzed. However, low-level concentrations of other organic compounds were occasionally detected at other sites. Diazinon was detected at least once at all of the sites for which 10 or more samples were analyzed for organic compounds.

The median ratios of fecal coliform to fecal streptococcus bacteria were less than 0.7 for most of the sites in the Pearl River basin, indicating that sources of fecal bacteria probably were predominantly livestock or poultry wastes. However, additional samples closer to the potential source of contamination need to be collected and analyzed to confirm these results. Phytoplankton concentrations varied greatly at sites in the basin due to the seasonal influence. Concentrations ranged from 0 to 50,000 cells per milliliter.

Daily mean suspended-sediment discharges at Pearl River near Bogalusa, which were available ranged from 111 tons per day when the corresponding daily mean discharge was 1,470 cubic feet per second to 80,600 tons per day when the corresponding daily mean discharge was 109,000 cubic feet per second.

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TABLE 2.2-1. STATISTICAL SUMMARY OF WATER-QUALITY DATA FOR THE PEARL RIVER BASIN IN LOUISIANA, 1943-95

Table 2.2-1. Statistical summary of water-quality data for the Pearl River basin in Louisiana, 1943-95

[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]

Bogue Chitto River near Bush, Louisiana (1)

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	179	(a)	(a)	187	19	44	32	40	44	46	52
pH (standard units)	190	(a)	(a)	7.2	5.4	6.4	5.7	6.2	6.4	6.7	7.0
Water temperature	178	(a)	(a)	31.5	1.0	20.3	9.5	15.0	20.5	27.0	29.0
Dissolved oxygen (milligrams per liter)	159	(a)	(a)	11.9	6.4	8.3	6.8	7.4	8.2	9.1	10.3
Dissolved solids (milligrams per liter)	168	(a)	(a)	136	20	37	26	32	36	40	52
Major cations (milligrams per liter)											
Calcium, dissolved	178	0.01	178	7.2	0.90	2.1	1.5	1.9	2.0	2.2	3.1
Magnesium, dissolved	175	.01	175	2.6	.05	.84	.38	.70	.87	.94	1.3
Sodium, dissolved	176	.01	176	14	.38	4.0	2.0	3.4	4.0	4.5	5.7
Potassium, dissolved	177	.01	177	3.4	.08	1.4	.90	1.2	1.4	1.7	2.2
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	172	1	172	63	3	8	5	7	8	9	11
Sulfate, dissolved	186	.1	181	8.2	<.1	(c)	.4	1.4	2.1	3.0	5.0
Chloride, dissolved	188	.1	187	16	<.1	(c)	3.6	5.3	6.0	7.0	8.6
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	140	0.1	140	3.8	0.1	0.6	0.2	0.3	0.5	0.7	1.2
Nitrogen, nitrite plus nitrate, total as nitrogen	147	.01	146	1.2	<.01	(c)	.10	.17	.25	.29	.40
Phosphorus, total as phosphorus	146	.01	145	.41	<.01	(c)	.03	.05	.06	.09	.15

Table 2.2-1. Statistical summary of water-quality data for the Pearl River basin in Louisiana, 1943-95--Continued

Bogue Chitto River near Bush, Louisiana (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											
Fecal coliform (colonies per 100 milliliters)	121	1	121	38,000	4	1,400	20	91	260	690	7,800
Fecal streptococcus (colonies per 100 milliliters)	119	1	119	60,000	2	2,200	20	90	280	1,200	13,000
Phytoplankton (cells per milliliter)	59	0	59	15,000	47	1,700	100	410	1,100	2,100	6,600
Trace metals (micrograms per liter)											
Copper, dissolved	72	20	0	<20	<20	(c)	<20	<20	<20	<20	<20
Iron, dissolved	78	10	78	370	20	190	60	130	200	240	300
Lead, dissolved	72	5	23	9	<5	(c)	<5	<5	<5	<5	5
Zinc, dissolved	72	20	9	47	<20	(c)	<20	<20	<20	<20	20
Organic compounds (micrograms per liter)											
DDT, total	15	0.01	0	<0.01	<0.01	(c)	<0.01	<0.01	<0.01	<0.01	<0.01
PCB, total	9	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	14	.01	4	.12	<.01	(c)	<.01	<.01	<.01	.01	.12
Lindane, total	15	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Chlordane, total	15	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Malathion, total	15	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endrin, total	15	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Parathion, total	14	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Dieldrin, total	15	.01	1	.01	<.01	(c)	<.01	<.01	<.01	<.01	.01
Endosulfan, total	2	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	12	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	.01

Table 2.2-1. Statistical summary of water-quality data for the Pearl River basin in Louisiana, 1943-95--Continued

Pearl River at Pools Bluff near Bogalusa, 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	72	(a)	(a)	132	33	84	45	63	83	102	124
pH (standard units)	72	(a)	(a)	7.9	5.3	6.6	5.7	6.2	6.6	6.9	7.2
Water temperature	74	(a)	(a)	31.5	6.0	20.1	7.4	14.8	20.2	27.5	30.1
Dissolved oxygen (milligrams per liter)	74	(a)	(a)	12.1	5.9	8.0	6.2	6.9	7.7	9.2	10.5
Dissolved solids (milligrams per liter)	70	(a)	(a)	98	29	62	38	50	61	72	86
Major cations (milligrams per liter)											
Calcium, dissolved	72	0.01	72	6.3	1.6	3.9	2.3	3.0	3.8	4.4	5.6
Magnesium, dissolved	72	.01	72	1.7	.50	1.1	.56	1.0	1.1	1.3	1.5
Sodium, dissolved	71	.01	71	22	2.2	9.9	3.7	6.2	9.2	13	19
Potassium, dissolved	72	.01	72	2.6	1.2	1.9	1.5	1.7	1.9	2.1	2.4
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	71	1	71	29	3	15	6	11	16	20	27
Sulfate, dissolved	72	.1	72	22	4.3	11	6.4	9.0	11	13	19
Chloride, dissolved	72	.1	72	16	2.6	7.0	3.6	5.6	7.0	8.3	11
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	57	0.01	1	5.9	0.09	0.85	0.30	0.56	0.70	0.96	1.5
Nitrogen, nitrite plus nitrate, total as nitrogen	71	.10	56	1.1	<.10	(c)	<.10	.10	.20	.28	.43
Phosphorus, total as phosphorus	72	.01	71	.20	<.01	(c)	.05	.07	.09	.11	.16

Table 2.2-1. Statistical summary of water-quality data for the Pearl River basin in Louisiana, 1943-95--Continued

Pearl River at Pools Bluff near Bogalusa, 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	54	5	50	3,200	<5	(c)	<5	30	70	250	1,300
Fecal streptococcus	50	1	50	24,000	4	1,600	23	150	500	1,800	6,800
Trace metals (micrograms per liter)											
Copper, dissolved	20	20	0	<20	<20	(c)	<20	<20	<20	<20	<20
Iron, dissolved	20	10	20	240	60	170	60	120	170	220	240
Lead, dissolved	20	1	12	6	<1	(c)	<1	<1	2	4	6
Zinc, dissolved	20	20	6	30	<20	(c)	<20	<20	<20	20	20
Organic compounds (micrograms per liter)											
DDT, total	16	0.01	0	<0.01	<0.01	(c)	<0.01	<0.01	<0.01	<0.01	<0.01
PCB, total	16	.1	0	<.1	<.1	(c)	<.1	<.1	<.1	<.1	<.1
Diazinon, total	16	.01	7	.02	<.01	(c)	<.01	<.01	<.01	.01	.02
Lindane, total	16	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Chlordane, total	16	.1	1	.1	<.1	(c)	<.1	<.1	<.1	<.1	.1
Malathion, total	16	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Endrin, total	16	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Parathion, total	16	.01	0	<.01	<.01	(c)	<.01	<.01	<.01	<.01	<.01
Dieldrin, total	16	.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	16	.01	7	.03	<.01	(c)	<.01	<.01	<.01	.01	.03

Table 2.2-1. Statistical summary of water-quality data for the Pearl River basin in Louisiana, 1943-95--Continued

Pearl River near Bogalusa, 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	379	(a)	(a)	175	36	71	46	60	70	78	100
pH (standard units)	370	(a)	(a)	7.8	5.3	6.4	5.8	6.2	6.4	6.7	7.1
Water temperature	181	(a)	(a)	31.5	4.0	20.0	8.1	14.2	20.5	27.0	29.5
Dissolved oxygen (milligrams per liter)	171	(a)	(a)	12.0	4.7	8.5	6.6	7.4	8.2	9.5	11.1
Dissolved solids (milligrams per liter)	330	(a)	(a)	124	32	53	37	45	51	58	72
Major cations (milligrams per liter)											
Calcium, dissolved	345	0.01	345	26	1.0	3.8	2.0	3.0	3.7	4.4	5.3
Magnesium, dissolved	345	.01	344	3.0	<.01	(c)	.40	.90	1.1	1.3	1.8
Sodium, dissolved	342	.01	342	20	1.9	7.2	3.6	5.2	6.9	8.1	13
Potassium, dissolved	331	.01	331	3.9	.40	1.7	1.1	1.4	1.7	2.0	2.7
Major anions (milligrams per liter)											
Alkalinity, total as $CaCO_3$	371	1	371	64	2	11	5	7	11	14	20
Sulfate, dissolved	344	.1	340	21	<.1	(c)	3.2	5.8	7.9	10	13
Chloride, dissolved	343	.1	343	39	2.3	8.4	3.7	5.9	7.9	10	14
Nutrients (milligrams per liter)											
Nitrogen, ammonia plus organic, total as nitrogen	136	0.01	136	1.9	0.13	0.72	0.30	0.50	0.66	0.86	1.4
Nitrogen, nitrite plus nitrate, total as nitrogen	140	.10	119	1.5	<.10	(c)	<.10	.14	.22	.29	.43
Phosphorus, total as phosphorus	148	.01	146	.65	<.01	(c)	.04	.07	.09	.12	.17

Table 2.2-1. Statistical summary of water-quality data for the Pearl River basin in Louisiana, 1943-95--Continued

Pearl River near Bogalusa, 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
Biological constituents											
Fecal coliform (colonies per 100 milliliters)	106	1	106	7,800	2	330	5	26	80	210	1,600
Fecal streptococcus (colonies per 100 milliliters)	106	1	106	17,000	12	1,100	26	120	310	760	6,200
Phytoplankton (cells per milliliter)	59	0	59	150,000	96	12,000	160	760	2,500	11,000	68,000
Trace metals (micrograms per liter)											
Copper, dissolved	79	20	3	25	<20	(c)	<20	<20	<20	<20	<20
Iron, dissolved	86	10	86	550	40	220	80	140	200	280	460
Lead, dissolved	80	5	15	28	<5	(c)	<5	<5	<5	<5	9
Zinc, dissolved	81	20	23	40	<20	(c)	<20	<20	<20	20	28
Organic compounds (micrograms per liter)											
DDT, total	4	0.01	0	<0.01	<0.01	(b,c)	(b)	(b)	(b)	(b)	(b)
PCB, total	3	.1	0	<.1	<.1	(b,c)	(b)	(b)	(b)	(b)	(b)
Diazinon, total	4	.01	2	.08	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Lindane, total	4	.01	0	<.01	<.01	(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	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Parathion, total	4	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
Dieldrin, total	4	.01	1	.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)
2,4-D, total	3	.01	0	<.01	<.01	(b,c)	(b)	(b)	(b)	(b)	(b)

Table 2.2-1. Statistical summary of water-quality data for the Pearl River basin in Louisiana, 1943-95--Continued

West Pearl River at Pearl River, 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	39	(a)	(a)	125	45	75	45	63	74	81	115
pH (standard units)	39	(a)	(a)	7.3	5.6	6.3	5.6	6.1	6.3	6.5	6.8
Dissolved solids (milligrams per liter)	37	(a)	(a)	88	47	62	49	56	62	68	79
Major anions (milligrams per liter)											
Sulfate, dissolved	39	0.1	39	17	3.2	8.4	4.2	6.4	7.6	9.2	16
Chloride, dissolved	39	.1	39	24	3.6	9.4	3.6	6.6	8.9	11	19

[a] Not applicable.
[b] Not calculated because sample size was less than 10.
[c] Not calculated because data base contained remarked values.

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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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