UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

QUALITY OF WATER IN THE PEARL RIVER, JACKSON TO BYRAM, MISSISSIPPI, SEPTEMBER 21-22, 1976

by Gene A. Bednar

Open-File Report 80-575

Prepared in cooperation with the

Mississippi Department of Natural Resources,
Bureau of Pollution Control

Jackson, Mississippi
1980

UNITED STATES DEPARTMENT OF THE INTERIOR
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FACTORS FOR CONVERTING INCH-POUNDS UNITS TO INTERNATIONAL SYSTEM (SI) UNITS

For use of those readers who may prefer to use international system (SI) units rather than the inch-pound system, the conversion factors for the terms used in this report are listed below:

Multiply inch-pound units	By	To obtain SI units
inch (in)	2.54	centimeter (cm)
foot (ft)	0.3048	meter (m)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)

°C=5/9 (°F-32) or °F=9/5 (°C)+32

National Geodetic Vertical Datum of 1929 is a geodetic datum derived from the average sea level measured over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, and as such does not necessarily represent local mean sea level at any particular place. To establish a more precise nomenclature, the term "NGVD of 1929" is used in place of "Sea Level Datum of 1929" or "mean sea level."

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ABSTRACT

The Pearl River, entering the study reach at site 1 at Jackson, was generally higher in dissolved-oxygen concentrations and lower in dissolved-solids, nutrients, and biochemical oxygen demands than at site 13 at Byram 11.8 miles downstream of site 1 and about 11 river miles downstream of treated sewage inflow. The dissolved-oxygen concentrations of the water ranged from 6.4 to 7.8 milligrams per liter at site 1 and from 4.9 to 7.4 milligrams per liter at site 13. The average dissolved-solids concentrations were 60 and 97 milligrams per liter at sites 1 and 13, respectively. The average dissolved-solids load increased downstream about 35 tons per day. The average loads of 5-day biochemical oxygen demand, total phosphorus, and ammonia increased downstream about 2, 0.7, and 0.6 tons per day, respectively.

The water in the study reach contained color, total iron, and manganese concentrations that exceeded limits recommended for public water supplies. Trace amounts of some pesticides and minor elements were present in both the water and bottom material at sites 1 and 13. Although the concentrations of a few dissolved constituents exceeded recommended limits during the study, the Pearl River in the study reach may be considered beneficial for many purposes.

INTRODUCTION

Water is one of the most important natural resources of Mississippi. Even though there is an abundant supply of high-quality water in the State, there is a need for a comprehensive management plan for effective utilization and conservation of this resource. To attain this goal, the Mississippi Department of Natural Resources, Bureau of Pollution Control, has been designated the responsibility for developing a statewide waste-treatment management plan.

The U.S. Geological Survey, in cooperation with the Bureau of Pollution Control, is providing hydrologic data necessary for determining the waste-assimilation capacity of selected reaches of major freshwater and tidal streams within the State. The hydrologic data in this report are intended for use in developing a comprehensive long-range plan for effective management of the water resources.

This report summarizes and documents data collected during a 36-hour intensive water-quality study conducted on September 21-22, 1976. The report is intended to supplement data collected during an intensive water-quality study on June 7-9, 1978, and published in U.S. Geological Survey Open-File Report 78-1032, "Quality of water and time of travel in the Pearl River, Jackson to Byram, Mississippi," by Gene A. Bednar and Fred Morris, III. The data in both reports include chemical, physical, and bacteriological data and discharge data. Time of travel, drainage, and channel morphology in the study area are given in U.S. Geological Survey Open-File Report 78-1032.

The data in this report is more representative of water quality conditions during low streamflow than the 1978 report. The 1978 study was conducted during a period of unsteady streamflow due to releases from the Ross Barnett Reservoir. Pertinent information concerning the study area including water use, streamflow, and quality of water are given by Spiers and Dalsin, 1979.

DESCRIPTION OF THE STUDY AREA

Location

The study area is a reach of the Pearl River in southern Hinds and Rankin Counties in south-central Mississippi (fig. 1). The reach begins about 5 river miles downstream from the city of Jackson, 20 river miles downstream from the Ross Barnett Reservoir, and 0.7 river mile upstream from the Jackson City Wastewater Treatment Plant. The 11.8-mile reach of the Pearl River extends to the suspension bridge at Byram (fig. 2).

Cultural features

The study area has experienced substantial growth in recent years because of its proximity to Jackson. The population of Hinds and Rankin Counties has increased about 17 percent from 1960 to 1970 while the population of the State increased about 2 percent during the same period. Although the area of the two counties account for about 3.5 percent of the total area of the State, the population of the two counties comprises 12 percent of the total population of the State.

The population in Hinds County is larger and more urbanized than the population in Rankin County. In 1970, about 84 percent of the 214,973 residents in Hinds County lived in urban areas while about 28 percent of the 43,933 residents of Rankin County lived in urban areas.

Climate

Hinds and Rankin Counties are in the humid, subtropical region typical of the southeast. Summers are consistently hot and winters are mild.

In the study area, the mean air temperature is 65°F (degrees Fahrenheit) 18.3°C (Celsius). The mean daily maximum temperature reaches 93°F (33.9°C) during the months of July and August and reaches a mean minimum of about 37°F (2.8°C) during January and December. The growing season lasts about 250 days. Normally, the first killing frost occurs in mid-November and the last in mid-March. Freezing temperatures have occurred as early as October and as late as April.

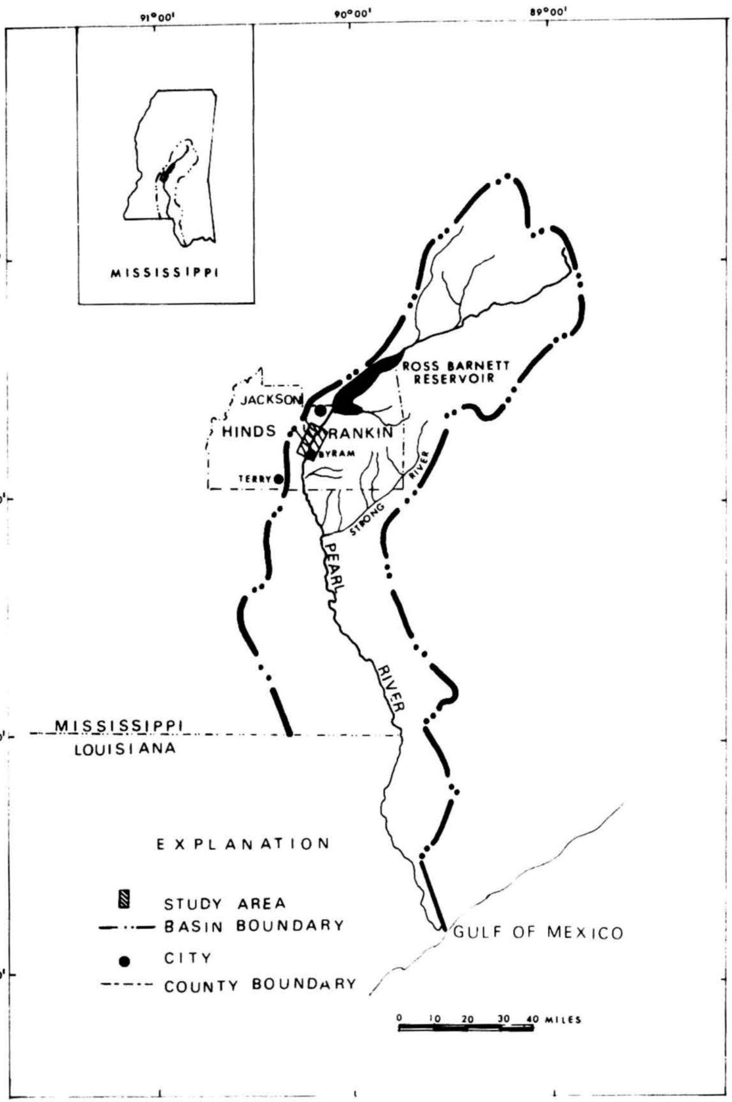

FIGURE 1.--STUDY AREA AND MAJOR DRAINAGE.

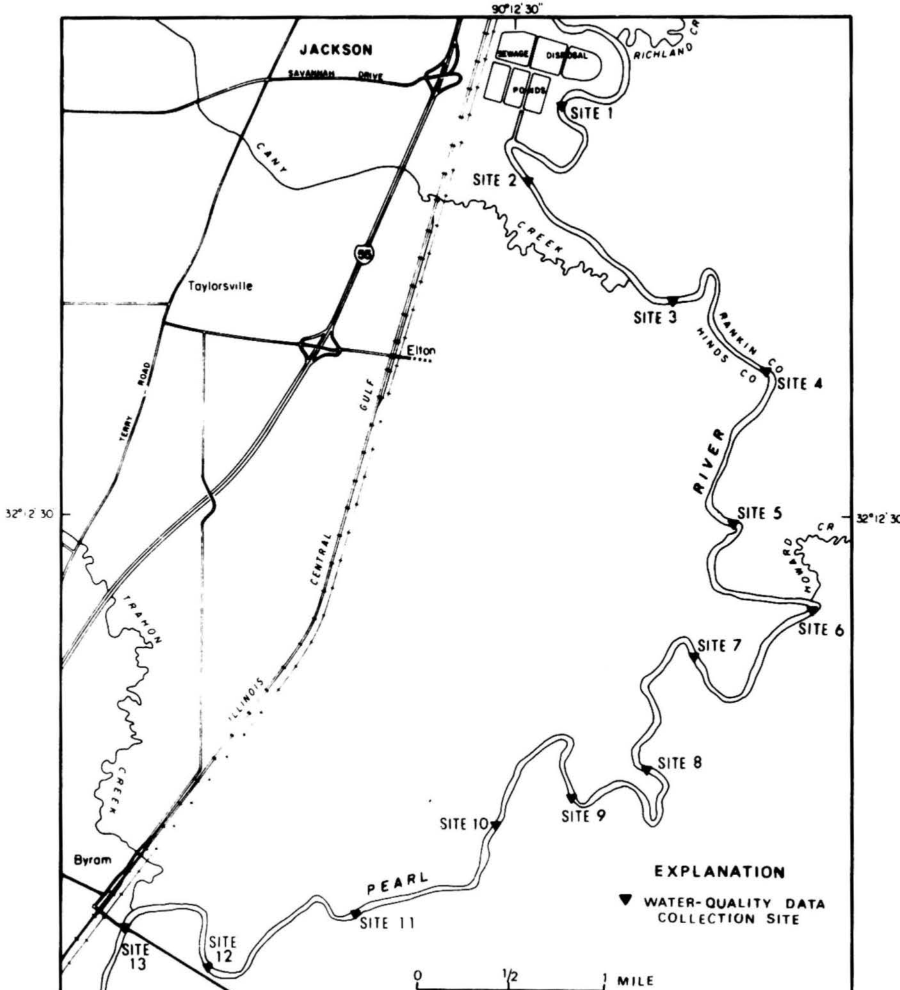

FIGURE 2.--WATER-QUALITY DATA-COLLECTION SITES IN STUDY AREA.

Rainfall in the study area is fairly evenly distributed throughout the year. The normal annual rainfall is about 49 inches ranging from 2.2 inches in October to 5.6 inches in March. September normally receives about 3.0 inches of rain. The NOAA Weather Station in Jackson reported the following rainfall and maximum, minimum, and mean air temperatures in September, 1976.

Date	Rainfall (inches)	Temperature (°F) Maximum	Temperature (°F) Minimum
September 19	0	88	69
20	0.03	86	69
21	0.03	84	61
22	0	83	51
September, 1976-mean		85	64

Geology and topography

The geologic units exposed at the surface in Hinds and Rankin Counties include part of the Eocene, Oligocene, and Miocene Series of the Tertiary System, and the Pleistocene and Holocene Series of the Quarternary System.

The terrain varies from high rugged hills with steep slopes and narrow valleys through lower, more rolling hills, wider valleys, and gentler slopes, to rather broad flat alluvial plains, typical of the Gulf Coastal Plain province. The hills rise to a maximum of 612 feet above NGVD (National Geodetic Vertical Datum) of 1929, and the alluvial plain of the Pearl River drops to a low of 220 ft above NGVD. In Hinds County, lower altitudes occur in the Big Black River alluvial plain that locally is less than 100 ft above NGVD. The land surface in the study area generally is less than 250 ft above NGVD and is characterized by swampy areas that are subject to river flooding.

The subsurface of the alluvial deposits into which the Pearl River is incised, is generally stratified with gravel at the base followed by sand, and silt, and in some places, clay. The alluvium also contains much organic material.

STREAMFLOW

The streamflow of the Pearl River at site 1 was computed using discharge records at the Jackson gage, about 5 miles upstream, and stage measurements at site 1. The streamflow at site 13 was computed from discharge and stage measurements made during the study and the stage record at the Jackson gage. The inflow from the Jackson Wastewater Treatment Plant was not measured during the study; but, according to the treatment plant records, an average of about 34 million gallons per day (52 cubic feet per second) of treated sewage was being discharged September 20-22, 1976 (Larry Shortridge, oral commun., 1980). No appreciable tributary inflow or releases from Ross Barnett Reservoir were observed during the study.

The mean daily discharge upstream at the Jackson gage was 261 and 244 ft^3/s (cubic feet per second) on September 21 and 22, 1976, respectively. During the 2-day study, the mean discharge was 255 ft^3/s at site 1 and 289 ft^3/s at site 13. The discharge during this period ranged from 235 to 263 ft^3/s at site 1 and 282 to 293 ft^3/s at site 13 (fig. 3). Although the computed discharge at site 1 compares favorably with the daily mean discharge at the Jackson gage, the increase in discharge from site 1 to site 13 was 18 ft^3/s less than discharge at site 1 plus the average wastewater release reported by the sewage treatment plant located downstream of site 1. The reason for the fairly large difference cannot be explained with certainty. A loss into the ground-water storage system is a possible explanation for part of the difference.

An analysis of the streamflow records for the Pearl River at the Jackson gage from October 1, 1961, to September 30, 1977, a period after impoundment of the Ross Barnett Reservoir, indicates that the flow of the Pearl River will exceed the discharge at site 1 during the study about 89 percent of the time (Bednar and Morris, 1978, p. 11). The 7-day Q_{10} at the Jackson gage is 118 ft^3/s (Morris, 1978, p. 11).

WATER-QUALITY CHARACTERISTICS

Data Collection and Analyses

The assessment of the water quality of the 11.8-mile reach of the Pearl River from upstream of the City of Jackson Wastewater Treatment Plant at Jackson to Byram is based on physical, chemical, and bacteriological analyses of water samples. The network of sampling sites was designed for uniform distribution of sampling points to provide representative data relevant to the study (fig. 2).

Specific conductance, water temperature, and dissolved oxygen (DO) data were obtained from continuous water-quality monitors at sites 1 and 13. Water samples were collected and field measurements were made in the main channel each morning and afternoon during the 2-day study. The data collected at site 3 may be more representative of a homogeneous mixture of the wastewater treatment plant effluent with the river water. There was some evidence that the water at site 2 was not always homogeneous as a result of slow lateral mixing in the river downstream of the treatment plant.

The 5-day biochemical oxygen demand (BOD_5), fecal coliform and streptococcal bacteria were collected at sites 1, 3, and 13, and analyzed at the U.S. Geological Survey Mobile Laboratory. The samples for the other water-quality parameters given in this report were analyzed by the U.S. Geological Survey National Water Quality Laboratory in Atlanta, Georgia.

River stage observations were taken during the study at non-recording stage gages at sites 1 and 13. Hourly streamflow values were computed from these observations as explained in the streamflow section. Site 1 was located about 20 miles downstream of Ross Barnett Reservoir. Releases from the reservoir regulates the streamflow downstream in the study area. The four sample-collection runs were conducted during generally low and stable flow conditions.

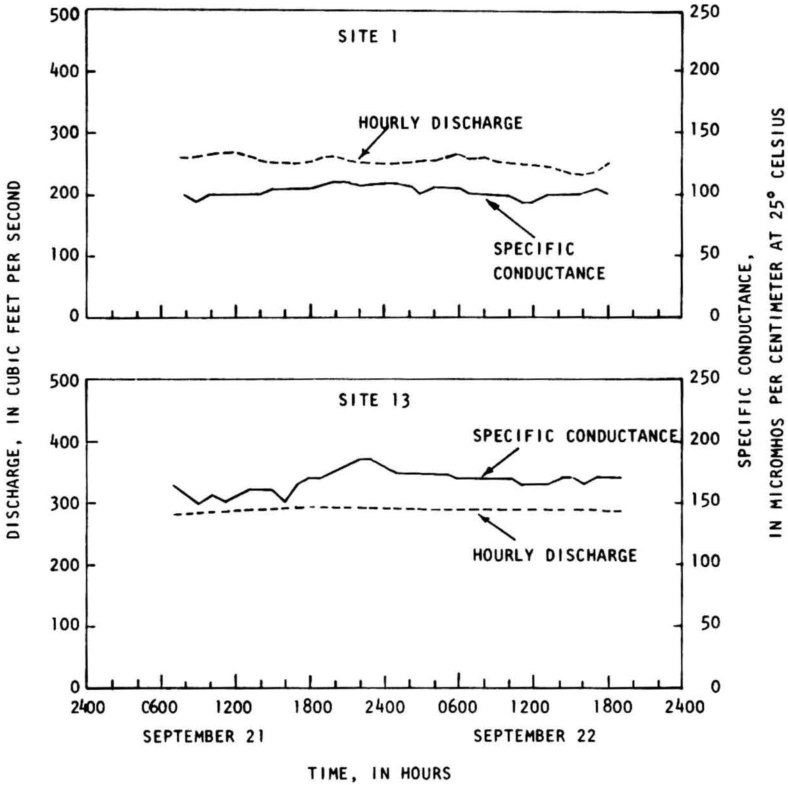

FIGURE 3. DISCHARGE AND SPECIFIC CONDUCTANCE AT SITES 1 and 13 ON PEARL RIVER, SEPTEMBER 21-22, 1976.

The results of the on-site measurements, water-quality monitor, laboratory analyses, and streamflow data are given in tables 1 and 2 at the end of this report.

General Composition

The results of comprehensive chemical analyses of water samples collected on September 22, 1976, at sites 1 and 13 are given in table 2. The water at both sites can be characterized as soft and low in dissolved minerals and containing objectionable color, total iron, and manganese concentrations which is characteristic of many surface waters in the State. The color (180 units), iron (6,300 ug/L, micrograms per liter), and manganese (330 ug/L) at site 1 were higher than at site 13. Several of the trace elements were present in low concentrations and were generally higher at site 1 than at site 13. Most pesticides and polychlorinated biphyenyls (PCB), and polychlorinated naphthalenes (PCN) were below detectable levels. Trace amounts of diazinon, heptachlorepoxide and silvex at site 1 and diazinon at site 13 were detected in the water samples. Color, total iron, and total manganese exceeded the suggested limits for public water supplies recommended by the National Academy of Science and the National Academy of Engineering (1973), but are not considered toxic to freshwater aquatic life or wildlife. The concentrations of the other constituents determined in both analyses were below the recommended limits suggested for the respective constituent.

The bottom material collected at sites 1 and 13 contained several trace elements in low concentrations. Trace amounts of aldrin and dieldrin and 24 ug/kg (micrograms per kilogram) of diazinon were present at site 1.

Even though the water in the study reach may not be desirable for a public water supply, it may be considered beneficial for many other purposes. The water-quality criteria for intrastate, interstate, and coastal waters in Mississippi are given in Mississippi Department of Natural Resources, Bureau of Pollution Control, 1980, page 75.

Specific Conductance and Dissolved Solids

The specific conductance of a water sample is a measure of its ability to conduct an electric current and can be used to indicate the degree of mineralization. The specific conductance values in this report are reported in micromhos per centimeter (umhos/cm) at 25°C (Celsius). The dissolved-solids concentration in water is proportional to specific conductance in a ratio ranging from 0.55 to 0.75, depending on the composition of the water (Hem, 1970, p. 99). Approximate dissolved-solids concentrations may be obtained by multiplying the specific conductance values given in table 1 by 0.58. The ratio is based on the sum of the various dissolved constituents and silica rather than the residue on evaporation which includes the weight contributed by color-producing organic matter.

The specific conductance values obtained from the monitors at sites 1 and 13 during the study are shown in relation to the streamflow in figure 3. The water entering the study area had specific conductance values ranging from 95 to 110 umhos/cm. The water leaving the study area had specific conductance values ranging from 150 to 185 umhos/cm. The specific conductance of the water significantly increased downstream of site 1, indicating an increase in the dissolved solids. The average calculated dissolved-solids concentrations were 60 and 97 mg/L at sites 1 and 13, respectively. The average dissolved-solids load, based on mean hourly specific conductance and discharge, increased from about 41 tons/d (tons per day) at site 1 to about 76 tons/d at site 13; an increase of about 85 percent downstream of the sewage treatment plant. The mean discharge from site 1 to site 13 increased about 13 percent.

Dissolved Oxygen

Dissolved oxygen (DO) in the water is derived from the air and by photosynthesis from aquatic plants. Dissolved oxygen, normally present in all surface water, is essential to most chemical and biological processes. Dissolved oxygen, a key element for supporting aquatic life, can serve as an index to water quality.

Under average hydrologic conditions, a minimum dissolved-oxygen concentration of 5.0 mg/L or more is desirable for maintaining a good balance of aquatic life in surface waters. A dissolved oxygen of 3.0 mg/L or less is considered to be hazardous or lethal to many forms of aquatic life; however, industrial water users may find a reduction in dissolved oxygen beneficial in reducing corrosion (Brown and others, 1970, p. 126).

The dissolved-oxygen concentrations of the water at sites 1 and 13 were determined by dissolved-oxygen monitors operated during the 2-day study (fig. 4). Dissolved-oxygen concentrations at site 1 ranged from 6.4 to 7.8 mg/L, but little diel change was exhibited. A diel change in dissolved-oxygen concentrations was observed at site 13. Dissolved-oxygen concentrations increased to 7.4 mg/L (milligrams per liter) during daylight and progressively decreased to 4.9 mg/L in the morning hours before radiant sunlight was available for photosynthesis by aquatic plants.

A comparison of maximum, minimum, and mean values of dissolved-oxygen measurements during daylight hours shows that dissolved-oxygen concentrations generally decreased downstream to site 7 (fig. 5). The dissolved oxygen in this reach undoubtedly was lower at night when photosynthetic processes were negligible. The dissolved-oxygen sag at sites 4 to 7 likely is the location of greatest oxygen demand.

Biochemical Oxygen Demand

Waste assimilation capacity is commonly assessed on the basis of the rate of reaeration and the 5-day biochemical oxygen demand (BOD_5). The BOD_5 is a measure of the amount of oxygen required to stabilize organic wastes by bacterial and chemical action in a closed water sample incubated in the dark at 20°C for 5 days. The amount of 5-day oxygen demand is generally controlled by the amount of carbonaceous material present.

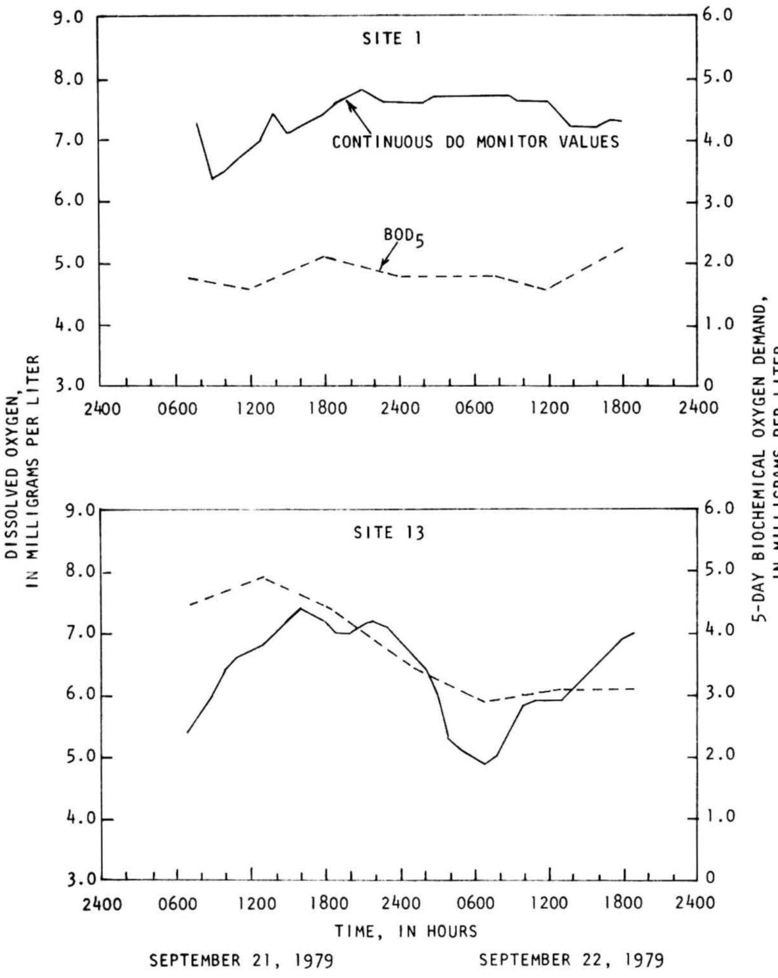

FIGURE 4. DISSOLVED-OXYGEN (DO) CONCENTRATIONS AND 5-DAY BIOCHEMICAL OXYGEN DEMAND (BOD_5) VALUES AT SITES 1 AND 13 ON PEARL RIVER, SEPTEMBER 21-22, 1976.

NOTE: VALUES SHOWN ARE DISSOLVED-OXYGEN FIELD MEASUREMENTS DURING DAYLIGHT HOURS AND DO NOT REPRESENT DIEL CHANGE AT RESPECTIVE SITES. CONTINUOUS DO VALUES FOR SITES 1 AND 13 GIVEN IN FIGURE 4.

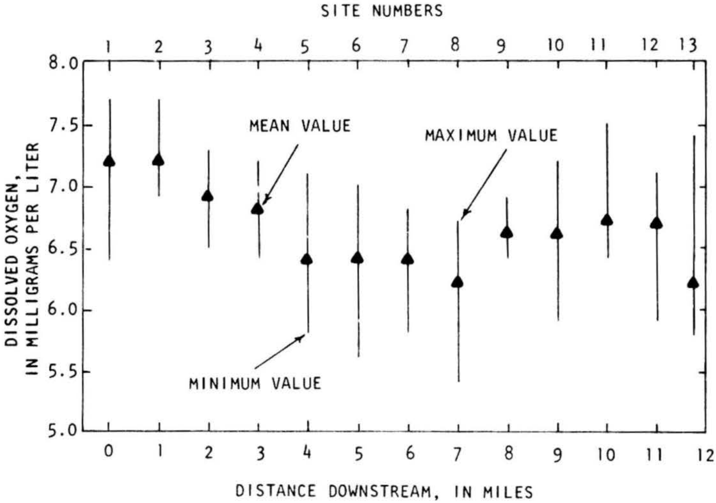

FIGURE 5. MAXIMUM, MINIMUM, AND MEAN DISSOLVED-OXYGEN CONCENTRATIONS AT SAMPLING SITES ON PEARL RIVER, SEPTEMBER 21-22, 1976.

The BOD_5 in the water at sites 1 and 13 are shown in figure 4 with the dissolved-oxygen values obtained from continuous monitors. The BOD_5 in the water entering the study area ranged from 1.6 to 2.2 mg/L at site 1. Downstream, the BOD_5 ranged from 2.4 to 3.7 mg/L at site 3 and 2.9 to 4.9 mg/L at site 13 (table 2). The oxygen demand likely was greatest between sites 4 and 7 where the dissolved-oxygen concentrations were observed to be the lowest (figure 5).

The estimated BOD_5 load, based on the average values of seven BOD_5 determinations and the mean discharges, increased downstream of site 1. The average BOD_5 during the study increased from about 1 ton/d at site 1 to about 3 tons/d at site 13.

Nitrogen Compounds

Organic nitrogen compounds from sewage and certain kinds of industrial wastes are decomposed into inorganic nitrogen compounds by either aerobic or anaerobic bacteria. The concentrations of the nitrogen compounds yield information about the stage of decomposition. The occurrence of the various forms of nitrogen compounds may indicate the amount of oxidation that has occurred since the waste was discharged.

The total nitrogen and ammonia concentrations were lower at site 1 than at sites 3 and 13. An increase in the concentrations of these compounds is usually a good indication of wastewater loading. The total nitrogen concentrations ranged from 0.80 to 1.2 mg/L at site 1 and from 2.3 to 2.7 mg/L at site 3. The total nitrogen concentrations decreased slightly downstream of site 3 and ranged from 2.0 to 2.6 mg/L at site 13. The ammonia concentrations at sites 1 and 3 ranged from 0.03 to 0.11 mg/L and 0.85 to 1.4 mg/L, respectively. Although the total nitrogen and ammonia concentrations were significantly higher at site 13 than at site 1, they were slightly lower than at site 3. The organic nitrogen concentrations of the water samples remained about the same during the study, which suggests that much of the organic nitrogen originated upstream of site 1 (fig. 6). The mean organic nitrogen concentration of samples collected during the study comprised a little more than 90 percent of the total nitrogen content at site 1 and was approximately 40 to 50 percent of the total nitrogen at the downstream sites (table 2).

The nitrite plus nitrate concentrations were lowest at site 1 and increased downstream. The mean nitrite plus nitrate concentrations were 0.03 mg/L at site 1, 0.16 mg/L at site 3, and 0.47 mg/L at site 13 (table 2). The progressive increase in nitrite plus nitrate along with a decrease in total nitrogen and ammonia concentrations downstream of site 3 also is indicative of the biological oxidation processes that were occurring at downstream sites.

NOTE: NUMBER OF ANALYSES SHOWN ABOVE BAR GRAPHS

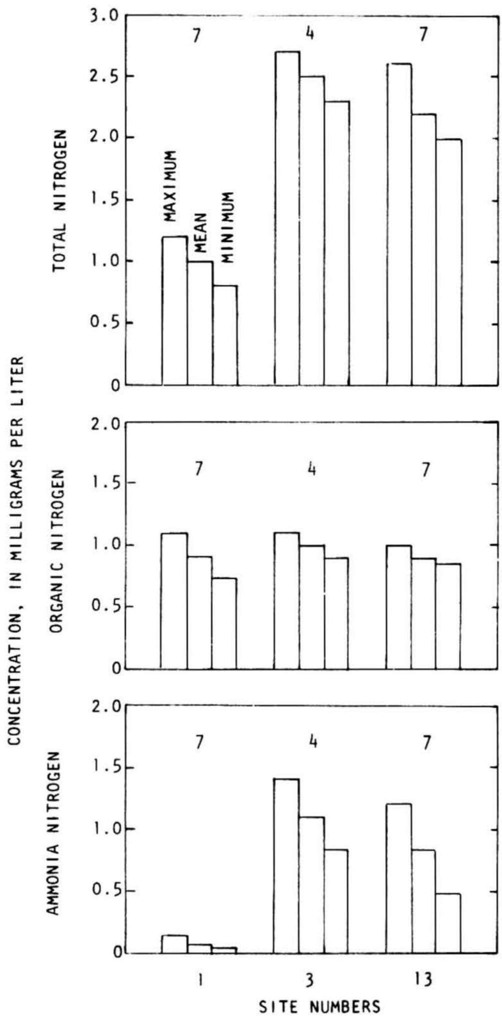

FIGURE 6. MAXIMUM, MINIMUM, AND MEAN AMMONIA, ORGANIC AND TOTAL NITROGEN CONCENTRATIONS AT SITES 1, 3, AND 13 ON PEARL RIVER, SEPTEMBER 21-22, 1976.

The total nitrogen load, based on the average nitrite plus nitrate, ammonia, and organic nitrogen concentrations and the mean discharge are shown in the following table:

Nitrogen compound	Average tons per day		
	Site 1	Site 13	Increase
Nitrite plus nitrate	0.0	0.4	0.4
Ammonia	.1	.7	.6
Organic	.6	.7	.1
Total	0.7	1.8	1.1

Phosphorus

Phosphorus is one of the primary nutrients essential to aquatic plant growth. In general, it is not considered toxic, but enrichment of a body of water with the element does stimulate the growth of algae, which may cause eutrophication. The critical concentration level of phosphorus needed for algal growth has been considered to be 0.1 mg/L, but this remains in question (Velz, 1970, p. 19).

The total phosphorus concentrations of the water entering the study area at site 1 ranged from 0.14 to 0.29 mg/L and increased significantly at downstream sites. Downstream, the total phosphorus concentrations ranged from 1.0 to 1.6 mg/L at site 3 and from 0.77 to 1.5 mg/L at site 13 (table 2).

The phosphorus load, based on the average phosphorus concentrations and the mean discharge during the study, averaged about 0.1 ton/d at site 1 and 0.8 ton/d at site 13. The average increase in the phosphorus load from site 1 to site 13 was about 0.7 ton/d during the study.

Water Temperature

Temperature is one of the most important factors in determining a stream's ability to assimilate waste material. It influences almost every physical property of water, every physical process that takes place in water, and all biological activity in the aquatic community.

The range of water temperature varied between the monthly mean maximum and minimum air temperature, which is typical of a stream in a semitropical climate. Minimum water temperatures were attained in the morning hours; maximum water temperatures at the sampling sites were reached in the afternoon and were highest at sites 9 to 11 during the study. Water temperatures at the monitor sites ranged from 24.0°C to 26.0°C (75°F to 79°F) at site 1, and from 23.5°C to 26.5°C (74°F to 80°F) at site 13. The largest difference between minimum and maximum water temperatures was at sites 9 to 11, where the water temperatures ranged from 23.0°C to 27.0°C (73°F to 81°F). Water temperatures in the study reach are given in table 1 and are shown graphically by Spiers and Dalsin (1979).

pH - Hydrogen Ion Activity

Freshwater streams generally possess a natural buffering system that regulates or limits the activity of hydrogen ions. The buffering system will maintain the water at a pH range of 6.5 to 8.5. Dilute waters having a low buffering capacity, in the presence of the acidic soils and tannic acid in the runoff from swamplands and dense pine forests, may have pH values less than 5.0 (Mississippi Air and Water Pollution Control Commission, 1978, p. 27). The presence of industrial wastes in a stream can cause extreme pH changes depending on the chemical and physical composition of the waste effluent.

The pH of the water entering the study area ranged from 6.2 to 7.1 units and remained essentially in a 6.8 to 7.1 range at all downstream sites except at site 13. The pH at site 13 ranged from 6.0 to 6.8 units. The median pH of measurements at sites 1 and 13 were 6.7 and 6.5 units, respectively (table 1).

Bacteria

The bacteria of the fecal coliform group and fecal streptococcus group are found in large numbers in enteric wastes of warmblooded animals, but are rarely present in soils or plant debris. A fecal coliform to fecal streptococcal bacteria ratio of less than 0.7 is evidence that wastes are of nonhuman origin; a ratio between 2.0 and 4.0 suggests a predominance of human wastes; and a ratio greater than 4.0 may be considered strong evidence that wastes are of human origin (Geldreich and Kenner, 1969). The population count of each bacterium in the report, determined by the membrane filter method, is reported in colonies per 100 milliliters of sample (col/100 mL) (Greeson and others, 1977, p. 53 and 59).

The fecal bacteria densities were higher in the water entering the study area at site 1 than that at site 13. The fecal coliform bacteria ranged from 210 to 1,000 col/100 mL at site 1 and 200 to 250 col/100 mL at site 13. The fecal streptococcal bacteria ranged from 250 to 430 col/100 mL at site 1 and from 23 to 84 col/100 mL at site 13 (table 2).

There was strong evidence, from the fecal coliform to fecal streptococcal ratios in water samples having both fecal coliform and streptococcus analyses, that the Pearl River was transporting wastes of human origin out of the study reach during the study. The ratio of fecal coliforms to fecal streptococci in five water samples collected at site 1 were less than 4.0. At downstream sites, two of two samples collected at site 3 and four of four samples collected at site 13 had ratios that were 4.0 or greater.

SUMMARY

The study was conducted during a period of low flow. The mean discharge was 255 ft^3/s, or about 89 percent flow duration, and increased 34 ft^3/s from site 1 to site 13 during the study. The increase is 18 ft^3/s less than the average discharge at site 1 plus the discharge reported by the sewage wastewater treatment plant located downstream of site 1. The apparent difference could not be explained.

The dissolved constituents in the water generally were within acceptable limits for many uses even though trace amounts of pecticides and minor elements were detected. Total iron and manganese concentrations and color in the water entering and leaving the study reach were at levels considered objectionable for public water supplies. Trace amounts of pesticides and minor elements also were present in bottom material samples collected at sites 1 and 13. The specific conductance of the water increased downstream of site 1 indicating an increase in dissolved-solids load. The average dissolved-solids load increased from about 41 to 76 tons/d or 85 percent, while the mean discharge increased about 13 percent between the upstream and downstream measurement sites.

The dissolved-oxygen concentrations in the water at site 1 did not change significantly, ranging between 6.4 and 7.8 mg/L. At site 13, the dissolved-oxygen concentrations ranged from 4.9 to 7.4 mg/L. The lowest dissolved oxygen and highest BOD_5 in the study reach likely were between sites 4 and 7. The oxygen demand increased between sites 1 and 3. BOD_5 concentrations were largest at site 13, ranging from 2.9 to 4.9 mg/L. The average BOD_5 load increased about 2 tons/d from site 1 to site 13.

In general, total nitrogen and ammonia concentrations were largest at site 3 and nitrite and nitrate were largest at site 13. The average total nitrogen load increased about 1.1 tons/d from site 1 to site 13; of the increased load, about 0.4 ton/d was nitrite plus nitrate nitrogen, and 0.6 ton/d was ammonia nitrogen. Organic nitrogen in the water entering and leaving the study reach was about the same. The average organic nitrogen load increased about 0.1 ton/d during the study.

The total phosphorus load increased 0.7 ton/d from site 1 to site 13, and concentrations ranged from 0.14 to 0.29 mg/L and 0.77 to 1.5 mg/L, respectively. Water temperatures ranged from 23.0 to 27.0°C; and the pH of the water ranged from 6.8 to 7.1 at most sites, from 6.2 to 7.1 at site 1, and from 6.0 to 6.8 at site 13.

The fecal bacteria densities in the water entering the study reach generally were higher than at the downstream sites. Fecal coliform bacteria ranged from 210 to 1,000 col/100 mL at site 1 and 200 to 250 col/100 mL at site 13. Fecal streptococcal bacteria ranged from 250 to 430 col/100 mL at site 1 and from 23 to 84 col/mL at site 13. Although fecal bacteria densities were highest at site 1, there was strong evidence that wastes of human origin were present in the water downstream of site 1.

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HYDROLOGIC DATA

TABLE 1.--RESULTS OF FIELD DETERMINATIONS, HOURLY DISCHARGE, AND CONTINUOUS MONITOR VALUES, PEARL RIVER, SEPTEMBER 21-22, 1976.

PEARL RIVER AT SITE 1 (RIVER MILE 282)
LAT 32°14'24" LONG 090°12'15"

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP						
21...	0740	260	100	6.9	25.5	7.3
21...	0800	260	100	--	25.0	7.1
21...	0900	260	95	6.3	25.0	6.4
21...	1000	263	100	--	25.5	6.5
21...	1100	263	100	--	25.5	6.7
21...	1200	263	100	6.3	25.5	6.8
21...	1300	260	100	--	25.5	7.0
21...	1400	258	100	6.9	26.0	7.4
21...	1500	255	105	6.6	25.5	7.1
21...	1600	255	105	--	26.0	7.2
21...	1700	255	105	--	26.0	7.3
21...	1800	255	105	6.2	26.0	7.4
21...	1900	260	107	--	26.0	7.6
21...	2000	260	110	--	26.0	7.7
21...	2100	258	110	7.0	25.5	7.8
21...	2200	258	108	--	25.5	7.7
21...	2300	255	110	--	25.0	7.6
21...	2400	255	110	6.3	25.0	7.6
22...	0100	255	110	--	25.0	7.6
22...	0200	255	108	--	24.5	7.6
22...	0300	258	100	6.7	24.0	7.7
22...	0400	258	105	--	24.0	7.7
22...	0500	260	105	--	24.0	7.7
22...	0600	263	105	--	24.0	7.7
22...	0700	260	100	--	24.0	7.7
22...	0730	260	100	6.8	24.0	7.8
22...	0800	260	100	--	24.0	7.7
22...	0900	258	100	--	24.0	7.7
22...	1000	255	100	--	24.0	7.6
22...	1100	250	95	--	24.0	7.6
22...	1200	250	95	6.5	24.0	7.6
22...	1300	245	100	--	24.5	7.4
22...	1400	240	100	7.1	25.0	7.2
22...	1500	235	100	--	25.0	7.2
22...	1600	235	100	--	25.0	7.2
22...	1700	237	105	--	25.0	7.3
22...	1800	245	100	6.8	25.0	7.3

TABLE 1. - CONTINUED

PEARL RIVER AT SITE 2 (RIVER MILE 281)
LAT 32°14'02" LONG 090°12'26"

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP					
21...	0810	190	6.8	26.0	6.9
21...	1410	175	6.9	26.0	7.2
22...	0750	190	6.8	24.0	7.7
22...	1405	160	7.1	26.0	7.1

PEARL RIVER AT SITE 3 (RIVER MILE 280)
LAT 32°13'29" LONG 090°11'38"

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP					
21...	0820	180	6.8	26.0	6.5
21...	1420	180	7.0	26.0	7.0
22...	0800	190	6.9	24.0	7.3
22...	1415	170	7.1	26.0	6.9

PEARL RIVER AT SITE 4 (RIVER MILE 279)
LAT 32°13'10" LONG 090°11'10"

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP					
21...	0830	190	6.8	26.0	6.4
21...	1430	175	6.9	26.0	7.0
22...	0815	190	6.9	23.5	7.2
22...	1425	170	7.1	26.0	6.7

TABLE 1. - CONTINUED

PEARL RIVER AT SITE 5 (RIVER MILE 278)
LAT 32°12'28" 090°11'20"

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP					
21...	0840	190	6.8	26.0	6.3
21...	1445	175	7.0	26.5	6.4
22...	0830	190	7.0	23.5	7.2
22...	1440	190	7.0	26.0	5.8

PEARL RIVER AT SITE 6 (RIVER MILE 277)
LAT 32°12'04" LONG 090°10'55"

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP					
21...	0850	190	6.8	26.0	6.4
21...	1500	190	6.8	26.5	6.6
22...	0840	180	6.9	24.0	7.0
22...	1450	175	7.1	26.0	5.6

PEARL RIVER AT SITE 7 (RIVER MILE 276)
LAT 32°11'50" LONG 090°11'32"

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP					
21...	0900	180	6.8	26.0	6.4
21...	1510	190	6.9	26.0	6.6
22...	0850	190	7.0	23.5	6.8
22...	1500	175	7.0	26.0	5.9

TABLE 1. - CONTINUED

PEARL RIVER AT SITE 8 (RIVER MILE 275)
LAT 32°11'19" LONG 090°11'47"

DATE	TIME	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	OXYGEN, DISSOLVED (MG/L)
SEP					
21...	0910	180	6.9	25.5	6.4
21...	1520	200	6.9	26.5	5.4
22...	0900	180	7.0	23.5	6.7
22...	1515	180	7.1	26.0	6.4

PEARL RIVER AT SITE 9 (RIVER MILE 274)
LAT 32°11'12" LONG 090°12'11"

DATE	TIME	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	OXYGEN, DISSOLVED (MG/L)
SEP					
21...	0920	170	6.9	25.5	6.4
21...	1530	200	6.9	27.0	6.9
22...	0915	180	7.0	23.0	6.7
22...	1525	200	7.1	26.0	6.4

PEARL RIVER AT SITE 10 (RIVER MILE 273)
LAT 32°11'05" LONG 090°12'36"

DATE	TIME	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	OXYGEN, DISSOLVED (MG/L)
SEP					
21...	0935	170	6.9	25.0	6.5
21...	1545	200	6.9	27.0	7.2
22...	0925	175	7.0	23.0	6.6
22...	1540	200	7.1	26.5	5.9

TABLE 1. - CONTINUED

PEARL RIVER AT SITE 11 (RIVER MILE 272)
LAT 32°10'40" LONG 090°13'21"

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP					
21...	0945	160	6.9	25.0	6.4
21...	1555	190	7.0	27.0	7.5
22...	0935	170	7.0	23.0	6.5
22...	1550	190	7.1	27.0	6.5

PEARL RIVER AT SITE 12 (RIVER MILE 271)
LAT 32°10'24" LONG 090°14'08"

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP					
21...	0955	170	6.9	25.0	6.0
21...	1600	170	7.0	26.0	7.1
22...	0945	180	6.9	23.0	6.0
22...	1600	180	6.9	25.5	5.9

TABLE 1. - CONTINUED

PEARL RIVER AT SITE 13 (RIVER MILE 270.2)
LAT 32°10'35" LONG 090°14'36"

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	OXYGEN, DIS-SOLVED (MG/L)
SEP						
21...	0700	283	165	6.4	25.5	5.4
21...	0800	284	155	--	25.5	5.7
21...	0900	285	150	--	25.5	6.0
21...	1000	286	155	6.4	25.5	6.4
21...	1100	286	150	--	25.5	6.6
21...	1200	287	155	--	25.5	6.7
21...	1300	288	160	6.5	25.5	6.8
21...	1400	288	160	--	26.0	7.0
21...	1500	290	160	--	26.0	7.2
21...	1600	293	150	6.8	26.5	7.4
21...	1700	293	165	--	26.5	7.3
21...	1800	293	170	--	26.5	7.2
21...	1900	290	170	6.0	26.0	7.0
21...	2000	290	175	--	26.0	7.0
21...	2100	293	180	--	25.5	7.1
21...	2140	293	185	6.8	25.0	7.2
21...	2200	293	185	--	25.0	7.2
21...	2300	293	185	--	25.0	7.1
21...	2400	293	180	--	25.0	6.9
22...	0100	293	175	6.1	25.0	6.7
22...	0200	293	175	--	24.5	6.4
22...	0300	290	175	--	24.5	6.0
22...	0330	290	175	6.7	24.0	5.6
22...	0400	290	175	--	24.0	5.3
22...	0500	290	175	--	24.0	5.1
22...	0600	290	170	--	23.5	5.0
22...	0700	290	170	6.6	23.5	4.9
22...	0800	290	170	--	23.5	5.0
22...	0900	290	170	--	24.0	5.4
22...	1000	290	170	6.6	24.0	5.8
22...	1100	290	165	--	24.0	5.9
22...	1200	288	165	--	24.0	5.9
22...	1300	288	165	6.7	24.0	5.9
22...	1400	287	170	--	24.5	6.1
22...	1500	286	170	--	24.5	6.3
22...	1600	284	165	6.3	24.5	6.5
22...	1700	284	170	--	25.0	6.7
22...	1800	283	170	--	25.0	6.9
22...	1900	282	170	6.4	25.0	7.0

TABLE 2. RESULTS OF LABORATORY ANALYSIS, PEARL RIVER, SEPTEMBER 21-22, 1979.

PEARL RIVER AT SITE 1 (RIVER MILE 282)
LAT 32°14'24" LONG 090°12'15"

DATE	TIME	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)
SEP						
21...	0740	13	1.8	--	350	.03
21...	1200	12	1.6	B310	340	.03
21...	1800	12	2.1	--	290	.04
21...	2400	11	1.8	B900	430	.02
22...	0730	9	1.8	B1000	280	.03
22...	1200	12	1.6	B550	290	.03
22...	1800	11	2.2	210	250	.03

DATE	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS NO3)	PHOS-PHORUS, TOTAL (MG/L AS P)
SEP						
21...	.10	1.0	1.1	1.1	5.0	.19
21...	.11	1.1	1.2	1.2	5.4	.29
21...	.03	.73	.76	.80	3.5	.14
21...	.05	.83	.88	.90	4.0	.19
22...	.06	1.0	1.1	1.1	5.0	.28
22...	.10	.87	.97	1.0	4.4	.20
22...	.05	.91	.96	.99	4.4	.17

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 1 (RIVER MILE 282) - LAT 32°14'24" LONG 090°12'15"

DATE	TIME	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (JTU)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, TOTAL RECOV-ERABLE (MG/L AS MG)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	BICAR-BONATE (MG/L AS HCO3)
SEP									
22...	1200	180	300	23	0	7.0	2.5	1.4	30

DATE	CAR-BONATE (MG/L AS CO3)	ALKA-LINITY (MG/L AS CACO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)
SEP								
22...	0	25	15	8.7	8.1	7.6	68	.09

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC TOTAL IN BOT-TOM MA-TERIAL (UG/G AS AS)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CADMIUM RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	CHRO-MIUM, RECOV. FM BOT-TOM MA-TERIAL (UG/G)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO)	COBALT, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CO)
SEP									
22...	45.9	5	2	0	<10	20	10	6	<10

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 1 (RIVER MILE 282) - LAT 32°14'24" LONG 090°12'15"

DATE	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	COPPER, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	LEAD, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, RECOV. FM BOT-TOM MA-TERIAL (UG/G)
SEP								
22...	9	<10	6300	1100	19	<10	330	20

DATE	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY RECOV. FM BOT-TOM MA-TERIAL (UG/G AS HG)	SELE-NIUM, TOTAL (UG/L AS SE)	SELE-NIUM, TOTAL IN BOT-TOM MA-TERIAL (UG/G)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	ZINC, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	PHENOLS (UG/L)	OIL AND GREASE (MG/L)
SEP									
22...	.2	.00	0	0	50	<10	3.1	1	0

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 1 (RIVER MILE 282) - LAT 32°14'24" LONG 090°12'15"

DATE	PCB, TOTAL (UG/L)	PCB, TOTAL IN BOTTOM MATERIAL (UG/KG)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	ALDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG)	CHLORDANE, TOTAL (UG/L)	CHLORDANE, TOTAL IN BOTTOM MATERIAL (UG/KG)	DDD, TOTAL (UG/L)	DDD, TOTAL IN BOTTOM MATERIAL (UG/KG)
SEP 22...	.0	0	.00	.00	8.0	.0	24	.00	.0

DATE	DDE, TOTAL (UG/L)	DDE, TOTAL IN BOTTOM MATERIAL (UG/KG)	DDT, TOTAL (UG/L)	DDT, TOTAL IN BOTTOM MATERIAL (UG/KG)	DIAZINON, TOTAL (UG/L)	DIAZINON, TOTAL IN BOTTOM MATERIAL (UG/KG)	DIELDRIN TOTAL (UG/L)	DIELDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG)	ENDRIN, TOTAL (UG/L)
SEP 22...	.00	.0	.00	.0	.01	.0	.00	5.3	.00

DATE	ENDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG)	ETHION, TOTAL (UG/L)	ETHION, TOTAL IN BOTTOM MATERIAL (UG/KG)	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR, TOTAL IN BOTTOM MATERIAL (UG/KG)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOT. IN BOTTOM MATL. (UG/KG)	LINDANE TOTAL (UG/L)	LINDANE TOTAL IN BOTTOM MATERIAL (UG/KG)
SEP 22...	.0	.00	.0	.00	.0	.00	.4	.00	.0

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 1 (RIVER MILE 282) - LAT 32°14'24" LONG 090°12'15"

DATE	MALA-THION, TOTAL (UG/L)	MALA-THION, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	METHYL PARA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOT. IN BOTTOM MATL. (UG/KG)	METHYL TRI-THION, TOTAL (UG/L)	METHYL TRI-THION, TOT. IN BOTTOM MATL. (UG/KG)	PARA-THION, TOTAL (UG/L)	PARA-THION, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	TOX-APHENE, TOTAL (UG/L)
SEP									
22...	.00	.0	.00	.0	.00	.0	.00	.0	0

DATE	TOXA-PHENE, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	TOTAL TRI-THION (UG/L)	TRI-THION, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	2,4-D, TOTAL (UG/L)	2,4-D, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	2,4,5-T TOTAL (UG/L)	2,4,5-T TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	SILVEX, TOTAL (UG/L)	SILVEX, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)
SEP									
22...	0	.00	.0	.00	0	.00	0	.02	.0

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 3 (RIVER MILE 280)
LAT 32°13'29" LONG 090°11'38"

DATE	TIME	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./100 ML)	STREP-TOCOCCI FECAL, (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)
SEP						
21...	0820	14	3.1	--	240	.09
21...	1420	10	2.4	--	B72	.22
22...	0800	9	3.1	B800	B42	.09
22...	1415	14	3.7	520	B35	.26

DATE	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS NO3)	PHOS-PHORUS, TOTAL (MG/L AS P)
SEP						
21...	1.4	1.1	2.5	2.6	11	1.6
21...	.88	1.2	2.1	2.3	10	1.0
22...	1.3	1.3	2.6	2.7	12	1.6
22...	.85	1.3	2.1	2.4	10	1.1

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 13 (RIVER MILE 270.2)
LAT 32°10'35" LONG 090°14'36"

DATE	TIME	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)
SEP						
21...	0700	14	4.5	--	--	.47
21...	1300	12	4.9	--	B72	.64
21...	1900	16	4.4	--	B63	.53
22...	0100	40	3.5	250	B23	.38
22...	0700	10	2.9	200	B84	.39
22...	1300	11	3.1	200	B32	.47
22...	1900	11	3.1	220	B55	.41

DATE	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS NO3)	PHOS-PHORUS, TOTAL (MG/L AS P)
SEP						
21...	.70	.90	1.6	2.1	9.2	.89
21...	.49	.91	1.4	2.0	9.0	.85
21...	.92	.98	1.9	2.4	11	1.1
22...	1.2	1.0	2.2	2.6	11	1.5
22...	.93	.87	1.8	2.2	9.7	1.1
22...	.66	.84	1.5	2.0	8.7	.77
22...	1.0	.90	1.9	2.3	10	.89

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 13 (RIVER MILE 270.2) - LAT 32°10'35" LONG 090°14'36"

DATE	TIME	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (JTU)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, TOTAL RECOVERABLE (MG/L AS MG)	MAGNESIUM, DISSOLVED (MG/L AS MG)	BICARBONATE (MG/L AS HCO3)
SEP									
22...	1300	50	60	32	0	9.8	1.9	1.8	44

DATE	CARBONATE (MG/L AS CO3)	ALKALINITY (MG/L AS CACO3)	CARBON DIOXIDE DISSOLVED (MG/L AS CO2)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)
SEP								
22...	0	36	14	14	15	9.2	110	.15

DATE	SOLIDS, DISSOLVED (TONS PER DAY)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC TOTAL IN BOTTOM MATERIAL (UG/G AS AS)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CADMIUM RECOV. FM BOTTOM MATERIAL (UG/G AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	CHROMIUM, RECOV. FM BOTTOM MATERIAL (UG/G)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, RECOV. FM BOTTOM MATERIAL (UG/G AS CO)
SEP									
22...	85.5	4	1	0	<10	10	20	3	<10

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 13 (RIVER MILE 270.2) - LAT 32°10'35" LONG 090°14'36"

DATE	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU)	COPPER, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS CU)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	LEAD, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS PB)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, RECOV. FM BOT- TOM MA- TERIAL (UG/G)
SEP								
22...	8	<10	2500	820	13	<10	280	10

DATE	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	MERCURY RECOV. FM BOT- TOM MA- TERIAL (UG/G AS HG)	SELE- NIUM, TOTAL (UG/L AS SE)	SELE- NIUM, TOTAL IN BOT- TOM MA- TERIAL (UG/G)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN)	ZINC, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	PHENOLS (UG/L)	OIL AND GREASE (MG/L)
SEP									
22...	.2	.10	0	0	30	<10	5.0	1	0

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 13 (RIVER MILE 270.2) - LAT 32°10'35" LONG 090°14'36"

DATE	PCB, TOTAL (UG/L)	PCB, TOTAL IN BOTTOM MATERIAL (UG/KG)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	ALDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG)	CHLORDANE, TOTAL (UG/L)	CHLORDANE, TOTAL IN BOTTOM MATERIAL (UG/KG)	DDD, TOTAL (UG/L)	DDD, TOTAL IN BOTTOM MATERIAL (UG/KG)
SEP									
22...	.0	0	.00	.00	.0	.0	0	.00	.0

DATE	DDE, TOTAL (UG/L)	DDE, TOTAL IN BOTTOM MATERIAL (UG/KG)	DDT, TOTAL (UG/L)	DDT, TOTAL IN BOTTOM MATERIAL (UG/KG)	DIAZINON, TOTAL (UG/L)	DIAZINON, TOTAL IN BOTTOM MATERIAL (UG/KG)	DIELDRIN TOTAL (UG/L)	DIELDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG)	ENDRIN, TOTAL (UG/L)
SEP									
22...	.00	.0	.00	.0	.14	.0	.00	.0	.00

DATE	ENDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG)	ETHION, TOTAL (UG/L)	ETHION, TOTAL IN BOTTOM MATERIAL (UG/KG)	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR, TOTAL IN BOTTOM MATERIAL (UG/KG)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOT. IN BOTTOM MATL. (UG/KG)	LINDANE TOTAL (UG/L)	LINDANE TOTAL IN BOTTOM MATERIAL (UG/KG)
SEP									
22...	.0	.00	.0	.00	.0	.00	.0	.00	.0

TABLE 2. - CONTINUED

PEARL RIVER AT SITE 13 (RIVER MILE 270.2) - LAT 32°10'35" LONG 090°14'36"

DATE	MALA-THION, TOTAL (UG/L)	MALA-THION, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	METHYL PARA-THION, TOTAL (UG/L)	METHYL PARA-THION, TOT. IN BOTTOM MATL. (UG/KG)	METHYL TRI-THION, TOTAL (UG/L)	METHYL TRI-THION, TOT. IN BOTTOM MATL. (UG/KG)	PARA-THION, TOTAL (UG/L)	PARA-THION, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	TOX-APHENE, TOTAL (UG/L)
SEP									
22...	.00	.0	.00	.0	.00	.0	.00	.0	0

DATE	TOXA-PHENE, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	TOTAL TRI-THION (UG/L)	TRI-THION, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	2,4-D, TOTAL (UG/L)	2,4-D, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	2,4,5-T TOTAL (UG/L)	2,4,5-T TOTAL IN BOT-TOM MA-TERIAL (UG/KG)	SILVEX, TOTAL (UG/L)	SILVEX, TOTAL IN BOT-TOM MA-TERIAL (UG/KG)
SEP									
22...	0	.00	.0	.00	0	.00	0	.00	.0