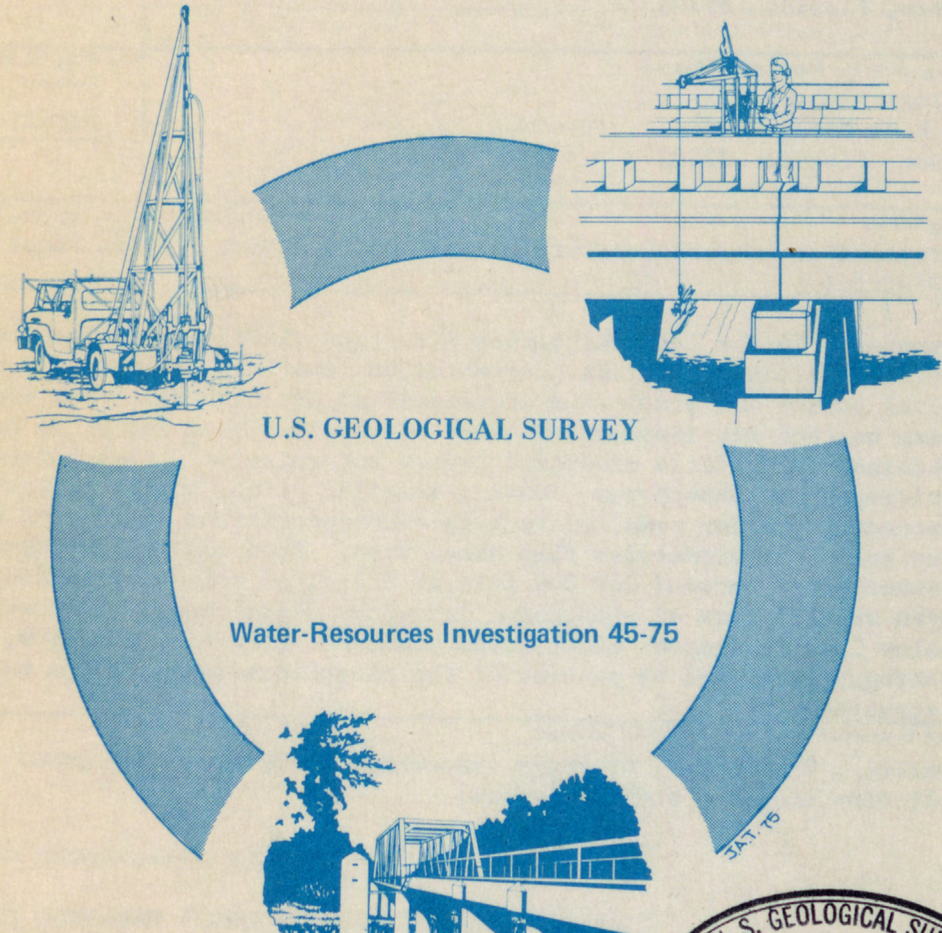
CHEMICAL CHARACTERISTICS OF THE LOWER KISSIMMEE RIVER, FLORIDA -- WITH EMPHASIS ON NITROGEN AND PHOSPHORUS



U.S. GEOLOGICAL SURVEY

Water-Resources Investigation 45-75

Prepared in cooperation with
CENTRAL AND SOUTHERN FLORIDA
FLOOD CONTROL DISTRICT

WRI 45-75 Chemical characteristics of the lower Kissimmee River, Florida -- with emphasis on nitrogen and phosphorus WRI 45-75

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16. Abstracts

The impoundments in the lower Kissimmee River contained calcium bicarbonate water with an average dissolved solids concentration less than 160 mg/l. Concentrations of dissolved solids and phosphorus increased and nitrogen decreased downstream. During warm weather the impoundments were often stratified and water near the bottom often contained very little dissolved oxygen but relatively high concentrations of ammonia nitrogen and phosphorus. During stratification, bottom releases from these impoundments often resulted in higher concentrations of ammonia nitrogen and phosphorus below the structures than above them. From July 1971 through June 1972 the Kissimmee River carried 268,000 tons of dissolved solids, including 2,330 tons of nitrogen and 135 tons of phosphorus into Lake Okeechobee. The lower part of the basin (below Lake Kissimmee) contributed about 60 percent of the flow, 49 percent of the nitrogen load, and 86 percent of the phosphorus loads at the most downstream control structure.

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November 1975

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CHEMICAL CHARACTERISTICS OF THE LOWER KISSIMMEE RIVER, FLORIDA--
WITH EMPHASIS ON NITROGEN AND PHOSPHORUS

By

A. G. Lamonds

ABSTRACT

Concentrations of dissolved solids and phosphorus, a major plant nutrient, increase in a downstream direction in the lower Kissimmee River. During July 1971 through June 1973, the average concentration of phosphorus at S-65E, the most downstream control structure, was three times that at S-65, the most upstream control structure. The concentration of phosphorus at S-65E averaged 0.08 milligram per litre but was as high as 0.25 milligram per litre during the first year of the investigation when the discharge was unusually low. Concentrations of nitrogen averaged between 1.00 and 2.00 milligrams per litre and decreased slightly between S-65 and S-65E.

The dissolved solids concentration in the lower Kissimmee River averages less than 160 milligrams per litre. The water is a moderately hard calcium bicarbonate water and the downstream increase in dissolved solids is due primarily to increases in the concentrations of calcium bicarbonate and sulfate ions. Water in the lower Kissimmee River also contains small amounts of arsenic, several trace metals and two herbicides. No insecticides were detected in water samples during this investigation but bottom material samples were found to contain low concentrations of several insecticides. Bottom materials in the Kissimmee River were also found to contain fairly high concentrations of phosphorus.

During the summer the impoundments in the lower Kissimmee River are often stratified, with water near the bottom of the impoundments lower in dissolved oxygen, several degrees cooler, and higher in ammonia nitrogen and phosphorus concentrations than water near the surface. When the impoundments are stratified, concentrations of ammonia nitrogen and phosphorus are often higher below the control structures than above them, particularly when gate openings are small.

The specific conductance of water in the river at S-65E during the early 1970's was twice the average specific conductance during the 1950's. This increase in specific conductance is due to unusually low discharge in recent years, the diversion of the Lake Istokpoga drainage out of the Kissimmee River, and increase in the amount of ground water contributed to the river.

The dissolved-solids load at S-65E totaled 268,000 tons (243,000 tonnes) and averaged 367 tons (333 tonnes) per day during this investigation. This dissolved-solids load included 2,330 tons (2,110 tonnes) of nitrogen and 135 tons (122 tonnes) of phosphorus. That part of the basin below Lake Kissimmee contributed 59 percent of the flow, 70 percent of the dissolved-solids load, 49 percent of the nitrogen load and 86 percent of the phosphorus load at S-65E. Forty-three percent of the phosphorus contributed by that part of the basin between S-65 and S-65E was from the area between S-65D and S-65E. Seventy-five percent of the total phosphorus load from the lower basin originated in the drainage area below S-65C.

INTRODUCTION

The Kissimmee River is the major tributary to Lake Okeechobee. Excluding part of the Lake Istokpoga basin, it drains an area of approximately 2,300 mi^2 or 6,000 km^2 in central Florida, stretching from Orlando south to the lake (fig. 1). In much of the drainage basin, land slopes are slight, and runoff is slow. Prior to the construction of canals, levees, and control structures, flooding was a frequent problem in parts of the basin. Major drainage improvements designed to reduce flooding were made in 1962-71. The larger lakes in the upper part of the basin were connected by canals and the river was channelized between Lake Kissimmee and Lake Okeechobee. Six control structures were constructed in the reach downstream of Lake Kissimmee which is referred to as the lower Kissimmee River in this report. These control structures are named, in downstream order, S-65, S-65A, S-65B, S-65C, S-65D, and S-65E.

The flood control work in the Kissimmee River has successfully increased the discharge capacity of the stream and greatly reduced the flood hazard in the basin. Shoreline development and use of the floodplain for agricultural purposes (primarily cattle and citrus farming) have increased since the threat of flooding has been reduced. Channelization in the lower part of the river shortened the flow path between Lake Kissimmee and Lake Okeechobee and increased drainage of much of the marshland along the river.

The more rapid movement of water from the upper basin into Lake Okeechobee, the reduction in the amount of marshes in the lower basin and the increased use of the flood plain following channelization has resulted in a growing public concern over the quality of water in the river. This interest in water quality related primarily to the effects of the Kissimmee River on the quality of water in Lake Okeechobee. Of particular interest, is the amount of the plant nutrients, nitrogen and phosphorus, carried by the Kissimmee River. To gain a better understanding of the chemical quality and the changes in that quality along the lower channelized part of the river, the U. S. Geological Survey, in cooperation with the Central and Southern Florida Flood Control District, conducted a 2-year investigation into the chemical characteristics of the lower Kissimmee River - with emphasis on the nutrients, nitrogen and phosphorus.

PURPOSE AND SCOPE

The overall purpose was to provide water-quality information for water management in the Kissimmee River basin. The specific purposes of the investigation were: (1) determine the chemical quality of water in the Kissimmee River, (2) determine the loads of the plant nutrients,

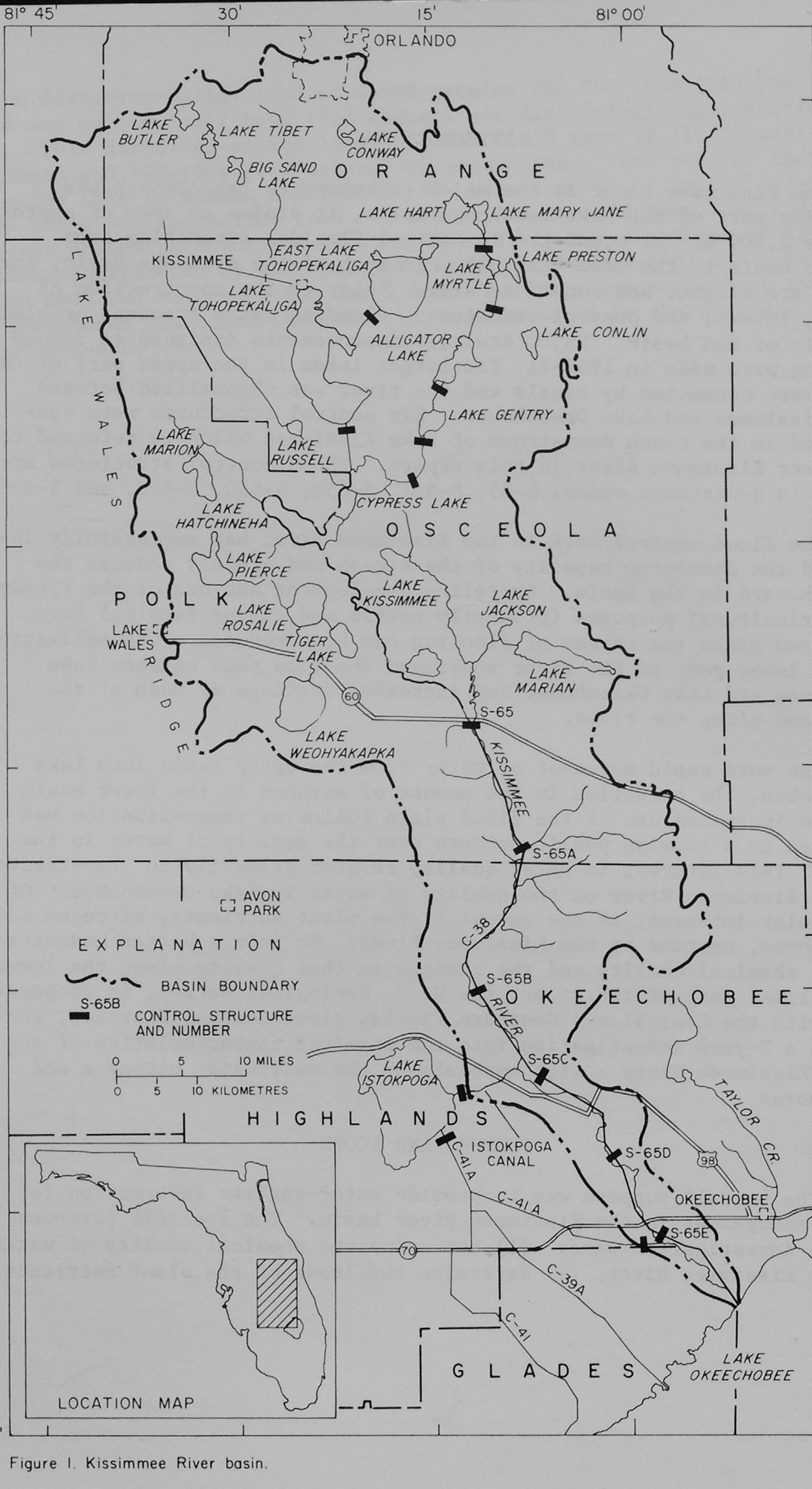


Figure 1. Kissimmee River basin.

nitrogen and phosphorus carried by the river, (3) determine variations in water quality and nutrients loads along the lower part of the river, (4) relate changes in water quality to discharge and seasonal climatic conditions, and (5) provide water quality information for water management in the Kissimmee River basin.

The investigation began in July 1971 and consisted of monthly sampling for nutrient analysis and semiannual sampling for comprehensive analysis for major ions, trace elements and pesticides at nine sites above and below most of the control structures in the lower Kissimmee River. The number of sites was expanded to 10 in October 1971, and to 12 in July 1972. During the second year of the investigation (July 1972-June 1973), samples were collected above and below all six of the structures in the lower Kissimmee River. Also during the second year of the investigation, samples were collected semiannually from several sites in the "old river" meanders and tributaries, and analyzed for nutrients. The location of the sites sampled during this investigation are shown in figure 2. This report presents a summary and interpretations of the data collected during the period July 1971 through June 1973 and available historical data. Flow data and a small amount of water-quality data were collected at two sites on the Kissimmee River prior to channelization. These sites, now discontinued, were: Kissimmee River below Lake Kissimmee, which was about 3 mi (5 km) downstream of the present site of control structure S-65, and Kissimmee River near Okeechobee which was at the bridge on State Highway 70, 1.8 mi (2.9 km) upstream from the present site of control structure S-65E. The locations of these sites are also shown on figure 2.

Conversion factors

The English units appearing in the text of this report are followed by the equivalent metric value in parentheses. In several tables, however, space did not permit the entry of the metric equivalent for values expressed in English units. The metric equivalents for these values may be computed using the following conversions:

1 inch (in.)	=	25.4 millimetres (mm)
1 foot (ft)	=	.3048 metre (m)
1 mile (mi)	=	1.609 kilometres (km)
1 square mile (mi^2)	=	2.590 square kilometres (km^2)
1 cubic foot per second (ft^3/s)	=	.02832 cubic meters per second (m^3/s)
1 ton	=	.9072 tonne

Temperature in degrees Celcius can be converted to degrees Fahrenheit as follows:

$$°F = 1.8°C + 32$$

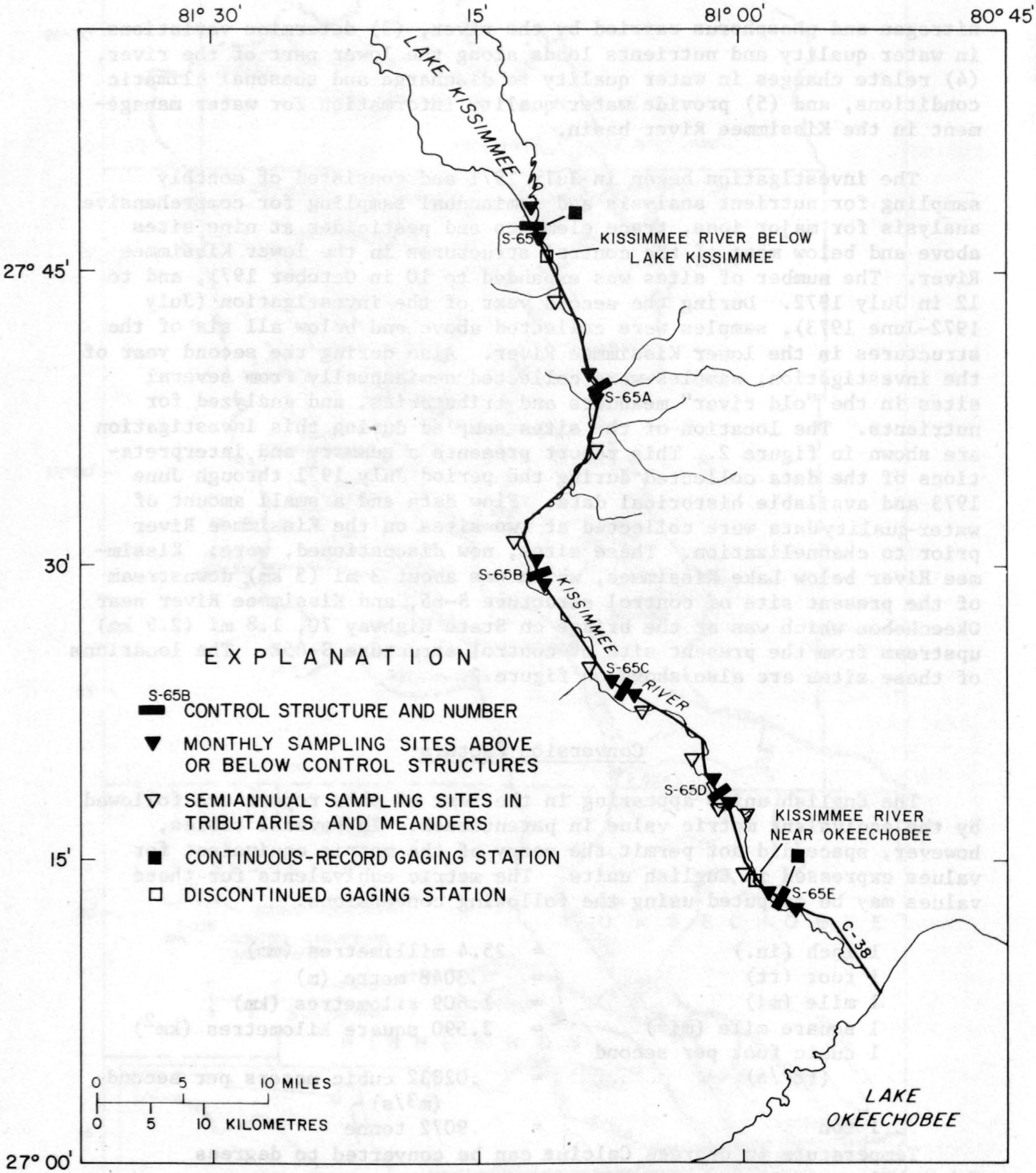


Figure 2. Sampling sites and stream-gaging stations in the lower Kissimmee River basin.

Acknowledgments

The author acknowledges the help received from members of the Central and Southern Florida Flood Control District who furnished discharge records at several structures and provided technical assistance during the course of this investigation. The author is also indebted to Mr. Lothian Ager, fisheries biologist, Florida Game and Freshwater Fish Commission, Okeechobee, Florida, who supplied information on water quality and land use in the basin.

DESCRIPTION OF THE KISSIMMEE RIVER BASIN

The Kissimmee River basin consists of about 2,300 mi^2 (6,000 km^2) in central Florida and includes most of Osceola and parts of Okeechobee, Orange, Polk, Highlands, Glades and Lake Counties (fig. 1). The basin is about 105 mi (170 km) long and has a maximum width of about 35 mi (56 km). The altitudes of the northern limits of the drainage basin near Orlando generally range from 100 to 125 ft (30 to 38 m). Drainage from the headwaters of the basin flows south-southeast to Lake Okeechobee, where the land surface is about 15 ft (4.6 m). The basin is bounded by the St. Johns River basin to the east, where altitudes generally range between 40 and 80 ft (12 and 24 m), and by the Lake Wales Ridge to the west, where altitudes are as much as 311 ft (94.8 m).

The part of the basin above the outlet of Lake Kissimmee has an area of approximately 1,600 mi^2 (4,100 km^2) and is characterized by several hundred lakes ranging from a few acres to 54 mi^2 (140 km^2). This part of the basin is referred to in this report as the upper basin. The principal lakes in the upper basin are East Lake Tohopekaliga, Lake Tohopekaliga, Cypress Lake, Lake Hatchineha, Tiger Lake, Lake Rosalie, Lake Weohyakapka, Lake Marian and Lake Kissimmee. The total surface area of these and other lakes is more than 10 percent of the total area of that part of the basin above the outlet of Lake Kissimmee.

Rainfall in the Kissimmee River basin occurs in a distinct pattern. The rainy season, normally June through September, contributes about 55 percent, or about 29 in. (740 mm) of the 52-in. (1,320-mm) annual total. Monthly rainfall averages more than 8 in. (200 mm) in July and less than 2 in. (50 mm) in November and December.

Annual rainfall varies considerably. In 1960, the total rainfall at Kissimmee was 80.38 in. (2042 mm); in 1938, it was 33.03 in. (840 mm). From July 1971 through June 1973, the total rainfall at Kissimmee was 89.55 in. (2274 mm) which was 16.05 in. (408 mm) below normal for the 2-year period.

Drainage from the upper basin flows into lake Kissimmee, the largest lake in the basin. Below Lake Kissimmee, the Kissimmee River flows through a marshy floodplain several miles wide, where lakes and well-defined tributary channels are few. Originally, drainage from Lake Istokpoga to the west of the lower basin entered the Kissimmee River through Istokpoga Canal. Since 1962 flow from the Istokpoga drainage basin has been diverted into three canals, one of which (C-41A) enters the Kissimmee River a few miles upstream from Lake Okeechobee and below S-65E, the most downstream control structure, and two (C-39A and C-41) which enter Lake Okeechobee directly (fig. 1).

The northern one-third of the Kissimmee River basin which includes much of Orlando is the most heavily populated part of the basin. The well-drained sand hills in the northern and western parts of the basin are used to grow citrus. Except for numerous communities along the Lake Wales Ridge west of Lake Kissimmee, the southern two-thirds of the basin is sparsely populated and given over largely to agriculture. The lower basin is relatively flat, poorly drained and is used extensively for large cattle ranches and some dairy farming.

CHANNELIZATION OF THE KISSIMMEE RIVER

Historically, the Kissimmee River began at the outlet of Lake Kissimmee and most of the lakes in the upper basin were connected only at high lake stages. The Kissimmee River meandered southward to Lake Okeechobee through a wide, flat floodplain characterized by marshes, numerous oxbows and cutoffs. The straightline distance between Lake Kissimmee and Lake Okeechobee is 52 mi (84 km) but before channelization the river meandered a distance of about 98 mi (158 km) between the two lakes. Because of the natural storage in the upper basin and the relatively slow runoff in the lower basin, flooding in both the upper and lower basins was frequently a problem during the rainy season.

Drainage improvements designed to lessen the threat of flooding in the basin began in the late 1800's when canals were dug to connect some of the lakes in the upper basin. In 1909, a channel 3 ft (0.9 m) deep and 30 ft (9.1 m) wide was completed between the city of Kissimmee on Lake Tohopekaliga and a point about 18 mi (29 km) north of Lake Okeechobee. In 1938, about 6.5 mi (10.4 km) of levee was constructed along the east side of the river, northward from Lake Okeechobee, and part of the flow was diverted into the borrow canal of that levee.

The Kissimmee River was altered most drastically between April 1962 and July 1971 when canals connecting the major lakes in the upper basin were dug and the Kissimmee River was channelized between Lake Kissimmee and Lake Okeechobee. This alteration was intended to remove runoff from the lower basin and to limit rises in lake levels to 2 ft (0.6 m) during floods with recurrence interval of 10 years or less. The meandering channel below Lake Kissimmee which averaged about 4 ft (1.2 m) deep before 1962 was straightened and deepened to about 30 ft (9 m). This channel was widened to about 200 ft (60 m) below Lake Kissimmee and more than 500 ft (150 m) near Lake Okeechobee. Six control structures with navigation locks were constructed to control the vertical drop of approximately 35 ft (11 m) between Lake Kissimmee and Lake Okeechobee. Regulation of flow from Lake Kissimmee to Lake Okeechobee began in 1964 by operation of control structures S-65 and S-65E. Regulation of the flow at S-65 began in July and at S-65E in October.

STREAMFLOW IN THE KISSIMMEE RIVER

Annual discharge from the upper Kissimmee River basin, as measured at the gaging station just below Lake Kissimmee averaged about 1,124 ft^3/s (31.8 m^3/s) from October 1933 to September 1972. The maximum flow at this station (called "Kissimmee River at S-65" since October 1969) was 8,970 ft^3/s (254 m^3/s) on October 22, 1969 but the stage at that time was less than stages observed during floods before channelization. Zero flow or reverse flow at the gaging station below Lake Kissimmee occurred only once before channelization--the occurrence was in October 1956--but zero flow has occurred at that station on many days since regulation of the flow began in July 1964 at control structure S-65.

Computations to determine the proportion of flow originating in the various segments of the Kissimmee River basin are based on flow data for the period 1933-62. (Discharge from Lake Istokpoga and its drainage area bypassed the gaging station at S-65E since 1962. Before 1964 records for this gaging station were published as "Kissimmee River near Okeechobee.") For that period, 1933-62, the average flow at S-65E was 2,179 ft^3/s (61.7 m^3/s), at S-65 it was 1,219 ft^3/s (34.5 m^3/s), and from the Lake Istokpoga basin and lake, 450 ft^3/s (12.7 m^3/s). On the basis of these flow data, the flow originating in the lower basin, excluding the contribution from Lake Istokpoga basin, was thus 510 ft^3/s (14 m^3/s). This represents 23 percent of the total flow from the basin including that from Lake Istokpoga basin. The flow from the upper basin was 56 percent of the total flow and the contribution from Lake Istokpoga basin was 21 percent of the total flow. The flow originating in the upper basin was 71 percent of the total flow less the 450 ft^3/s (12.7 m^3/s) contributed by the Lake Istokpoga basin.

The flows from the two parts of the basin represent a runoff of about 10 inches (250 mm) from their respective drainage basins.

The flood control work in the Kissimmee River basin has increased the discharge capacity of the river and reduced the magnitude of water-level fluctuations during floods. The maximum recorded discharge at the gaging station near Okeechobee (25,800 ft^3/s or 730 m^3/s) occurred on October 3, 1969, after the control structures were completed and in operation. Flood stages at that time were almost 5 ft (1.5 m) lower than those observed during the 1953 flood. Although the regulation of flow in the Kissimmee River has reduced the flood hazard in the basin, it has also resulted in periods of no flow. Before regulation the Kissimmee River at the gaging station near Okeechobee has never ceased flowing, but no flow conditions have existed for 1 or more days in most years since regulation began.

The seasonal distribution of the flow of the Kissimmee River has been changed by regulation practices. Average monthly discharges of the Kissimmee River below Lake Kissimmee and near Okeechobee are shown in figure 3 for regulated and for natural conditions. The figure shows that the average monthly discharge is highest in October, the end of the rainy season. Prior to regulation average monthly discharge declined through May and began rising in June, the start of the rainy season. Since regulation began, the magnitude of the average discharge for October has been reduced and the minimum average monthly discharge has occurred in November at S-65 and December at S-65E. The effects of regulation are most apparent in February, March and April when the average monthly discharge increases during a relatively dry period as the lakes and impoundments are lowered in anticipation of the rainy season.

It is apparent from figure 3 that the average discharge of the Kissimmee River was lower after channelization and regulation of flow than before. At S-65E, the decrease in the average discharge since channelization is due primarily to deficient rainfall. Rainfall at the National Oceanic and Atmospheric Administration (formerly U.S. Weather Bureau) station at Kissimmee, for October 1964 through September 1973 is more than 57 in. (1,450 mm) below normal. At S-65E, the decrease in average discharge reflects not only the deficient rainfall but also the diversion of Lake Istokpoga drainage out of the Kissimmee River basin. The available data indicate that the relation between rainfall and discharge has not changed appreciably at either

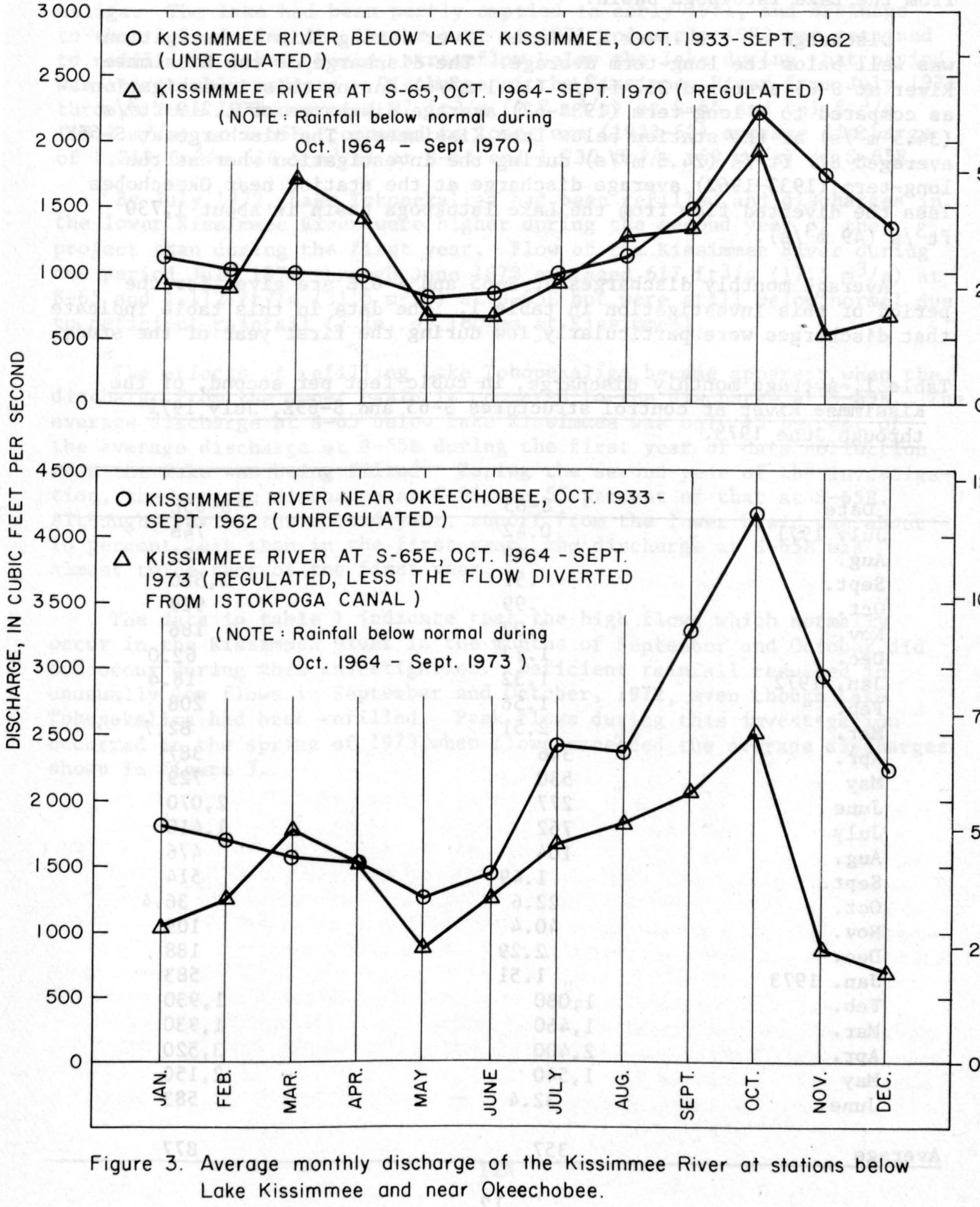


Figure 3. Average monthly discharge of the Kissimmee River at stations below Lake Kissimmee and near Okeechobee.

station on the Kissimmee River. When rainfall in the Kissimmee River basin is normal, the average annual discharge should approach the average for the period prior to construction, less the diversion of flow from the Lake Istokpoga basin.

Discharge of the lower Kissimmee River during this investigation was well below the long-term average. The discharge of the Kissimmee River at S-65 averaged 357 ft^3/s (10.1 m^3/s) during this investigation as compared to a long-term (1933-62) average discharge of 1,219 ft^3/s (34.5 m^3/s) at the station below Lake Kissimmee. The discharge at S-65E averaged 877 ft^3/s (24.8 m^3/s) during the investigation whereas the long-term (1933-1962) average discharge at the station near Okeechobee less the diverted flow from the Lake Istokpoga basin is about 1,730 ft^3/s (49 m^3/s).

Average monthly discharges at S-65 and S-65E are given for the period of this investigation in table 1. The data in this table indicate that discharges were particularly low during the first year of the study

Table 1.-Average monthly discharge, in cubic feet per second, of the Kissimmee River at control structures S-65 and S-65E, July 1971 through June 1973.

Date	S-65	S-65E
July 1971	0.42	748
Aug.	.49	721
Sept.	.51	1,580
Oct.	.99	929
Nov.	2.02	186
Dec.	1.72	62.0
Jan. 1972	1.32	18.4
Feb.	1.56	208
Mar.	2.51	82.7
Apr.	346	387
May	530	729
June	277	2,070
July	762	1,410
Aug.	104	476
Sept.	1.49	514
Oct.	22.6	36.4
Nov.	40.4	109
Dec.	2.29	188
Jan. 1973	1.51	583
Feb.	1,080	1,930
Mar.	1,460	1,930
Apr.	2,400	3,520
May	1,540	2,150
June	32.4	583
Average	357	877

(July 1971 through June 1972). During this period, discharges were unusually low because of deficient rainfall (9 in. or 230 mm at Kissimmee) and because some of the basin drainage was being stored in Lake Tohopekaliga. The lake had been partly emptied in early 1971, and drainage to that lake during the latter part of 1971 and early 1972 was retained to refill the lake. Hence, streamflow below the lake during that period was appreciably reduced. Discharge of the Kissimmee River from July 1971 through June 1972 averaged 97 ft^3/s (2.7 m^3/s) at S-65 and 641 ft^3/s (18.2 m^3/s) at S-65E, compared to long-term (1933-62) average discharge of 1,219 ft^3/s (34.5 m^3/s) at S-65 and 1,730 ft^3/s (49 m^3/s) at S-65E.

By July 1972, Lake Tohopekaliga had been refilled and discharges in the lower Kissimmee River were higher during the second year of the project than during the first year. Flow of the Kissimmee River during the period July 1972 through June 1973 averaged 617 ft^3/s (17.5 m^3/s) at S-65 and 1,112 ft^3/s (31.5 m^3/s) at S-65E but were still below normal due to deficient rainfall (7 in. or 180 mm at Kissimmee).

The effects of refilling Lake Tohopekaliga became apparent when the discharge from the upper basin is compared to the discharge at S-65E. The average discharge at S-65 below Lake Kissimmee was only 15 percent of the average discharge at S-65E during the first year of data collection when the lake was being filled. During the second year of the investigation, the average discharge at S-65 was 55 percent of that at S-65E. Although, During the second year, runoff from the lower basin was about 10 percent less than in the first year, the discharge at S-65E was almost twice that of the first year.

The data in table 1 indicate that the high flows which normally occur in the Kissimmee River in the months of September and October did not occur during this investigation. Deficient rainfall resulted in unusually low flows in September and October, 1972, even though Lake Tohopekaliga had been refilled. Peak flows during this investigation occurred in the spring of 1973 when flows exceeded the average discharges shown in figure 3.

Geology

In areas where cultural influences are small, the amount of dissolved solids carried by streams depends principally on the solubility of the chemical constituents in the rocks and soil in the drainage basin and the length of time that the water is in contact with these materials before it enters the stream.

In the Kissimmee River basin the surface soils consist primarily of clean, well-drained sand in the higher areas and dark, organic, muck in the marshes and flood plains. The surface sand has been leached of most of the easily soluble minerals and surface runoff from the sand is very low in dissolved-mineral content. Runoff from the organic muck soils is also very low in mineral content but high in tannic acid and other organic compounds which color the water. Thus, surface runoff from the Kissimmee River basin is typically soft, low in dissolved-solids concentrations, and high in color.

Some rainfall on the basin infiltrates the soil and moves into lakes and streams as base flow, the ground-water component of streamflow. Because of its slow rate of travel, this water is in contact with the soil much longer than is direct surface runoff and thus contains more dissolved minerals. Many streams in the Kissimmee River basin receive ground water in this manner and generally are more highly mineralized than streams with no base flow.

The surface soils which make up the shallow aquifer are not the only formation to contribute ground water to the Kissimmee River. The Floridan aquifer, a thick sequence of carbonate rocks which underlies the shallow aquifer contains water under artesian pressure. Water from wells cased into this formation is used extensively throughout much of the basin for municipal and private water supplies, irrigation, watering of livestock and other agricultural uses. Much of the water pumped or allowed to flow from these wells eventually reaches the Kissimmee River as effluent from municipal sewage treatment plants, drainage from irrigated areas, cooling water effluent, and drainage from unchecked flowing wells and livestock watering areas. Because the water in the Floridan aquifer is under artesian pressure, there is also a potential for upward seepage from the Floridan aquifer into the shallow aquifer and into the lower Kissimmee River and its tributaries.

Because the Floridan aquifer is primarily a limestone formation, water from this aquifer is characteristically a moderately hard to hard, (61 to 180 mg/l as calcium carbonate) calcium bicarbonate water.

Throughout most of the Kissimmee River basin, dissolved-solids concentrations in water from this aquifer generally range between 100 and 300 mg/l (milligrams per litre). Although concentrations of sodium and chloride ions in water from the Floridan aquifer are low in most of the basin, the concentrations of these ions are relatively high along the eastern edge and in the southern part of the basin. In the extreme southern part of the Kissimmee River basin, water from the Floridan aquifer is predominantly a sodium chloride water and the dissolved-solids concentration usually exceeds 500 mg/l, making the water undesirable for many uses (Shampine, 1965). Lakes and streams that receive water from the Floridan aquifer have comparatively high concentrations of dissolved solids. Some streams which receive a considerable amount of water from this aquifer have dissolved-solids concentrations that exceed 250 mg/l during low-flow periods.

Streamflow

The quality of water in the Kissimmee River varies with streamflow. Because ground water is usually more mineralized than surface runoff, the mineral content of water in the river generally is greatest during low-flow periods when the flow consists largely of ground water. During periods of high flow when the flow consists primarily of surface runoff, the concentration of dissolved solids in the river is generally low. However, surface runoff often contains relatively high concentrations of nitrogen, phosphorus, trace elements, pesticides and other constituents normally found in low concentrations in ground water. Concentrations of these constituents are often higher during periods of high flow than during periods of low flow.

Because the flow in many of the smaller unregulated streams tributary to the Kissimmee River is sustained by ground water, the quality of these streams varies widely in response to storm runoff. The variations in the quality are generally much smaller and occur more slowly in the mainstem of the Kissimmee River due to the mixing that occurs in the lakes and impoundments and the longer retention times in these water bodies.

Land Use

The increased flood protection afforded by the channelization and regulation of flow in the Kissimmee River basin has indirectly affected the quality of water in the river in that it has resulted in an increase in the number of people and cattle in the basin. Census figures from the Department of Commerce and the Department of Agriculture indicate that between 1960 and 1970, the number of people in the six counties which are drained in part by the Kissimmee River increased by 132,789, an increase of 26 percent. There were 173,747 more cattle in these counties in 1969 than in 1959, an increase of 51 percent. These changes in land use and population density have resulted in an increase in the amount of ground water contributed to the Kissimmee River in the form of effluent from sewage treatment plants, cooling water, and runoff from livestock watering areas and dairy barns. This increase in the amount of more highly mineralized ground water contributed to the flow of the Kissimmee River has probably resulted in a slight increase in the concentration of dissolved solids in the river. Also, increases in the amounts of effluent from municipal sewage treatment plants and runoff from cattle and dairy barns may have resulted in an increase in the amount of nutrients reaching the river.

Water Management

The quality of water in the Kissimmee River has also been affected to some extent by the channelization of the lower river and the regulation of flow in the basin. The magnitude of water-level fluctuations has been reduced in much of the basin and some of the wetlands along the river have been drained as a result of these efforts to control and manage the flow. This reduction in wetlands has probably resulted in a slightly reduced uptake of nutrients by aquatic vegetation.

Channel excavation has increased average depths of water in the lower Kissimmee River from less than 5 ft (1.5 m) to about 30 ft (9 m). During warm weather, the water stored in the channelized part of the river often becomes stratified with respect to temperature, dissolved-oxygen and, to a lesser degree, dissolved-solids concentration.

Because the gates that regulate flow through the control structures open from the bottom, much of the water passing through the gates comes from the bottom of the impoundments. Bottom release of water through the gates sometimes results in an increase in the concentration of calcium bicarbonate, phosphorus, and ammonia nitrogen and a decrease in the concentration of dissolved oxygen in the water below the structure. The effect of these releases on the quality of water below the structures is dependent upon the degree to which the impoundments are stratified and the height to which the gates have been raised. Small gate openings did not always result in differences between the quality of water above and below the structures; generally, however, the greatest differences between the quality of water above and below the structures did occur when gate openings were small. The greatest increases in phosphorus and ammonia nitrogen below the structures occurred in the first few months of the investigation when gate openings were small and stratification of the impoundments was the greatest.

PHYSICAL AND CHEMICAL CHARACTERISTICS OF WATER IN THE LOWER KISSIMMEE RIVER

The Kissimmee River, as with all streams, contains dissolved inorganic solids, and organic material leached from decaying vegetation although it is one of the least mineralized streams in south Florida. The amount and type of these materials in the water determine the physical and chemical properties of the water and its suitability for specific uses. The present (1974) chemical quality of the Kissimmee River downstream from Lake Kissimmee, as determined from field measurements and laboratory analyses of water samples collected monthly at sampling sites above and below the control structures during July 1971 through June 1973, is discussed in the following sections. The physical and chemical data collected during the investigation are presented in tables 5 through 39, in the section on basic data.

Physical Characteristics

Specific Conductance

Specific conductance is a measure of the ability of water to conduct an electrical current and is reported in micromhos per centimetre at 25°C (Celsius). This property is a function of the amount and kind of mineral matter in solution and can be used to estimate the dissolved-solids concentration of the water. Ratios of dissolved-solids (residue on evaporation) concentration to specific conductance of water samples collected from the Kissimmee River in recent years average 0.76. Specific conductance of samples collected monthly in the lower Kissimmee River during this investigation (tables 5 through 16) ranged from 80 to 370 micromhos. Hence, dissolved-solids concentration ranged from about 60 to about 280 mg/l. Maximum, minimum, and average specific conductance of the Kissimmee River at each of the sites which were sampled more than one year, are shown in figure 4. This figure shows that during this investigation the specific conductance increased downstream and was slightly higher just below the structures than just above them.

During this investigation the specific conductance of the lower Kissimmee River increased in a downstream direction, averaging 147 micromhos just below S-65 and 209 micromhos at S-65E. Figure 4 shows that a downstream increase in the average specific conductance of water in the lower Kissimmee River occurred between each of the structures, with the greatest increase occurring between S-65D and S-65E. This increase in specific conductance indicates a downstream increase in the dissolved solids concentration and is probably the result of the more mineralized water from tributaries flowing into the river and increased ground water inflow.

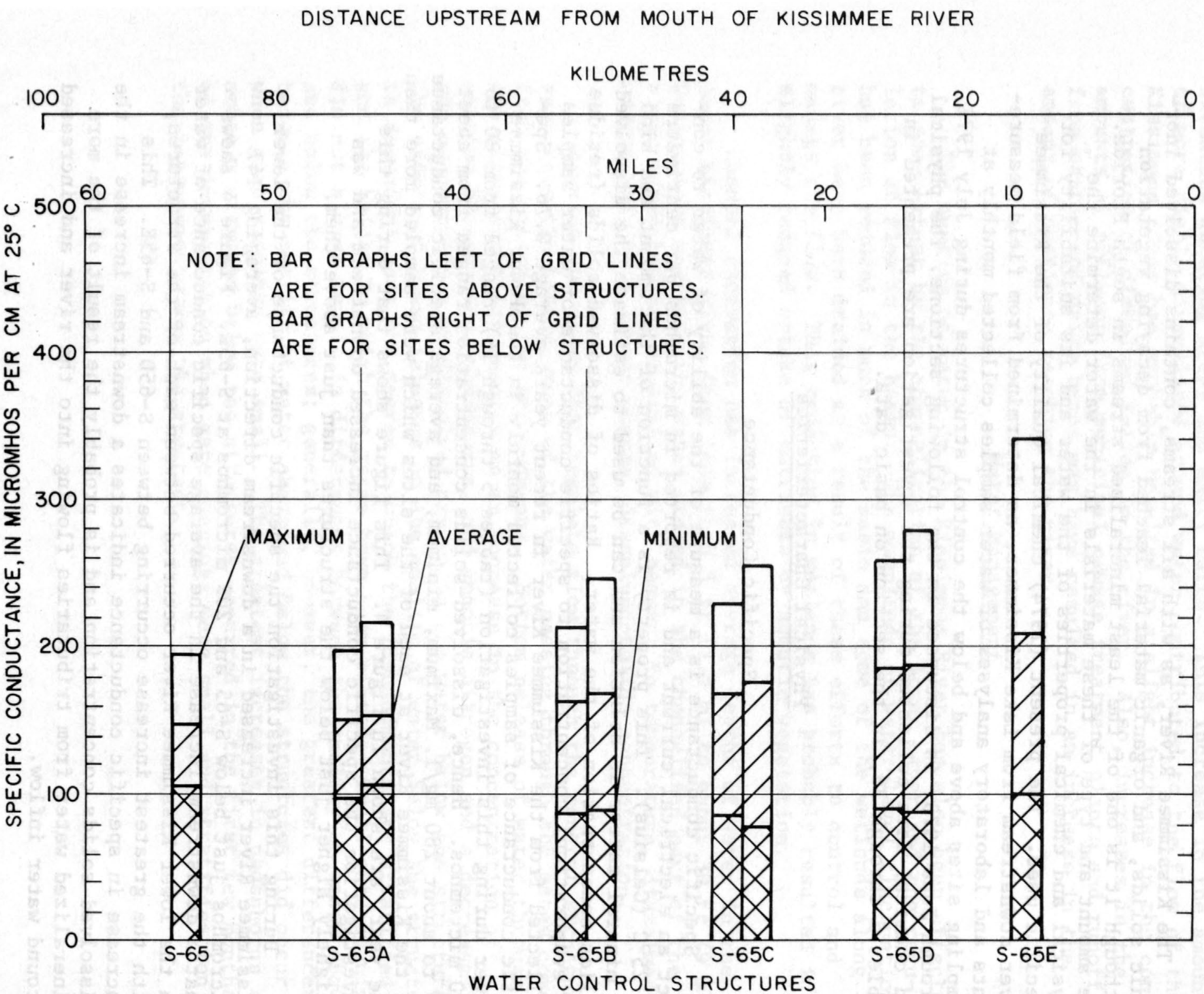


Figure 4. Maximum, minimum, and average specific conductance in the lower Kissimmee River, July 1971 through June 1973.

The specific conductance of depth integrated water samples collected below the control structures in the lower Kissimmee River averaged from 4 to 8 micromhos higher than that of samples collected above the structures. This was apparently due to the bottom releases of water from the impoundments. During periods when the impoundments were stratified, the water near the bottom often contained slightly higher concentrations of dissolved solids and bottom releases resulted in a slightly higher dissolved solids concentration and specific conductance below the structure. A comparison of the analyses in tables 5 to 11 indicate that the higher specific conductance below the structure was generally due to higher concentrations of calcium bicarbonate, phosphorus and ammonia nitrogen.

The increases in specific conductance resulting from bottom releases account for only part of the total increase in specific conductance between S-65 and S-65E. Figure 4 shows that much of the downstream increase in specific conductance occurs in the reaches between the structures, particularly in the reaches S-65C to S-65D and from S-65D to S-65E.

The specific conductance of water in the lower Kissimmee River varies seasonally in response to seasonal variation in flow. Average monthly specific conductance and discharge at S-65E and rainfall at Okeechobee are shown for the period July 1971-June 1973 in figure 5. The seasonal relation between specific conductance and streamflow is readily apparent from this figure. The specific conductance was generally higher in those months when rainfall and discharge were low and low during the rainy season when discharges were high. The effects of storage and regulation can be seen by comparing month-to-month changes in specific conductance with changes in the average monthly discharge. For some months--for example, February and July 1972--an increase or decrease in average monthly streamflow did not produce a decrease or increase, respectively, in the average monthly specific conductance.

The specific conductance of samples collected from the Kissimmee River during this investigation was notably higher than that of samples collected during the 1950's. The specific conductance of water in the Kissimmee River near Okeechobee and below Lake Kissimmee and in Lake Tohopekaliga in the upper Kissimmee River basin is shown for 1954 through 1973 in figure 6. It is apparent from this figure that the specific conductance of water in Lake Tohopekaliga and in the lower Kissimmee River has increased appreciably in the last 20 years. The specific conductance of water samples collected at S-65E in the early 1970's averaged more than 200 micromhos, whereas the average specific conductance of samples collected at a site a short distance upstream from the present location of S-65E averaged less than 100 micromhos in

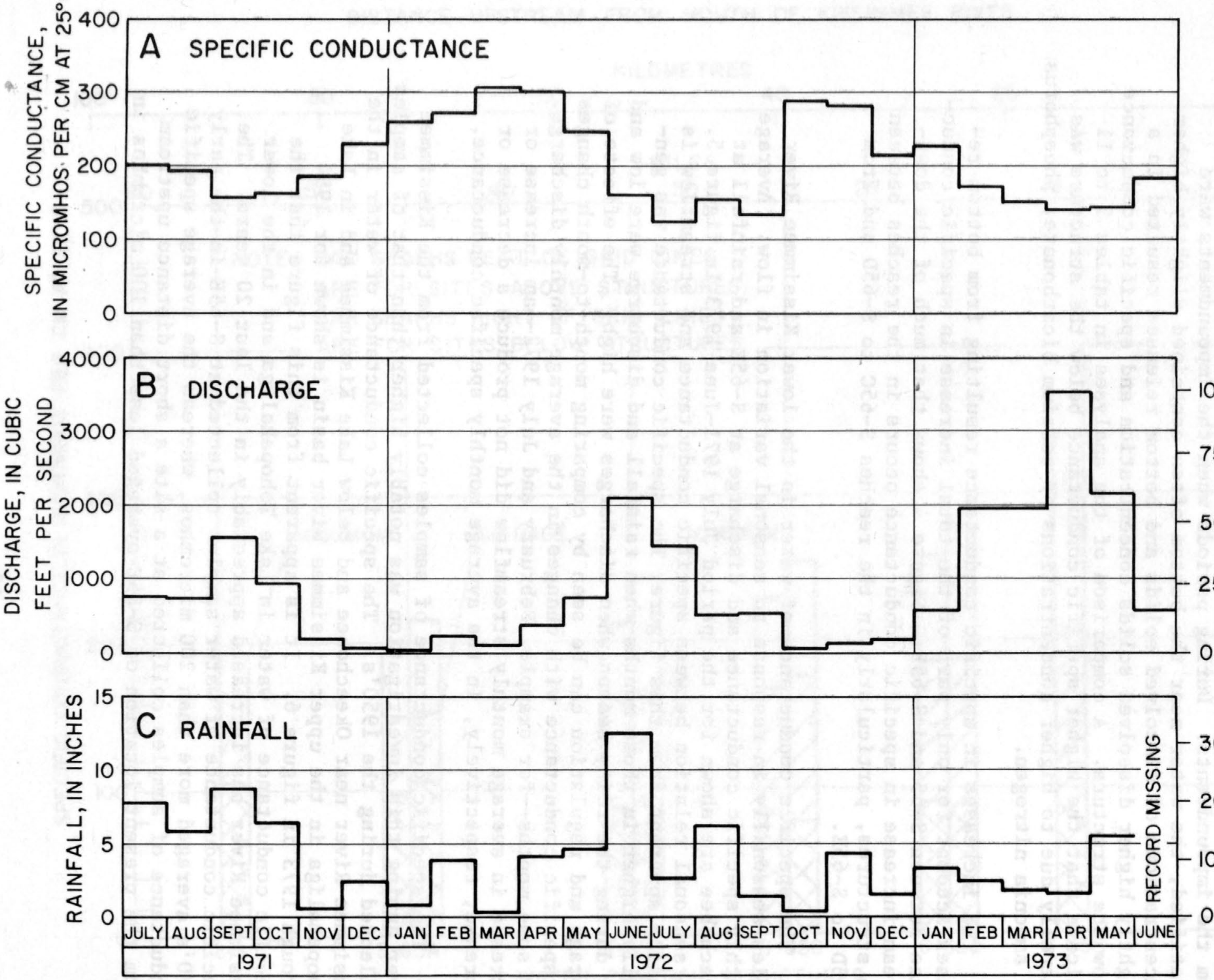


Figure 5. A, Average monthly specific conductance; B, average monthly discharge of the Kissimmee River at S-65E; C, monthly rainfall at Okeechobee.

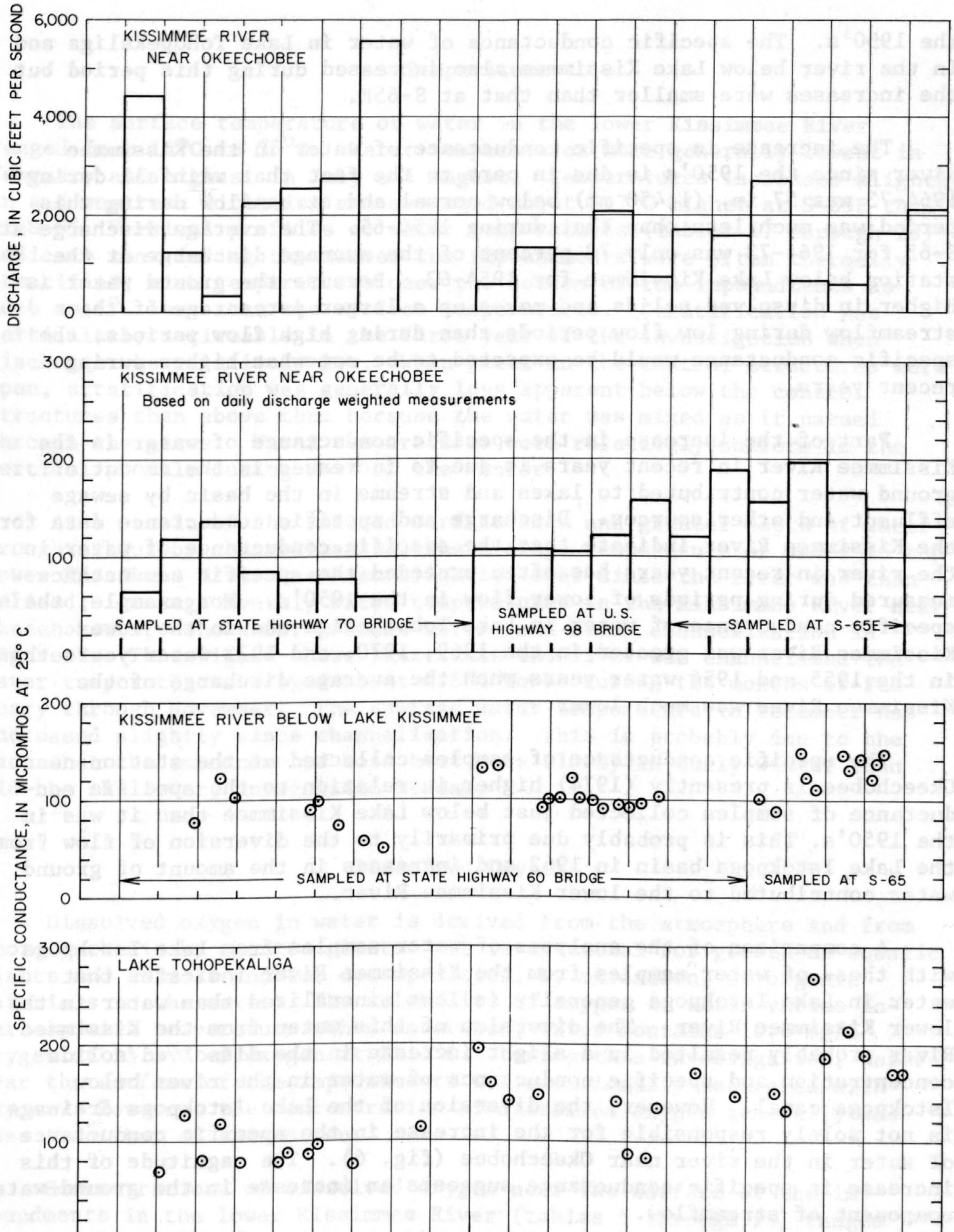


Figure 6. Average annual specific conductance of Kissimmee River near Okeechobee and specific conductance of samples collected from Kissimmee River below Lake Kissimmee and Lake Tohopekaliga.

the 1950's. The specific conductance of water in Lake Tohopekaliga and in the river below Lake Kissimmee also increased during this period but the increases were smaller than that at S-65E.

The increase in specific conductance of water in the Kissimmee River since the 1950's is due in part to the fact that rainfall during 1964-73 was 57 in. (1,450 mm) below normal and streamflow during this period was much less than that during 1954-65. The average discharge at S-65 for 1964-73 was only 70 percent of the average discharge at the station below Lake Kissimmee for 1954-63. Because the ground water is higher in dissolved solids and makes up a larger percentage of the streamflow during low flow periods than during high flow periods, the specific conductance would be expected to be somewhat higher during recent years.

Part of the increase in the specific conductance of water in the Kissimmee River in recent years is due to increases in the amount of ground water contributed to lakes and streams in the basin by sewage effluent and other sources. Discharge and specific conductance data for the Kissimmee River indicate that the specific conductance of water in the river in recent years has often exceeded the specific conductance measured during periods of lower flow in the 1950's. For example, the specific conductance of water in Lake Tohpekaliga and in the lower Kissimmee River was greater in the 1969, 1970, and 1973 water years than in the 1955 and 1956 water years when the average discharge of the Kissimmee River was much lower.

The specific conductance of samples collected at the station near Okeechobee is presently (1974) higher in relation to the specific conductance of samples collected just below Lake Kissimmee than it was in the 1950's. This is probably due primarily to the diversion of flow from the Lake Istokpoga basin in 1962 and increases in the amount of ground water contributed to the lower Kissimmee River.

A comparison of the analyses of water samples from Lake Istokpoga with those of water samples from the Kissimmee River indicates that water in Lake Istokpoga generally is less mineralized than water in the lower Kissimmee River. The diversion of this water from the Kissimmee River probably resulted in a slight increase in the dissolved solids concentration and specific conductance of water in the river below Istokpoga canal. However, the diversion of the Lake Istokpoga drainage is not solely responsible for the increase in the specific conductance of water in the river near Okeechobee (fig. 6). The magnitude of this increase in specific conductance suggests an increase in the ground-water component of streamflow.

Temperature

The surface temperature of water in the lower Kissimmee River ranged from 14°C to 36°C. Water temperatures were generally lowest in February and highest in July and August. Temperatures increased slightly in a downstream direction and averaged about 1.7°C higher at S-65E than at S-65. Vertical profiles of water temperatures (tables 17 through 28) indicate that during the summer the impoundments were often thermally stratified, with temperatures near the bottom of the impoundments as much as 6°C less than the surface temperatures. Stratification was particularly noticeable in the first year of the investigation when discharge was relatively low. When gates in the control structures were open, stratification was generally less apparent below the control structures than above them because the water was mixed as it passed through the gates. Water temperatures were relatively uniform in the vertical profile during most of the winter.

As a result of the reduced surface area and greater depth of water brought about by channelization, the average temperature of water in the lower Kissimmee River has been slightly lower since the river was channelized. Average monthly water temperatures in the Kissimmee River near Okeechobee are shown for periods before and after channelization in figure 7. This figure shows that since the river was channelized the water temperature averaged about 1.5°C lower during the months of February through November. The average water temperature in December has increased slightly since channelization. This is probably due to the fact that the impoundments lose heat more slowly in early winter than did the shallower, unregulated stream.

Dissolved Oxygen

Dissolved oxygen in water is derived from the atmosphere and from photosynthesis by aquatic plants. It is essential for growth of aquatic plants and animals and for decomposition, by oxidation, of organic materials in the water. The solubility of oxygen in water varies inversely with temperature. When saturated, water contains 10.0 mg/l oxygen at 15.5°C of oxygen at 32.0°C. During this investigation, water near the surface of the impoundments was occasionally saturated with oxygen. However, the concentration of dissolved oxygen generally was less than that at saturation.

Concentrations of dissolved oxygen near the surface of the impoundments in the lower Kissimmee River (tables 5 through 16) ranged from 1.7 to 10.5 mg/l and generally exceeded 5 mg/l, particularly in the cooler months during the study. In summer months, concentrations of

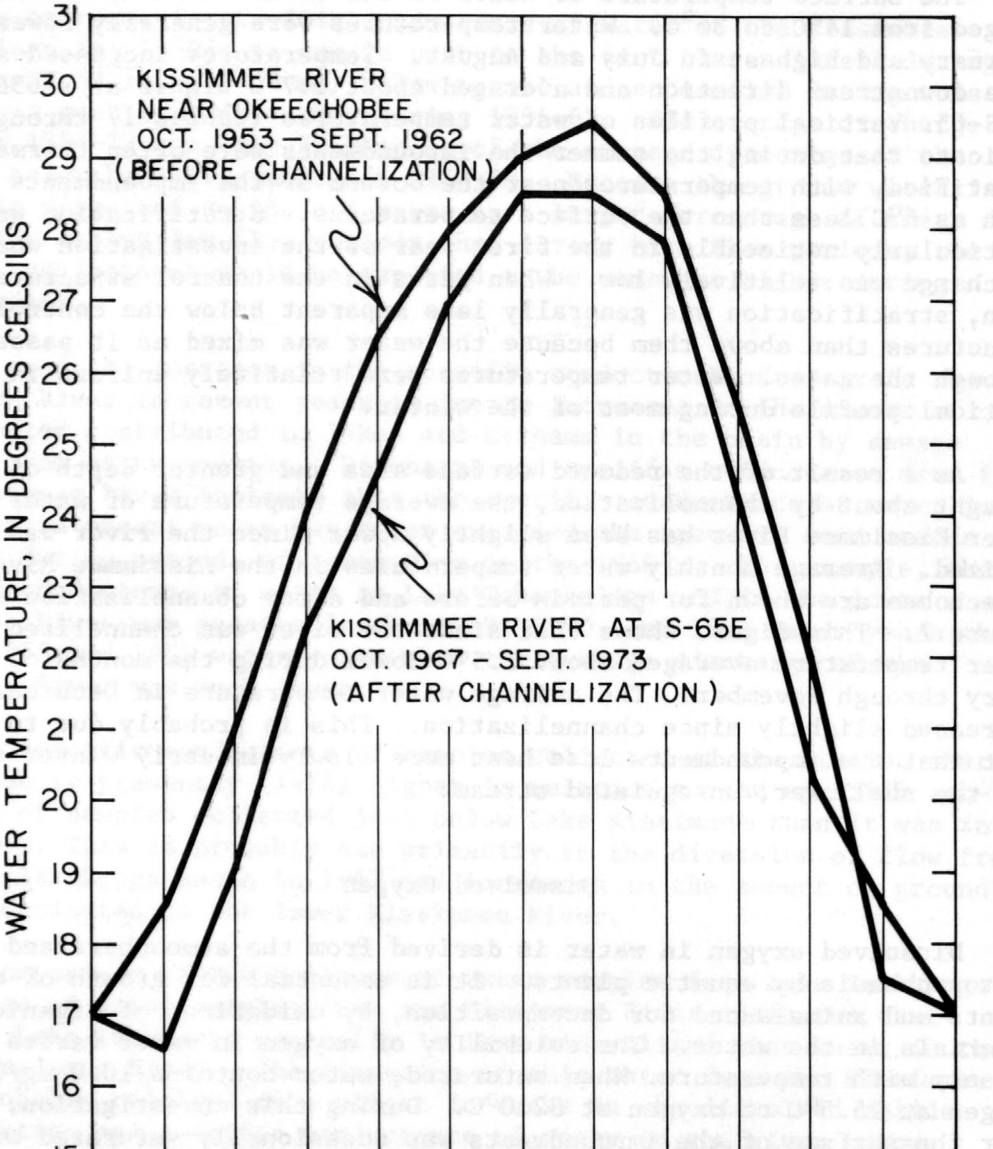


Figure 7. Average monthly water temperature, Kissimmee River near Okeechobee.

less than 3 mg/l were not uncommon. Dissolved-oxygen concentrations varied from one impoundment to another as a result of differences in wind, biological activity, temperature and other factors that affected the impoundments. Also, dissolved-oxygen concentrations below the structures were often less than those above the structures. This was particularly noticeable during periods when gate openings in the structures were small.

The impoundments in the lower Kissimmee River were stratified with respect to dissolved oxygen as well as temperature during much of the summer. Vertical profiles of temperature and dissolved oxygen at sites above and below the control structures in the lower Kissimmee River are given in tables 17 through 28. These profiles indicate that during June, July, August and September the impoundments were aften stratified on the upstream side of the control structures. Dissolved-oxygen concentrations near the bottom were often less than 2.0 mg/l and sometimes less than 0.5 mg/l. Stratification was most apparent in August and September 1971 when discharge was very low. Water on the downstream side of the control structures generally was stratified only when the gates were either closed or open only a small amount.

During the winter months dissolved-oxygen concentrations were generally high and relatively uniform in the profiles, except during February and March 1973, when dissolved-oxygen concentrations were unusually low near the bottom of the impoundments even though discharge through the structures was high.

pH

The pH of water is a measure of the effective hydrogen ion concentration. A water having a pH of less than 7.0 is acidic whereas water with a pH greater than 7.0 is alkaline. The pH of most natural waters is controlled by reactions involving water, dissolved carbon dioxide, carbonate and bicarbonate ions. The reaction of dissolved carbon dioxide in water produces hydrogen ions and results in a lower pH. Reactions of carbonate and bicarbonate ions in water use up hydrogen ions and result in a higher pH.

Natural waters receive carbon dioxide from the atmosphere, from the decomposition of organic matter and from the respiration of plants, animals and bacteria. The pH of rainfall is frequently in the vicinity of 5.6 due to dissolved atmospheric carbon dioxide (Hem, 1970, p.91). Where streams drain swamps and marshes, the carbon dioxide and organic acids produced during the decomposition of organic matter often result in a pH less than 5.0.

The pH of water in several streams in the upper Kissimmee River basin is sometimes less than 5.0 (Kaufman, 1970) but the pH is higher throughout most of the basin due to surface runoff and ground-water inflow from carbonate rocks and soils. During this investigation, the median pH of water in the lower Kissimmee River was 6.9 at S-65 and 7.1 at S-65E. The slight increase downstream was probably due to ground water inflow in the lower basin.

The pH of water in the lower Kissimmee River ranged from 6.0 to 8.0 during this investigation. The lower pH values generally occurred during periods of high flow. During these periods the water was rich in dissolved carbon dioxide and organic acids flushed from swamps and the influence of alkaline groundwater inflow was relatively small. During periods of low flow, alkaline ground water made up a much larger percent of the flow and the pH was generally greater than 7.0.

The pH of water at sampling sites above and below the control structures in the lower Kissimmee River are given for the period of this investigation in tables 1A-12A. A comparison of pH measurements above the structures to those below the structures indicates that the only appreciable change occurred at S-65. The median pH was slightly lower above S-65 than below it.

Turbidity

Turbidity in water is caused by the presence of suspended material such as clay, silt, organic material and microscopic organisms. Turbidity is an optical property of water and is dependent not only on the concentration of suspended material in the water but also on the light-scattering and light-absorbing properties of the materials. The turbidities of water samples collected in the lower Kissimmee River during this investigation were measured with a turbidimeter using standard reference suspensions which were calibrated against the Jackson candle turbidimeter. The turbidities of these water samples are given in Jackson turbidity units (JTU) in tables 5-16 in the back of the report.

In the impoundments of the Kissimmee River downstream from S-65, the turbidity of the water was very low. Turbidities ranged from 1 to 30 JTU and averaged about 4 JTU. The average turbidity was below the maximum limit recommended by the U. S. Public Health Service (1962) for drinking water on interstate carriers. Turbidity of most water samples was less than 10 JTU.

The turbidity of the water in the Kissimmee River between S-65 and S-65E was appreciably lower than that of water in Lake Kissimmee. Half of the samples collected above S-65 had turbidities between 10 and 35 JTU. The turbidities of samples collected from the lower Kissimmee

River during this investigation were also lower than those reported for Lake Okeechobee in 1969 and 1970 (Joyner, 1971). The higher turbidities in these shallow lakes is probably due to the effects of wind and wave action on bottom materials and to the higher concentrations of plankton in the lakes.

Although the turbidity of the lower Kissimmee River was low throughout the period of this investigation, the turbidity was generally highest during 1973 when the highest discharges occurred. During periods of high discharge the turbidity was often slightly higher below the control structures than above them. However, the differences in turbidities above and below the structures were generally less than 2 JTU.

Color

The Kissimmee River, like most streams in southern Florida, is highly colored with organic acids, tannins and other humic materials from decaying vegetation. Color in some streams in the upper basin and at S-65E in the lower basin has exceeded 300 units on the Platinum-Cobalt scale (Kaufman, 1969). Color, like turbidity, reduces light penetration in water and consequently restricts biological activity. Color in the lower Kissimmee River when sampled in August 1971, February, May and August 1972, and February 1973, ranged from 30 to 200 units on the Platinum-Cobalt scale and averaged 85 units. Color was least on the upstream side of S-65 in Lake Kissimmee and generally increased in a downstream direction. This increase was probably due to drainage from swamps, marshes and organic soils in the lower basin. Color was generally higher during the first year of the investigation when discharge from the upper basin was very low.

Transparency

Transparency of water is dependent upon turbidity, the light reflecting or scattering properties of the suspended solids, and the color of the water. Secchi disk measurements of transparency in the lower Kissimmee River ranged from 20 to 72 in. (510 to 1,830 mm) and averaged about 44 in. (1,120 mm). Secchi disk transparencies were generally greater above the structures than below them. Water in the Kissimmee River was usually less transparent during periods of high discharge, probably because turbidities were higher during those periods.

Chemical Characteristics

Major Chemical Constituents

Calcium, bicarbonate, sodium and chloride are the major dissolved chemical constituents in the water of the lower Kissimmee River. Magnesium, sulfate, silica, and potassium are present in lesser amount. Water samples from most of the sampling sites above and below the control structures were analyzed for these chemical constituents four or five times during the study. The analyses are given in table 29 in the basic data. Water in the Kissimmee River usually is a soft to moderately hard calcium bicarbonate type. However, during periods when the dissolved solids concentration was relatively low, sodium and chloride were the dominant chemical ions, particularly at the sites above and below S-65.

The concentrations of sodium and chloride ions were relatively stable during this investigation, ranging from 8 to 13 mg/l for sodium and 14 to 23 mg/l for chloride. Concentrations of calcium and bicarbonate ions were much more variable, ranging from 7.3 to 32 mg/l for calcium and from 20 to 82 mg/l for bicarbonate. Concentrations of calcium and bicarbonate ions were highest in the first year of the sampling program and the concentrations of these ions generally increased in a downstream direction. Concentration of calcium and bicarbonate ions averaged 13 and 34 mg/l, respectively, in five samples collected above S-65A, whereas the concentrations of these ions averaged 18 and 48 mg/l in five samples collected above S-65E. The only other major constituent that increased in concentration downstream was sulfate. Sulfate concentration averaged 10 mg/l above S-65A and 18 mg/l above S-65E.

The downstream increase in the concentrations of calcium, bicarbonate and sulfate ions was probably the result of ground-water inflow in the lower Kissimmee River. Shallow ground water in some areas of the lower basin is highly mineralized and contains relatively high concentrations of sulfate (Parker, Ferguson, Love and others, 1955, p. 818). The downstream increase in these constituents was reflected in a similar increase in the concentration of dissolved solids. The average concentration of dissolved solids increased from 110 mg/l above S-65A to 134 mg/l above S-65E. These trends are shown in figure 8. The diagrams of that figure indicate that water in the lower Kissimmee River generally is a calcium bicarbonate type and the percentage of sodium and chloride decreases in a downstream direction.

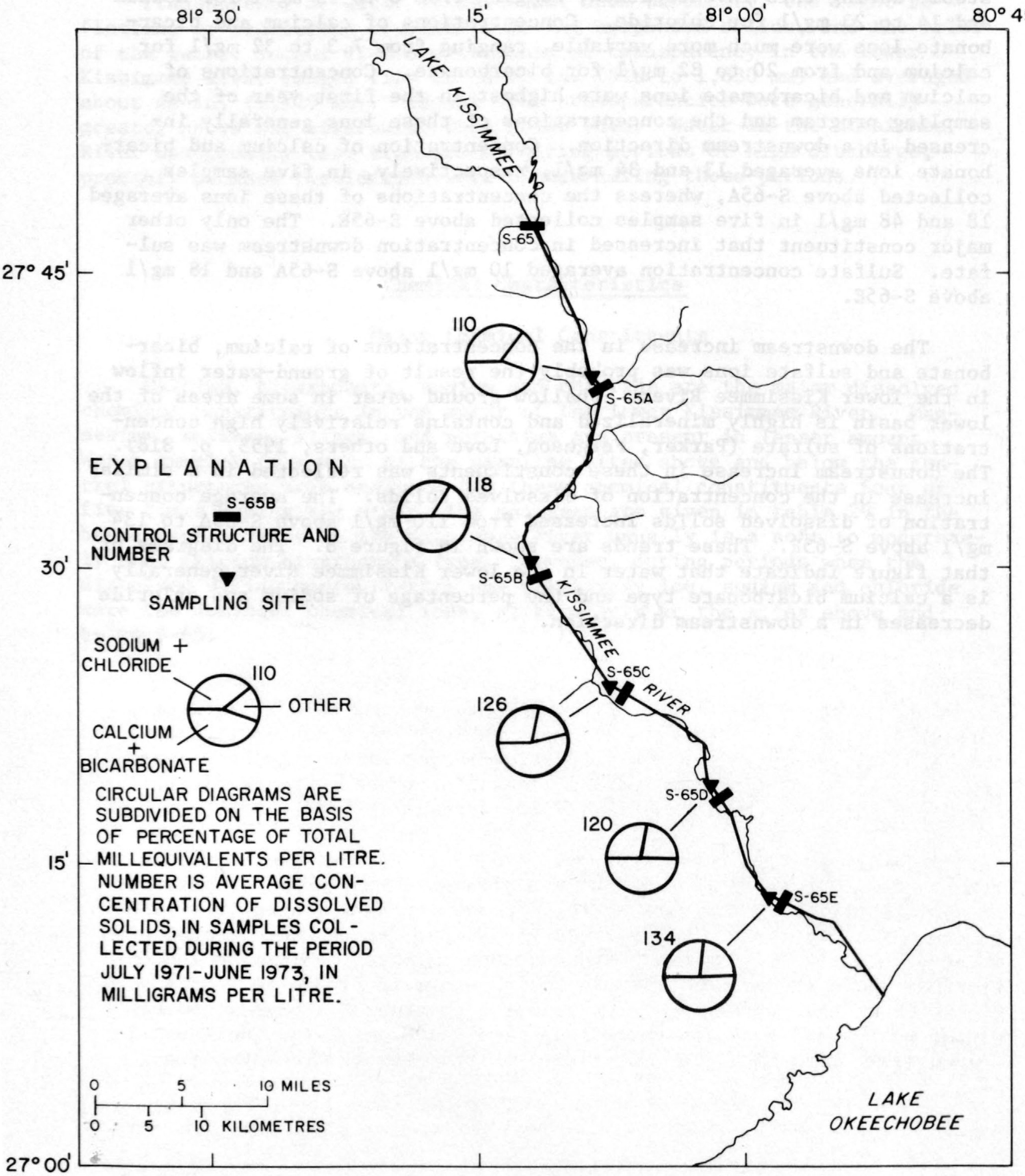


Figure 8. Chemical characteristics of water in the lower Kissimmee River.

Nitrogen and Phosphorus

Nitrogen and phosphorus are the essential plant nutrients of primary interest in the lower Kissimmee River because the concentration of one or both of these nutrients is probably the factor limiting the growth of algae and other aquatic plants. Water samples were collected and analyzed for the various forms of these nutrients on a monthly basis during the investigation. The results of these analyses are given in tables 5 through 16. Concentrations of total nitrogen ranged from 0.82 to 4.84 mg/l in the lower Kissimmee River, but most of the samples contained between 1.00 and 2.00 mg/l. The predominant form of nitrogen was organic nitrogen, which on the average, made up about 85 percent of the total nitrogen. Inorganic nitrogen concentrations were relatively low, averaging about 0.20 mg/l (as N). The average concentration of inorganic nitrogen in the lower Kissimmee River was less than that found in rainfall near Lake Okeechobee by Joyner (1971). Average concentrations of organic and inorganic nitrogen at most sampling sites on the lower Kissimmee River are shown in figure 9. Averages for stations above S-65 and below S-65E are not shown in this figure because of the shorter period of record at these stations. Figure 9 shows that the average concentration of nitrogen was somewhat higher below S-65 than at the other sites. Average concentrations of nitrogen decreased from S-65 to S-65B but remained relatively constant downstream of S-65B. Figure 9 also shows that differences between average concentrations of nitrogen above and below the structures were generally small.

Although the inorganic forms of nitrogen make up only a small part of the total nitrogen in the Kissimmee River, it is the inorganic nitrogen that is most readily used by algae and other aquatic plants. The inorganic nitrogen in water samples collected during this investigation consisted primarily of nitrate nitrogen (NO_3-N) and ammonia nitrogen (NH_4-N). Nitrate nitrogen averaged about 50 percent and ammonia nitrogen about 45 percent of the total inorganic nitrogen. The remaining inorganic nitrogen consisted of nitrite nitrogen (NO_2-N).

Although average concentrations of nitrate nitrogen were greater than average concentrations of ammonia nitrogen, many samples contained no nitrate nitrogen. Nitrate nitrogen concentrations ranged from zero in the warmer months to 0.50 mg/l in the winter months and averaged about 0.10 mg/l. The seasonal fluctuations in nitrate nitrogen concentrations above the control structures are shown in figure 10. This figure shows that nitrate concentrations were generally higher in the winter months and that concentrations of nitrate generally increased in a downstream direction. A comparison of the nitrate concentrations

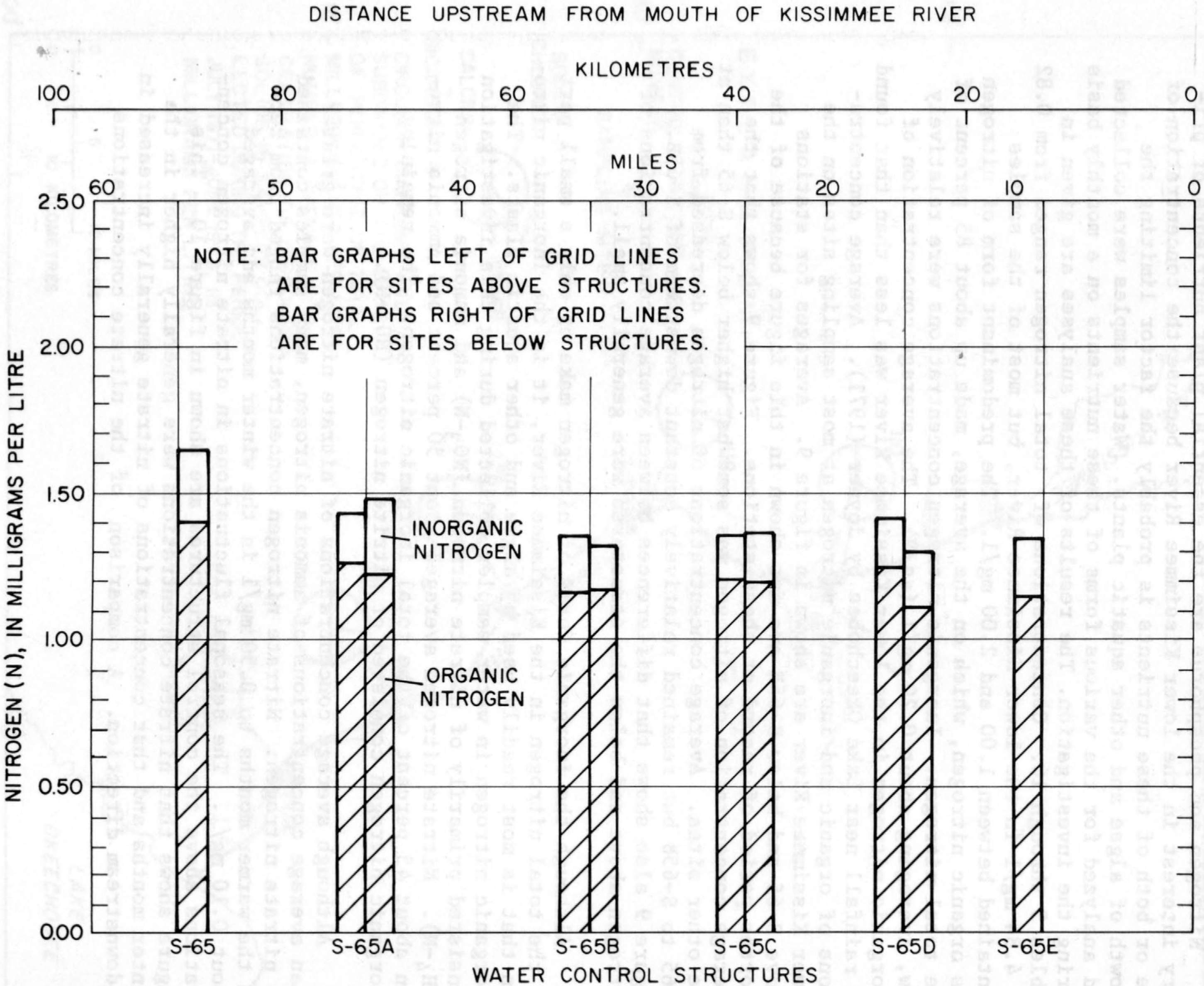


Figure 9. Average concentrations of nitrogen in the lower Kissimmee River, July 1971 through June 1973.

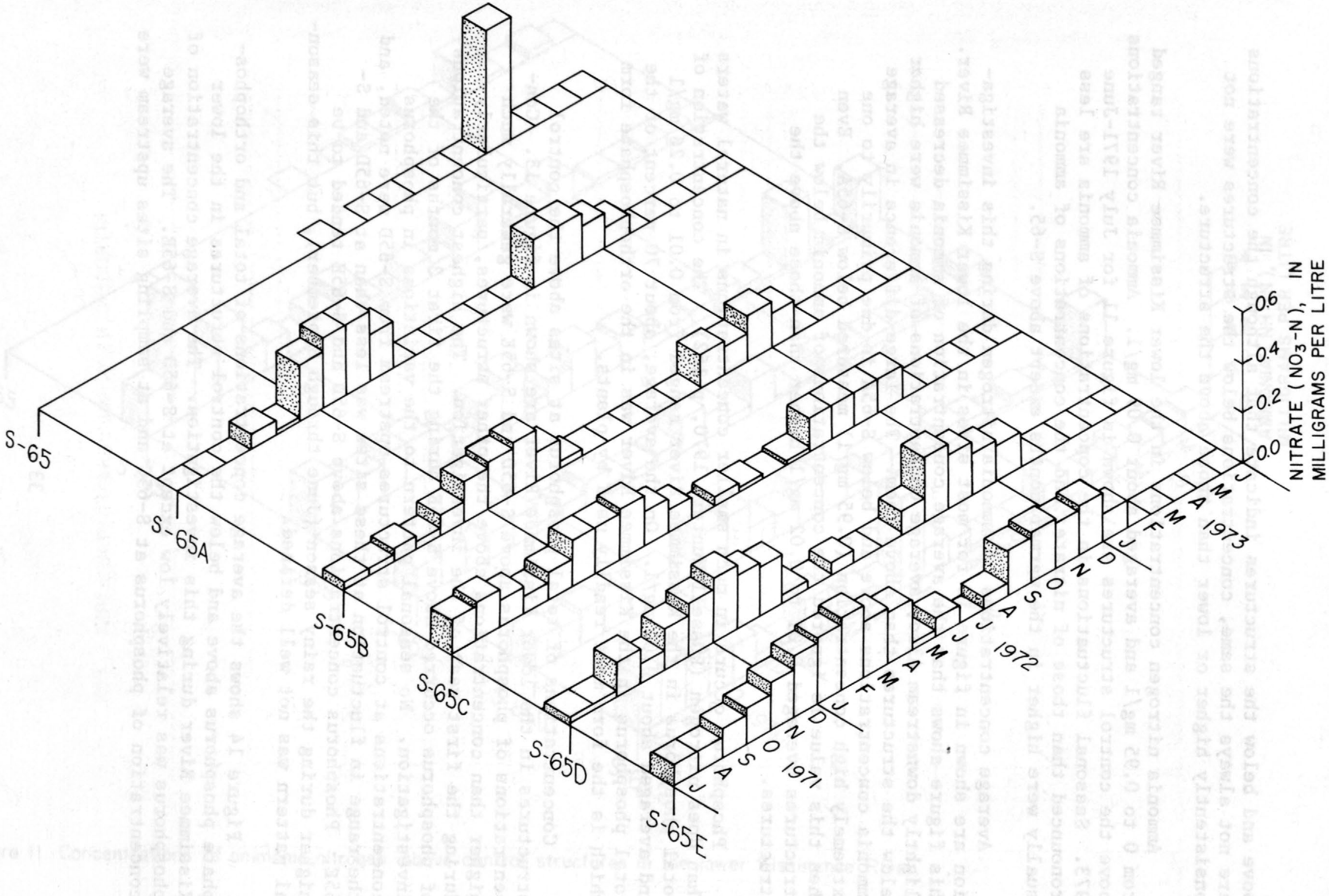


Figure 10. Concentrations of nitrate nitrogen above control structures in the lower Kissimmee River.

above and below the structures indicate that although the concentrations were not always the same, concentrations below the structures were not consistently higher or lower than those above the structure.

Ammonia nitrogen concentrations in the lower Kissimmee River ranged from 0 to 0.95 mg/l and averaged about 0.09 mg/l. Ammonia concentrations above the control structures are shown in figure 11 for July 1971-June 1973. Seasonal fluctuations in the concentrations of ammonia are less pronounced than those of nitrate; and the concentrations of ammonia usually were higher in the warmer months except above S-65.

Average concentrations of ammonia nitrogen during this investigation are shown in figure 12 for most sites in the lower Kissimmee River. This figure shows that the average concentration of ammonia decreased slightly downstream Also, average concentrations of ammonia were higher below the structures than above them. The large difference in average ammonia concentrations above and below S-65A is due primarily to one extremely high concentration (0.95 mg/l) measured below S-65A. Even when this value is ignored the concentrations of ammonia below the structures averaged 0.01 to 0.02 mg/l higher than those above the structures.

Phosphorus occurs in much smaller concentrations in natural waters than does nitrogen (Russell-Hunter, 1970, p.162). The concentration of total phosphorus in the Kissimmee River ranged from 0.01 to 0.26 mg/l and averaged about 0.04 mg/l. On the average, about 70 percent of the total phosphorus in the Kissimmee River was in the orthophosphate form which is the form most readily used by plants.

Concentrations of total phosphorus at sites above the control structures in the lower Kissimmee River are shown in figure 13. Concentrations of phosphorus above S-65D and S-65E were generally much higher than concentrations above the other structures, particularly during the first year of the investigation. The highest concentrations of phosphorus occurred above S-65E during the first 3 months of the investigation. No seasonal pattern to the variations in phosphorus concentrations at control structures upstream from S-65D were noted, and the range in fluctuation at these sites was less than at S-65D and S-65E. Phosphorus concentrations above S-65D and S-65E tended to be higher during the rainy season (June through September), but this seasonal pattern was not well defined.

Figure 14 shows the average concentrations of total and orthophosphate phosphorus above and below the control structures in the lower Kissimmee River during this investigation. The average concentration of phosphorus was relatively low except at S-65D and S-65E. The average concentration of phosphorus at S-65C and at sampling sites upstream were

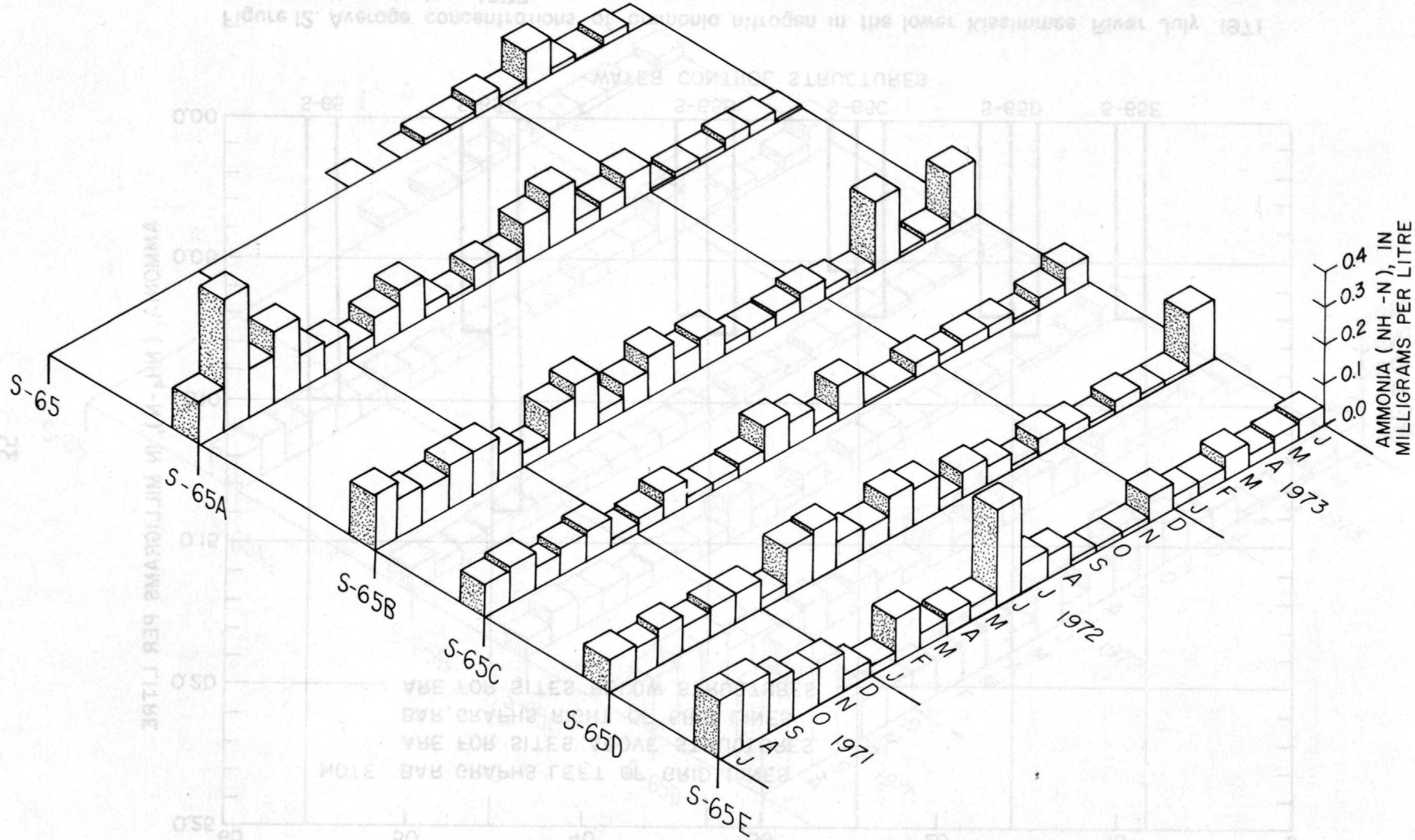


Figure 11. Concentrations of ammonia nitrogen above control structures in the lower Kissimmee River.

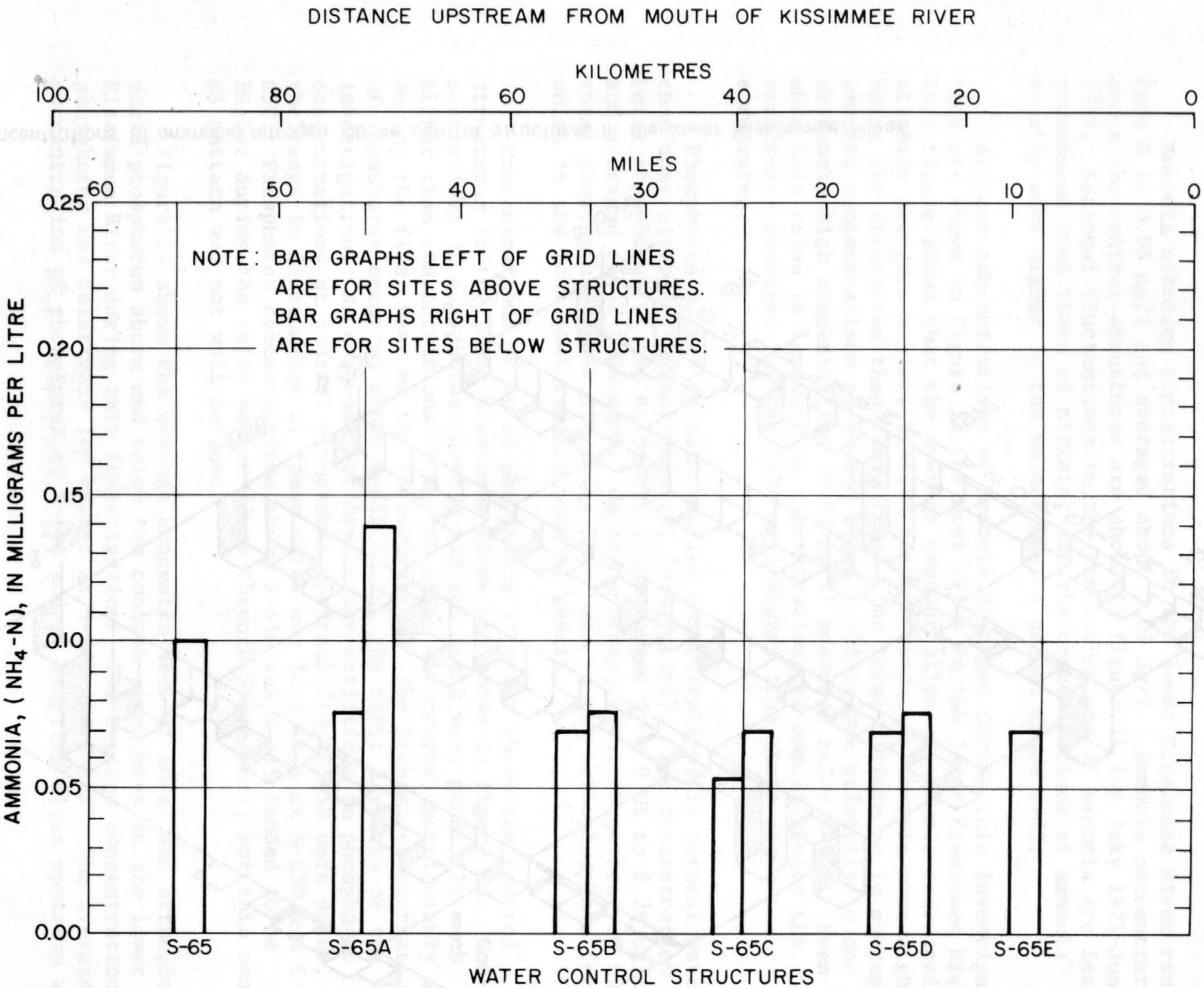


Figure 12. Average concentrations of ammonia nitrogen in the lower Kissimmee River July 1971 through June 1973.

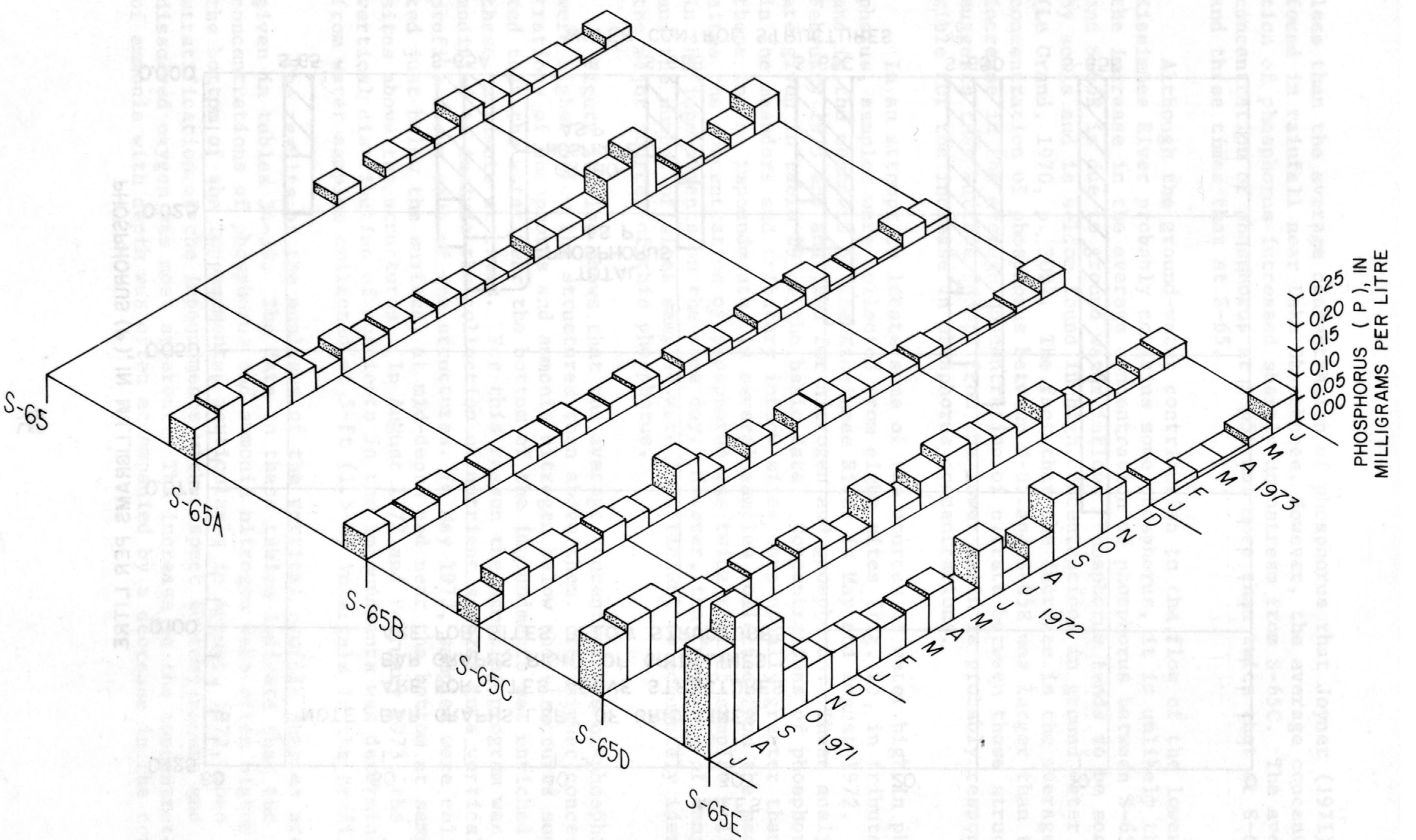
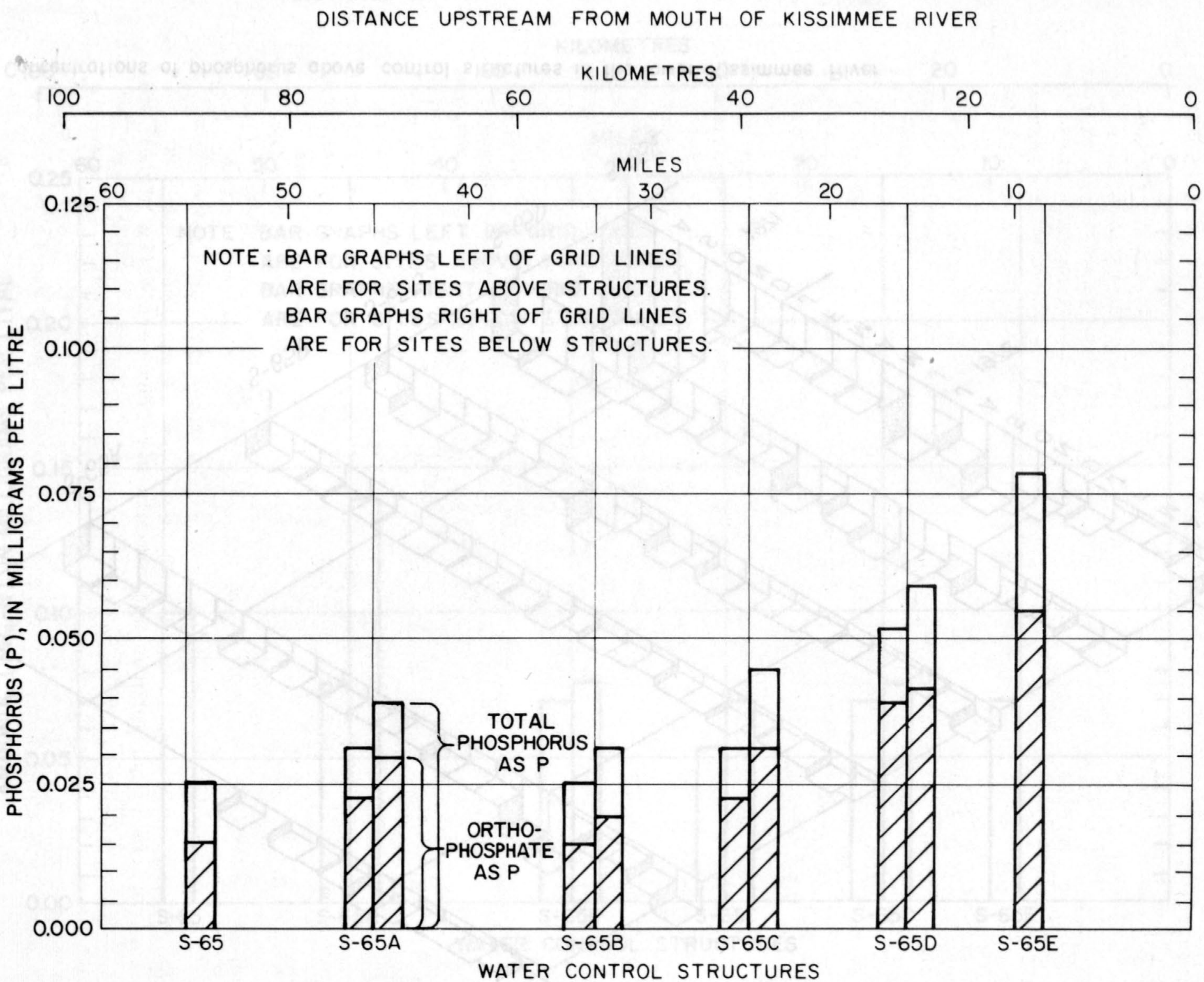


Figure 13. Concentrations of phosphorus above control structures in the lower Kissimmee River.


DISTANCE UPSTREAM FROM MOUTH OF KISSIMMEE RIVER
KILOMETRES
100
80
60
40
20
0
MILES
60
50
40
30
20
10
0
NOTE: BAR GRAPHS LEFT OF GRID LINES
ARE FOR SITES ABOVE STRUCTURES.
BAR GRAPHS RIGHT OF GRID LINES
ARE FOR SITES BELOW STRUCTURES.
PHOSPHORUS (P), IN MILLIGRAMS PER LITRE
0.125
0.100
0.075
0.050
0.025
0.000
TOTAL PHOSPHORUS AS P
ORTHO-PHOSPHATE AS P
S-65
S-65A
S-65B
S-65C
S-65D
S-65E
WATER CONTROL STRUCTURES

less than the average concentration of phosphorus that Joyner (1971) found in rainfall near Lake Okeechobee. However, the average concentration of phosphorus increased sharply downstream from S-65C. The average concentration of phosphorus at S-65E was more than twice that at S-65C and three times that at S-65.

Although the ground-water contribution to the flow of the lower Kissimmee River probably contains some phosphorus, it is unlikely that the increase in the average concentration of phosphorus between S-65 and S-65E is due to ground water inflow. Phosphorus tends to be sorbed by soils and is seldom found in high concentrations in ground water (Le Grand, 1970, p. 308). The fact that the increase in the average concentration of phosphorus between S-65 and S-65E was larger than the increase in the average concentration of nitrate between those structures suggests that surface runoff from the lower basin is probably responsible for the increase in phosphorus concentrations.

In an attempt to locate some of the sources of water high in phosphorus, samples were collected from eight sites (fig. 2), in tributaries and in the meanders of the Kissimmee River in May and August 1972, and February 1973 and analyzed for nitrogen and phosphorus. These analyses are given in table 29 of the basic data. Concentrations of phosphorus in the meanders and tributary inflow sites were usually greater than those in the impoundments. In several samples collected from the meander sites the concentration of phosphorus was twice that of samples collected in the impoundments on the same day. However, the frequency of sampling and the number of sites sampled were insufficient to accurately identify the major sources of this phosphorus.

Figure 14 also shows that the average concentrations of phosphorus were higher below the structures than above them. The higher concentrations of phosphorus and ammonia nitrogen below the structures suggested that the water near the bottom of the impoundments was enriched with these nutrients at times. For this reason the sampling program was modified to include the collection of nutrient samples in a vertical profile above each of the structures. In May 1972, samples were collected just below the surface, at mid-depth and near the bottom at sampling sites above the structures. In August 1972 and February 1973, the vertical distribution of nutrients in the impoundments was determined from water samples collected at 5-ft (1.5-m) intervals in the profile.

The results of the analyses of the vertical profile samples are given in tables 34-39. The data in these tables indicate that the concentrations of phosphorus and ammonia nitrogen were often higher near the bottom of the impoundments, particularly in August, 1972, when stratification of the impoundments with respect to temperature and dissolved oxygen was most apparent. The increase in the concentration of ammonia with depth was often accompanied by a decrease in the concentration of nitrate and other forms of nitrogen. The concentration of total nitrogen generally did not increase appreciably with depth. The high concentrations of total nitrogen in water samples collected near the bottom above S-65 in May and August, 1972, was probably due to sampling error. The bottom material above S-65 was extremely fine and it was very difficult to collect water samples near the bottom without disturbing this material and contaminating the samples with small amounts of suspended sediment.

Vertical profiles of total phosphorus, total nitrogen, temperature and dissolved oxygen above each of the structures in the lower Kissimmee River are shown in figures 15-20 for August 29, 1972 and February 27, 1973. These figures show that phosphorus concentrations were generally highest near the bottom of the impoundments where the dissolved oxygen concentrations were lowest. The higher concentrations of phosphorus in the oxygen-deficient water near the bottom were probably due to (1) the decomposition of sedimented plankton and organic material carried into the river and (2) the reduction of phosphate precipitates in the bottom material and the subsequent release of phosphorus into the water (Stumm and Morgan, 1970, p. 553).

The fact that the phosphorus concentrations increased more with depth in August 1972 than in February 1973 suggests that the release of phosphorus from bottom material was not the major cause of the higher phosphorus concentration near the bottom. The dissolved-oxygen concentrations near the bottom were generally lower and hence the tendency for phosphorus to be released from sediments greater in February, 1973 than in August, 1972. The higher concentrations of phosphorus near the bottom of the impoundments in August 1972 were probably due primarily to the decomposition of organic matter in the bottom waters which were isolated from the water near surface by a thermocline.

Trace Elements

In addition to the major chemical constituents, nitrogen and phosphorus, the Kissimmee River contains elements which normally occur only in trace quantities. The elements include aluminum; arsenic; strontium; toxic metals such as cadmium, chromium, lead and nickel; and micronutrients such as copper, iron, manganese and zinc which are essential for plant growth. Water samples were collected at sites above and below the control structures in August 1971, February and August 1972, and February 1973, and analyzed for these trace elements.

All of these trace elements, except nickel, were found in one or more of the samples, but the concentrations of all but iron were well within the limits recommended by the National Technical Advisory Committee (1968) for waters to be used for public water supplies, irriga-

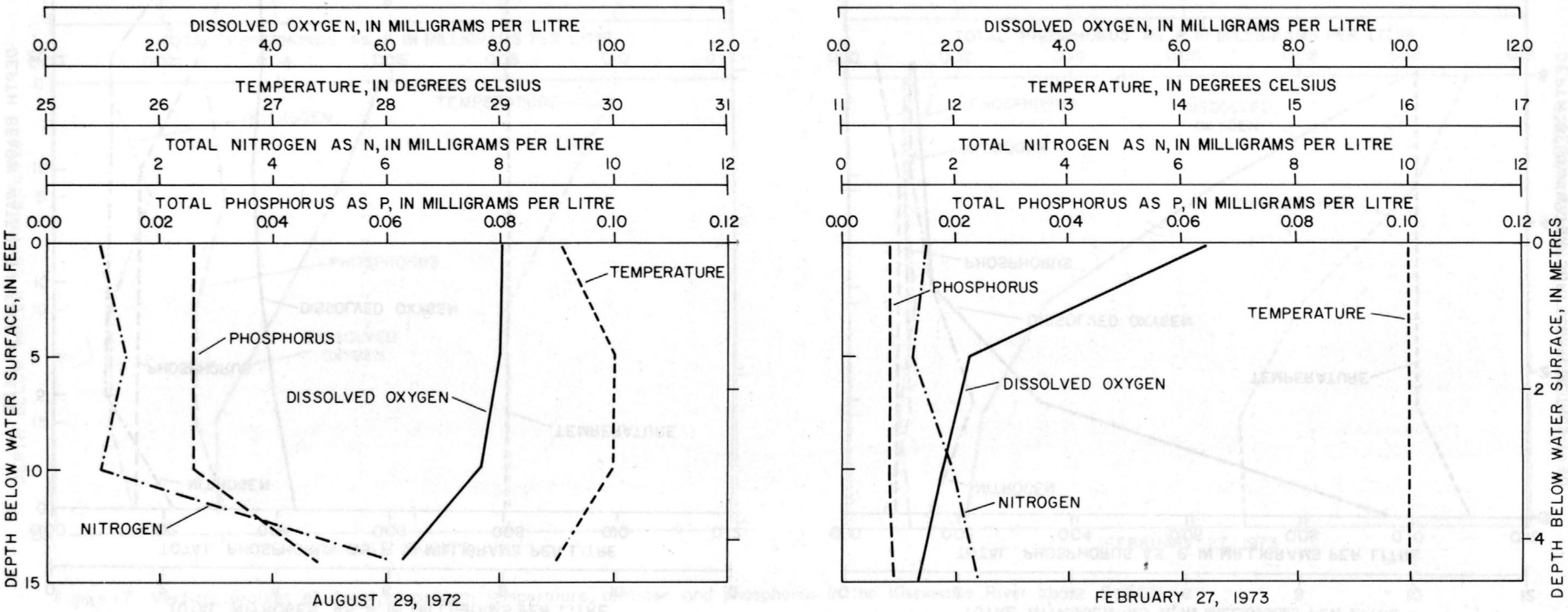


Figure 15. Vertical profiles of dissolved oxygen, temperature, nitrogen and phosphorus in the Kissimmee River above S-65.

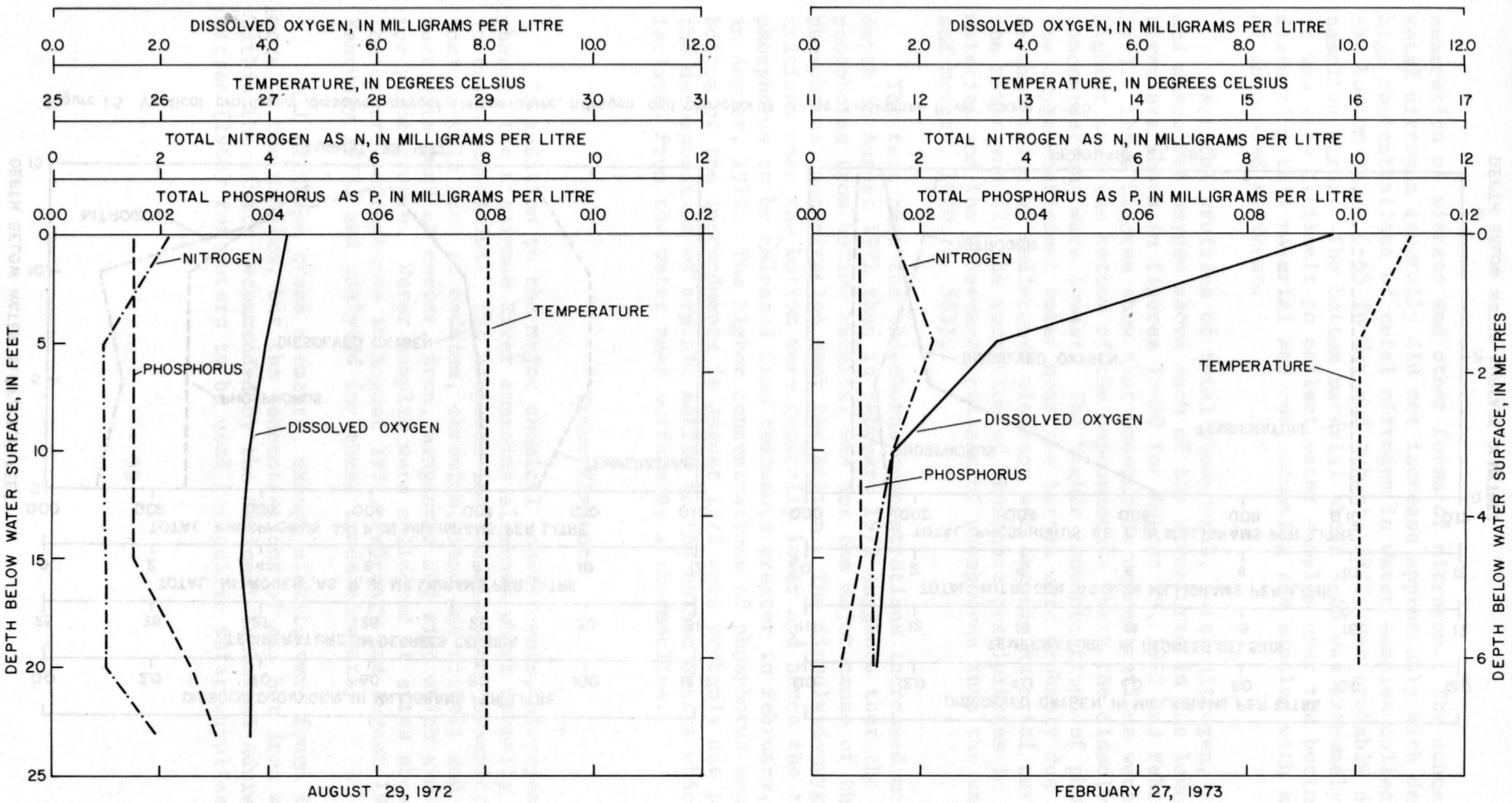


Figure 16. Vertical profiles of dissolved oxygen, temperature, nitrogen and phosphorus in the Kissimmee River above S-65A.

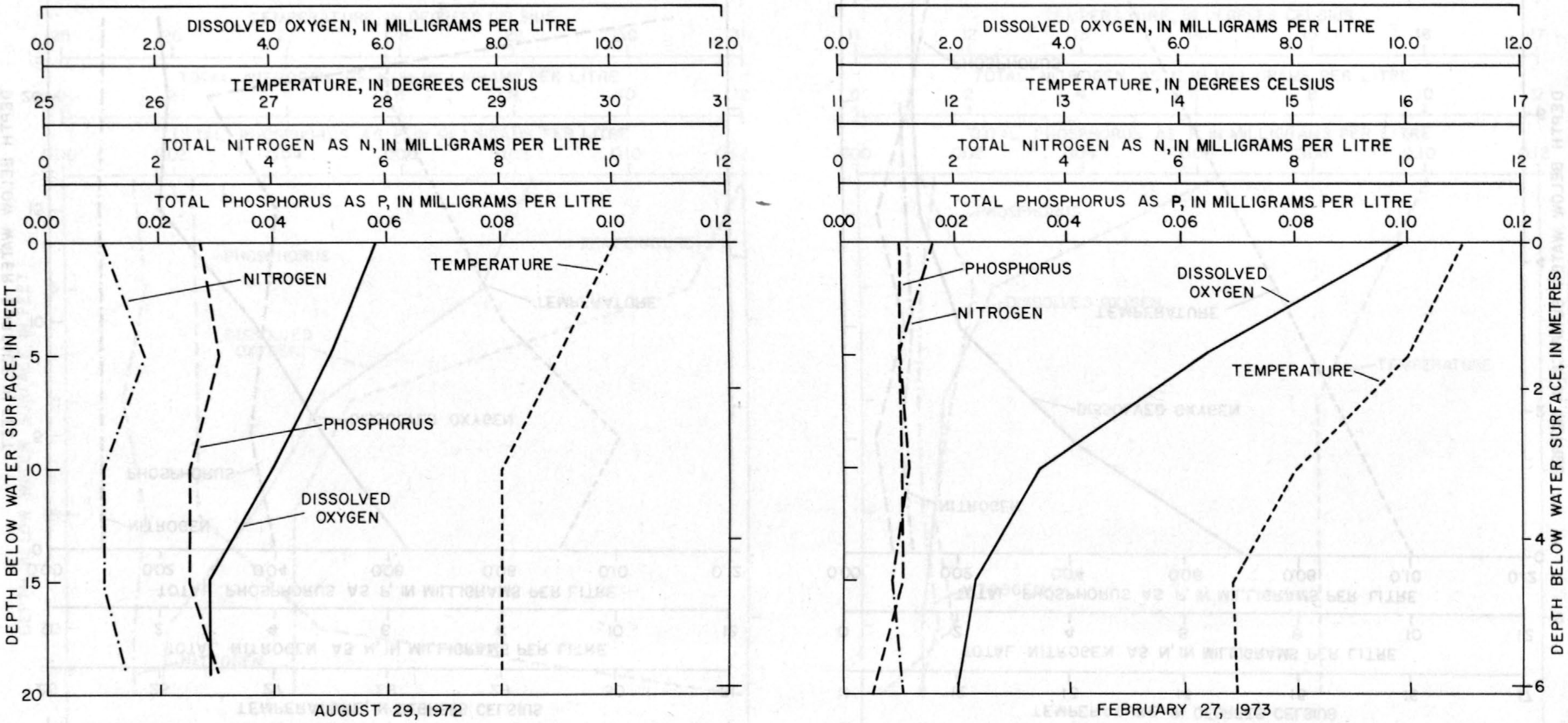


Figure 17. Vertical profiles of dissolved oxygen, temperature, nitrogen and phosphorus in the Kissimmee River above S-65B.

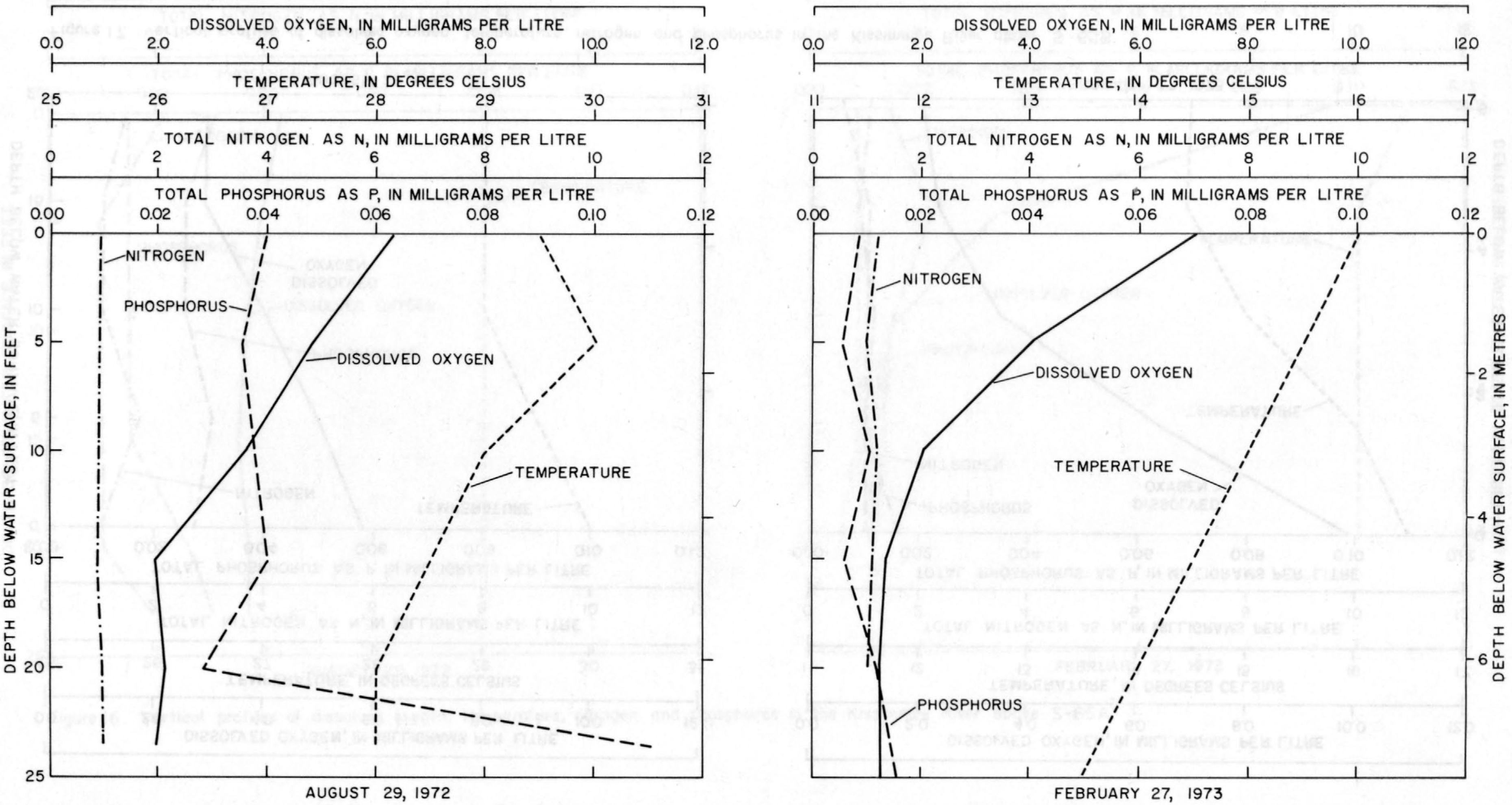


Figure 18. Vertical profiles of dissolved oxygen, temperature, nitrogen and phosphorus in the Kissimmee River above S-65C.

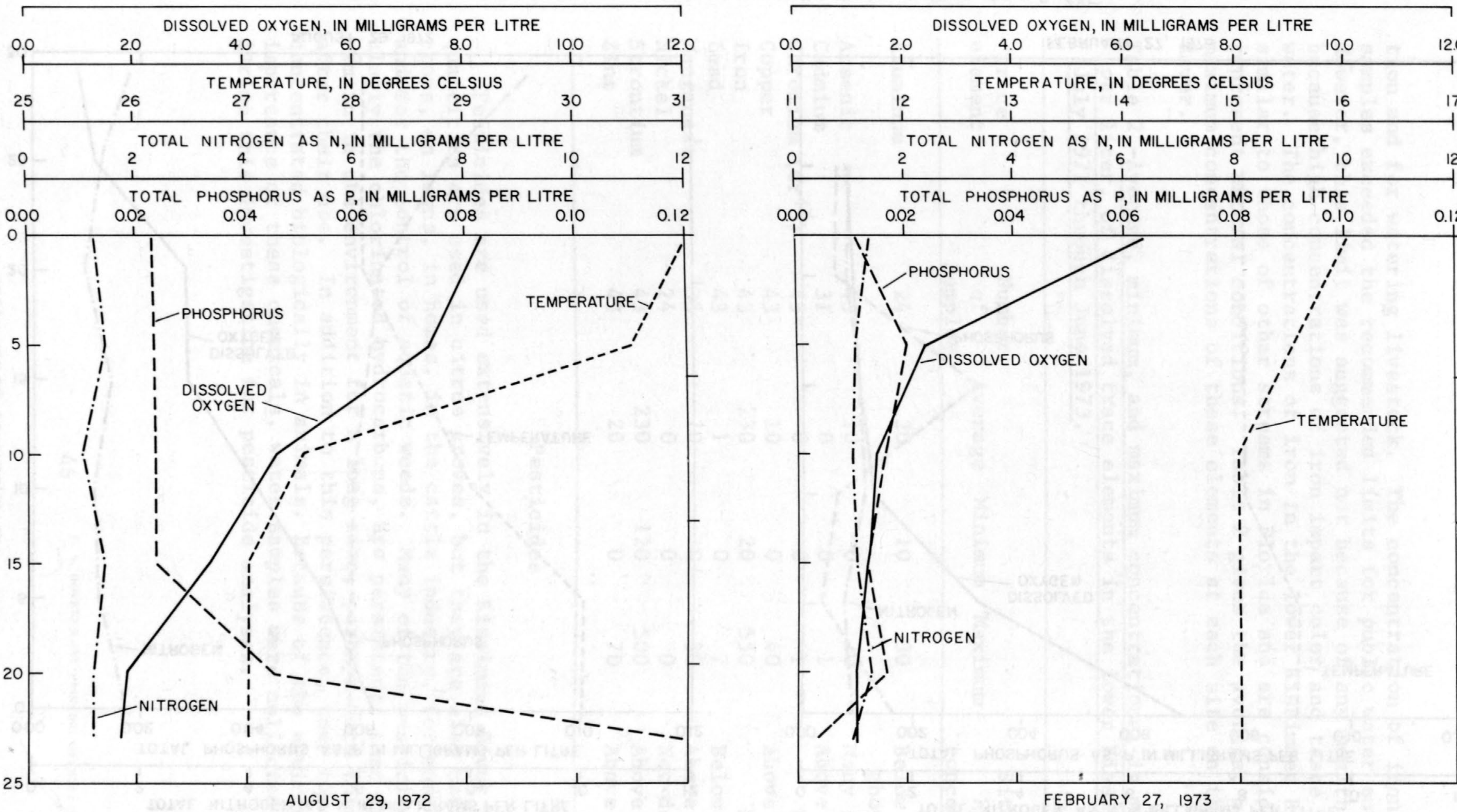


Figure 19. Vertical profiles of dissolved oxygen, temperature, nitrogen and phosphorus in the Kissimmee River above S-65D.

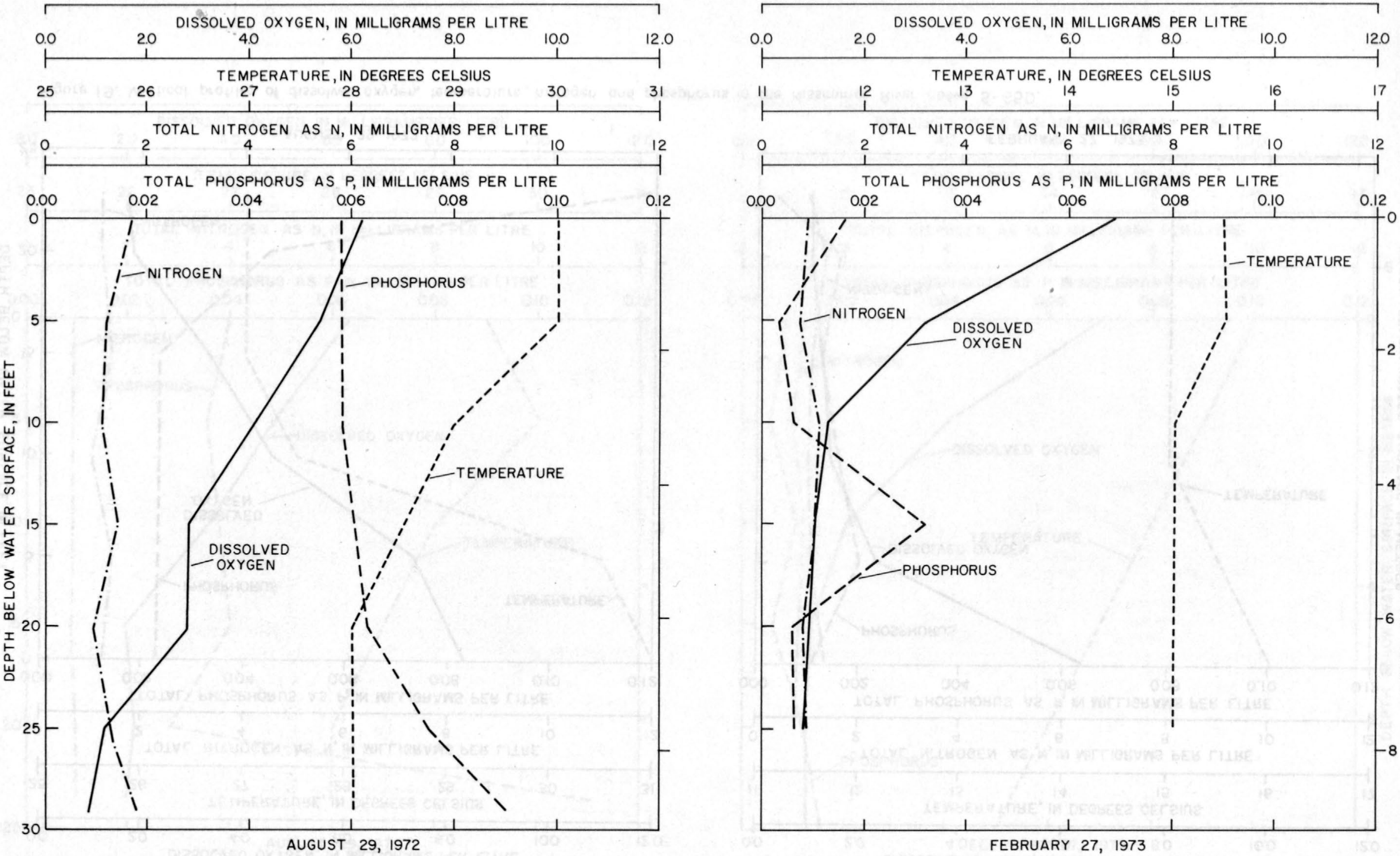


Figure 20. Vertical profiles of dissolved oxygen, temperature, nitrogen and phosphorus in the Kissimmee River above S-65E.

tion and for watering livestock. The concentration of iron in several samples exceeded the recommended limits for public water supplies. However, this limit was suggested not because of any health hazard but because high concentrations of iron impart color and taste to drinking water. The concentrations of iron in the lower Kissimmee River were similar to those of other streams in Florida and are considered to represent natural conditions. Table 2 gives the average, minimum and maximum concentrations of these elements at each site on the Kissimmee River.

Table 2.-Average, minimum, and maximum concentrations, in micrograms per liter, of dissolved trace elements in the lower Kissimmee River, July 1971 through June 1973.

Trace element	Number of Samples	Average	Minimum	Maximum	Site with highest concentration
Aluminum	24	20	10	30	Below S-65A, above S-65E
Arsenic	43	10	0	20	Many sites
Cadmium	31	0	0	1	Above S-65E
Chromium (Cr^{+6})	43	0	0	1	Do.
Copper	43	10	0	40	Above S-65A
Iron	43	230	20	550	Do.
Lead	43	1	0	7	Below S-65
Manganese	35	10	0	30	Above S-65E
Nickel	24	0	0	0	Not detected
Strontium	43	230	120	500	Above S-65E
Zinc	43	20	0	70	Above 65-C

Pesticides

Pesticides are used extensively in the Kissimmee River basin. Large quantities are used in citrus groves, but they are also used on other crops, on lawns, in homes, in the cattle industry, for mosquito control and for the control of aquatic weeds. Many of the pesticides, particularly the chlorinated hydrocarbons, are persistent; that is, they remain in the environment for a long time, perhaps more than 50 years after their use. In addition to this persistence, they can become concentrated biologically in animals. Because of the environmental importance of these chemicals, water samples were collected semiannually during this investigation for pesticide analyses.

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Water samples collected at sites above and below the control structures in August 1971, in February and August 1972, and in February 1973 were analyzed for nine chlorinated hydrocarbon insecticides including the DDT family and three herbicides (2,4-D; 2,4,5-T; and Silvex). These analyses are given in table 31 in the basic data. None of the samples analyzed for insecticides contained measurable concentrations of these chlorinated hydrocarbons. However, of the 41 samples analyzed for herbicides, 32 contained 2,4-D, and 9 contained Silvex. The herbicide 2,4,5-T was not detected in any sample.

The maximum concentrations of 2,4-D generally occurred in February 1973 when three samples contained more than 0.40 ug/l (micrograms per litre) and one sample contained 0.47 ug/l. Concentrations of 2,4-D were 0.06 ug/l or less in August 1971 and February 1972 and 0.25 ug/l or less in August 1972.

Silvex was found in three samples collected in February 1972 and in six samples collected in August of that year. The maximum concentration of Silvex (6.0 ug/l) occurred in August 1972 below S-65A. Concentrations of Silvex in the other samples were 0.03 ug/l or less.

Although most of the samples analyzed contained these herbicides, the total concentration was below the suggested limit (100 ug/l) for public water supplies as published in the National Technical Advisory Committee's report (1968).

The presence of herbicides in water in the river is not surprising inasmuch as these chemicals are used to control the growth of water hyacinths. Although insecticides doubtless are used in significant amounts in agricultural areas adjacent to the river their adsorption onto soil particles prevents their reaching the river in detectable quantity.

CHEMICAL CHRACTERISTICS OF BOTTOM MATERIAL IN THE LOWER KISSIMMEE RIVER

Bottom material in a stream acts as a trap for many constituents and often contain relatively high concentrations of nutrients, trace elements and pesticides that are normally found in low concentrations in the water. These constituents are trapped in the bottom material by the incomplete decomposition of organic materials containing these compounds and by the adsorption of these constituents onto sediment particles which settle to the bottom of the stream or reservoir. Those constituents near the water-sediment interface can go back into solution if the conditions permit, but the chemicals trapped at depth in the sediment cannot go back into solution and, hence, are removed from the aquatic environment unless the sediments are disturbed. Because the chemistry of the bottom material is much more stable than that of water, the quality of the bottom material reflect the quality of the stream or reservoir during the time those sediments were being deposited.

During this investigation, samples of bottom material were collected semiannually at sites above the control structures in the lower Kissimmee River. These samples were analyzed for nitrogen, phosphorus and insecticides. The results of these analyses are given in tables 32 and 33 in the basic data. The nutrient analyses of bottom materials in table 32 indicate that the concentrations of nutrients, particularly phosphorus, fluctuated over a wide range. This may be due in part to the fact that not all of the samples were analyzed by the same laboratory and the analytical methods used by the two laboratories differ slightly. If the results of the two laboratories are averaged together, the bottom materials in the lower Kissimmee River contained, on the average, 3.4 grams of nitrogen and 1.0 gram of phosphorus per kilogram of dry solids.

Average concentrations of nitrogen were lower and average concentrations of phosphorus were higher in bottom materials in the lower Kissimmee River than in bottom materials collected from Lake Okeechobee by Joyner (1971). The high concentrations of phosphorus in bottom materials in the river suggest that phosphorus is removed from the water and incorporated into the bottom material as the result of precipitation of insoluble phosphates and the incorporation of organic materials containing phosphorus into the bottom material. The bottom materials appear to act as a phosphorus sink most of the time but low dissolved oxygen concentrations and certain pH conditions may, at times, favor the dissolution of some of the phosphorus.

Most of the nitrogen in bottom material in the lower Kissimmee River was in the form of organic nitrogen with lesser amounts in the form of ammonia. Very little of the total nitrogen was in the form of nitrate. Conversely, most of the total phosphorus in bottom material was inorganic phosphorus. The phosphorus in bottom material was probably tied up with iron, calcium and other naturally occurring metals as insoluble phosphates and other inorganic compounds. The high concentrations of organic nitrogen in bottom material was probably due to the fact that nitrogen is released more slowly than phosphorus during the decomposition of organic materials.

Concentrations of chlorinated hydrocarbon insecticides in bottom material of the lower Kissimmee River are given in table 33. Although none of the water samples collected during this investigation contained chlorinated hydrocarbon insecticides, the bottom material samples contained five of these insecticides. Bottom materials contained as much as 14 ug/kg (micrograms per kilogram) of DDE and an estimated 13 ug/kg of Chlordane. DDD and DDE, which are members of the DDT family, were in most of the bottom material samples. Average concentrations of these insecticides were DDD, 1.4 ug/kg, and DDE, 1.3 ug/kg. The higher concentrations of these insecticides generally occurred in samples collected above S-65, S-65A and S-65E. The concentration of the DDT family of insecticides in bottom material ranged from 0.0 to 21.5 ug/kg and averaged 2.7 ug/kg in 22 samples. Goolsby and McPherson (1970) reported an average concentration of these insecticides in bottom material in the upper St. Johns River basin almost twice as large as that found in the lower Kissimmee River during this investigation.

CHEMICAL LOADS TRANSPORTED BY THE KISSIMMEE RIVER

The Kissimmee River is one of the least mineralized streams that flow into Lake Okeechobee. However, it is also the largest tributary to the lake and because of its large flow, it carries more dissolved minerals into the lake than the smaller more highly mineralized tritaries.

Dissolved Solids

Although dissolved-solids concentrations in the lower Kissimmee River were determined only semiannually during this study, the relation between dissolved-solids concentration and specific conductance made it possible to estimate average dissolved--solids concentrations and compute dissolved solids loads at the sampling sites. The dissolved-solids loads at each of the control structures in the lower Kissimmee River are given in table 3. The data in this table indicate that the dissolved-solids load at S-65E was 268,000 tons (243,000 tonnes) for July 1971-June 1973, an average of 367 tons (333 tonnes) per day. This was more than three times the dissolved-solids load at S-65 (108 tons or 98 tonnes per day). That part of the basin between S-65 and S-65E contributed 59 percent of the flow and 70 percent of the dissolved-solids load at S-65E.

Table 3.--Loads of dissolved solids transported by the Kissimmee River, July 1971 through June 1973.

Sampling Site	Average Discharge (ft^3/s)	Average Dissolved Solids Concentration (mg/l)	Dissolved Solids Load: Total Load (tons)	Dissolved Solids Load: Average Daily Load (tons)
S-65	357	[a]112	78,900	108
S-65A	[b]474	[c]114	107,000	146
S-65B	[b]655	[c]123	159,000	218
S-65C	[b]709	[c]129	180,000	246
S-65D	[b]833	[c]140	231,000	316
S-65E	877	[d]155	268,000	367

a Estimated from the average specific conductance of 21 samples collected below the structure.

b Estimated from drainage area ratios and the increase in average discharge between S-65 and S-65E.

c Estimated from the average specific conductance of 23 samples collected above the structure.

d Estimated from the average specific conductance of samples collected daily above the structure.

Dissolved-solids loads in the lower Kissimmee River during this investigation were well below normal due to the unusually low discharge. Although the dissolved-solids concentrations are usually higher during periods of low flow, dissolved-solids loads generally are greater during periods of high flow. The range in discharge of the Kissimmee River is much greater than the range in the concentration of dissolved solids. During this investigation, the average monthly discharge at S-65E ranged from less than 20 ft^3/s (0.56 m^3/s) to more than 3,500 ft^3/s (100 m^3/s). The average monthly dissolved-solids concentrations at S-65E were estimated to range from 94 to 231 mg/l during this time. The close relation between dissolved-solids load and discharge is apparent from a comparison of the average monthly discharge and the average monthly dissolved solids load at S-65E during this study (fig. 21).

Although dissolved-solids concentrations in the lower Kissimmee River have increased in the past 20 years, dissolved-solids loads at S-65E in recent years have not been appreciably larger than loads in the

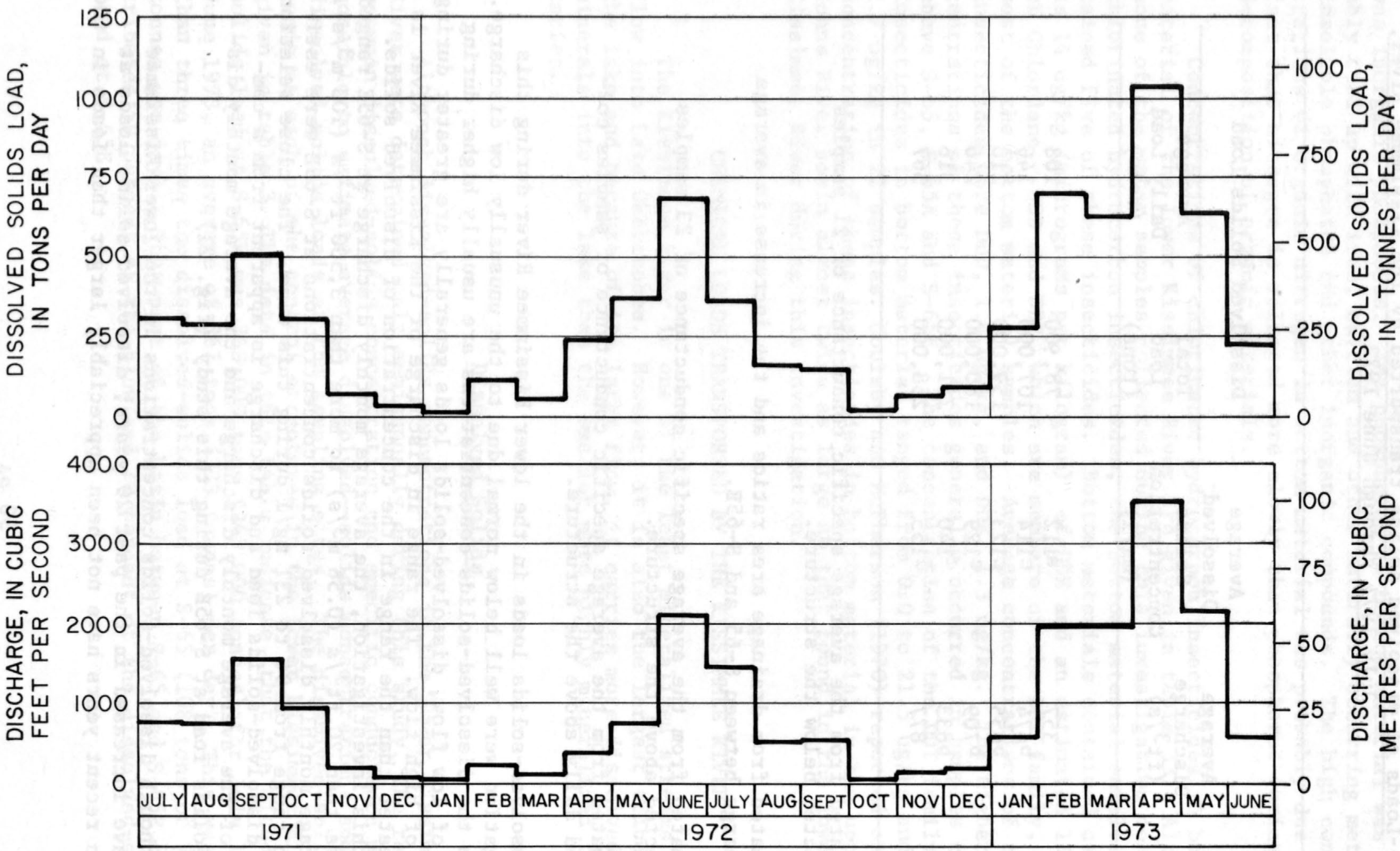

Figure 21. Average monthly loads of dissolved solids and average monthly discharge of the Kissimmee River at S-65E.

1950's. This is due primarily to the diversion of Lake Istokpoga drainage and dissolved-solids loads from the Kissimmee River basin and to low flows in the Kissimmee River resulting from deficient rainfall. A comparison of dissolved-solids loads for years when the average discharge was about equal suggests that in recent years dissolved-solids loads have been higher in relation to the discharge. For example, the dissolved-solids load at S-65E in the 1970 water year (October 1969-September 1970) was almost twice the dissolved solids loads in the 1958 and 1959 water years, even though the average discharges in all three years were nearly equal.

Nitrogen and Phosphorus

Nitrogen and phosphorus made up only a small part of the 268,000 tons (243,000 tonnes) of dissolved solids carried past S-65E and into Lake Okeechobee during July 1971-June 1973. Total loads of these plant nutrients at S-65E during this period were: nitrogen, 2,330 tons (2,110 tonnes) and phosphorus, 135 tons (122 tonnes). Loads of nitrogen and phosphorus at each of the control structures in the lower Kissimmee River are given in table 4. The data in this table indicates that the load of nitrogen at S-65E averaged 3.19 tons per day (2.89 tonnes per day) and was twice the load at S-65. The phosphorus load at S-65E averaged 0.185 tons per day (0.168 tonnes per day) and was more than seven times the average load at S-65. During July 1971-June 1973 that part of the basin between S-65 and S-65E contributed 59 percent of the flow (520 ft^3/s or 15 m^3/s), 49 percent of the nitrogen load (1,180 tons or 1,070 tonnes) and 86 percent of the phosphorus load (116 tons or 105 tonnes) at S-65E.

Loads of nitrogen and phosphorus increased in a downstream direction. The greatest increases in nitrogen load between structures were noted in impoundments above S-65D and S-65B, which have the largest drainage areas of the five impoundments. The largest increase in phosphorus load between structures occurred in the impoundment between S-65D and S-65E, which has the smallest drainage area of any of the impoundments. From July 1971 to June 1973, 43 percent of the phosphorus contributed to Lake Okeechobee from that part of the basin between S-65 and S-65E was contributed from the area between S-65D and S-65E. The area between S-65C and S-65D also contributed large amounts of phosphorus, and 75 percent of the total phosphorus load from the lower basin originated in t-he drainage area below S-65C which contributed less than 20 percent of the flow at S-65E.

Nitrogen concentrations fluctuated within a smaller range than did phosphorus concentrations and consequently, the nitrogen loads in the lower Kissimmee River were more closely related to discharge than were phosphorus loads. Average monthly loads of nitrogen and phosphorus at S-65E during this investigation are shown in figure 22. The figure

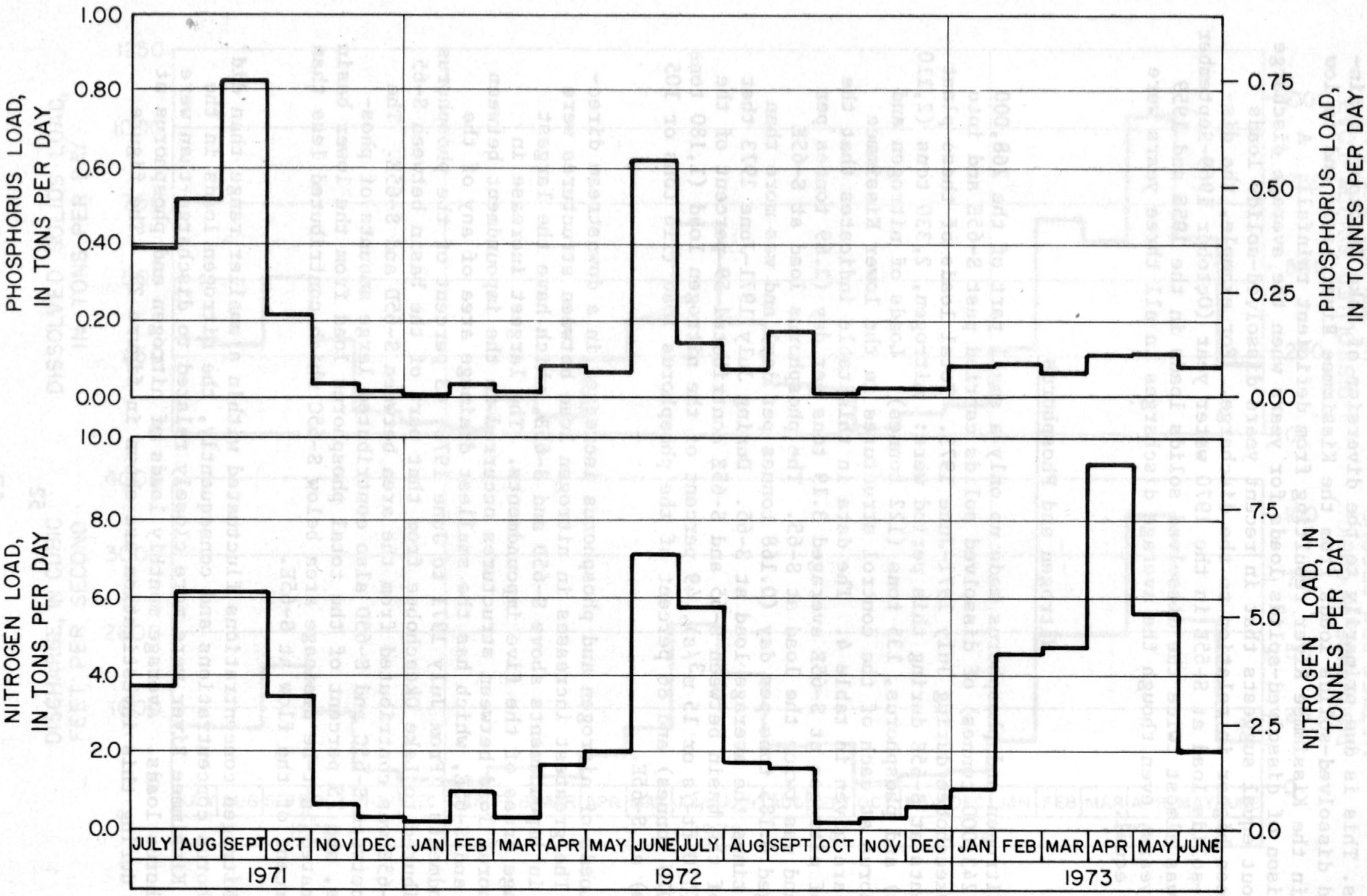

Figure 22. Average monthly loads of nitrogen and phosphorus transported by the Kissimmee River at S-65E.

Table 4.--Loads of nitrogen and phosphorus transported by the Kissimmee River, July 1971 through June 1973.

		NITROGEN			PHOSPHORUS		
Sampling Site	Average Discharge (ft^3/s)	Average Concentration (mg/l)	Total Load (tons)	Average Daily Load (tons per day)	Average Concentration (mg/l)	Total Load (tons)	Average Daily Load (tons per day)
S-65	357	[a]1.64	1,150	1.57	[a]0.027	19.0	0.026
S-65A	[b]474	[c]1.43	1,340	1.83	[c] .033	30.7	.042
S-65B	[b]655	[c]1.35	1,750	2.39	[c] .026	33.6	.046
S-65C	[b]709	[c]1.35	1,880	2.57	[c] .033	46.0	.063
S-65D	[b]833	[c]1.41	2,310	3.16	[c] .052	85.5	.117
S-65E	877	[c]1.34	2,330	3.19	[c] .078	135	.185

a Average concentration in 21 samples collected below the structure.

b Estimated from drainage area ratios and the increase in average discharge between S-65 and S-65E.

c Average concentration is 24 samples collected above the structure.

shows that nitrogen loads at S-65E were relatively large during the months of August and September, 1971, June and July, 1972, and February through May, 1973, when the discharge was high. Phosphorus loads were also large during August and September, 1971, and June and July, 1972, but were small during February through May, 1973. The relatively small phosphorus loads in the months of February through May, 1973 were probably due to the fact that the high flows during those months were not due to surface runoff from the entire basin, but were the result of the lakes in the upper basin being lowered in anticipation of the rainy season. The analyses of water samples collected at S-65 suggest that outflow from the large lakes in the upper basin generally contain more nitrogen but less phosphorus than surface runoff from the lower basin.

Loads of nitrogen and phosphorus were larger during the rainy season when surface runoff was high. The loads of these nutrients carried by the Kissimmee River would probably have been much larger had the rainfall and runoff during this investigation not been deficient. Between January 1, 1969 and January 31, 1970, when rainfall and flow were well above average, the loads of nitrogen and phosphorus at a point several miles downstream of S-65E averaged 9.22 and 0.73 ton per day (8.36 and 0.66 tonne per day), respectively, (Joyner, 1971). If the concentrations of nitrogen and phosphorus used to compute those loads were used to estimate loads at S-65E, the average loads of nitrogen and phosphorus at S-65E during that period would have been about 7.5 tons per day (6.8 tonnes per day) and 0.6 ton per day (0.5 tonne per day), respectively. Thus, during January 1969-January 1970, when the flow at S-65E averaged about three times as much as the average flow during this study, the nitrogen load was about twice as much and the phosphorus load about three times as much as the average loads during this investigation.

SUMMARY

The significant results of this investigation are summarized as follows:

1. The lower Kissimmee River contains a soft to moderately hard calcium bicarbonate water, low in turbidity but high in color. The dissolved-solids concentration increased downstream and was often slightly higher on the downstream side of a structure than on the upstream side. The dissolved-solids concentration above S-65E, the most downstream control structure, averaged less than 160 mg/l but occasionally exceeded 250 mg/l.

2. Concentrations of nitrogen generally decreased slightly between S-65 and S-65B, but remained fairly constant at sites downstream of S-65B. Concentrations of nitrogen generally were between 1.00 and 2.00 mg/l. On the average, about 85 percent of the total nitrogen was in the form of organic nitrogen. The inorganic nitrogen consisted largely of nitrate and ammonia nitrogen. Concentrations of nitrate nitrogen were higher during the winter and increased downstream. Concentrations of ammonia nitrogen were higher in the summer when dissolved-oxygen concentrations were low and decreased slightly downstream.

3. Concentrations of phosphorus increased appreciably downstream. The concentration of phosphorus at S-65E averaged 0.08 mg/l, three times the average concentration below S-65. Concentrations of phosphorus were as much as 0.25 mg/l and were higher during the first year of the investigation when discharge was unusually low. Above 70 percent of the phosphorus was in the orthophosphate form.

4. Water temperature and dissolved-oxygen concentrations in the impoundments were fairly uniform from top to bottom during the winter but the impoundments were often stratified during the summer. Stratification was particularly noticeable during the first year of the investigation. When the impoundments were stratified, water temperatures near the bottom were as much as 6°C lower than temperatures near the surface and dissolved-oxygen concentrations near the bottom were often less than 2.0 mg/l and sometimes less than 0.5 mg/l. When gates in the control structures were open, the water below the structures was usually well mixed.

5. When the impoundments were stratified, concentrations of phosphorus and ammonia nitrogen were often higher near the bottom of the impoundments than near the surface. When gate openings in the control structures were small, much of the water passing through the structures was from the bottom of the impoundments and consequently concentrations of ammonia nitrogen and phosphorus were often slightly higher below the structures than above them. Although the concentration of total phosphorus increased with depth, the concentration of total nitrogen generally

did not increase appreciably with depth because the increase in ammonia nitrogen with depth was often accompanied by a decrease in nitrate and other forms of nitrogen.

6. Water in the lower Kissimmee River often contains small amounts of dissolved aluminum, arsenic, cadmium, chromium, copper, iron, lead, manganese, strontium, zinc and the herbicides 2,4D and Silvex. None of the water samples analyzed during this investigation contained nickel or chlorinated hydrocarbon insecticides. The concentrations of the herbicides 2,4-D and silvex and all of the trace elements except iron were less than the limits recommended by the National Technical Advisory Committee (1968) for waters to be used for public water supplies.

7. Bottom materials in the lower Kissimmee River contain, on the average, 3.4 grams of nitrogen and 1.0 gram of phosphorus per kilogram of dry material. Bottom material in the lower Kissimmee River contains less nitrogen but more phosphorus than that in Lake Okeechobee (Joyner 1971). Most of the bottom material samples from the lower Kissimmee River also contained chlorinated hydrocarbon insecticides. The concentration of the DDT family of insecticides in bottom materials was as much as 21.5 ug/kg in one sample but averaged only 2.7 ug/kg and was much less than average concentrations that Goolsby and McPherson (1970) found in bottom materials in the upper St. Johns River basin.

8. The specific conductance and dissolved-solids concentration of water in the lower Kissimmee River has increased in the last 20 years. The specific conductance of water in the river near Okeechobee averaged more than 200 micromhos in the early 1970's compared to an average of less than 100 micromhos in the 1950's. This increase was due partly to the low discharge in recent years and to the diversion of the Lake Istokpogs drainage out of the Kissimmee River. However, the specific conductance has also been higher in relation to the discharge in recent years than in the 1950's because of increases in the amount of the more highly mineralized ground water contributed to the river in the form of sewage effluent from municipalities, cooling water, and water pumped or allowed to flow from artesian wells.

9. From July 1971 to June 1973, an estimated 268,000 tons (243,000 tonnes) of dissolved solids passed through control structure S-65E on the lower Kissimmee River. This was equivalent to 367 tons (333 tonnes) per day during a period when the average discharge was well below normal. That part of the basin between S-65 and S-65E contributed 59 percent of the flow and 70 percent of the dissolved-solids load at S-65E. Dissolved-solids loads at S-65E in recent years have not been appreciably larger than dissolved-solids loads in the 1950's because of the relatively low flows and the diversion of the Lake Istokpoga drainage out of the Kissimmee River. However, the dissolved-solids loads have been higher in relation to discharge in recent years than in the 1950's.

10. During this study, 2,330 tons (2,110 tonnes) of nitrogen and 135 tons (122 tonnes) of phosphorus were carried past S-65E and into Lake Okeechobee. The loads at S-65E averaged 3.19 tons (2.89 tonnes) of nitrogen per day and 0.185 ton (0.168 tonne) of phosphorus per day. The nitrogen load at S-65E was twice the load at S-65. The phosphorus load at S-65E was more than seven times the load at S-65. That part of the Kissimmee River basin below Lake Kissimmee contributed 59 percent of the flow, 49 percent of the total nitrogen load and 86 percent of the total phosphorus load at S-65E. The greatest increases in loads of nitrogen between control structures occurred in those impoundments with the largest drainage areas, but the largest increase in phosphorus load was between S-65D and S-65E, the impoundment with the smallest drainage area. Forty-three percent of the phosphorus contributed by the lower basin was from the area between S-65D and S-65E. Seventy-five percent of the total phosphorus load from the lower basin originated in the drainage area below S-65C.

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B A S I C   D A T A

Table 5.--*Chemical and physical characteristics and nutrient concentrations in the Kissimmee River above S-65.*

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
7-27-72	0810	681	132	28.0	6.7	21	5.3	24	15	36	0.00	.00	0.00	1.4	1.40	.02	.02
8-29-72	0800	0	130	27.5	6.6	20	8.0	12		52							
9-28-72	0810	0	140	27.0	7.4	34	6.3	13	15	52	.00	.01	.00	2.3	2.31	.02	.02
10-30-72	0825	0	132	21.0	6.2	20	8.3	8	5	60	.00	.01	.02	1.0	1.02	.01	.01
11-28-72	0825	0	142	17.0	6.4	20	9.4	6	8	35	.00	.00	.02	.86	.88	.02	.02
12-27-72	0805	0	130	14.0	6.0	30	7.7	26	35	14	.00	.00	.04	4.8	4.84	.02	.04
1-25-73	0805	0	126	17.0	6.2	16	6.4	14	5	64	.00	.00	.02	.85	.87	.00	.02
2-27-73	0800	1322	120	15.0	7.0	23	6.4	13	35	40	.50	.00	.10	2.2	2.80	.01	.02
3-28-73	0810	2444	138	19.5	7.7	22	2.7	11	10	20	.00	.01	.02	2.0	2.03	.02	.02
4-25-73	0810	825	138	22.5	6.7	24	7.3	10	9	38	.00	.00	.01	.89	.90	.01	.02
5-30-73	0800	155	140	29.0	6.8	24	5.4	23	10	36	.00	.00	.03	1.4	1.43	.01	.01
6-28-73	0800	0	146	29.0	7.2	32	7.6	13	9	54	.00	.01	.00	1.1	1.11	.02	.02

Table 6.--Chemical and physical characteristics and nutrient concentrations in the Kissimmee River below S-65.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
10-28-71	0800	0	148	24.0	6.7	51	2.7	20	2	32	0.34	0.06	0.25	0.93	1.57	0.05	0.06
11-29-71	0830	0	140	20.5	7.1	50	7.9	17	2	41	.22	.03	.09	1.2	1.54	.03	.04
12-27-71	0845	0	160	20.0	7.0	40	9.2	26	15	39	.32	.02	.15	2.6	3.09	.02	.05
1-27-72	0825	0	175	19.0	6.9	52	8.1	18	7	36	.32	.01	.30	2.2	2.83	.04	.05
2-28-72	0840	0	180	18.0	6.0	37	8.6	-	4	36	.30	.01	.13	3.0	3.44	.02	.04
3-30-72	0845	0	180	21.0	7.5	52	7.9	16	4	36	.14	.01	.03	1.2	1.38	.01	.03
4-27-72	0825	477	132	20.5	7.2	42	7.3	17	4	40	.00	.00	.07	2.6	2.70	.01	.02
5-24-72	0745	455	133	25.0	6.6	24	6.6	16	4	36	.00	.00	.00	1.2	1.20	.00	.02
6-29-72	0830	687	109	29.0	6.9	20	6.0	19	5	44	.00	.01	.03	1.3	1.34	.02	.03
7-27-72	0830	681	142	29.0	6.7	26	5.5	20	4	43	.00	.00	.00	1.0	1.00	.01	.02
8-29-72	0850	0	135	29.5	6.8	24	7.7	17	4	69	.00	.00	.19	1.2	1.40	.01	.02
9-28-72	0850	0	148	27.0	7.7	39	4.1	11	1	62	.00	.06	.19	1.0	1.25	.01	.01
10-30-72	0840	0	148	25.0	6.4	28	6.8	6	3	62	.09	.01	.13	.93	1.16	.01	.02
11-28-72	0850	0	158	19.0	7.1	26	9.1	6	2	52	.06	.02	.07	.73	.88	.00	.02
12-27-72	0825	0	170	15.5	6.2	36	5.9	7	4	60	.11	.01	.21	1.2	1.53	.01	.04
1-25-73	0830	0	178	16.0	6.6	30	6.8	15	5	50	.29	.00	.05	.81	1.16	.01	.03
2-27-73	0850	1322	105	15.5	6.7	20	8.5	12	6	42	.00	.00	.03	1.2	1.23	.01	.01
3-28-73	0835	2444	130	20.0	7.6	25	8.3	14	10	26	.00	.01	.02	2.0	2.03	.02	.02
4-25-73	0830	825	137	24.0	7.0	23	6.6	10	8	36	.00	.00	.01	1.4	1.43	.01	.01
5-30-73	0820	155	142	29.5	7.6	24	6.2	21	10	37	.00	.01	.03	1.3	1.34	.01	.02
6-28-73	0820	0	160	29.5	7.2	32	6.1	14	5	66	.00	.01	.02	1.0	1.02	.00	.03

Table 7. --Chemical and physical characteristics and nutrient concentrations in the Kissimmee River above S-65A

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
8-09-71	0850	0	-	30.0	7.0	52	3.5	-	4	-	0.00	0.03	0.11	1.8	1.94	0.04	0.06
8-30-71	0900	0	153	29.0	6.6	45	3.2	26	5	-	.00	.01	.35	1.5	1.86	.05	.06
9-27-71	0835	0	130	28.0	7.0	32	5.8	-	5	-	.00	.02	.13	1.6	1.75	.02	.05
10-28-71	0905	40	128	27.0	6.6	50	4.4	21	4	32	.07	.02	.19	1.1	1.38	.05	.06
11-29-71	0915	0	136	21.0	7.0	46	7.1	20	2	33	.02	.04	.09	1.1	1.24	.03	.04
12-27-71	0920	0	180	20.0	7.2	47	9.0	21	5	38	.25	.02	.07	1.8	2.14	.02	.04
1-27-72	0900	0	150	20.0	7.0	54	8.4	18	6	42	.29	.01	.03	1.9	2.23	.03	.04
2-28-72	0935	0	180	20.0	6.7	44	8.5	18	5	45	.30	.01	.08	1.6	1.99	.02	.03
3-30-72	0940	0	186	22.0	7.4	58	7.7	20	4	35	.20	.01	.12	1.1	1.45	.02	.04
4-27-72	0900	455	98	24.5	6.5	29	7.6	13	2	35	.00	.00	.03	1.3	1.33	.01	.02
5-24-72	0845	437	133	26.0	7.0	24	6.1	18	3	48	.00	.00	.02	1.0	1.02	.00	.02
6-29-72	0915	839	100	31.0	6.6	16	6.3	16	3	30	.00	.01	.06	1.3	1.37	.02	.02
7-27-72	0900	723	146	29.0	6.8	24	5.0	22	3	52	.00	.00	.04	1.3	1.34	.01	.02
8-29-72	0955	80	160	28.0	6.4	32	4.3	14	3	65	.00	.00	.10	.94	1.04	.00	.02
9-28-72	0925	0	175	28.0	7.8	46	5.8	12	1	48	.00	.01	.15	1.2	1.36	.02	.03
10-30-72	0910	0	168	25.5	6.7	40	7.9	6	3	55	.20	.00	.04	1.1	1.34	.02	.03
11-28-72	0915	0	195	19.5	6.6	26	8.5	7	3	60	.20	.00	.05	.69	.94	.01	.03
12-27-72	0900	0	198	17.0	6.4	38	6.2	6	3	52	.16	.01	.08	.75	1.00	.02	.08
1-25-73	0850	485	180	17.0	6.5	24	9.2	18	4	46	.10	.00	.01	1.2	1.32	.06	.10
2-27-73	1000	1410	105	15.5	7.5	26	9.6	14	9	40	.00	.00	.02	1.0	1.02	.01	.01
3-28-73	0900	2580	135	20.5	7.5	28	8.8	14	10	25	.00	.00	.02	1.5	1.52	.01	.01
4-25-73	0900	771	135	23.5	7.5	22	6.7	10	8	40	.00	.00	.03	1.6	1.63	.01	.01
5-30-73	0845	171	135	28.5	7.4	25	4.8	20	10	37	.00	.00	.03	1.0	1.03	.01	.02
6-28-73	0850	195	146	28.5	6.9	32	5.9	14	4	54	.00	.01	.01	.95	.97	.03	.05

Table 8. --Chemical and physical characteristics and nutrient concentrations in the Kissimmee River below S-65A.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
8-09-71	0920	0	-	29.0	6.9	76	1.8	-	4	-	0.00	0.02	0.53	1.9	2.46	0.10	0.10
8-30-71	1015	0	153	29.0	6.7	52	1.7	27	6	-	.00	.02	.33	1.8	2.15	.08	.09
9-27-71	0910	0	132	26.5	6.8	29	2.2	-	3	-	.09	.02	.16	1.3	1.57	.04	.06
10-28-71	0940	40	118	25.0	6.5	31	2.9	23	3	23	.07	.02	.26	1.1	1.45	.05	.06
11-29-71	0935	0	155	21.0	7.2	48	7.1	21	2	32	.18	.02	.12	.85	1.17	.04	.04
12-27-71	0950	0	194	20.0	7.1	56	8.6	20	4	36	.29	.01	.11	1.6	2.01	.02	.04
1-27-72	0930	0	162	21.0	7.1	66	7.8	17	7	36	.32	.01	.03	1.9	2.26	.04	.05
2-28-72	1035	0	185	19.5	6.0	36	8.1	17	3	41	.30	.01	.08	1.2	1.59	.02	.03
3-30-72	1015	0	215	24.0	7.7	72	7.8	16	4	25	.17	.01	.08	1.2	1.46	.02	.04
4-27-72	0940	455	150	25.0	6.8	32	9.0	14	3	37	.00	.00	.05	2.5	2.55	.01	.02
5-24-72	0940	437	132	26.0	7.1	24	5.8	17	3	47	.00	.00	.02	1.0	1.02	.01	.02
6-29-72	0945	839	105	30.0	6.5	20	4.7	17	4	40	.00	.01	.07	1.2	1.28	.02	.02
7-27-72	0915	723	146	29.0	6.5	24	4.1	25	2	52	.00	.00	.01	1.1	1.11	.01	.02
8-29-72	1030	80	130	29.0	6.6	32	3.7	15	3	60	.00	.01	.12	.92	1.05	.01	.02
9-28-72	1000	0	196	27.0	7.6	46	2.4	14	1	48	.17	.01	.95	.29	1.42	.02	.03
10-30-72	0925	0	154	24.5	6.7	48	6.1	9	3	54	.18	.01	.10	1.2	1.49	.02	.02
11-28-72	0940	0	210	20.0	7.4	54	7.8	16	2	54	.25	.00	.04	.74	1.03	.02	.04
12-27-72	0915	0	208	17.0	6.4	40	6.0	9	3	48	.18	.01	.10	.73	1.02	.02	.04
1-25-73	0910	485	175	17.0	6.7	29	8.4	19	5	38	.10	.01	.03	1.0	1.14	.07	.10
2-27-73	1050	1410	112	15.5	7.4	25	9.1	14	7	38	.20	.00	.03	.91	1.14	.01	.01
3-28-73	0925	2580	140	20.5	7.4	26	4.8	12	6	25	.00	.00	.04	1.5	1.54	.01	.02
4-25-73	0910	771	135	23.5	7.5	24	8.1	9	9	38	.00	.00	.01	1.2	1.21	.01	.01
5-30-73	0900	171	130	29.0	7.2	26	5.7	20	10	38	.00	.00	.03	1.2	1.24	.01	.02
6-28-73	0910	195	130	28.5	6.6	30	4.2	15	3	48	.00	.01	.03	1.0	1.04	.02	.06

Table 9. --Chemical and physical characteristics and nutrient concentrations in the Kissimmee River above S-65B.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
8-09-71	1010	0	-	29.5	7.1	64	2.6	-	4	-	0.02	0.04	0.14	1.8	2.00	0.03	0.04
8-30-71	1110	0	183	30.0	-	-	4.5	27	5	-	.02	.02	.09	1.6	1.73	.02	.03
9-27-71	0945	101	138	28.0	7.0	46	4.6	-	4	-	.04	.02	.08	1.5	1.64	.02	.04
10-28-71	1010	243	112	25.0	6.7	32	3.8	19	6	25	.02	.02	.12	1.1	1.26	.03	.04
11-29-71	1015	0	140	21.0	7.2	48	6.3	20	2	33	.09	.02	.12	1.1	1.33	.03	.03
12-27-71	1015	0	184	20.0	7.2	58	9.0	20	4	36	.16	.01	.06	1.8	2.03	.02	.04
1-27-72	1000	0	160	22.0	7.3	69	7.7	17	7	33	.18	.01	.03	.75	.97	.02	.04
2-28-72	1115	40	210	21.0	7.0	69	7.9	19	3	45	.20	.01	.11	1.8	2.12	.02	.03
3-30-72	1100	0	212	21.0	7.6	78	6.9	17	4	31	.11	.01	.14	1.1	1.36	.02	.03
4-27-72	1010	553	175	25.0	7.2	53	7.5	15	4	37	.03	.01	.03	1.4	1.47	.01	.03
5-24-72	1145	685	136	27.0	6.5	32	5.1	24	2	47	.00	.01	.06	.98	1.05	.01	.03
6-29-72	1025	1100	87	30.0	6.0	18	3.8	16	2	41	.01	.02	.10	1.2	1.33	.03	.03
7-27-72	0950	891	136	28.5	6.4	25	3.8	35	2	45	.00	.00	.06	1.1	1.16	.01	.02
8-29-72	1140	200	140	30.0	6.6	40	5.8	16	3	60	.00	.01	.08	.84	.93	.01	.03
9-28-72	1030	0	200	29.0	7.9	45	4.8	11	2	48	.00	.01	.03	1.1	1.14	.02	.02
10-30-72	0950	0	168	25.5	6.6	48	6.9	7	2	64	.13	.00	.04	.92	1.09	.02	.02
11-28-72	1005	100	208	20.0	7.5	62	9.0	13	2	60	.11	.00	.04	.67	.82	.02	.02
12-27-72	0940	0	195	16.5	6.4	48	7.1	7	2	48	.19	.01	.05	.74	.99	.02	.02
1-25-73	0950	1190	208	17.5	7.0	40	6.4	15	3	52	.13	.01	.03	1.1	1.27	.02	.03
2-27-73	1145	1560	134	16.5	7.6	29	9.9	13	7	48	.00	.00	.02	1.4	1.42	.01	.01
3-28-73	0955	3100	148	21.0	7.6	28	2.9	12	9	33	.00	.00	.19	1.3	1.49	.01	.01
4-25-73	0945	322	142	23.0	7.5	24	6.0	8	7	45	.00	.00	.01	1.2	1.21	.01	.01
5-30-73	0930	0	145	28.5	7.0	32	4.7	20	10	40	.00	.01	.02	1.2	1.23	.02	.03
6-28-73	0945	450	175	28.5	6.9	40	4.9	14	3	60	.00	.01	.15	1.2	1.36	.01	.02

Table 10.--Chemical and physical characteristics and nutrient concentrations in the Kissimmee River below S-65B.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
8-09-71	1040	0	-	30.0	7.2	80	3.7	-	4	-	0.02	0.04	0.28	1.4	1.74	0.07	0.09
8-30-71	1150	0	198	30.0	7.1	71	4.8	28	6	-	.04	.02	.16	1.9	2.12	.04	.05
9-27-71	1015	101	148	28.0	6.6	49	3.4	-	3	-	.02	.02	.17	1.4	1.61	.06	.09
10-28-71	1030	243	113	25.0	6.8	32	3.3	20	2	28	.02	.02	.12	1.0	1.16	.03	.04
11-29-71	1030	0	157	21.5	6.8	48	7.4	19	2	34	.11	.01	.09	1.0	1.20	.03	.04
12-27-71	1050	0	205	21.5	7.3	65	8.7	19	3	31	.20	.01	.03	1.3	1.54	.02	.04
1-27-72	1025	0	244	21.0	7.3	70	7.6	20	5	41	.23	.01	.04	2.2	2.47	.02	.04
2-28-72	1200	40	215	19.0	7.2	75	7.7	-	5	38	.20	.01	.06	.93	1.20	.02	.03
3-30-72	1130	0	215	23.5	8.0	82	7.9	17	4	32	.11	.01	.12	1.2	1.45	.02	.03
4-27-72	1035	553	210	25.0	7.0	55	7.1	14	3	36	.04	.01	.03	1.4	1.49	.01	.03
5-24-72	1300	685	138	26.0	6.8	25	5.9	17	2	40	.00	.01	.07	1.1	1.18	.01	.03
6-29-72	1045	1100	90	29.0	6.3	20	2.5	17	2	47	.01	.02	.10	1.0	1.13	.03	.03
7-27-72	1010	891	138	28.5	6.4	25	3.2	20	2	48	.02	.00	.06	.99	1.07	.01	.02
8-29-72	1210	200	140	30.0	6.6	44	4.7	16	3	60	.00	.01	.08	.86	.95	.02	.03
9-28-72	1050	0	192	28.5	7.7	45	3.1	16	1	40	.04	.01	.06	1.1	1.21	.02	.03
10-30-72	1015	0	166	25.5	6.7	48	6.3	7	2	42	.11	.01	.06	.90	1.08	.02	.02
11-28-72	1030	100	192	20.5	7.5	62	8.5	6	2	52	.12	.00	.04	.68	.84	.02	.02
12-27-72	1005	0	210	19.5	6.6	48	5.7	3	2	56	.20	.01	.04	.79	1.03	.01	.02
1-25-73	1020	1190	210	17.0	6.9	46	5.6	17	4	48	.13	.01	.02	1.3	1.46	.02	.03
2-27-73	1230	1560	133	16.0	7.4	28	10.5	13	8	33	.00	.00	.03	1.1	1.13	.01	.01
3-28-73	1015	3100	145	21.5	7.6	28	3.9	10	10	33	.00	.00	.03	1.2	1.23	.01	.01
4-25-73	1005	322	140	23.0	7.5	25	8.6	10	7	38	.00	.00	.03	1.2	1.23	.01	.01
5-30-73	0950	0	150	29.5	7.7	33	5.6	18	10	38	.00	.00	.03	1.1	1.13	.01	.01
6-28-73	1015	450	167	33.0	6.9	42	2.9	13	3	66	.00	.01	.13	.92	1.06	.01	.02

Table 11.--Chemical and physical characteristics and nutrient concentrations in the Kissimmee River above S-65C.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
8-09-71	1110	0	-	30.0	7.2	78	3.8	-	4	-	0.14	0.01	0.09	1.7	1.94	0.02	0.04
8-30-71	1250	0	230	30.0	7.0	79	2.0	25	5	-	.16	.02	.10	2.1	2.38	.05	.05
9-27-71	1120	109	158	28.0	7.2	52	5.8	-	4	-	.11	.02	.06	1.2	1.39	.03	.05
10-28-71	1110	108	130	25.5	6.8	50	3.7	20	4	40	.07	.02	.08	1.2	1.37	.04	.05
11-29-71	1100	0	152	21.0	7.2	50	6.1	19	2	36	.11	.02	.09	1.2	1.41	.03	.04
12-27-71	1145	0	203	21.0	7.5	63	9.2	18	5	36	.20	.01	.03	1.7	1.92	.02	.04
1-27-72	1050	0	205	21.5	7.3	64	7.8	17	4	47	.20	.01	.04	1.6	1.83	.03	.04
2-28-72	1305	0	210	23.0	7.2	73	8.8	18	4	44	.20	.01	.07	.69	.97	.02	.03
3-30-72	1200	0	215	21.5	7.8	84	6.6	16	30	25	.14	.01	.03	1.2	1.38	.08	.08
4-27-72	1100	321	196	24.5	7.2	69	7.4	15	2	38	.09	.00	.03	2.1	2.22	.01	.04
5-24-72	1330	545	160	27.0	7.2	40	7.5	15	4	72	.00	.00	.04	.84	.88	.01	.02
6-29-72	1130	1250	85	31.0	6.4	20	4.2	15	3	37	.05	.02	.10	1.6	1.77	.03	.04
7-27-72	1025	760	141	29.0	6.4	26	3.3	21	2	52	.02	.00	.08	.97	1.07	.02	.02
8-29-72	1300	213	140	33.5	7.0	46	6.3	14	2	54	.00	.01	.03	.85	.89	.02	.03
9-28-72	1115	0	180	28.0	6.6	33	2.6	12	1	48	.02	.01	.10	1.1	1.23	.02	.04
10-30-72	1030	0	150	26.0	6.6	40	7.5	7	2	52	.14	.01	.02	1.0	1.17	.02	.02
11-28-72	1050	44	168	21.0	6.8	42	7.9	15	2	64	.13	.00	.02	.68	.83	.02	.02
12-27-72	1030	0	230	18.0	6.6	52	5.4	6	3	66	.13	.01	.05	.75	.94	.01	.02
1-25-73	1045	1290	218	17.0	6.9	52	5.4	15	3	51	.14	.00	.03	1.0	1.18	.02	.03
2-27-73	1315	1400	138	17.0	7.5	30	7.0	12	10	44	.01	.00	.04	.88	.93	.01	.01
3-28-73	1035	3760	150	21.0	7.7	32	8.8	9	7	40	.00	.00	.04	1.1	1.14	.01	.01
4-25-73	1010	740	150	24.0	7.6	30	6.3	10	7	40	.00	.00	.02	1.4	1.42	.01	.01
5-30-73	1015	0	135	28.0	7.6	32	4.5	19	10	44	.00	.00	.04	1.0	1.04	.01	.02
6-28-73	1045	688	175	33.0	7.4	46	6.5	14	3	48	.00	.01	.08	.98	1.07	.02	.03

Table 12.--Chemical and physical characteristics and nutrient concentrations in the Kissimmee River below S-65C.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
8-09-71	1135	0	-	31.5	7.3	106	5.7	-	10	-	0.09	0.02	0.14	1.9	2.15	0.06	0.07
8-30-71	1350	0	215	30.5	7.1	80	4.3	24	5	-	.14	.02	.12	1.7	1.98	.06	.07
9-27-71	1145	109	165	28.5	7.1	52	4.9	-	3	-	.11	.02	.08	1.3	1.51	.04	.06
10-28-71	1130	108	136	25.0	6.8	52	3.4	18	1	42	.07	.02	.12	1.1	1.31	.05	.06
11-29-71	1145	0	186	20.5	7.4	63	9.1	21	3	33	.18	.01	.09	1.2	1.48	.05	.06
12-27-71	1150	0	226	22.0	7.8	76	9.0	19	4	36	.23	.01	.05	1.2	1.48	.04	.07
1-27-72	1120	0	256	23.0	7.5	81	6.9	17	5	33	.27	.01	.04	1.9	2.22	.05	.07
2-28-72	1350	0	220	21.5	7.4	82	7.9	-	5	35	.20	.01	.04	.93	1.18	.06	.06
3-30-72	1230	0	222	24.5	8.0	88	8.2	14	5	32	.20	.01	.04	.91	1.15	.03	.05
4-27-72	1125	321	198	25.0	7.2	71	7.0	15	2	38	.10	.01	.05	2.4	2.56	.01	.03
5-24-72	1410	545	162	28.0	6.9	44	7.1	14	2	72	.00	.00	.02	.88	.90	.01	.02
6-29-72	1200	1250	80	30.0	6.4	18	3.1	17	1	37	.05	.02	.12	1.3	1.49	.04	.05
7-27-72	1050	760	141	28.5	6.3	26	2.8	19	1	55	.02	.00	.09	.96	1.07	.02	.02
8-29-72	1345	213	150	33.0	6.7	41	4.0	16	3	62	.00	.01	.06	.86	.93	.06	.09
9-28-72	1140	0	204	28.0	7.0	38	2.9	11	1	38	.04	.01	.35	1.1	1.50	.08	.08
10-30-72	1045	0	166	25.0	6.7	42	6.7	7	3	45	.20	.01	.04	.84	1.08	.04	.04
11-28-72	1120	44	188	21.0	7.2	50	8.2	15	2	50	.20	.00	.03	.67	.86	.04	.04
12-27-72	1045	0	222	18.0	6.5	52	5.0	2	2	57	.13	.01	.05	.71	.90	.01	.02
1-25-73	1110	1290	214	17.0	7.3	58	6.3	17	4	48	.13	.00	.03	.89	1.06	.02	.02
2-27-73	1400	1400	135	16.5	7.4	29	8.2	12	5	38	.00	.00	.04	1.0	1.04	.01	.01
3-28-73	1100	3760	150	21.0	7.5	32	6.6	9	8	40	.00	.00	.05	1.1	1.15	.01	.01
4-25-73	1045	740	150	23.5	7.6	30	5.7	10	7	38	.00	.00	.03	1.1	1.13	.01	.01
5-30-73	1040	0	130	29.0	7.6	32	5.8	19	10	36	.00	.00	.01	1.2	1.22	.01	.02
6-28-73	1105	688	175	31.5	7.0	42	3.2	14	5	50	.01	.01	.07	1.1	1.19	.02	.03

Table 13.--Chemical and physical characteristics and nutrient concentrations in the Kissimmee River above S-65D.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nutrients: Nitrite (NO_2-N)	Nutrients: Ammonia (NH_4-N)	Nutrients: Organic Nitrogen (N)	Nutrients: Total Nitrogen (N)	Nutrients: Ortho-phosphorus (P)	Nutrients: Total Phosphorus (P)
8-09-71	1300	330	-	33.5	6.8	62	6.8	-	4	-	0.02	0.02	0.09	1.3	1.43	0.07	0.10
8-30-71	1440	504	166	29.0	6.7	50	2.6	23	3	-	.02	.01	.08	1.8	1.91	.10	.11
9-27-71	1250	506	170	29.0	7.1	58	4.2	-	3	-	.14	.02	.10	1.2	1.46	.09	.11
10-28-71	1230	301	156	25.5	7.0	48	4.2	20	2	38	.07	.02	.08	1.2	1.37	.05	.06
11-29-71	1310	50	188	21.0	7.3	58	7.6	19	5	33	.16	.02	.09	.93	1.19	.05	.06
12-27-71	1300	0	206	21.5	7.4	70	8.9	20	4	33	.20	.01	.09	1.6	1.89	.03	.06
1-27-72	1215	0	258	22.5	7.7	76	7.5	20	20	41	.25	.01	.03	2.2	2.49	.05	.06
2-28-72	1430	0	240	24.0	7.1	78	8.9	17	5	38	.20	.01	.13	1.2	1.54	.04	.04
3-30-72	1325	0	242	23.0	7.9	88	7.3	15	4	25	.18	.02	.14	1.2	1.54	.03	.05
4-27-72	1205	517	212	25.0	7.5	92	6.0	14	2	38	.03	.01	.05	2.6	2.69	.02	.04
5-24-72	1515	503	178	28.0	7.4	48	7.9	15	2	55	.00	.00	.06	.87	.93	.01	.03
6-29-72	1300	1620	90	34.0	6.6	22	5.3	15	2	32	.05	.02	.12	1.3	1.49	.07	.08
7-27-72	1145	994	185	29.0	6.6	30	3.9	22	2	54	.01	.01	.09	1.5	1.61	.02	.03
8-29-72	1445	920	145	35.0	6.9	39	8.3	16	3	42	.00	.01	.03	1.0	1.04	.02	.06
9-28-72	1235	0	195	28.5	6.7	34	4.1	14	2	42	.06	.01	.07	1.1	1.24	.06	.07
10-30-72	1200	0	170	26.0	6.8	41	7.0	8	3	45	.30	.01	.05	.91	1.22	.06	.06
11-28-72	1215	0	192	20.5	6.3	36	9.1	7	2	48	.21	.00	.02	.70	.93	.05	.06
12-27-72	1145	0	238	17.5	6.9	56	5.5	7	2	62	.20	.01	.05	1.0	1.22	.02	.04
1-25-73	1205	1240	244	18.0	7.1	60	3.9	16	4	50	.14	.00	.03	1.0	1.18	.04	.06
2-27-73	1445	1620	150	17.0	7.4	30	6.3	11	6	45	.00	.00	.02	1.1	1.12	.01	.01
3-28-73	1210	3630	160	22.5	7.6	34	5.9	9	7	48	.00	.00	.04	1.1	1.14	.01	.01
4-25-73	1110	780	155	24.0	7.3	34	5.5	10	8	45	.00	.00	.02	.97	.99	.01	.01
5-30-73	1100	0	130	28.0	7.5	33	3.8	18	10	48	.00	.00	.02	1.0	1.02	.01	.02
6-28-73	1130	950	175	29.5	7.3	42	6.4	12	4	60	.00	.02	.16	1.0	1.18	.02	.03

Table 14.--Chemical and physical characteristics and nutrient concentrations in the Kissimmee River below S-65D.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
8-10-71	0930	330	-	28.5	6.9	60	2.3	-	5	-	0.05	0.02	0.15	1.2	1.42	0.09	0.11
8-30-71	1530	504	163	28.5	6.8	50	2.9	32	4	-	.05	.01	.13	1.3	1.48	.09	.10
9-27-71	1305	506	170	28.0	6.8	53	4.3	-	3	-	.14	.01	.09	1.3	1.54	.10	.12
10-28-71	1245	301	157	25.5	7.0	48	4.1	19	2	42	.09	.02	.11	1.1	1.32	.05	.06
11-29-71	1335	50	198	22.0	7.2	56	8.1	19	2	35	.16	.02	.10	1.2	1.48	.06	.06
12-27-71	1335	0	222	22.5	7.6	65	8.4	20	4	35	.27	.01	.04	1.6	1.92	.04	.07
1-27-72	1255	0	280	22.5	7.6	75	6.7	18	5	38	.30	.01	.03	1.2	1.51	.06	.07
2-28-72	1525	0	250	21.5	7.5	81	8.3	-	5	44	.30	.01	.56	-	-	.06	.06
3-30-72	1345	0	268	23.0	7.9	86	8.1	15	4	37	.22	.01	.06	.83	1.12	-	.06
4-27-72	1235	517	212	25.5	7.5	81	5.3	14	2	37	.05	.01	.07	2.8	2.93	.02	.04
5-24-72	1550	503	180	27.0	7.2	40	7.3	4	2	59	.00	.01	.06	.98	1.05	.02	.03
6-29-72	1335	1620	87	31.0	6.3	20	3.3	15	3	36	.05	.02	.14	.96	1.17	.07	.08
7-27-72	1200	994	184	29.0	6.3	30	3.5	20	2	60	.01	.01	.08	1.9	2.00	.02	.03
8-29-72	1515	920	145	32.5	6.6	37	5.3	17	3	55	.00	.01	.06	1.1	1.17	.02	.06
9-28-72	1300	0	174	28.5	7.1	38	3.4	14	2	38	.20	.01	.02	.92	1.19	.10	.12
10-30-72	1215	0	180	26.5	6.8	41	7.0	7	5	38	.30	.01	.03	.90	1.19	.08	.08
11-28-72	1235	0	204	21.5	7.0	46	9.0	7	2	45	.23	.00	.02	.75	1.00	.05	.06
12-27-72	1200	0	240	18.0	7.2	66	3.2	7	2	52	.20	.01	.05	.76	.98	.02	.02
1-25-73	1230	1240	248	20.0	7.1	60	4.5	16	4	48	.14	.00	.03	.83	1.01	.05	.06
2-27-73	1520	1620	146	16.5	7.4	29	6.4	10	7	48	.00	.00	.01	1.0	1.01	.01	.02
3-28-73	1230	3630	155	22.0	7.4	34	5.2	9	7	48	.00	.00	.06	1.2	1.26	.01	.01
4-25-73	1130	780	155	24.0	7.6	34	6.4	10	8	40	.00	.00	.02	.91	.93	.01	.01
5-30-73	1120	0	130	29.0	7.4	36	8.1	16	8	45	.00	.01	.01	.94	.96	.02	.02
6-28-73	1145	950	175	29.5	7.0	44	5.9	12	3	54	.00	.02	.10	1.2	1.32	.02	.03

Table 15.--Chemical and physical characteristics and nutrient concentrations in the Kissimmee River above S-65E.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
8-10-71	0855	431	-	29.0	7.0	64	3.5	-	4	-	0.07	0.03	0.15	1.6	1.86	0.17	0.19
8-30-71	1600	715	168	28.5	6.8	49	2.2	24	4	-	.07	.02	.15	2.9	3.15	-	.26
9-27-71	1340	330	170	29.0	7.1	45	5.3	-	7	-	.11	.02	.13	1.2	1.45	.16	.19
10-28-71	1315	319	177	26.5	6.9	50	3.9	24	3	43	.14	.02	.10	1.1	1.36	.07	.08
11-29-71	1400	112	215	21.5	7.4	60	6.0	19	2	35	.18	.02	.10	.85	1.15	.06	.06
12-27-71	1400	0	268	21.5	7.4	72	8.4	19	5	38	.25	.01	.04	1.1	1.40	.04	.06
1-27-72	1315	0	310	22.0	7.8	72	8.1	16	4	35	.27	.01	.02	1.9	2.20	.05	.06
2-28-72	1600	0	265	23.0	7.5	78	9.2	19	5	44	.30	.01	.12	1.2	1.63	.05	.06
3-30-72	1415	0	305	23.5	7.8	86	7.3	15	3	25	.22	.01	.04	.85	1.12	.04	.06
4-27-72	1300	350	275	25.0	7.4	84	4.9	7	2	38	.20	.01	.05	1.3	1.56	.06	.07
5-24-72	1620	576	210	28.0	7.2	58	7.7	14	2	60	.03	.01	.04	.90	.98	.02	.04
6-29-72	1400	2360	100	32.0	6.5	27	4.9	14	2	38	.06	.02	.26	.94	1.28	.10	.11
7-27-72	1220	650	170	29.5	6.5	32	4.1	22	2	64	.01	.01	.08	1.4	1.50	.03	.04
8-29-72	1600	1090	150	36.0	6.7	38	6.2	15	3	38	.05	.01	.06	1.2	1.32	.02	.06
9-28-72	1330	0	182	28.0	7.0	37	4.0	13	1	48	.20	.01	.02	.92	1.12	.11	.12
10-30-72	1235	0	218	26.0	6.9	40	6.8	8	4	52	.21	.01	.02	.94	1.18	.09	.09
11-28-72	1250	107	340	21.0	7.0	42	8.7	6	2	48	.20	.01	.02	.68	.90	.07	.08
12-27-72	1230	648	252	18.0	7.0	52	5.7	7	2	62	.21	.01	.07	.76	1.05	.04	.04
1-25-73	1225	1290	250	19.5	7.1	60	3.8	16	3	66	.12	.01	.03	.74	.90	.04	.05
2-27-73	1625	1710	165	16.5	7.3	31	6.8	12	7	40	.00	.00	.03	.83	.86	.01	.02
3-28-73	1300	3371	165	22.5	7.5	35	7.6	9	5	60	.00	.00	.06	.84	.90	.01	.01
4-25-73	1145	1200	155	24.0	7.5	31	5.8	10	7	44	.00	.00	.03	.96	.99	.01	.01
5-30-73	1145	0	130	28.5	7.7	34	5.4	20	7	48	.00	.01	.04	.91	.96	.02	.02
6-28-73	1215	5380	180	29.5	6.8	40	6.2	10	3	62	.00	.01	.05	1.2	1.26	.03	.05

Table 16.--Chemical and physical characteristics and nutrient concentrations in the Kissimmee River below S-65E.

(milligrams per litre except as indicated)

Date	Time	Discharge (cfs)	Specific conductance (micromhos)	Temperature (°C)	pH	Bicarbonate (HCO_3)	Dissolved Oxygen	Total Organic Carbon	Turbidity (JTU)	Secchi disk (in.)	Nutrients: Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-phosphorus (P)	Total Phosphorus (P)
7-27-72	1240	650	138	29.5	6.3	31	4.6	24	1	60	0.01	0.01	0.09	1.2	1.31	0.03	0.04
8-29-72	1645	1090	150	35.0	6.5	38	3.1	-	3	45	.06	.01	.08	1.1	1.25	.03	.06
9-28-72	1345	0	218	29.5	7.2	39	4.2	17	3	36	.26	.01	.03	1.0	1.30	.11	.13
10-30-72	1250	0	262	27.0	7.1	51	7.2	10	7	36	.37	.01	.03	1.0	1.41	.11	.11
11-28-72	1315	107	370	21.5	6.9	46	9.0	7	2	48	.29	.00	.03	.76	1.08	.08	.09
12-27-72	1245	648	260	18.5	7.0	54	4.5	6	2	57	.22	.01	.06	.74	1.03	.04	.05
1-25-73	1330	1290	250	18.0	7.1	62	5.3	16	4	62	.12	.01	.05	.72	.90	.04	.05
2-27-73	1645	1710	160	15.5	7.4	32	7.2	11	7	42	.00	.00	.01	1.0	1.01	.01	.02
3-28-73	1315	3371	165	22.5	7.5	35	5.9	8	6	56	.00	.00	.06	1.2	1.26	.01	.02
4-25-73	1205	1200	155	23.5	7.7	34	6.3	10	8	40	.00	.00	.03	.93	.96	.01	.01
5-30-73	1200	0	150	29.5	7.7	33	5.7	20	7	40	.00	.01	.02	.93	.96	.02	.02
6-28-73	1235	5380	205	29.5	6.8	38	4.7	10	4	62	.00	.01	.07	.83	.91	.05	.06

Table 17.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65.
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	July 27, 1972 0810 hrs.		Aug. 29, 1972 0800 hrs.		Sept. 28, 1972 0810 hrs.		Oct. 30, 1972 0825 hrs.		Nov. 28, 1972 0825 hrs.		Dec. 27, 1972 0805 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	28.0	5.3	27.5	8.0	27.0	6.3	21.0	8.3	17.0	9.4	14.0	7.7
5	28.0	5.0	28.0	8.0	27.0	6.1	21.0	8.1	17.0	8.8	14.0	7.4
10	28.0	4.9	28.0	7.7	27.0	5.4	21.0	8.1	17.0	8.6	14.0	6.6
15	[a]28.0	[a]5.0	[a]27.5	[a]6.3	26.5	1.0	20.5	3.4	17.0	7.5	14.0	5.1

Table 17.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River at S-65.-Continued.
(Profiles taken at midstream approximately 150 ft above structure.)

Depth below water surface (ft)	Jan. 25, 1973 0805 hrs.		Feb. 27, 1973 0800 hrs.		Mar. 28, 1973 0810 hrs.		Apr. 25, 1973 0810 hrs.		May 30, 1973 0800 hrs.		June 28, 1973 0800 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	17.0	6.4	15.0	6.4	19.5	2.7	22.5	7.3	29.0	5.4	29.0	7.6
5	17.0	3.9	15.0	2.2	20.0	1.4	22.5	6.9	29.0	5.5	29.0	7.6
10	17.0	2.7	15.0	1.7	20.0	1.2	23.0	6.9	28.5	5.4	28.0	3.0
15	16.5	2.4	15.0	1.3	20.0	.9	[a]23.0	[a]6.4	[b]28.0	[b]5.3	27.0	.8

a Depth, 14.0 feet.
b Depth, 13.0 feet.

Table 18.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65.
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)							Oct. 28, 1971 0800 hrs.		Nov. 29, 1971 0830 hrs.		Dec. 27, 1971 0845 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0							24.0	2.7	20.5	7.9	20.0	9.2
5							24.0	2.5	20.5	7.8	20.0	9.1
10							24.0	2.5	20.0	7.5	20.0	9.1
15							24.0	2.5	20.0	7.2	20.0	9.1
20							24.0	2.3	20.0	7.0	20.0	8.9
25							24.0	2.4	20.0	6.9	20.0	8.7
30							[a]24.0	[a]2.3	[b]19.5	[b]5.7	[b]20.0	[b]8.7

Table 18.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65 (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 27, 1972 0825 hrs.		Feb. 28, 1972 0840 hrs.		Mar. 30, 1972 0845 hrs.		Apr. 27, 1972 0825 hrs.		May 24, 1972 0745 hrs.		June 29, 1972 0830 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	19.0	8.1	18.0	8.6	21.0	7.9	20.5	7.3	25.0	6.6	29.0	6.0
5	19.0	7.5	17.0	8.3	21.0	7.6	22.0	7.6	25.0	6.6	28.5	6.3
10	18.5	7.1	16.5	8.2	21.0	7.4	22.0	5.5	25.0	6.5	28.5	6.3
15	18.5	6.9	16.5	8.2	21.0	7.4	22.0	6.4	25.0	6.5	28.5	6.3
20	18.0	6.3	16.0	7.0	21.0	7.4	22.0	5.9	25.0	6.5	28.5	6.3
25	-	-	15.0	7.0	21.0	7.2	22.0	5.7	25.0	6.5	29.0	6.4
30	[b]18.0	[b]6.0	[c]15.0	[c]7.0	[a]21.0	[a]7.2			[a]25.0	[a]6.4	[a]29.0	[a]5.9

Table 18.-- Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65 (continued)
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	July 27, 1972 0830 hrs.		Aug. 29, 1972 0850 hrs.		Sept. 28, 1972 0850 hrs.		Oct. 30, 1972 0840 hrs.		Nov. 28, 1972 0850 hrs.		Dec. 27, 1972 0825 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	29.0	5.5	29.5	7.7	27.0	4.1	25.0	6.8	19.0	9.1	15.5	5.9
5	29.0	5.4	29.5	7.6	27.0	4.2	25.0	6.0	19.0	8.6	17.0	5.5
10	29.0	5.0	29.0	6.0	27.0	3.6	25.0	5.8	19.0	8.2	17.0	5.4
15	29.0	5.0	29.0	3.3	27.0	3.3	25.0	5.6	19.0	6.8	17.0	5.0
20	29.0	4.7	28.5	.9	27.0	2.2	25.0	5.3	19.0	6.2	17.0	4.9
25	28.5	4.8	28.5	.7	27.0	1.4	25.0	5.3	19.0	5.7	17.0	4.9
30	[b]28.5	[b]4.7	[b]28.5	[b].7	[a]27.0	[a].6	[a]25.0	[a]1.9	[b]18.5	[b]5.6	[a]17.0	[a]4.8

Table 18.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65 (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 25, 1973 0830 hrs.		Feb. 27, 1973 0850 hrs.		Mar. 28, 1973 0835 hrs.		Apr. 25, 1973 0830 hrs.		May 30, 1973 0820 hrs.		June 28, 1973 0820 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	16.0	6.8	15.5	8.5	20.0	8.3	24.0	6.6	29.5	6.2	29.5	6.1
5	16.0	4.4	15.5	3.7	20.0	2.4	24.0	6.8	29.5	6.3	29.5	6.2
10	16.0	3.4	15.5	2.1	20.0	1.3	24.0	6.9	29.5	5.9	29.0	4.8
15	16.0	3.0	15.5	1.5	20.0	1.1	23.0	6.9	29.5	5.7	28.5	4.5
20	16.0	2.7	15.5	1.3	20.0	1.0	23.0	6.8	29.5	5.7	28.0	3.5
25	16.0	2.6	15.5	1.2	20.0	.9	23.0	6.8	29.0	5.5	28.0	2.8
30	[a]16.0	[a]2.4			20.0	.9	[b]23.0	[b]6.7	[b]29.0	[b]5.6	[a]28.0	[a]2.0

a Depth, 29.0 feet
b Depth, 28.0 feet
c Depth 28.5 feet

Table 19.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65A
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Aug. 9, 1971 0850 hrs.		Aug. 30, 1971 0920 hrs.		Sept. 27, 1971 0835 hrs.		Oct. 28, 1971 0905 hrs.		Nov. 29, 1971 0915 hrs.		Dec. 27, 1971 0920 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	30.0		29.0	3.2	28.0	5.8	27.0	4.4	21.0	7.1	20.0	9.0
5	30.0	3.5	29.0	3.2	28.0	5.6	27.0	4.7	21.0	6.6	20.0	8.7
10	30.0	.4	29.0	2.1	28.0	5.6	27.0	4.5	20.5	6.2	20.0	8.4
15	29.0	.2	28.0	.2	28.0	5.3	27.0	4.5	20.5	6.0	20.0	8.4
20	29.0	.3	27.5	.2	28.0	4.2	27.0	4.3	20.5	5.7	20.0	8.3
25	[a]28.5	[a].4	27.0	.1	27.5	1.6	27.0	4.2	20.5	5.7	20.0	8.2

Table 19.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65A (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 27, 1972 0900 hrs.		Feb. 28, 1972 0935 hrs.		Mar. 30, 1972 0940 hrs.		Apr. 27, 1972 0900 hrs.		May 24, 1972 0845 hrs.		June 29, 1972 0915 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	20.0	8.4	20.0	8.5	22.0	7.7	24.5	7.6	26.0	6.1	31.0	6.3
5	20.0	8.6	20.0	8.4	22.0	7.1	24.5	6.3	26.0	6.0	32.0	5.9
10	20.0	8.5	19.5	8.3	21.5	4.8	24.5	5.4	26.0	5.9	32.0	5.0
15	19.5	8.1	18.0	7.4	20.0	4.1	24.5	5.2	26.0	5.7	31.0	4.8
20	19.5	7.9	16.0	7.2	20.0	3.6	24.5	4.7	25.5	4.4	31.0	3.1
25	[b]19.5	[b]7.2	[a]16.0	[a]7.2	20.0	2.8	[b]24.5	[b]3.5	[a]25.0	[a]3.8	[c]30.5	[c]2.7

Table 19.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65A (continued).

(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	July 27, 1972 0900 hrs.		Aug. 29, 1972 0955 hrs.		Sept. 28, 1972 0925 hrs.		Oct. 30, 1972 0910 hrs.		Nov. 28, 1972 0915 hrs.		Dec. 27, 1972 0900 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	29.0	5.0	28.0	4.3	28.0	5.8	25.5	7.9	19.5	8.5	17.0	6.2
5	29.0	4.8	28.0	3.9	28.0	5.1	25.5	6.9	19.0	7.9	17.0	6.2
10	29.0	4.6	28.0	3.6	28.0	4.4	25.5	6.4	19.0	7.6	17.0	5.5
15	29.0	3.8	28.0	3.5	28.0	4.0	25.0	5.1	19.0	7.4	17.0	5.5
20	28.5	2.0	28.0	3.7	28.0	2.8	25.0	4.0	19.0	7.1	17.0	5.3
25	28.0	1.1	[c]28.0	[c]3.7	[c]28.0	[c]2.7	25.0	2.8	19.0	6.9	[a]16.5	[a]4.3

Table 19.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65A (continued).

(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 25, 1973 0850 hrs.		Feb. 27, 1973 1000 hrs.		Mar. 28, 1973 0900 hrs.		Apr. 25, 1973 0900 hrs.		May 30, 1973 0845 hrs.		June 28, 1973 0850 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	17.0	9.2	15.5	9.6	20.5	8.8	23.5	6.7	28.5	4.8	28.5	5.9
5	17.0	7.5	15.0	3.6	20.5	2.2	23.5	6.6	28.5	4.7	28.5	5.4
10	17.0	4.7	15.0	1.6	20.5	1.1	23.5	6.0	28.5	4.4	28.0	3.8
15	17.0	3.9	15.0	1.4	20.5	1.0	23.0	6.0	28.0	3.3	28.0	3.7
20	17.0	3.2	15.0	1.2	20.0	.9	23.0	5.5	28.0	2.6	27.5	2.6
25	16.5	3.2	[c]15.0	[c]1.1	20.0	.8	23.0	5.6	28.0	2.5	27.5	2.2

a Depth, 24.0 feet.
b Depth, 24.5 feet.
c Depth, 23.0 feet.

Table 20.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65A.
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Aug. 9, 1971 0920 hrs.		Aug. 30, 1971 1030 hrs.		Sept. 27, 1971 0910 hrs.		Oct. 28, 1971 0940 hrs.		Nov. 29, 1971 0935 hrs.		Dec. 27, 1971 0950 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	29.0	1.8	29.0	1.7	26.5	2.2	25.0	2.9	21.0	7.1	20.0	8.6
5	29.0	1.7	29.0	1.4	26.0	1.9	25.0	2.9	21.0	7.7	20.0	7.9
10	29.0	.2	28.5	1.3	26.0	1.8	25.0	2.9	21.0	7.0	20.0	7.9
15	28.5	.1	28.5	1.3	26.0	1.7	25.0	2.9	21.0	7.1	20.0	7.8
20	28.5	.1	28.0	.2	26.0	1.7	25.0	2.6	21.0	6.7	20.0	7.7
25	28.0	.1	28.0	.1	[a]26.0	[a]1.5	25.0	2.4	21.0	6.6	20.0	7.7

Table 20.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65 A (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 27, 1972 0930 hrs.		Feb. 28. 1972 1035 hrs.		Mar. 30, 1972 1015 hrs.		Apr. 27, 1972 0940 hrs.		May 24, 1972 0940 hrs.		June 29, 1972 0945 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	21.0	7.8	19.5	8.1	24.0	7.8	25.0	9.0	26.0	5.8	30.0	4.7
5	20.5	7.4	19.0	7.7	24.0	7.5	25.0	7.4	26.0	5.8	30.0	4.6
10	20.5	7.3	17.0	7.5	24.0	7.4	25.0	6.0	26.0	5.8	29.0	4.4
15	20.5	6.7	16.5	7.5	24.0	7.4	25.0	5.3	26.0	5.7	30.0	4.5
20	20.0	6.6	16.0	7.4	23.5	7.2	25.0	5.1	26.0	5.7	30.0	4.4
25	20.0	6.3	16.0	7.0	21.0	7.2	[b]25.0	[b]5.1	[b]26.0	[b]5.6	30.0	4.5

Table 20.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65 A (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	July 27, 1972 0915 hrs.		Aug. 29, 1972 1030 hrs.		Sept. 28, 1972 1000 hrs		Oct. 30, 1972 0925 hrs.		Nov. 28. 1972 0940 hrs.		Dec. 27, 1972 0915 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	29.0	4.1	29.0	3.7	27.0	2.4	24.5	6.1	20.0	7.8	17.0	6.0
5	29.0	3.9	29.0	3.4	26.5	1.8	24.5	5.4	20.0	6.9	17.5	5.5
10	29.0	3.9	28.5	3.3	26.5	1.6	24.5	5.1	19.5	6.7	17.5	5.4
15	29.0	3.9	28.5	3.3	26.5	1.7	24.5	4.9	19.5	6.5	17.5	5.4
20	29.0	3.9	28.0	3.2	26.5	1.6	24.5	4.5	19.5	6.3	17.5	4.9
25	29.0	3.9	28.0	3.2	26.5	1.7	24.5	2.9	19.5	6.1	17.5	4.7

Table 20.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65 A (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 25, 1973 0910 hrs.		Feb. 27, 1973 1050 hrs.		Mar. 28, 1973 0925 hrs.		Apr. 25, 1973 0910 hrs.		May 30, 1973 0900 hrs.		June 28, 1973 0910 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	17.0	8.4	15.5	9.1	20.5	4.8	23.5	8.1	29.0	5.7	28.5	4.2
5	17.0	4.6	15.5	4.4	20.5	2.4	23.5	7.4	28.5	5.1	28.5	4.6
10	17.0	3.5	15.5	2.2	20.5	1.1	23.5	6.9	28.5	4.6	28.5	3.7
15	17.0	3.0	15.5	1.6	20.5	.9	23.5	6.6	28.5	4.5	28.5	3.6
20	17.0	2.9	15.5	1.3	20.5	.8	23.5	6.3	28.5	4.3	28.5	3.1
25	17.0	2.7	15.5	1.2	20.5	.9	[b]23.5	[b]6.3	[b]28.5	[b]4.3	28.5	2.9

a Depth, 26.0 feet
b Depth, 24.0 feet

Table 21.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65B.
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Aug. 9, 1971 1010 hrs.		Aug. 30, 1971 1100 hrs.		Sept. 27, 1971 0945 hrs.		Oct. 28, 1971 1010 hrs.		Nov. 29, 1971 1015 hrs.		Dec. 27, 1971 1015 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	29.5	2.6	30.0	4.5	28.0	4.6	25.0	3.8	21.0	6.3	20.0	9.0
5	29.0	2.3	30.0	3.7	28.0	4.3	25.0	3.9	21.0	6.4	19.0	8.8
10	29.0	2.1	29.5	3.0	28.0	4.2	25.0	4.0	21.0	6.4	18.5	8.8
15	29.0	.5	29.0	2.4	28.0	4.1	25.0	3.8	21.0	6.3	18.5	8.1
20	28.0	.1	[a]29.0	[a]1.2	27.5	4.1	25.0	3.4	[b]21.0	[b]6.3	[c]18.5	[c]8.0

Table 21.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65B (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 27, 1972 1000 hrs.		Feb. 28, 1972 1115 hrs.		Mar. 30, 1972 1100 hrs.		Apr. 27, 1972 1110 hrs.		May 24, 1972 1145 hrs.		June 29, 1972 1025 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	22.0	7.7	21.0	7.9	21.0	6.9	25.0	7.5	27.0	5.1	30.0	3.8
5	22.0	7.4	21.0	7.9	21.0	6.9	25.0	6.4	26.5	5.0	30.0	2.6
10	22.0	7.6	21.0	7.9	21.0	6.7	24.5	5.1	26.0	4.7	29.5	2.3
15	21.5	7.4	20.5	7.8	20.5	6.5	24.5	5.0	26.0	4.7	29.5	2.1
20	21.0	7.3	17.0	7.3	[a]20.0	[a]6.0			25.5	4.5	[c]29.5	[c]2.1

Table 21.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65B (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	July 27, 1972 0950 hrs.		Aug. 29, 1972 1140 hrs.		Sept. 28, 1972 1030 hrs.		Oct. 30, 1972 0950 hrs.		Nov. 28, 1972 1005 hrs.		Dec. 27, 1972 0940 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	28.5	3.8	30.0	5.8	29.0	4.8	25.5	6.9	20.0	9.0	16.5	7.1
5	28.5	3.4	29.5	5.0	28.5	4.8	25.5	6.4	19.5	8.4	17.5	5.9
10	28.0	3.1	29.0	4.0	28.5	4.7	25.5	5.9	19.5	7.8	17.5	5.5
15	28.0	2.0	29.0	2.9	28.5	3.5	25.0	5.0	19.0	7.7	17.5	5.4
20	[c]28.0	[c]1.4	[c]29.0	[c]2.9	28.0	2.3	[d]25.0	[d]4.6	[c]19.0	[c]7.5	17.5	5.0

Table 21.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65B (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 25, 1973 0950 hrs.		Feb. 27, 1973 1145 hrs.		Mar. 28, 1973 0955 hrs.		April 25, 1973 0945 hrs.		May 30, 1973 0930 hrs.		June 28, 1973 0945 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	17.5	6.4	16.5	9.9	21.0	2.9	23.0	6.0	28.5	4.7	28.5	4.9
5	17.0	3.7	16.0	6.4	21.0	1.5	23.0	5.4	28.5	4.2	28.5	4.3
10	17.0	2.8	15.0	3.5	20.5	1.0	23.0	4.7	28.0	3.6	28.5	3.5
15	17.0	2.4	14.5	2.3	20.5	.8	22.5	4.4	28.0	3.7	27.5	1.1
20	17.0	2.3	14.5	2.0	20.5	.8			[e]28.0	[e]3.6	27.5	.6

a Depth, 19.5 feet
b Depth, 18.5 feet
c Depth, 19.0 feet
d Depth, 21.0 feet
e Depth, 18.0 feet

Table 22.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65B.
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Aug. 9, 1971 1040 hrs.		Aug. 30, 1971 1145 hrs.		Sept. 27, 1971 1015 hrs.		Oct. 28, 1971 1030 hrs.		Nov. 29, 1971 1030 hrs.		Dec. 27, 1971 1050 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	30.0	3.7	30.0	4.8	28.0	3.4	25.0	3.3	21.5	7.4	21.5	8.7
5	30.0	2.4	30.0	4.6	28.0	3.2	25.0	3.5	21.5	7.4	21.0	8.3
10	29.5	1.3	30.0	4.2	28.0	3.0	25.0	3.4	21.5	7.2	21.0	8.2
15	29.0	.2	30.0	4.2	27.5	3.0	25.0	3.6	21.5	7.2	21.0	8.1
20	29.0	.2	29.0	.9	27.5	2.6	25.0	3.3	21.5	7.2	21.0	8.0
25	28.5	.1	28.0	.2	27.0	.5	25.0	3.3	21.5	7.2	20.5	7.9
30	28.0	.1	28.0	.1	27.0	.2	24.5	3.2	21.5	7.1	20.5	7.8
35	[a]28.0	[a].1			[b]27.0	[b].2			21.5	6.9		

Table 22.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65B (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 27, 1972 1025 hrs.		Feb. 28, 1972 1200 hrs.		Mar. 30, 1972 1130 hrs.		Apr. 27, 1972 1035 hrs.		May 24, 1972 1300 hrs.		June 29, 1972 1045 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	21.0	7.6	19.0	7.7	23.5	7.9	25.0	7.1	26.5	5.9	29.0	2.5
5	21.0	7.5	18.0	7.5	23.5	7.9	24.5	6.5	26.0	5.0	29.0	2.4
10	20.5	7.5	18.0	7.5	23.5	7.7	24.5	5.5	26.0	4.9	29.0	2.4
15	20.0	7.6	18.0	7.6	23.0	7.8	24.5	5.1	26.0	4.8	29.0	2.1
20	20.0	7.3	16.5	7.2	22.5	7.5	24.5	5.0	26.0	4.7	29.0	2.2
25	20.0	7.2	16.5	7.0	21.5	7.1	24.5	4.6	26.0	4.6	29.5	2.2
30	20.0	6.9	16.5	7.0	20.5	5.3	24.0	3.3	26.0	4.5	29.0	2.2
35	20.0	6.9	16.5	3.0			[c]24.0	[c]3.2	25.0	4.2	[e]29.0	[e]2.2
40									[d]25.0	[d]3.2		

Table 22.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65B (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	July 27, 1972 1010 hrs.		Aug. 29, 1972 1210 hrs.		Sept. 28, 1972 1050 hrs.		Oct. 30, 1972 1015 hrs.		Nov. 28, 1972 1030 hrs.		Dec. 27, 1972 1005 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	28.5	3.2	30.0	4.7	28.5	3.1	25.5	6.3	20.5	8.5	19.5	5.7
5	28.5	3.0	30.0	3.9	28.0	2.7	25.5	5.9	20.0	8.4	19.5	5.8
10	28.5	3.0	29.0	3.5	28.0	2.5	25.0	5.8	20.0	7.8	20.0	5.4
15	28.0	2.9	29.0	3.3	28.0	2.6	25.0	5.6	20.0	7.6	20.0	5.1
20	28.0	2.9	29.0	3.2	28.0	2.1	25.0	5.5	20.0	7.4	20.0	5.1
25	28.0	2.8	29.0	3.0	27.5	.4	25.0	5.5	19.5	7.3	20.0	5.0
30	28.0	2.8	28.5	2.7	27.5	.2	25.0	5.3	19.5	7.2	20.0	5.0
35	[f]28.0	[f]2.7	28.5	2.6			[c]25.0	[c]5.3			20.0	4.8
40			[g]28.5	[g]2.6								

Table 22.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65B (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 25, 1973 1020 hrs.		Feb. 27, 1973 1230 hrs.		Mar. 28, 1973 1015 hrs.		Apr. 25, 1973 1005 hrs.		May 30, 1973 0950 hrs.		June 28, 1973 1015 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	17.0	5.6	16.0	10.5	21.5	3.9	23.0	8.6	29.5	5.6	33.0	2.9
5	17.0	4.0	15.5	9.1	21.0	1.1	23.0	7.2	29.5	5.7	33.0	2.6
10	17.0	3.0	15.5	2.8	20.5	1.0	23.0	6.1	29.5	5.7	33.0	2.6
15	17.0	2.5	15.5	1.5	20.5	.8	23.0	5.9	29.5	5.7	33.0	2.3
20	17.0	2.3	15.5	1.2	20.5	.8	23.0	5.5	29.0	5.4	33.0	2.2
25	17.0	2.2	15.5	1.1	20.5	.8	23.0	5.3	28.5	3.9	33.0	1.8
30			15.5	1.1	20.5	.9	[h]23.0	[h]5.2	[h]28.5	[h]2.1	33.0	1.6
35			15.5	1.0	20.5	.9					32.5	1.4

a Depth, 36.0 feet.
b Depth, 37.0 feet.
c Depth, 34.0 feet.
d Depth, 38.0 feet.
e Depth, 32.0 feet.
f Depth, 33.0 feet.
g Depth, 39.0 feet.
h Depth, 29.0 feet.

Table 23.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65C.
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Aug. 9, 1971 1110 hrs.		Aug. 30, 1971 1245 hrs.		Sept. 27, 1971 1120 hrs.		Oct. 28, 1971 1110 hrs.		Nov. 29, 1971 1100 hrs.		Dec. 27, 1971 1145 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	30.0	3.8	30.0	2.0	28.0	5.8	25.5	3.7	21.0	6.1	21.0	9.2
5	29.5	2.6	29.0	1.6	28.0	5.1	25.0	3.7	21.0	6.2	20.5	8.8
10	29.5	2.5	29.0	1.1	28.0	5.1	25.0	3.7	21.0	5.9	20.5	8.6
15	29.0	1.4	28.5	.8	28.0	4.9	25.0	3.7	21.0	6.0	20.5	8.4
20	29.0	1.6	28.0	.4	28.0	4.8	25.0	3.5	21.0	5.8	20.5	8.4
25	28.5	.4	27.5	.2	28.0	3.2	[a]25.0	[a]3.4	21.0	5.4	20.5	8.4

Table 23.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65C (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 27, 1972 1050 hrs.		Feb. 28, 1972 1305 hrs.		Mar. 30, 1972 1200 hrs.		Apr. 27, 1972 1100 hrs.		May 24, 1972 1330 hrs.		June 29, 1972 1130 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	21.5	7.8	23.0	8.8	21.5	6.6	24.5	7.4	27.0	7.5	31.0	4.2
5	21.5	7.9	22.0	8.6	21.0	6.7	24.5	5.8	27.0	7.5	31.0	3.3
10	21.0	7.7	20.5	8.4	20.5	6.2	24.5	5.3	26.5	7.4	31.0	2.6
15	21.0	7.6	18.5	7.9	20.0	6.4	24.5	4.9	26.5	7.2	31.0	2.5
20	20.5	7.6	17.0	7.9	19.5	6.1	24.0	4.5	26.5	6.9	30.0	2.5
25	20.0	7.6	17.0	7.7	19.0	6.0	24.0	4.2	26.0	6.2	29.0	2.1

Table 23.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65C (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	July 27, 1972 1025 hrs.		Aug. 29, 1972 1300 hrs.		Sept. 28, 1972 1115 hrs.		Oct. 30, 1972 1030 hrs.		Nov. 28, 1972 1050 hrs.		Dec. 27, 1972 1030 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	29.0	3.3	33.5	6.3	28.0	2.6	26.0	7.5	21.0	7.9	18.0	5.4
5	28.5	3.0	34.0	4.8	27.5	2.3	25.5	6.5	20.5	7.6	18.0	4.9
10	28.5	2.8	33.0	3.6	27.0	2.2	25.5	6.3	20.5	7.2	18.0	5.0
15	28.5	2.1	32.5	1.9	27.0	2.2	25.5	5.4	20.5	7.1	18.0	4.5
20	28.0	1.8	32.0	2.1	27.0	2.0	25.0	5.0	20.0	7.0	18.0	4.4
25	28.0	1.8	[b]32.0	[b]1.9	27.0	2.0	25.0	4.6	20.0	6.9	18.0	4.0
30							[c]25.0	[c]2.0				

Table 23.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65C (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 25, 1973 1045 hrs.		Feb. 27, 1973 1315 hrs.		Mar. 28, 1973 1035 hrs.		Apr. 25, 1973 1010 hrs.		May 30, 1973 1015 hrs.		June 28, 1973 1045 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	17.0	5.4	17.0	7.0	21.0	8.8	24.0	6.3	28.0	4.5	33.0	6.5
5	17.0	3.4	16.5	4.0	21.0	2.1	24.0	5.8	28.0	4.3	33.0	6.5
10	17.0	2.6	16.0	2.0	20.5	1.3	23.5	5.1	28.0	3.7	32.5	3.1
15	17.0	2.3	15.5	1.3	20.5	1.1	23.0	4.7	28.0	3.8	32.0	2.3
20	17.0	2.2	15.0	1.2	20.5	1.0	23.0	4.4	28.0	3.4	31.5	.5
25	16.5	2.1	14.5	1.2	20.5	.9			27.5	1.5	a 31.0	a .5

a Depth, 24.0 feet.
b Depth, 23.5 feet.
c Depth, 28.0 feet.

Table 24.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65C.

(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Aug. 9, 1971 1135 hrs.		Aug. 30, 1971 1310 hrs.		Sept. 27, 1971 1145 hrs.		Oct. 28, 1971 1130 hrs.		Nov. 29, 1971 1145 hrs.		Dec. 27, 1971 1150 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	31.5	5.7	30.5	4.3	28.5	4.9	25.0	3.4	20.5	9.1	22.0	9.0
5	31.0	4.1	30.0	4.1	28.0	4.9	25.0	3.5	21.0	8.6	22.0	8.7
10	30.5	1.6	30.0	4.0	28.0	4.8	25.0	3.4	21.0	7.9	21.5	8.6
15	29.5	.5	30.0	3.7	28.0	4.7	25.0	3.4	21.0	7.6	21.5	8.5
20	29.0	.2	30.0	3.7	28.0	4.6	25.0	3.3	21.0	7.1	21.0	8.2
25	29.0	.1	29.5	2.8	28.0	4.6	25.0	3.2	20.5	6.7	21.0	8.3
30	29.0	.1	29.0	2.6	28.0	4.6	25.0	3.1	20.5	6.2	20.5	8.2
35	29.0	.1	[a]29.0	[a]2.6	28.0	4.5	25.0	3.0	[b]20.5	[b]6.1	[a]20.5	[a]8.2

Table 24.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65C (continued)
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 27, 1972 1120 hrs.		Feb. 28, 1972 1350 hrs.		Mar. 30, 1972 1230 hrs.		Apr. 27, 1972 1125 hrs.		May 24, 1972 1410 hrs.		June 29, 1972 1200 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	23.0	6.9	21.5	7.9	24.5	8.2	25.0	7.0	28.0	7.1	30.0	3.1
5	22.5	7.1	19.0	7.6	23.5	7.9	24.5	6.0	27.0	7.0	30.0	3.1
10	22.0	7.0	18.0	7.7	23.0	7.4	24.5	5.1	27.0	7.2	29.5	3.0
15	22.0	7.0	17.5	7.3	23.0	7.2	24.5	4.8	27.0	7.1	29.5	2.9
20	21.0	6.8	17.0	7.6	22.0	7.3	24.5	4.7	27.0	6.6	29.0	2.9
25	21.0	6.8	17.0	7.5	21.5	6.6	24.0	4.7	27.0	6.9	29.0	2.7
30	20.5	6.7	17.0	7.4	21.0	5.0	24.0	4.5	27.0	6.9	29.5	2.8
35	[a]20.5	[a]6.6							[a]27.0	[a]6.9	[a]29.5	[a]2.7

Table 24.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65C (continued)
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	July 27, 1972 1050 hrs.		Aug. 29, 1972 1345 hrs.		Sept. 28, 1972 1140 hrs.		Oct. 30, 1972 1045 hrs.		Nov. 28, 1972 1120 hrs.		Dec. 27, 1972 1045 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	28.5	2.8	33.0	4.0	28.0	2.9	25.0	6.7	21.0	8.2	18.0	5.0
5	28.5	2.7	33.0	3.1	28.0	3.1	25.0	6.5	20.5	8.0	18.0	4.6
10	28.5	2.7	32.5	3.3	27.5	3.0	25.0	6.0	20.5	8.0	18.0	4.2
15	28.0	2.6	32.5	2.6	27.5	2.8	25.0	5.8	20.0	7.7	18.0	3.8
20	28.0	2.6	32.0	2.4	27.0	.8	25.0	5.8	20.0	7.1	18.0	3.4
25	28.0	2.5	32.0	2.2	27.0	.2	25.0	5.6	20.0	7.0	18.0	3.6
30	28.0	2.6	32.0	2.2	27.0	.1	25.0	5.5	20.0	6.8	18.0	3.5
35	28.0	2.5	32.0	2.0			[c]25.0	[c]5.3	[a]20.0	[a]6.7	18.0	3.3

Table 24.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65C (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 25, 1973 1110 hrs.		Feb. 27, 1973 1400 hrs.		Mar. 28, 1973 1100 hrs.		Apr. 25, 1973 1045 hrs.		May 30, 1973 1040 hrs.		June 28, 1973 1105 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	17.0	6.3	16.5	8.2	21.0	6.6	23.5	5.7	29.0	5.8	31.5	3.2
5	17.0	4.0	16.5	3.6	21.0	1.7	23.0	5.4	29.0	5.7	30.5	3.8
10	17.0	2.9	16.0	1.8	21.0	1.2	23.0	5.3	29.0	5.5	30.5	3.2
15	17.0	2.6	16.0	1.4	21.0	1.0	23.0	5.3	29.0	5.7	30.5	3.2
20	17.0	2.4	16.0	1.2	21.0	1.0	23.0	5.2	29.0	5.5	30.5	2.6
25	17.0	2.4	16.0	1.1	20.5	.9	23.0	5.4	29.0	5.5	30.0	2.5
30	17.0	2.3	16.0	1.0	20.5	.9	23.0	5.3	28.5	2.9	30.0	2.2
35											[c]30.0	[c]2.1

a Depth, 33.0 feet.
b Depth, 33.5 feet.
c Depth, 34.0 feet.

Table 25.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65D.

(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Aug. 9, 1971 1300 hrs.		Aug. 30, 1971 1440 hrs.		Sept. 27, 1971 1250 hrs.		Oct. 28, 1971 1230 hrs.		Nov. 29, 1971 1310 hrs.		Dec. 27, 1971 1300 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	33.5	6.8	29.0	2.6	29.0	4.2	25.5	4.2	21.0	7.6	21.5	8.9
5	32.0	6.7	29.0	2.1	28.5	4.2	25.5	4.2	20.5	7.4	21.0	8.7
10	31.5	2.8	28.5	1.1	28.0	4.1	25.0	4.0	20.5	7.2	21.0	8.5
15	30.0	1.4	28.0	.4	28.0	4.0	25.0	4.0	20.5	6.9	21.0	8.4
20	29.5	.4	28.0	.3	27.5	3.7	25.0	4.2	20.5	6.6	20.5	8.2
25	[a]28.5	[a].2	27.5	.2	[b]27.5	[b]3.0	[b]25.0	[b]3.8	20.5	6.6	20.5	8.2

Table 25. --Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65D (continued).
(Profiles taken at midstream approximately 150 ft. above structure)

Depth below water surface (ft)	Jan. 27, 1972 1215 hrs.		Feb. 28, 1972 1430 hrs.		Mar. 30, 1972 1325 hrs.		Apr. 27, 1972 1205 hrs.		May 24, 1972 1515 hrs.		June 29, 1972 1300 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	22.5	7.5	24.0	8.9	23.0	7.3	25.0	6.0	28.0	7.9	34.0	5.3
5	22.0	7.4	22.0	8.7	23.0	7.3	25.0	5.2	28.0	7.8	32.0	3.9
10	21.5	7.4	18.5	7.8	22.5	6.6	24.5	4.7	27.5	8.0	31.5	2.8
15	21.0	7.4	17.0	7.3	22.0	6.6	24.5	4.4	27.5	7.8	30.0	2.6
20	20.5	7.2	16.5	7.3	21.0	5.8	24.5	4.1	27.0	7.6	29.5	1.8
25	[c]20.0	[c]6.8	16.0	7.0	20.5	4.5	24.0	2.7	[b]27.0	[b]7.7	[d]29.5	[d]1.2

Table 25.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65D (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	July 27, 1972 1145 hrs.		Aug. 29, 1972 1445 hrs.		Sept. 28, 1972 1235 hrs.		Oct. 30, 1972 1200 hrs.		Nov. 28, 1972 1215 hrs.		Dec. 27, 1972 1145 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	29.0	3.9	35.0	8.3	28.5	4.1	26.0	7.0	20.5	9.1	17.5	5.5
5	29.0	3.5	34.5	7.3	28.5	4.1	26.0	6.8	20.0	8.8	17.5	3.4
10	29.0	3.1	31.5	4.5	28.0	3.7	25.5	6.4	20.0	8.0	17.5	2.6
15	28.5	2.5	31.0	3.3	28.0	3.2	25.5	6.2	20.0	7.7	18.0	2.0
20	28.5	2.2	31.0	1.8	27.5	1.6	25.0	5.9	20.0	7.5	18.0	1.7
25	28.0	1.3	[b]31.0	[b]1.7	27.0	.9	25.0	2.4	20.0	7.3	[a]18.0	[a]1.7
30					[e]27.0	[e].6						

Table 25.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65D (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 25, 1973 1205 hrs.		Feb. 27, 1973 1445 hrs.		Mar. 28, 1973 1210 hrs.		Apr. 25, 1973 1110 hrs.		May 30, 1973 1100 hrs.		June 28, 1973 1130 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	18.0	3.9	17.0	6.3	22.5	5.9	24.0	5.5	28.0	3.8	29.5	6.4
5	18.0	2.5	16.5	2.3	22.0	1.7	23.5	5.3	28.0	3.8	29.5	6.4
10	17.5	2.2	16.0	1.4	22.0	1.2	23.5	4.6	27.5	3.6	29.5	5.8
15	17.5	2.1	16.0	1.2	21.5	1.1	23.0	4.1	27.5	3.6	29.0	4.1
20	17.5	2.1	16.0	1.0	21.5	1.0	23.0	4.0	27.5	3.0	28.5	2.6
25	17.0	2.1	[a]16.0	[a]1.0	21.5	1.0	23.0	3.6	27.0	1.9	[a]27.5	[a]1.2

a Depth, 24.0 feet.
b Depth, 23.0 feet.
c Depth, 24.5 feet.
d Depth, 23.5 feet.
e Depth, 28.0 feet.

Table 26.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65D.
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Aug. 10, 1971 0930 hrs.		Aug. 30, 1971 1515 hrs.		Sept. 27, 1971 1305 hrs.		Oct. 28, 1971 1245 hrs.		Nov. 29, 1971 1335 hrs.		Dec. 27, 1971 1335 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	28.5	2.3	28.5	2.9	28.0	4.3	25.5	4.1	22.0	8.1	22.5	8.4
5	28.5	2.3	28.5	2.8	28.0	4.0	25.5	4.2	22.0	7.8	22.0	8.3
10	29.0	2.3	29.0	2.1	28.0	3.9	25.5	3.9	22.0	7.4	22.0	8.2
15	29.0	2.2	29.0	1.9	28.0	3.9	25.5	3.9	22.0	7.1	22.0	8.3
20	29.0	2.2	29.0	1.9	27.5	3.9	25.5	3.8	21.5	6.4	21.5	8.0
25	29.0	2.2	29.0	1.9	27.5	3.9	25.5	3.7	21.5	6.2	21.0	8.0
30	29.0	1.7	29.0	1.9	27.5	3.9	25.5	3.7	21.5	5.7	21.0	7.9
35	[a]29.0	[a]1.9	[b]29.0	[b]1.9	[b]27.5	[b]3.8	[a]25.5	[a]3.6	[b]21.5	[b]5.6		

Table 26.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65D (continued)
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 27, 1972 1255 hrs.		Feb. 28, 1972 1525 hrs.		Mar. 30, 1972 1345 hrs.		Apr. 27, 1972 1235 hrs.		May 24, 1972 1550 hrs.		June 29, 1972 1335 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	22.5	6.7	21.5	8.3	23.0	8.1	25.5	5.3	27.0	7.3	31.0	3.3
5	22.0	6.7	18.5	7.4	23.0	7.8	25.5	5.1	27.0	7.1	30.5	3.2
10	21.5	6.6	18.0	7.3	23.0	7.4	25.5	4.8	27.0	6.9	30.0	3.2
15	21.0	6.5	17.5	7.3	22.5	7.3	25.0	4.8	26.5	6.9	30.5	3.0
20	20.5	6.4	17.0	7.3	22.5	7.1	25.0	4.8	26.5	6.8	30.0	2.9
25	20.0	6.4	17.0	7.3	22.0	6.6	25.0	4.8	25.5	6.6	30.0	3.0
30	20.0	6.4	17.0	7.2	21.5	3.7	25.0	4.7	25.5	6.3	29.5	2.7
35									[b]25.5	[b]5.8	[b]29.5	[b]2.5

Table 26.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65D (continued)
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	July 27, 1972 1200 hrs.		Aug. 29, 1972 1515 hrs.		Sept. 28, 1972 1300 hrs.		Oct. 30, 1972 1215 hrs.		Nov. 28, 1972 1235 hrs.		Dec. 27, 1972 1200 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	29.0	3.5	32.5	5.3	28.5	3.4	26.5	7.0	21.5	9.0	18.0	3.2
5	29.0	3.4	32.0	4.7	28.0	3.2	26.0	7.4	21.0	8.2	18.0	2.6
10	28.5	3.2	32.0	4.2	28.0	2.6	26.0	6.2	21.0	7.4	18.0	2.7
15	28.5	3.1	31.5	4.2	28.0	2.6	25.5	6.2	20.5	7.0	18.0	2.4
20	28.5	3.1	31.5	3.9	28.0	2.3	25.5	6.0	20.5	7.1	18.0	2.5
25	28.5	3.1	31.5	3.9	27.5	1.5	25.0	6.0	20.5	7.0	18.0	2.4
30	28.5	3.1	31.5	3.7	27.5	.7	25.0	5.9	20.0	7.2	18.0	2.5
35	28.5	3.1	[a]31.0	[a]2.7	[c]27.5	[c].3	[c]25.0	[c]5.9			[a]18.0	[a]2.5

Table 26.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65D (continued)
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 25, 1973 1230 hrs.		Feb. 27, 1973 1520 hrs.		Mar. 28, 1973 1230 hrs.		Apr. 25, 1973 1130 hrs.		May 30, 1973 1120 hrs.		June 28, 1973 1145 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	20.0	4.5	16.5	6.4	22.0	5.2	24.0	6.4	29.0	8.1	29.5	5.9
5	19.5	3.0	16.5	3.8	21.5	2.4	23.5	5.7	29.0	6.3	29.5	6.4
10	19.5	1.6	16.5	1.7	21.5	1.7	23.5	5.1	29.0	5.6	29.5	6.4
15	19.5	1.7	16.5	1.3	21.5	1.2	23.5	5.1	29.0	5.4	29.0	6.4
20	19.5	1.4	16.5	1.0	21.5	1.2	23.5	4.9	29.0	5.1	29.0	5.9
25	19.5	2.1	16.0	1.1	21.5	1.0	23.0	4.9	28.5	5.0	29.0	5.8
30	19.0	2.0	16.0	1.0	21.5	1.0	23.0	4.9	28.5	4.7	29.0	5.0
35			16.0	.9							29.0	4.8

a Depth, 34.0 feet.
b Depth, 33.0 feet.
c Depth, 33.5 feet.

Table 27.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65E.
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Aug. 10, 1971 0855 hrs.		Aug. 30, 1971 1615 hrs.		Sept. 27, 1971 1340 hrs.		Oct. 28, 1971 1315 hrs.		Nov. 29, 1971 1400 hrs		Dec. 27, 1971 1400 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	29.0	3.5	28.5	2.2	29.0	5.3	26.5	3.9	21.5	6.0	21.5	8.4
5	29.0	3.5	28.5	2.3	29.0	4.8	26.0	3.6	21.0	5.9	21.0	8.4
10	29.0	3.6	28.5	1.8	28.5	4.4	26.0	3.9	21.0	5.6	21.0	8.2
15	29.0	3.8	28.0	.5	28.0	4.3	26.0	3.6	21.0	5.4	21.0	8.2
20	29.0	.9	28.0	.3	28.0	.9	25.5	3.5	21.0	5.1	21.0	8.2
25	29.0	.2	28.0	.3	28.0	.4	25.5	3.5	21.0	5.0	21.0	8.2
30	[a]29.0	[a].2	28.0	.3	[b]28.0	[b].1	[a]25.5	[a]3.3	[b]21.0	[b]4.8	[b]20.5	[b]8.1

Table 27.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65E (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 27, 1972 1315 hrs.		Feb. 28, 1972 1600 hrs.		Mar. 30, 1972 1414 hrs.		Apr. 27, 1972 1300 hrs.		May 24, 1972 1620 hrs.		June 29, 1972 1400 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	22.0	8.1	23.0	9.2	23.5	7.3	25.0	4.9	28.0	7.7	32.0	4.9
5	22.0	7.5	22.0	8.8	22.5	7.2	25.0	4.6	27.5	7.5	31.0	4.0
10	21.5	7.3	21.0	8.5	22.0	6.5	24.5	4.6	27.5	7.3	29.5	3.2
15	21.0	7.3	18.0	8.2	21.5	6.1	24.5	4.6	27.0	7.0	29.5	3.2
20	21.0	7.2	17.0	8.2	21.0	6.0	24.5	4.4	27.0	6.9	29.0	2.5
25	20.0	7.2	17.0	7.9	21.0	5.3	24.0	3.0	27.0	6.6	29.0	2.5
30	[c]20.0	[c]6.9			[c]21.0	[c]4.1			[c]26.5	[c]5.5	[b]29.0	[b]2.1

Table 27.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65E (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	July 27, 1972 1220 hrs.		Aug. 29, 1972 1600 hrs.		Sept. 28, 1972 1330 hrs.		Oct. 30, 1972 1235 hrs.		Nov. 28, 1972 1250 hrs.		Dec. 27, 1972 1230 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	29.5	4.1	36.0	6.2	28.0	4.0	26.0	6.8	21.0	8.7	18.0	5.7
5	29.0	3.8	36.0	5.4	28.0	3.0	26.0	6.6	20.0	8.1	18.0	4.5
10	29.0	3.8	35.0	4.1	27.5	2.7	25.5	6.4	20.0	7.7	18.0	3.7
15	28.5	3.2	34.5	2.8	27.5	2.6	25.5	6.4	20.0	7.5	18.0	3.1
20	28.5	2.8	34.0	2.8	27.5	2.5	25.5	5.9	20.0	7.3	18.0	2.8
25	28.5	2.6	34.0	1.2	27.5	2.5	25.5	5.5	20.0	7.1	18.0	2.7
30	[d]28.0	[d]2.2	[a]34.0	[a].8	[a]27.0	[a]2.5	[a]25.0	[a]4.8	[a]20.0	[a]7.1	[a]18.0	[a]2.5

Table 27.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River above S-65E (continued).
(Profiles taken at midstream approximately 150 ft above structure)

Depth below water surface (ft)	Jan. 25, 1973 1255 hrs.		Feb. 27, 1973 1625 hrs.		Mar. 28, 1973 1300 hrs.		Apr. 25, 1973 1145 hrs.		May 30, 1973 1145 hrs.		June 28, 1973 1215 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	19.5	3.8	16.5	6.8	22.5	7.6	24.0	5.8	28.5	5.4	29.5	6.2
5	19.0	2.8	16.5	3.2	22.0	3.1	24.0	5.8	28.0	5.0	29.0	5.5
10	18.5	2.3	16.0	1.3	21.5	1.3	24.0	5.4	28.0	4.5	28.5	4.8
15	18.0	2.1	16.0	1.0	21.5	1.1	23.5	4.8	28.0	4.4	28.0	3.6
20	17.5	2.0	16.0	.9	21.5	1.1	23.0	4.1	28.0	3.6	28.0	3.1
25	17.5	1.9	16.0	.8	21.0	1.0	23.0	3.8	27.5	2.0	28.0	2.8
30	[a]17.0	[a]1.9	[d]16.0	[d].8	21.0	1.0	[a]23.0	[a]3.6	[d]27.5	[d]1.4	28.0	1.8

a Depth, 29.0 feet.
b Depth, 28.5 feet.
c Depth, 29.5 feet.
d Depth, 28.0 feet.

Table 28.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65E.
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	July 27, 1972 1240 hrs.		Aug. 29, 1972 1645 hrs.		Sept. 28, 1972 1345 hrs.		Oct. 30, 1972 1250 hrs.		Nov. 28, 1972 1315 hrs.		Dec. 27, 1972 1245 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)	Temp. (°C)	Dissolved oxygen (mg/1)
0	29.5	4.6	35.0	3.1	29.5	4.2	27.0	7.2	21.5	9.0	18.5	4.5
5	29.5	4.3	35.0	3.5	29.5	4.2	26.5	7.1	21.0	7.8	18.0	3.9
10	29.0	4.1	34.5	2.4	29.0	3.9	26.0	6.9	21.0	7.3	18.0	3.1
15	29.0	3.9	34.0	2.8	29.0	3.5	25.5	6.8	21.0	7.0	18.0	2.6
20	29.0	3.7	34.0	1.2	29.0	3.3	25.5	6.3	21.0	6.8	18.0	2.0
25	29.0	3.8	33.5	2.1	28.5	3.0	25.5	6.0	20.5	6.7	18.0	2.3
30	29.0	3.7			28.0	2.1	25.5	5.5	20.5	6.7	18.0	2.0
35					[a]28.0	[a]1.0						

Table 28.--Vertical profiles of temperature and dissolved oxygen in the Kissimmee River below S-65E (continued).
(Profiles taken at midstream approximately 150 ft below structure)

Depth below water surface (ft)	Jan. 25, 1973 1330 hrs.		Feb. 27, 1973 1645 hrs.		Mar. 28, 1973 1315 hrs.		Apr. 25, 1973 1205 hrs.		May 30, 1973 1200 hrs.		June 28, 1973 1235 hrs.	
	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)	Temp. (°C)	Dissolved oxygen (mg/l)
0	18.0	5.3	16.5	7.2	22.5	5.9	23.5	6.3	29.5	5.7	29.5	4.7
5	18.0	3.4	16.5	3.0	22.0	1.6	23.5	5.7	29.5	5.6	29.0	5.3
10	18.0	2.6	16.0	1.4	22.0	1.1	23.5	5.3	29.0	5.3	29.0	4.7
15	17.5	2.2	16.0	1.1	22.0	1.0	23.5	5.2	29.0	5.4	29.0	4.5
20	17.5	2.1	16.0	1.0	21.5	1.0	23.5	5.1	29.0	5.1	29.0	3.8
25	17.5	2.1	16.0	.9	21.5	1.4	23.5	5.1	28.5	3.6	28.5	3.6
30	17.5	2.2	16.0	1.0	21.0	1.0	[b]23.5	[b]5.0	28.0	2.8	28.5	3.2

a Depth, 32.0 feet.
b Depth, 29.0 feet.

Table 29.--Chemical analyses of water
(Milligrams per litre

Location	Date	Time	Depth (feet)	Temperature (°C)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)
At S-65	8-29-72	0800	14.0	27.5	4.5	7.3	3.4	12	1.4	20	9.6	19	0.2
	2-27-73	0800	15.0	15.0	2.0	7.5	3.3	12	1.2	23	11.0	20	.6
Below S-65	2-28-72	0840	28.5	18.0	5.0	17	3.2	12	1.5	37	14	20	.2
	8-29-72	0850	28.0	29.5	3.7	9.1	3.3	12	1.4	24	9.6	18	.5
	2-27-73	0850	25.0	15.5	2.0	7.6	3.3	12	1.2	20	11	19	.5
Meander above S-65A (west side)	8-29-72	0935	5.0	28.5	6.6	-	-	-	-	54	-	-	-
	2-27-73	0945	-	16.5	2.8	-	-	-	-	25	-	-	-
At S-65A	8-30-71	0900	25.0	29.0	5.7	18	2.9	8.2	.8	45	7.2	14	.1
	2-28-72	0935	24.0	20.0	4.8	18	3.3	13	1.3	44	13	22	.2
	5-24-72	0845	24.0	26.0	2.4	9.2	3.2	11	1.2	24	12	18	.3
	8-29-72	0955	23.0	28.0	3.6	11	3.9	13	1.6	32	9.6	21	.3
	2-27-73	1000	23.0	15.5	1.9	8.6	3.3	12	1.2	26	11	20	.3
Below S-65A	8-30-71	1015	26.0	29.0	5.7	18	2.9	8.0	.8	52	.4	14	.1
	2-28-72	1035	25.0	19.5	5.0	19	3.3	13	1.3	36	13	22	.2
	8-29-72	1030	25.0	29.0	3.2	10	3.2	11	1.2	32	9.6	17	.2
	2-27-73	1050	25.0	15.5	2.0	7.9	3.2	12	1.2	25	11	20	.3
Meander below S-65A (east side)	5-24-72	1015	2.0	25.0	4.3	13	2.6	9.5	.6	37	8.0	15	.4
	8-29-72	1100	3.5	27.0	3.3	-	-	-	-	42	-	-	-
	2-27-73	1115	-	15.5	1.2	-	-	-	-	20	-	-	-
Meander above S-65B (west side)	5-24-72	1105	6.0	27.0	26	14	3.3	12	1.3	44	13	19	.3
	8-29-72	1120	8.0	29.5	3.3	-	-	-	-	48	-	-	-
	2-27-73	1135	-	17.0	2.1	-	-	-	-	30	-	-	-
At S-65B	8-30-71	1110	19.5	30.0	5.1	22	3.0	8.9	.8	-	3.6	15	.1
	2-28-72	1115	20.0	21.0	4.1	25	3.1	12	1.4	69	14	20	.2
	5-24-72	1145	20.0	27.0	2.5	11	3.0	11	1.2	32	11	18	.3
	8-29-72	1140	19.0	30.0	3.6	13	3.0	10	1.1	40	11	15	.2
	2-27-73	1145	20.0	16.5	2.1	9.8	3.3	12	1.1	29	11	19	.3
Below S-65B	8-30-71	1150	30.5	30.0	5.2	24	3.3	9.3	1.1	71	4.0	16	.3
	2-28-72	1200	35.0	19.0	4.7	27	3.1	11	1.2	75	14	20	.2
	8-29-72	1210	39.0	30.0	3.5	13	3.0	10	1.1	44	11	16	.2
	2-27-73	1230	38.0	16.0	2.1	9.0	3.2	12	1.1	28	11	19	.3
Meander above S-65C (west side)	8-29-72	1245	6.5	35.0	3.3	-	-	-	-	47	-	-	-
	2-27-73	1300	-	17.0	2.0	-	-	-	-	28	-	-	-

in the lower Kissimmee River, Fla.
except as indicated).

Nitrate Nitrogen (NO_3-N)	Nitrite Nitrogen (NO_2-N)	Ammonia Nitrogen (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-Phosphorus (P)	Total Phosphorus (T)	Total Organic Carbon (TOC)	BOD	Dissolved Solids: Residue at 180°C	Dissolved Solids: Calculated	Hardness as $CaCO_3$: Calcium Magnesium	Hardness as $CaCO_3$: Non-Carbonate	Specific Cond. micromhos at 25°C	pH	Color (unit)	Turbidity (JTU)	Secchi Disk (inches)	Dissolved Oxygen
-	-	-	-	-	-	-	12	0.5	92	70	32	13	130	6.6	30	-	52	8.0
0.50	0.00	0.10	2.2	2.80	0.01	0.02	13	2.7	97	70	32	16	120	7.0	40	35	40	6.4
.30	.01	.13	3.0	3.44	.02	.04	-	1.1	131	98	56	16	180	6.0	90	4	36	8.6
.00	.00	.19	1.2	1.40	.01	.02	17	1.0	88	73	36	12	135	6.8	45	4	69	7.7
.00	.00	.03	1.2	1.23	.01	.01	12	3.2	94	68	33	15	105	6.7	40	6	42	8.5
.00	.00	.05	1.3	1.36	.01	.04	-	-	-	-	-	-	190	6.6	-	5	58	5.5
.00	.00	.02	1.0	1.02	.00	.01	-	-	-	-	-	-	124	6.7	-	5	40	6.6
.00	.01	.35	1.5	1.86	.05	.06	26	3.4	127	85	57	11	153	6.6	160	5	-	3.2
.30	.01	.08	1.6	1.99	.02	.03	18	1.2	134	102	59	18	180	6.7	120	5	45	8.5
.00	.00	.02	1.0	1.02	.00	.02	18	1.7	82	70	37	17	133	7.0	90	3	48	6.1
.00	.00	.10	.94	1.04	.00	.02	14	1.4	110	84	44	11	160	6.4	45	3	65	4.3
.00	.00	.02	1.0	1.02	.01	.01	14	2.7	97	70	35	17	105	7.5	40	9	40	9.6
.00	.02	.33	1.8	2.15	.08	.09	27	2.9	127	83	57	0	153	6.7	200	6	-	1.7
.30	.01	.08	1.2	1.59	.02	.03	17	1.1	127	105	62	17	185	6.0	100	3	41	8.1
.00	.01	.12	.92	1.05	.01	.02	15	1.4	106	73	39	11	130	6.6	60	3	60	3.7
.20	.00	.03	.91	1.14	.01	.01	14	3.2	96	70	32	12	112	7.4	45	7	38	9.1
.00	.01	.04	1.4	1.45	.03	.04	19	1.6	82	72	43	13	125	6.8	20	1	24	2.5
.00	.01	.07	1.9	1.98	.01	.02	-	-	-	-	-	-	80	6.2	-	3	38	4.8
.00	.00	.03	1.0	1.03	.01	.01	-	-	-	-	-	-	112	7.4	-	3	68	6.9
.00	.05	.04	1.1	1.19	.01	.04	15	1.5	101	88	49	13	162	7.1	90	2	48	6.6
.00	.01	.04	1.2	1.25	.00	.03	-	-	-	-	-	-	152	6.7	-	3	60	6.4
.00	.00	.02	1.0	1.02	.01	.01	-	-	-	-	-	-	142	7.6	-	5	46	8.9
.02	.02	.09	1.6	1.73	.02	.03	27	2.5	144	95	68	8	183	6.8	160	5	-	4.5
.20	.01	.11	1.8	2.12	.02	.03	19	1.4	150	116	76	18	210	7.0	120	3	45	7.9
.00	.01	.06	.98	1.05	.01	.03	24	1.3	96	72	40	16	136	6.5	100	2	47	5.1
.00	.01	.08	.84	.93	.01	.03	16	1.5	105	77	46	13	140	6.6	60	3	60	5.8
.00	.00	.02	1.4	1.42	.01	.01	13	3.6	97	72	38	17	134	7.6	45	7	48	9.9
.04	.02	.16	1.9	2.12	.04	.05	28	3.5	152	101	74	12	198	7.1	160	6	-	4.8
.20	.01	.06	.93	1.20	.02	.03	-	1.0	153	120	81	18	215	7.2	120	5	38	7.7
.00	.01	.08	.86	.95	.02	.03	16	1.6	109	78	46	13	140	6.6	70	3	60	4.7
.00	.00	.03	1.1	1.13	.01	.01	13	2.3	97	70	36	16	133	7.4	45	8	33	10.5
.00	.01	.06	1.2	1.27	.01	.04	-	-	-	-	-	-	158	6.6	-	3	52	3.4
.00	.00	.01	.95	.96	.00	.00	-	-	-	-	-	-	140	7.7	-	7	48	5.5

Table 29.--Chemical analyses of water
(Milligrams per litre

Location	Date	Time	Depth (feet)	Temperature (°C)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)
At S-65C	8-30-71	1250	25.0	30.0	5.4	32	3.9	10	1.2	79	10	18	0.1
	2-28-72	1305	25.0	23.0	4.1	27	3.1	10	1.0	73	15	16	.2
	5-24-72	1330	25.0	27.0	2.1	12	3.6	12	1.7	40	13	20	.3
	8-29-72	1300	23.5	33.5	3.5	13	3.1	11	1.2	46	13	14	.2
	2-27-73	1315	25.0	17.0	2.1	9.5	3.2	12	1.1	30	11	20	.4
Below S-65C	8-30-71	1350	33.0	30.5	6.0	25	3.7	10	1.2	80	13	18	.1
	2-28-72	1350	32.5	21.5	4.6	29	3.2	10	1.1	82	16	16	.2
	8-29-72	1345	35.0	33.0	4.0	14	3.1	11	1.2	41	13	17	.2
	2-27-73	1400	30.0	16.5	2.1	9.4	3.2	12	1.1	29	11	19	.3
Meander below S-65C (west side)	5-24-72	1430	6.0	29.0	4.2	24	3.6	12	1.3	72	14	21	.3
	8-29-72	1420	4.0	34.5	2.6	-	-	-	-	34	-	-	-
	2-27-73	1425	-	17.5	2.7	-	-	-	-	32	-	-	-
At S-65D	8-30-71	1440	25.0	29.0	5.5	17	3.1	10	.8	50	9.0	16	.3
	2-28-72	1430	26.0	24.0	5.0	30	4.1	12	2.2	78	22	20	.2
	5-24-72	1515	23.0	28.0	2.3	15	3.6	13	1.5	48	14	20	.4
	8-29-72	1445	23.0	35.0	4.0	13	3.1	11	1.2	39	12	17	.2
	2-27-73	1445	24.0	17.0	2.1	10	3.2	12	1.3	30	12	20	.3
Below S-65D	8-30-71	1530	33.0	28.5	5.6	17	3.0	9.3	1.1	50	6.8	17	.6
	2-28-72	1525	33.0	21.5	6.2	32	3.9	11	1.8	81	26	20	.2
	8-29-72	1515	34.0	32.5	4.2	13	3.1	11	1.2	37	13	18	.2
	2-27-73	1520	38.0	16.5	2.1	10	3.2	12	1.1	29	12	20	.4
Meander below S-65D (east side)	8-29-72	1545	3.5	40.0	3.7	-	-	-	-	36	-	-	-
	2-27-73	1545	-	17.5	2.1	-	-	-	-	30	-	-	-
Meander below S-65D (west side)	2-27-73	1600	-	-	2.1	-	-	-	-	-	-	-	-
Maple River above S-65E	2-27-73	1615	-	17.5	2.3	-	-	-	-	45	-	-	-
At S-65E	8-30-71	1600	28.0	28.5	6.4	18	3.1	11	1.7	49	14	18	.2
	2-28-72	1600	28.5	23.0	7.3	32	4.4	13	1.8	78	29	23	.2
	5-24-72	1620	29.5	28.0	2.6	20	3.7	13	1.4	58	18	22	.4
	8-29-72	1600	29.0	36.0	4.1	13	3.2	11	1.2	38	15	18	.2
	2-27-73	1625	28.0	16.5	2.1	9.7	3.2	13	1.2	31	12	21	.3
Below S-65E	8-29-72	1645	27.0	35.0	4.2	13	3.3	11	1.2	38	15	17	.2
	2-27-73	1645	30.0	15.5	2.1	10	3.3	13	1.3	32	14	21	.3

except as indicated).

Nitrate Nitrogen (NO_3-N)	Nitrite Nitrogen (NO_2-N)	Ammonia Nitrogen (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-Phosphorus (P)	Total Phosphorus (P)	Total Organic Carbon (TOC)	BOD	Dissolved Solids: Residue at 180°C	Dissolved Solids: Calculated	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Non-Carbonate	Specific Cond. micromhos at 25°C	pH	Color (unit)	Turbidity (JTU)	Secchi Disk (inches)	Dissolved Oxygen
0.16	0.02	0.10	2.1	2.38	0.05	0.05	25	2.0	174	127	96	22	230	7.0	160	5	-	2.0
.20	.01	.07	.69	.97	.02	.03	18	.9	149	115	81	19	210	7.2	120	4	44	8.8
.00	.00	.04	.84	.88	.01	.02	15	1.3	97	84	45	14	160	7.2	45	4	72	7.5
.00	.01	.03	.85	.89	.02	.03	14	1.8	107	79	46	13	140	7.0	60	2	54	6.3
.01	.00	.04	.88	.93	.01	.01	12	2.3	102	73	37	14	138	7.5	45	10	44	7.0
.14	.02	.12	1.7	1.98	.06	.07	24	2.9	166	118	78	11	215	7.1	120	5	-	4.3
.20	.01	.04	.93	1.18	.06	.06	-	.7	158	112	86	17	220	7.4	120	5	35	7.9
.00	.01	.06	.86	.93	.06	.09	16	.7	112	84	49	16	150	6.7	70	3	62	4.0
.00	.00	.04	1.0	1.04	.01	.01	12	2.5	102	70	37	17	135	7.4	45	5	38	8.2
.00	.01	.04	1.0	1.05	.07	.07	17	1.3	140	120	76	17	213	7.2	90	2	60	6.4
.00	.01	.09	.96	1.06	.04	.08	-	-	-	-	-	-	150	6.6	-	3	52	5.6
.00	.00	.04	1.1	1.14	.01	.02	-	-	-	-	-	-	160	7.5	-	4	50	2.4
.02	.01	.08	1.8	1.91	.10	.11	23	2.1	126	89	56	12	166	6.7	140	3	-	2.6
.20	.01	.13	1.2	1.54	.04	.04	17	1.6	153	137	93	24	240	7.1	90	5	38	8.9
.00	.00	.06	.87	.93	.01	.03	15	1.3	112	92	53	16	178	7.4	50		55	7.9
.00	.01	.03	1.0	1.04	.02	.06	16	2.6	103	82	46	13	145	6.9	80	3	42	8.3
.00	.00	.02	1.1	1.12	.01	.01	11	2.9	106	75	38	15	150	7.4	50	6	45	6.3
.05	.01	.13	1.3	1.48	.09	.10	32	2.5	128	86	55	14	163	6.8	160	4	-	2.9
.30	.01	.56	-	-	.06	.06	-	1.3	167	143	97	30	250	7.5	100	5	44	8.3
.00	.01	.06	1.1	1.17	.02	.06	17	1.4	108	82	46	17	145	6.6	100	3	55	5.3
.00	.00	.01	1.0	1.01	.01	.02	10	3.7	100	74	38	17	146	7.4	50	7	48	6.4
.00	.01	.04	1.1	1.15	.02	.06	-	-	-	-	-	-	170	6.7	-	3	46	5.9
.00	.00	.02	1.1	1.12	.01	.02	-	-	-	-	-	-	145	7.3	-	10	36	4.6
.00	.00	.02	1.0	1.02	.01	.03	-	-	-	-	-	-	160	6.8	-	4	-	-
.00	.00	.03	.88	.91	.01	.02	-	-	-	-	-	-	258	7.7	-	6	44	6.5
.07	.02	.15	2.9	3.15	-	.26	24	3.4	132	98	59	18	168	6.8	120	4	-	2.2
.30	.01	.12	1.2	1.63	.05	.06	19	1.1	189	151	99	34	265	7.5	120	5	44	9.2
.03	.01	.04	.90	.98	.02	.04	14	-	140	110	66	17	210	7.2	55	2	60	7.7
.05	.01	.06	1.2	1.32	.02	.06	15	.9	108	84	46	17	150	6.7	80	3	38	6.2
.00	.00	.03	.83	.86	.01	.02	12	2.3	100	77	38	13	165	7.3	50	7	40	6.8
.06	.01	.08	1.1	1.25	.03	.06	-	.0	115	83	47	17	150	6.5	80	3	45	3.1
.00	.00	.01	1.0	1.01	.01	.02	11	2.5	110	80	39	14	160	7.4	50	7	42	7.2

Table 30.--Concentration of trace elements in the lower Kissimmee River. (All determinations, except arsenic, were made on filtered samples)

(micrograms per litre)

Location	Date	Time	Aluminum (Al)	Arsenic (As)	Cadmium (Cd)	Hexavalent Chromium (Cr^{+6})	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Nickel (Ni)	Strontium (Sr)	Zinc (Zn)
Above S-65	8-29-72	0800	20	10	0	0	10	240	1	0	0	200	20
	2-27-73	0800	10	10	-	0	0	210	1	10	0	140	10
Below S-65	2-28-72	0840	-	20	0	0	30	360	7	0	-	130	40
	8-29-72	0850	20	10	0	0	0	340	3	20	0	200	20
	2-27-73	0850	20	10	-	0	0	40	0	0	0	140	0
Above S-65A	8-30-71	0900	-	0	0	0	10	550	3	-	-	170	20
	2-28-72	0935	-	20	0	0	40	320	0	10	-	290	30
	8-29-72	0955	20	10	0	0	10	80	2	10	0	360	10
	2-27-73	1000	10	10	-	0	0	20	0	0	0	140	10
Below S-65A	8-30-71	1015	-	10	0	0	30	540	2	-	-	150	20
	2-28-72	1035	-	20	0	0	30	380	0	0	-	300	30
	8-29-72	1030	30	10	0	0	0	130	4	10	0	260	10
	2-27-73	1050	20	10	-	0	0	60	1	10	0	140	0
Above S-65B	8-30-71	1110	-	0	0	0	20	350	2	-	-	170	20
	2-28-72	1115	-	10	0	0	30	300	2	0	-	250	30
	8-29-72	1140	20	10	0	0	0	100	5	10	0	260	10
	2-27-73	1145	20	10	-	0	0	40	1	0	0	140	0
Below S-65B	8-30-71	1150	-	10	0	0	10	360	2	-	-	160	20
	2-28-72	1200	-	20	0	0	30	310	0	10	-	260	20
	8-29-72	1210	20	20	0	0	0	120	3	10	0	220	10
	2-27-73	1230	10	10	-	0	0	60	0	10	0	120	0

Table 30.--**Concentration of trace elements in the** lower Kissimmee River. (All determinations, except arsenic, were made on filtered samples)--continued

(**micrograms per** litre)

Location	Date	Time	Aluminum (Al)	Arsenic (As)	Cadmium (Cd)	Hexavalent Chromium (Cr^{+6})	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Nickel (Ni)	Strontium (Sr)	Zinc (Zn)
Above S-65C	8-30-71	1250	-	10	0	0	10	290	2	-	-	220	20
	2-28-72	1305	-	20	0	0	30	290	1	10	-	250	70
	8-29-72	1300	20	10	0	0	0	140	5	10	0	220	40
	2-27-73	1315	20	10	-	0	10	20	0	10	0	150	0
Below S-65C	8-30-71	1350	-	20	0	0	20	290	2	-	-	200	20
	2-28-72	1350	-	10	0	0	30	250	0	10	-	270	20
	8-29-72	1345	20	10	0	0	10	160	0	10	0	280	20
	2-27-73	1400	20	10	-	0	10	40	0	10	0	160	0
Above S-65D	8-30-71	1440	-	10	0	0	30	460	2	-	-	210	30
	2-28-72	1430	-	20	0	0	30	280	1	0	-	350	20
	8-29-72	1445	20	20	0	0	0	240	1	10	0	300	10
	2-27-73	1445	20	10	-	0	0	60	0	10	0	160	0
Below S-65D	8-30-71	1530	-	0	0	0	10	350	2	-	-	190	40
	2-28-72	1525	-	10	0	0	20	330	0	10	-	330	20
	8-29-72	1515	20	20	0	0	0	240	0	10	0	300	10
	2-27-73	1520	20	10	-	0	0	80	0	10	0	160	0
Above S-65E	8-30-71	1600	-	10	1	1	20	440	2	30	-	500	30
	2-28-72	1600	-	20	0	0	30	350	0	0	-	430	20
	8-29-72	1600	30	20	0	0	0	340	1	20	0	300	10
	2-27-73	1625	20	10	-	0	10	60	1	10	0	160	50
Below S-65E	8-29-72	1645	20	20	0	0	0	310	0	10	0	300	10
	2-27-73	1645	20	7	-	0	0	60	1	0	0	180	0

Table 31.--Pesticide analyses of water in the lower Kissimmee River.
(micrograms per litre)

Location	Date	Time	Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Lindane	Chlordane Estimate	2,4-D	2,4,5,-T	Silvex
Above S-65	8-29-72	0800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.25	0.00	0.00
	2-27-73	0800	.00	.00	.00	.00	.00	.00	.00	.00	.0	.02	.00	.00
Below S-65	2-28-72	0840	.00	.00	.00	.00	.00	.00	.00	.00	.0	.02	.00	.01
	8-29-72	0850	.00	.00	.00	.00	.00	.00	.00	.00	.0	.14	.00	.00
	2-27-73	0850	.00	.00	.00	.00	.00	.00	.00	.00	.0	.00	.00	.00
Above S-65A	8-30-71	0900	.00	.00	.00	.00	.00	.00	.00	.00	-	.06	.00	.00
	2-28-72	0935	.00	.00	.00	.00	.00	.00	.00	.00	.0	.00	.00	.01
	8-29-72	0955	.00	.00	.00	.00	.00	.00	.00	.00	.0	.06	.00	.13
	2-27-73	1000	.00	.00	.00	.00	.00	.00	.00	.00	.0	.00	.00	.00
Below S-65A	8-30-71	1015	.00	.00	.00	.00	.00	.00	.00	.00	-	.04	.00	.00
	2-28-72	1035	.00	.00	.00	.00	.00	.00	.00	.00	.0	.00	.00	.00
	8-29-72	1030	.00	.00	.00	.00	.00	.00	.00	.00	.0	.05	.00	6.0
	2-27-73	1050	.00	.00	.00	.00	.00	00	.00	.00	.0	.00	.00	.00
Above S-65B	8-30-71	1110	.00	.00	.00	.00	.00	.00	.00	.00	-	.02	.00	.00
	2-28-72	1115	.00	.00	.00	.00	.00	.00	.00	.00	.0	.01	.00	.03
	8-29-72	1140	.00	.00	.00	.00	.00	.00	.00	.00	.0	.05	.00	.00
	2-27-73	1145	.00	.00	.00	.00	.00	.00	.00	.00	.0	.13	.00	.00
Below S-65B	8-30-71	1150	.00	.00	.00	.00	.00	.00	.00	.00	-	.02	.00	.00
	2-28-72	1200	.00	.00	.00	.00	.00	.00	.00	.00	.0	.01	.00	.00
	8-29-72	1210	.00	.00	.00	.00	.00	.00	.00	.00	.0	.05	.00	.00
	2-27-73	1230	.00	.00	.00	.00	.00	.00	.00	.00	.0	.09	.00	.00

Table 31.--Pesticide analyses of water in the lower Kissimmee River. (continued)
(micrograms per litre)

Location	Date	Time	Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Lindane	Chlordane Estimate	2,4-D	2,4,5,-T	Silvex
Above S-65C	8-30-71	1250	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.01	0.00	0.00
	2-28-72	1305	.00	.00	.00	.00	.00	.00	.00	.00	0.0	.05	.00	.00
	8-29-72	1300	.00	.00	.00	.00	.00	.00	.00	.00	.0	-	-	-
	2-27-73	1315	.00	.00	.00	.00	.00	.00	.00	.00	.0	.47	.00	.00
Below S-65C	8-30-71	1350	.00	.00	.00	.00	.00	.00	.00	.00	-	.03	.00	.00
	2-28-72	1350	.00	.00	.00	.00	.00	.00	.00	.00	.0	.00	.00	.00
	8-29-72	1345	.00	.00	.00	.00	.00	.00	.00	.00	.0	.03	.00	.00
	2-27-73	1400	.00	.00	.00	.00	.00	.00	.00	.00	.0	.41	.00	.00
Above S-65D	8-30-71	1440	-	-	-	-	-	-	-	-	-	.00	.00	.00
	2-28-72	1430	.00	.00	.00	.00	.00	.00	.00	.00	.0	.00	.00	.00
	8-29-72	1445	.00	.00	.00	.00	.00	.00	.00	.00	.0	.06	.00	.01
	2-27-73	1445	.00	.00	.00	.00	.00	.00	.00	.00	.0	.21	.00	.00
Below S-65D	8-30-71	1530	.00	.00	.00	.00	.00	.00	.00	.00	-	.01	.00	.00
	2-28-72	1525	-	-	-	-	-	-	-	-	-	.01	.00	.00
	8-29-72	1515	.00	.00	.00	.00	.00	.00	.00	.00	.0	.06	.00	.01
	2-27-73	1520	.00	.00	.00	.00	.00	.00	.00	.00	.0	.12	.00	.00
Above S-65E	8-30-71	1600	.00	.00	.00	.00	.00	.00	.00	.00	-	.00	.00	.00
	2-28-72	1600	-	-	-	-	-	-	-	-	-	-	-	-
	8-29-72	1600	.00	.00	.00	.00	.00	.00	.00	.00	.0	.06	.00	.01
	2-27-73	1625	.00	.00	.00	.00	.00	.00	.00	.00	.0	.41	.00	.00
Below S-65E	8-29-72	1645	.00	.00	.00	.00	.00	.00	.00	.00	.0	.06	.00	.02
	2-27-73	1645	.00	.00	.00	.00	.00	.00	.00	.00	.0	.20	.00	.00

Table 32.--Chemical analyses of bottom material in the lower Kissimmee River.

(percent of air dried weight)

Location	Date	Time	Total Organic Carbon	Biochemical Oxygen Demand	Phosphorus as P			Nitrogen as N			
					Inorganic	Organic	Total	Ammonia	Nitrate	Organic	Total
Above S-65	8-29-72	0800	2.34[1]	0.02	0.085[1]	0.001[1]	0.086[1]	0.021[1]	0.000[1]	0.067[1]	0.088[1]
	2-27-73	0800	20.00[1]	.01	.120[1]	.001[1]	.121[1]	.280[1]	.004[1]	2.500[1]	2.784[1]
Above S-65A	8-30-71	0900	.74	.08	-	-	.005	.116	-	.015	.131
	2-28-72	0935	1.61	.23	-	-	.000	.009	-	.500	.509
	8-29-72	0955	4.57[1]	.07	.007[1]	.110[1]	.117[1]	.055[1]	.001[1]	.357[1]	.413[1]
	2-27-73	1000	6.00[1]	.04	.108[1]	.006[1]	.114[1]	.041[1]	.000[1]	.470[1]	.511[1]
Above S-65B	8-30-71	1110	.98	.01	-	-	.008	.071	-	.000	.071
	2-28-72	1115	2.16	.16	-	-	.000	.030	-	.590	.620
	8-29-72	1140	1.36[1]	.02	.140[1]	.000[1]	.140[1]	.020[1]	.000[1]	.081[1]	.101[1]
	2-27-73	1145	1.80[1]	.03	.126[1]	.014[1]	.140[1]	.019[1]	.000[1]	.160[1]	.179[1]
Above S-65C	8-30-71	1250	1.72	.02	-	-	.011	.008	-	.000	.008
	2-28-72	1305	1.94	.28	-	-	.001	.003	-	.031	.034
	8-29-72	1300	1.66[1]	.02	-	-	.259[1]	.018[1]	.000[1]	.185[1]	.203[1]
	2-27-73	1315	1.70[1]	.06	.249[1]	.003[1]	.252[1]	.012[1]	.000[1]	.160[1]	.172[1]
Above S-65D	8-30-71	1440	2.66	.03	-	-	.020	.076	-	.010	.086
	2-28-72	1430	2.91	.39	-	-	.000	.019	-	.290	.309
	8-29-72	1445	2.92[1]	.02	.221[1]	.011[1]	.232[1]	.013[1]	.000[1]	.117[1]	.130[1]
	2-27-73	1445	2.70[1]	.07	.225[1]	.004[1]	.229[1]	.024[1]	.001[1]	.350[1]	.374[1]
Above S-65E	8-30-71	1600	4.16	.02	-	-	.002	.093	-	.019	.112
	2-28-72	1600	4.57	.34	-	-	.003	.013	-	.035	.048
	8-29-72	1600	3.73[1]	.02	.152[1]	.008[1]	.160[1]	.032[1]	.001[1]	.156[1]	.189[1]
	2-27-73	1625	3.80[1]	.04	.240[1]	.007[1]	.247[1]	.038[1]	.000[1]	.400[1]	.438[1]

[1] Analyzed by a different laboratory and reported as percent of oven dried weight.

Table 33.--Insecticide analyses of bottom material in the lower Kissimmee River.

(micrograms per kilogram)

Location	Date	Time	Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Lindane	Chlordane Estimate
Above S-65	8-29-72	0800	0.0	7.5	14	0.0	0.0	0.0	0.0	0.0	0
	2-27-73	0800	.0	.1	2.8	.0	.0	.0	.0	.0	3
Above S-65A	8-30-71	0900	.0	.1	.0	.0	.0	.0	.0	.0	-
	2-28-72	0935	.0	1.8	.8	.0	.0	.0	.0	.0	0
	8-29-72	0955	.0	1.5	1.8	.0	.0	.0	.0	.0	0
	2-27-73	1000	.0	2.0	1.5	.0	.0	.0	.0	.0	13
Above S-65B	8-30-71	1110	.0	.1	.0	.0	.0	.0	.0	.0	-
	2-28-72	1115	.0	.2	.1	.0	.0	.0	.0	.0	0
	8-29-72	1140	.0	.0	.0	.0	.0	.0	.0	.0	0
	2-27-73	1145	.0	.8	.4	1.2	.1	.0	.0	.0	0
Above S-65C	8-30-71	1250	.0	.5	.2	.0	.0	.0	.0	.0	-
	2-28-72	1305	.0	.3	.5	.0	.0	.0	.0	.0	0
	8-29-72	1300	.0	.0	.0	.0	.0	.0	.0	.0	0
	2-27-73	1315	.0	.0	.0	.0	.0	.0	.0	.0	0
Above S-65D	8-30-71	1440	.0	.3	.0	.0	.0	.0	.0	.0	-
	2-28-72	1430	.0	3.7	.7	.0	.0	.0	.0	.0	0
	8-29-72	1445	.0	.2	.0	.0	.0	.0	.0	.0	0
	2-27-73	1445	.0	.0	.0	.0	.0	.0	.0	.0	0
Above S-65E	8-30-71	1600	.0	2.8	1.4	.0	.0	.0	.0	.0	-
	2-28-72	1600	.0	5.5	2.0	.0	.0	.0	.0	.0	0
	8-29-72	1600	.0	1.3	1.4	.0	.0	.0	.0	.0	0
	2-27-73	1625	.0	1.2	.2	.0	.4	.0	.0	.0	0

Table 34.--Vertical profiles of nutrients in the Kissimmee River above S-65.

Depth below water surface (ft)	Temp. (°C)	Dissolved Oxygen (mg/1)	Nutrients (mg/1)						
			Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-Phosphorus (P)	Total Phosphorus (P)
May 25, 1972									
1.0	28.0	7.2	0.00	0.01	0.01	1.2	1.2	0.00	0.02
12.0	25.5	6.7	.00	.01	.04	14	14	.01	.02
August 29, 1972									
0	27.5	8.0	0.00	0.00	0.01	0.93	0.94	0.01	0.03
5.0	28.0	8.0	.00	.00	.01	1.4	1.4	.01	.03
10.0	28.0	7.7	.00	.00	.00	.94	.94	.01	.03
14.0	27.5	6.3	.00	.01	.11	6.0	6.1	.02	.05
February 27, 1973									
0	15.0	6.4	0.00	0.00	0.03	1.4	1.4	0.01	0.01
5.0	15.0	2.2	.00	.00	.03	1.3	1.3	.01	.01
10.0	15.0	1.7	.00	.00	.03	1.9	1.9	.01	.01
15.0	15.0	1.3	.00	.00	.04	2.4	2.4	.01	.01

Table 35.--Vertical profiles of nutrients in the Kissimmee River above S-65A.

Depth below water surface (ft)	Temp. (°C)	Dissolved Oxygen (mg/1)	Nutrients (mg/1)						
			Nitrate (NO_3-N)	Nitrite (NO2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-Phosphorus (P)	Total Phosphorus (P)
May 25, 1972									
1.0	26.0	6.1	0.00	0.00	0.01	0.93	0.94	0.00	0.02
12.0	26.0	5.8	.00	.00	.01	1.1	1.1	.00	.02
23.0	25.0	3.8	.00	.01	.08	1.1	1.2	.02	.04
August 29, 1972									
0	28.0	4.3	0.00	0.00	0.12	2.0	2.1	0.01	0.02
5.0	28.0	3.9	.00	.00	.11	.83	.94	.00	.02
10.0	28.0	3.6	.00	.00	.12	.76	.91	.01	.02
15.0	28.0	3.5	.00	.00	.11	.93	1.0	.00	.02
20.0	28.0	3.7	.00	.00	.10	.94	1.0	.02	.02
23.0	28.0	3.7	.00	.01	.12	1.7	1.9	.02	.03
February 27, 1973									
0	15.5	9.6	0.00	0.00	0.03	1.5	1.5	0.01	0.01
5.0	15.0	3.6	.00	.00	.03	2.2	2.2	.01	.01
10.0	15.0	1.6	.00	.00	.03	1.5	1.5	.01	.01
15.0	15.0	1.4	.00	.00	.02	1.1	1.1	.01	.01
20.0	15.0	1.2	.09	.01	.01	1.0	1.1	.00	.00

Table 36.--Vertical profiles of nutrients in the Kissimmee River above S-65B.

Depth below water surface (ft)	Temp. (°C)	Dissolved Oxygen (mg/l)	Nutrients (mg/l) Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-Phosphorus (P)	Total Phosphorus (P)
			May 25, 1972						
1.0	27.0	5.1	0.00	0.01	0.06	0.98	1.0	0.01	0.03
10.0	26.0	4.7	.00	.01	.05	.89	.95	.01	.03
19.0	25.5	4.5	.00	.01	.07	.97	1.0	.02	.03
			August 29, 1972						
0	30.0	5.8	0.00	0.01	0.06	0.98	1.0	0.02	0.03
5.0	29.5	5.0	.00	.01	.09	1.6	1.7	.02	.03
10.0	29.0	4.0	.00	.01	.07	.97	1.0	.01	.02
15.0	29.0	2.9	.00	.01	.10	.94	1.0	.01	.02
19.0	29.0	2.9	.00	.01	.10	1.2	1.4	.02	.03
			February 27, 1973						
0	16.5	9.9	0.70	0.01	0.04	0.86	1.6	0.01	0.01
5.0	16.0	6.4	.00	.03	.03	.88	.94	.01	.01
10.0	15.0	3.5	.00	.00	.03	1.2	1.2	.01	.01
15.0	14.5	2.3	.00	.00	.04	.85	.89	.01	.01
20.0	14.5	2.0	.00	.00	.02	1.0	1.0	.00	.00

Table 37.--Vertical profiles of nutrients in the Kissimmee River above S-65C.

Depth below water surface (ft)	Temp. (°C)	Dissolved Oxygen (mg/l)	Nutrients (mg/l)						
			Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-Phosphorus (P)	Total Phosphorus (P)
May 25, 1972									
1.0	27.0	7.5	0.00	0.00	0.02	0.92	0.96	0.01	0.03
12.5	26.5	7.3	.00	.00	.03	1.1	1.1	.01	.03
24.0	26.0	6.2	.00	.01	.03	1.1	1.1	.03	.05
August 29, 1972									
0	33.5	6.3	0.00	0.01	0.02	0.92	0.95	0.02	0.04
5.0	34.0	4.8	.00	.01	.01	.91	.93	.02	.04
10.0	33.0	3.6	.00	.01	.02	.90	.93	.02	.04
15.0	32.5	1.9	.00	.01	.03	.85	.89	.02	.04
20.0	32.0	2.1	.00	.01	.03	.91	.95	.02	.03
23.5	32.0	1.9	.00	.03	.04	.88	.95	.10	.11
February 27, 1973									
0	17.0	7.0	0.00	0.00	0.02	1.1	1.1	0.00	0.01
5.0	16.5	4.0	.00	.00	.01	.95	.96	.00	.00
10.0	16.0	2.0	.00	.00	.02	1.1	1.1	.01	.01
15.0	15.5	1.3	.00	.00	.01	1.0	1.0	.00	.00
20.0	15.0	1.2	.00	.00	.04	.91	.96	.01	.01
25.0	14.5	1.2	-	-	.28	.58	-	.01	.01

Table 38.--Vertical profiles of nutrients in the Kissimmee River above S-65D.

Depth below water surface (ft)	Temp. (°C)	Dissolved Oxygen (mg/l)	Nutrients (mg/l)						
			Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-Phosphorus (P)	Total Phosphorus (P)
May 25, 1972									
1.0	28.0	7.9	0.00	0.00	0.04	0.76	0.80	0.01	0.02
11.5	27.5	8.0	.00	.00	.03	.88	.91	.02	.03
22.0	27.0	7.7	.00	.01	.03	1.0	1.0	.02	.04
August 29, 1972									
0	35.0	8.3	0.00	0.00	0.03	1.2	1.2	0.01	0.04
5.0	34.5	7.3	.00	.00	.02	1.4	1.4	.01	.04
10.0	31.5	4.5	.00	.00	.03	1.0	1.0	.01	.04
15.0	31.0	3.3	.03	.01	.06	1.4	1.5	.02	.04
20.0	31.0	1.8	.00	.01	.05	1.2	1.3	.03	.06
23.0	31.0	1.7	.00	.02	.07	1.2	1.3	.11	.14
February 27, 1973									
0	17.0	6.3	0.00	0.00	0.03	1.3	1.3	0.01	0.02
5.0	16.5	2.3	.00	.00	.01	1.0	1.0	.01	.02
10.0	16.0	1.4	.00	.00	.03	.89	.94	.01	.02
15.0	16.0	1.2	.00	.00	.03	1.0	1.0	.01	.01
20.0	16.0	1.0	.00	.00	.02	1.3	1.3	.01	.02
23.0	16.0	1.0	.00	.00	.01	1.0	1.0	.00	.00

Table 39.--Vertical profiles of nutrients in the Kissimmee River above S-65E.

Depth below water surface (ft)	Temp. (°C)	Dissolved Oxygen (mg/1)	Nutrients (mg/1) Nitrate (NO_3-N)	Nitrite (NO_2-N)	Ammonia (NH_4-N)	Organic Nitrogen (N)	Total Nitrogen (N)	Ortho-Phosphorus (P)	Total Phosphorus (P)
			May 25, 1972						
1.0	28.0	7.7	0.04	0.00	0.02	1.0	1.1	0.02	0.04
15.0	27.0	7.0	.05	.00	.02	1.0	1.1	.02	.04
28.0	26.5	5.5	.05	.00	.03	1.2	1.3	.02	.04
			August 29, 1972						
0	36.0	6.2	0.02	0.01	0.05	1.6	1.7	0.02	0.06
5.0	36.0	5.4	.04	.01	.05	1.1	1.2	.02	.06
10.0	35.0	4.1	.04	.01	.07	.98	1.1	.02	.06
15.0	34.5	2.8	.05	.01	.09	1.2	1.4	.03	.06
20.0	34.0	2.8	.05	.01	.09	.82	.97	.03	.06
25.0	34.0	1.2	.09	.01	.14	1.1	1.3	.04	.08
29.0	34.0	.8	.08	.02	.11	1.6	1.8	.05	.09
			February 27, 1973						
0	16.5	6.8	0.00	0.00	0.01	0.85	0.87	0.01	0.02
5.0	16.5	3.2	.00	.00	.01	.71	.73	.00	.00
10.0	16.0	1.3	.00	.00	.01	1.1	1.1	.00	.01
15.0	16.0	1.0	.00	.00	.03	1.0	1.0	.01	.03
20.0	16.0	.9	.00	.00	.01	.77	.79	.00	.01
25.0	16.0	.8	.00	.00	.03	.80	.85	.00	.01

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